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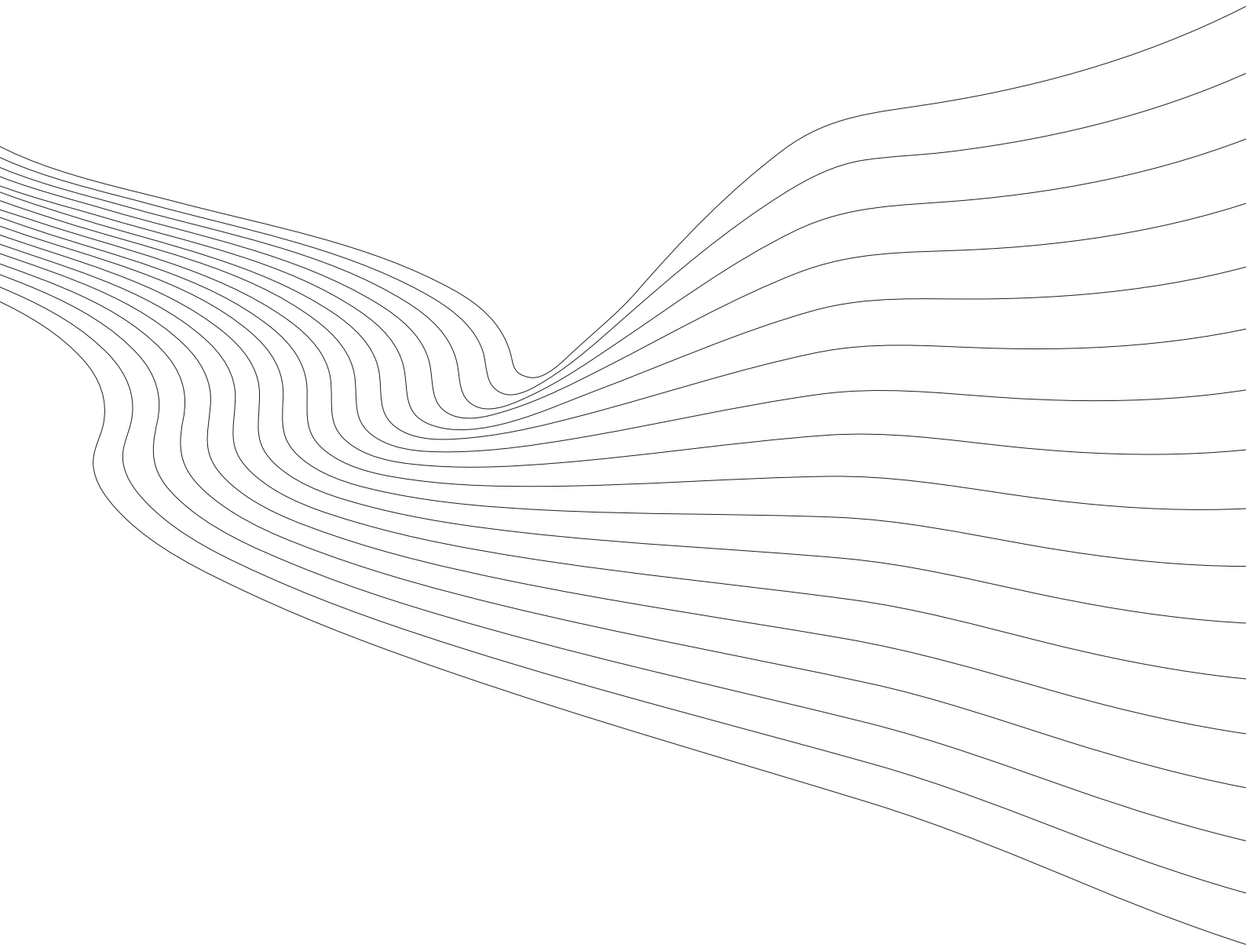

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Extreme Bounds of Democracy

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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 3 million regressions. The most robust determinants of the transition to democracy are GDP growth (a negative effect), past transitions (a positive effect), and OECD membership (a positive effect). There is 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 GDP per capita (a positive effect) and past transitions (a negative effect). There is some evidence that having a former military leader as the chief executive has a negative effect, while having other democracies as neighbors has a reinforcing effect.

