**Appendix A: Coup Attempts in Oil-Rich and Oil-Poor Autocracies**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | N | Mean of Coup Attempts | Standard Errors | 95% Confidence Intervals |
| Oil-rich autocracies | 1,005 | 0.003 | 0.00172 | [-0.0003, 0.006] |
| Oil-poor autocracies | 3,514 | 0.010 | 0.00167 | [0.0066, 0.013] |
| Difference |  | -0.007 | 0.0032 | [-0.013, -0.0005] |

Note:

* Oil-rich (Oil-poor) countries are defined as countries whose oil-gas value per capita is above (below) the mean.
* The coup attempt data are drawn from Powell and Thyne (2011).

**Appendix B: List of Countries**



Note:

* Hyde and Marinov’s (2012) NELDA and Svolik’s (2012) dataset are used to define electoral authoritarian regimes.

**Appendix C: Descriptive Statistics**

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**Appendix D: Estimated Results**

Figure D1: Plot of Predicted Values (Based on Model 2 in Table 1)

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Note:

* The straight line indicates fitted values of EET according to the values of the oil-gas value per capita. The shaded area represents the 95% confidence intervals.
* This figure shows that as natural resource wealth increases, electoral systems become more proportional.

**Appendix E: Robustness Checks**

To ensure the robustness of our previous results, we further perform a series of robustness checks. Robustness checks consist of two parts: (1) issues concerning data, measurements, and model specifications and (2) issues concerning selection bias and endogeneity.

1. Issues of Data, Measurement, and Model Specification

Because the distribution of the natural resource wealth variable is skewed, we take the natural logarithm transformation to reduce the skewness, and the transformation does not change our main results (Table E-1).

Additionally, we employ alternative measurements of natural resource abundance. A recent debate has emerged regarding how to best measure a country's natural resource profusion (Ross 2012: 15-17). In brief, Ross’ measure focuses on oil and natural gas, but other natural resources may also be available to dictators (Ross 2012). To ensure that our previous findings are not sensitive to the measurement of natural resources, we re-estimate all models using Haber and Menaldo’s (2011) measure of total fuel income per capita, which includes coal as well as oil and natural gas. Using their data, we also add minerals to our measurement of natural resources and find that our results are robust. It is worth noting, however, that some minerals, like gold and diamonds, are less capital intensive and are consequently also often available to rebel groups. Thus, their inclusion may not be appropriate in light of our theoretical focus. Nevertheless, we proceed with caution and our results remain unchanged (Table E-2).

We next consider the possibility that dictators’ capacity and resources to induce compliance might be influenced by authoritarian regime type. For instance, some notable personalistic dictators, such as Mao of China and Stalin of the Soviet Union, were able to fully personalize their power and consolidate their regimes without the aid of natural resources. Essentially, personalistic regimes are important and distinctive from other types of autocracies because personalistic dictators can yield their power and dominance vis-à-vis ruling elites and citizens without being constrained by formal and informal rules. Therefore, we include a dummy variable for personalist regimes. Further, as we discussed earlier, Lust-Okar and Jamal (2002) argue that single-party regimes are more likely to choose electoral systems that favor the dominant party. Hence, we include a dummy variable of party-based regimes (Geddes et al. 2014).[[1]](#footnote-1) Our results show that the inclusion of the personalist and party-based regimes dummies do not change our results (Table E-3).[[2]](#footnote-2)

We also consider other potential confounding factors. First, we take into account the possibility that dictators can also directly appoint legislators into legislatures. Therefore, we control for the proportion of appointed legislators in the lower house in our model. The results, presented in Table E-4 show that our key findings remain unchanged. Second, in ethnically diverse societies, PR systems may be introduced to mitigate the threat of civil conflict between different ethnic groups. Also, in hybrid and authoritarian regimes, the political consequences of SMD can be different in countries with ethno-territorial splits (Zollinger and Bochsler 2012). To consider these possibilities, we introduce ethnic fractionalization index (Roeder 2001) and its interaction with civil conflict, and we find that our results remain unchanged (Table E-5).

Lastly, we employ alternative methods of computing standard errors. Errors may be correlated across countries as well as within them. To consider spatial and unit correlations, we use robust standard errors clustered by both country and year. In addition, we also compute the Driscoll and Kraay standard errors that simultaneously deal with both time and spatial dependence as well as heteroskedasticity. Again, our main results are insensitive to the choice of standard errors (Table E-6).

1. Selection Bias and Endogeneity

We also guard against the danger of selection bias in our empirical estimation. We analyze the set of electoral systems in autocratic regimes, but these observations may be a self-selected sample from all potential authoritarian countries that have ever considered institutionalizing elections in the first place. For instance, Gandhi (2008) argues that dictators have greater incentives to establish formal political institutions such as legislatures when they lack natural resources to buy off the opponent. Indeed, some oil-abundant countries in the Middle East, such as Saudi Arabia, do not even hold national elections. Likewise, some resource-abundant autocracies do not allow opposition parties to participate in elections (e.g., Turkmenistan).

To address this issue, we estimate a Heckman selection model. In the first-stage model, we build on Miller’s (2017) baseline model (Table E7-1) while adding the natural resource variable to predict transitions from closed autocracies to electoral authoritarian regimes.[[3]](#footnote-3) Then, introducing the inverse Mill's ratio calculated from the estimation of the first stage, we predict electoral system choice in electoral autocracies.[[4]](#footnote-4) Our results show that the inverse Mill's ratio is not statistically significant, indicating that selection bias is not concerning. Most importantly, the selection model estimation does not alter our main findings (Table E7-2).

Finally, we are also cautious about the potential threat of endogeneity between natural resource wealth and dictators’ institutional choice. A recent study points out that weak institutions may incentivize political leaders to increase non-tax revenues and buy off political support from elites (Menaldo 2016). Along this line of thinking, astute readers may wonder whether autocrats adopting PR systems may pump more oil prior to elections to maintain a supermajority. Consequently, we employ an instrumental variable (IV) estimation with country- and year-fixed effects and a GMM estimator (IV-GMM). Following Haber and Menaldo (2011), we use three time-varying variables on proven oil reserves–proven oil reserves in billions of dollars, proven oil reserves divided by country size, and proven oil reserves in each region–as instrumental variables. These instruments are ideal because oil reserves in a given country and region are highly correlated with oil-gas value per capita. Importantly, these variables satisfy the exclusion restriction because the amount of oil reserves cannot be artificially produced and be randomly distributed in nature and thus will not