JEL classification: C23; F59; O11; P16; P48
Keywords: democracy; extreme bounds analysis; regime transition

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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 1.5 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 through membership in international organizations (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). This, of course, could be endogenous or due to reverse causality (we discuss this below). 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, 2008; Jensen and Wantchekon 2004; Boix and Stokes 2003; and Boix 2003) 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 may be 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). Finally, again following the diffusion literature, having other democracies as neighbors has a reinforcing effect (consistent with Gleditsch 2002). These latter two 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 (2002), 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

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

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 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 this 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).

[2]See Przeworski et al. (2000).

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 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.[4] This finding is confirmed by Ross (2008) using a more precise measure of oil rents and a richer dataset.

Boix (2003) provides a compelling story with a game theoretic mechanism to explain the effect of natural resources.[5] 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 redistributional

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

[4]Note that the claim is a direct causal relationship between natural resources and the survival of dictatorship. This is distinct from a "Dutch disease" argument, where the presence of natural resource exports leads to an overvalued exchange rate, which hurts the development of other exports, thereby weakening the overall economic development of the country and diminishing prospects for sustainable economic growth. The latter mechanism could lead natural resources to have an indirect influence on regime transition, but this should be captured by other economic variables.

[5]See also Boix and Stokes (2003) and Rosendorff (2001) on this matter.

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 redistributional demands of the poor and may make democracy possible even in countries with relatively low levels of economic development, such as India. Asset specificity aside, if redistributional 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.[6]

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.[7] 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

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

[7]Also see Simmons and Elkins (2004), Elkins and Simmons (2005), Meseguer (2005), Gilardi (2005), and Way (2005).

Latin America.

A related story is suggested by Pevehouse (2002a,b), who argues that participation in regional international organizations with many democratic members influences both the emergence and survival of democracy. He develops an innovative mechanism by which regional diffusion may operate – participation in regional organizations provides incentives for countries to encourage democratic standards amongst the membership. Domestic elites with a preference for democracy pressure governments to enter into regional international organizations with many democratic members. They prefer other members to have democratic political institutions as well. Participation in the regional international organization provides various benefits to the country, but these benefits can be taken away if democracy is either not achieved or is subverted. Thus the incentives for establishing and maintaining democracy can change if a country participates in an organization with a highly democratic membership. Political regime may therefore be correlated with the number of democracies in a region – particularly as they participate in regional international organizations.

This stylized and brief sketch of the literature on the determinants of democracy demonstrates 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 16 panel studies on the determinants of democracy. Most of these 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,

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

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:

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

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

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 (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. Even if the vast bulk of the distribution of the parameter of interest lies to one side of zero, if the distribution has some positive and negative support, then a researcher will likely find that the estimated coefficient - plus or minus two standard deviations - changes sign in at least one regression model. Consequently, we report the percentage of the regressions in which the coefficient of the variable F is statistically different from zero at the 5% 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.[8]

[8]In 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 is not identical over all permutations. 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

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, in order not to prejudge the importance of other explanatory variables for the outcome of the EBA we choose to test all other variables by including them in the F vector and test their relevance individually. The list of all variables, their definitions, and sources is given in Table 1.[9] 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.[10] Obviously for time-invariant variables, lagging is not an issue.

As it is pervasive in the literature, we use pooled country-year data in our 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 so many studies in the literature do not use the fixed effects approach).

So, to summarize, the basic idea of the EBA is to run many regressions continuously

reports back extraordinarly 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.

[9] As 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 10 (out of 1,712) 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; television sets and telephone mainlines; globalization and telephone mainlines; globalization and television sets; European settlers 1900 and population share 16-51. Otherwise, the pairwise correlations were quite low.

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

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 1,779,457 specifications for the emergence of democracy and 1,554,172 specifications for the survival of democracy.[11]

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 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.[12] 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).

Our preference for this variable has to do with the theoretical and empirical crispness with which regime transitions are defined. Since our interest is precisely these transitional moments, this is of utmost importance. Alternative measures of democracy with many categories, for example, Polity and Freedom House, require the researcher to use arbitrary thresholds to distinguish regime types and define transitions. Since these measures conflate several features of political systems into an overall index, countries can "transition" for different reasons, thus the definition of transition lacks clarity. Moreover, the indexes

[11]The 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.

[12]Sometimes 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.

have some strange features. For example, both of them are coded so that situations of civil war are more democratic than total dictatorships because the civil war represents a form of increased political participation. In our view, entering into a civil war does not increase the democratic character of a country. Nevertheless, we acknowledge that one can generate interesting results by using alternative measures, as evidenced, for example, by Epstein et al. (2006), who suggest a trichotomous measure of democracy using the Polity Scale. We remain, however, unconvinced by the arbitrariness of the thresholds they use to define transitions. They in fact do not provide a definition of transition and merely rely of arbitrary cutoff points. While there are certainly differences amongst democracies and differences amongst dictatorships, we are interested in estimating the determinants of key transitional moments. For this, the Przeworski et al. measure is ideal.

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)

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Variable	Definition	Source	Proposed by
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)
Fuel exports	Fuel exports (% of merchandise exports)	World Bank (2006)	Ross (2001)
GDP growth, PPP	GDP growth, PPP (annual %)	World Bank (2006)	Boix and Stokes (2003); Epstein et al. (2006); Fidrmuc (2003); Li and Reuveny (2003); Muller (1995); Ross (2008)
GDP p.c., PPP	GDP per capita, PPP (current international $)	World Bank (2006)	Acemoglu et al. (2008a); Boix and Stokes (2003); Crenshaw (1995); Epstein et al. (2006); Gleditsch and Ward (2006); Muller (1995); Nieswiadomy and Strazicich (2004), Ross (2008)
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)

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Variable	Definition	Source	Proposed by
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)
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, 2008)

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Variable	Definition	Source	Proposed by
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 if exports of oil exceed 50%	Easterly and Sewadeh (2001)	Barro (1999); López-Córdova and Meissner (2008)
Oil rents, p.c. (log)	log of value of oil and gas production, minus the country-specific extraction costs, divided by the country's midyear population	Ross (2008)	Ross (2008)
OPEC member	Dummy variable for OPEC membership	OPEC (2008)	Nieswiadomy and Strazcich (2004)
Openness	Trade (% of GDP)	World Bank (2006)	Epstein et al. (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)

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Variable	Definition	Source	Proposed by
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)
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); Epstein et al. (2006); 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% 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: Results EBA – transition from autocracy to democracy (robust variables)

Variable	**Median Beta**	**Median S.E.**	**%Sig.**	**CDF(0)**	**Regres.**	**Avg. Obs.**
Base Model						
GDP p.c., PPP (log)	-0.093	0.251	12.9	0.5981	32,567	891
Extended Model						
Number of past transitions	0.516	0.165	87.4	0.9746	30,725	884
OECD member	2.374	0.972	82.3	0.9674	28,262	936
Muslim share	-1.706	0.777	68.8	0.9487	30,888	817
Fuel exports	-0.025	0.012	66.5	0.9444	30,847	540
GDP growth, PPP	-5.266	2.458	69.0	0.9442	30,910	842

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 5% 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.

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 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 result could certainly be endogenous or due to reverse causality. In principle, the OECD requires members to be democracies. Clearly, however, this has not always been the case. There 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. Now, it is possible that these countries were admitted to the OECD because democracy was on the horizon. Yet, Greece, Portugal, Spain, and Turkey were all founding members in 1961, many years before transiting to democracy; and Mexico joined in 1994 before making the electoral reforms (in 1997) that helped bring about a change in the incumbent party. The OECD espouses democracy explicitly, and members pressure one another to follow democratic values. So the incentive effect of regional international organizations described by Pevehouse (2002a,b) is also a plausible explanation for the correlation (though we note that Pevehouse himself did not focus on the OECD as it is not, strictly speaking, regional – the variable was originally proposed by Ross 2001). We thus caution readers that future case study research would be required to examine whether this correlation is driven by reverse causality or if the OECD actually has an influence in bringing about democratic transitions. For now we underscore that this is one of very few robust effects on the emergence of democracies and that it holds even if one accounts for level of economic development.

We next 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 from this finding that Islam is incompatible with democracy.[13] Turkey is a notable example. One possibility is that several Muslim countries are fuel exporters. We find the larger the

[13]As argued, e.g., by Borooah and Paldam (2007).

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 long non-democratic traditions. The finding is consistent with the resource-curse literature (e.g., Ross 2001, 2008; Jensen and Wantchekon 2004). Note that we used three alternative measures to account for fuel producing countries. Besides the two standard measures (the share of fuel in merchandise exports and a dummy for an export share above 50%) we use a newly developed oil rent variable which is defined as (log of) value of oil and gas production, minus the country-specific extraction costs, divided by the country's midyear population (see Ross 2008). 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 as the current chief executive 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).[14]

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

[14]For 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.
Base Model						
GDP p.c., PPP (log)	1.562	0.518	66.8	0.9044	32,158	991
Extended Model						
Military leader	-1.775	0.787	76.3	0.9514	22,363	826
Neighboring democracies	2.104	1.185	47.0	0.9259	27,711	819
Number of past transitions	-0.660	0.331	57.5	0.9049	29,596	1,002

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.

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 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.

Table 4: Final models – transition from autocracy to democracy

Variable	**Coefficient**	**Marginal Effect**	**Coefficient**	**Marginal Effect**
Number of past transitions	0.5542	0.0111	0.5383	0.0131
	(5.05)***	(4.10)***	(4.82)***	(4.22)***
OECD member	1.1230	0.0386	1.0909	0.0443
	(2.19)**	(1.40)	(2.12)**	(1.40)
Muslim share	-1.1606	-0.0232	-1.0022	-0.0244
	(1.91)*	(2.06)**	(1.56)	(1.64)
Fuel exports	-0.0066	-0.0001	-0.0117	-0.0003
	(0.86)	(0.87)	(0.89)	(0.91)
GDP growth	-0.0711	-0.0014	-0.0579	-0.0014
	(2.69)***	(2.70)***	(1.96)**	(1.97)**
Constant	-3.2960		-3.3072	
	(13.28)***		(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.

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% holding all our explanatory variables to their mean values.[15] 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).[16] 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.[17] 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.[18]

With neighboring democracy, the results also appear to be disappointing at first. Recall

[15]The unconditional transition probability in our sample is 2.1%.

[16]In 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.

[17]The cases are Guatemala 1982, Thailand 1991, and Sierra Leone 1997.

[18]Democracy 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.

from Table 3 that while most of the mass of the cumulative distribution function, CDF(0), is positive (0.9259), the coefficient is significant at the 5% level in only 47% 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.

Table 5: Final models – remaining a democracy

Variable	**Coefficient**	**Marginal Effect**	**Coefficient**	**Marginal Effect**
GDP p.c., PPP (log)	1.8440	0.0033	1.3239	0.0033
	(3.78)***	(1.61)*	(3.75)***	(2.10)**
Military leader	-0.8219	-0.0022		
	(1.04)	(0.65)		
Neighboring democracies	1.3768	0.0025	1.8801	0.0046
	(1.17)	(0.99)	(2.01)**	(1.60)
Number of past transitions	-0.7277	-0.0013	-0.6198	-0.0015
	(2.39)**	(1.54)	(2.67)***	(1.87)*
Constant	-9.8800		-6.3225	
	(3.07)***		(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.

Regarding marginal effects, the probability of remaining a democracy is (at the mean of our variables) 99.8%.[19] This explains why basically all marginal effects in the first specification presented in Table 5 are insignificant except for GDP per capita. Note,

[19]The unconditional survival probability in our sample is 98.2%.

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 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% to 2.21%, and significance levels of the effects of the individual variables are not affected. For the survival of democracy, the probability changes from 99.82% to 99.74%, and – again – the significance levels of the effects of the individual variables are not affected. These results are available on request.

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. Remarkably, they are distinctly different. One central variable proposed is GDP per capita. Contrary to modernization theory, we find that richer countries are not more likely to become demo-

cratic. 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 (we caution readers that causality may run in the other direction with respect to this finding, but we do find the incentive effect that international organizations may provide, as described by Pevehouse 2002a,b, to be a plausible explanation for the correlation). Having democracies as neighboring countries also 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 sup-

port 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	-0.012	0.007	57.0	0.8963	30,910	849
European settlers 1900	0.020	0.009	64.1	0.8853	30,882	835
Military expenditure	-0.368	0.188	47.2	0.8849	30,900	376
Military leader	1.036	0.459	61.3	0.8836	30,639	750
French colony	-0.785	0.520	33.1	0.8772	28,781	931
Spanish colony	1.057	0.598	52.7	0.8600	29,736	907
FDI net inflows	-0.086	0.081	38.3	0.8598	30,910	847
Spanish speaking	1.089	0.639	51.8	0.8571	29,737	907
Latin America	1.093	0.615	54.6	0.8507	29,696	848
Oil rents, p.c. (log)	-0.114	0.088	32.4	0.8450	30,477	882
Population (log)	0.176	0.131	37.4	0.8410	30,910	879
Employment in agriculture	0.026	0.020	26.1	0.8393	30,891	232
Service employment, male	-0.031	0.030	9.2	0.8226	30,842	180
Neighboring democracies	1.044	0.600	48.6	0.8204	30,899	821
Portuguese speaking	0.888	0.857	17.2	0.8114	22,715	1,085
Colony	-0.686	0.554	37.9	0.8036	29,958	842
Population share 65+	0.140	0.110	47.7	0.8029	30,911	874
Literacy	0.014	0.012	29.9	0.7965	30,912	753
Oil exporter	-0.821	0.817	26.3	0.7954	26,311	917
World democracy	2.676	1.912	44.0	0.7889	30,893	879
IO score	0.059	0.041	41.5	0.7856	30,859	763
French speaking	-0.527	0.517	13.1	0.7810	29,142	922
Settler mortality (log)	0.227	0.233	19.5	0.7753	30,832	624
Military personnel	-1.8E-06	2.0E-06	4.3	0.7747	30,909	435
Population share 0-14	-0.040	0.040	30.9	0.7642	30,910	874
IO score, change	0.107	0.101	27.1	0.7400	30,827	762
Tax revenue	0.052	0.055	15.5	0.7373	30,766	209
Bonds investment	1.4E-10	1.9E-10	8.8	0.7233	30,895	784
Socialist	-0.552	0.581	12.5	0.7093	26,998	867
Life expectancy	0.028	0.053	12.0	0.7042	30,853	259
Service employment, female	-0.013	0.022	3.9	0.7011	30,855	180
Population share 15-64	0.036	0.051	17.8	0.6941	30,911	874
Inequality	0.030	0.049	9.0	0.6798	30,815	471
Telephone mainlines	-0.003	0.005	3.6	0.6660	30,912	854
Africa	-0.326	0.529	13.4	0.6641	30,734	824

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Variable	Median Beta	Median S.E.	%Sig.	CDF(0)	Regres.	Avg. Obs.
Metal exports	0.006	0.012	3.5	0.6546	30,785	568
Land area	-7.7E-10	2.5E-09	3.6	0.6540	30,913	875
U.K. colony	-0.205	0.417	7.3	0.6292	30,807	882
Portuguese colony	0.338	1.028	3.6	0.6289	22,122	1,091
Infant mortality	-0.006	0.019	0.4	0.6117	30,734	168
Portfolio investment	-2.9E-11	9.8E-11	0.0	0.6100	30,910	724
Arable land	2.1E-09	1.4E-08	17.3	0.5995	30,913	875
OPEC member	-0.303	0.749	9.7	0.5994	26,439	983
Income taxes	0.007	0.027	4.3	0.5957	30,768	207
TV sets	-0.001	0.003	3.5	0.5939	30,912	842
Industry employment, female	-0.010	0.039	0.1	0.5859	30,859	180
Urban population	0.004	0.014	4.1	0.5822	30,913	868
Middle East	-0.171	0.594	1.8	0.5814	28,786	868
Globalization	-0.006	0.023	7.1	0.5793	30,899	719
Industry employment, male	-0.003	0.048	3.7	0.5412	30,843	180
English speaking	-0.048	0.418	2.9	0.5301	30,752	883
Inflation	-0.001	0.003	14.1	0.5163	30,892	862
Equity investment	2.9E-11	2.0E-10	4.2	0.5051	30,883	814

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	1.460	0.894	51.2	0.8867	27,957	961
Oil rents, p.c. (log)	-0.207	0.157	32.4	0.8658	30,184	958
English speaking	0.832	0.822	23.7	0.8060	28,027	1,033
Openness	0.018	0.016	34.7	0.7955	30,444	974
Telephone mainlines	0.015	0.017	0.4	0.7920	30,432	976
Muslim share	-1.393	1.198	33.0	0.7844	29,453	919
U.K. colony	0.697	0.787	13.7	0.7802	28,028	1,033
GDP growth, PPP	7.049	5.996	41.1	0.7794	29,658	965
Spanish colony	-0.814	0.810	13.5	0.7708	23,698	1,134
Bonds investment	7.2E-10	9.5E-10	0.1	0.7693	30,365	575
Population share 65+	0.267	0.323	0.3	0.7537	29,918	969
Industry employment, female	0.132	0.160	0.1	0.7473	29,198	536
Industry employment, male	0.123	0.137	0.4	0.7452	27,864	545
French colony	0.625	0.828	7.1	0.7386	20,316	1,143
Spanish speaking	-0.662	0.799	6.7	0.7352	23,698	1,134
World democracy	3.570	3.142	36.1	0.7231	29,669	999
IO score, change	0.186	0.261	0.5	0.7214	27,794	729
Inequality	-0.066	0.093	3.4	0.7197	27,407	671
Tax revenue	0.107	0.140	0.2	0.7116	23,867	304
Military expenditure	-0.200	0.291	1.2	0.7088	29,546	551
Service employment, female	0.032	0.043	0.2	0.7034	29,188	536
Infant mortality	-0.021	0.029	0.4	0.7025	25,896	390
Arable land	8.7E-09	1.4E-08	4.8	0.6948	30,489	955
Middle East	-0.650	0.957	5.7	0.6926	26,186	1,002
Inflation	0.001	0.005	19.7	0.6924	30,304	975
IO score	0.052	0.088	2.0	0.6862	29,360	713
OECD member	-0.702	1.233	3.3	0.6815	15,225	1,344
Population (log)	-0.131	0.218	3.8	0.6652	30,240	987
Urban population	0.013	0.026	5.3	0.6651	30,260	984
Fuel exports	0.020	0.029	2.4	0.6614	28,990	881
Income taxes	0.039	0.075	1.1	0.6607	24,966	293
FDI net inflows	0.129	0.169	0.2	0.6589	30,021	962
Military personnel	-4.5E-07	1.5E-06	3.2	0.6397	30,404	632
Metal exports	-0.012	0.015	11.4	0.6392	28,997	918
TV sets	0.004	0.008	0.6	0.6372	30,483	966
Globalization	0.031	0.051	0.7	0.6359	30,438	925
French speaking	-0.281	0.719	1.2	0.6332	20,570	1,137

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Variable	Median Beta	Median S.E.	%Sig.	CDF(0)	Regres.	Avg. Obs.
Employment in agriculture	-0.021	0.045	2.4	0.6215	29,674	606
Land area	1.0E-09	3.9E-09	1.0	0.5993	30,407	958
Life expectancy	-0.095	0.241	0.0	0.5960	26,854	460
Population share 0-14	-0.028	0.097	0.5	0.5958	30,367	959
OPEC member	0.232	1.102	10.1	0.5887	15,147	1,280
Equity investment	-1.2E-10	6.0E-10	0.0	0.5847	30,216	582
Literacy	-0.006	0.022	2.5	0.5833	30,293	597
Settler mortality (log)	0.110	0.355	1.7	0.5710	29,337	578
European settlers 1900	0.005	0.021	0.4	0.5643	23,701	1,085
Socialist	0.310	1.092	0.1	0.5607	16,260	1,047
Portfolio investment	-1.1E-11	1.0E-10	0.0	0.5573	30,497	899
Oil exporter	-0.050	1.132	10.4	0.5569	15,147	1,194
Service employment, male	0.015	0.064	0.8	0.5476	28,503	543
Population share 15-64	-0.007	0.117	0.7	0.5260	30,286	962
Africa	-0.018	0.709	2.7	0.5124	22,421	1,032
Latin America	0.001	0.806	1.1	0.5007	23,694	1,054

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

Author	Period	Cntr.	Obs.	Democracy 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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Author	Period	Cntr.	Obs.	Democracy 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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Author	Period	Cntr.	Obs.	Democracy 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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Author	Period	Cntr.	Obs.	Democracy Measure	Explanatory Variables	Effect	Sig.	Method
Clague et al. (2001)	1960-1994	146	146	Clague	Former British colony	+	++	two-sided tobit
					Island dummy	+	∼	period averages
				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
		52	805	duration	GDP p.c., change	+	∼	model
					IO score	+	-	Weibull hazard
				Gasiorowski,	IO score, change	+	+	model
				duration	Share of neighboring democracies	+	-	(here all signs are
					Previous democratic breakdown	-	-	multiplied by -1)
					Disputes in region	+	-	
					Dummy for political violence	∼	-	
					Dummy for presidential or mixed system	∼	-	
					Dummy for established democracies	∼	-	

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Author	Period	Cntr.	Obs.	Democracy Measure	Explanatory Variables	Effect	Sig.	Method
Pevehouse	1950-1992	106	2,776	Polity IV > 6	GDP p.c.	-	-	logit
(2002b)		86	2,299		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	1950-1990	135	3,991	Przeworski	GDP p.c.	+	++	dynamic probit
Stokes (2003)	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 Measure	Explanatory Variables	Effect	Sig.	Method
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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Author	Period	Cntr.	Obs.	Democracy 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	-	-	
Epstein et al. (2006)	1960-2000	169	4,259	Polity IV	Lagged dependent	+	++	Tobit
					GDP p.c.	+	++	(ordered) probit
					GDP growth	-	++	Hazard model
					Urban population	-	-	
					Population density	+	∼	
					Openness	+	+	
					Previous transitions	+	+	
					Oil producer	-	∼	
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	-	-	

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Author	Period	Cntr.	Obs.	Democracy Measure	Explanatory Variables	Effect	Sig.	Method
Acemoglu et al. (2008a)	1960-2000	150	3,701	Freedom	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)	+	++	
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	-	+	

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Author	Period	Cntr.	Obs.	Democracy Measure	Explanatory Variables	Effect	Sig.	Method
Ross (2008)	1960-2002	170	3,353	Przeworski	Prior Democracy	+	++	panel logit
					Prior Autocracy	∼	-	
					GDP p.c., log	+	+	
					Oil rents	-	+	
					GDP growth	-	+	
					Muslim share	-	∼	
					Regime duration	+	++	

Notes: 'Cntr.' and 'Obs.' report the (maximum) 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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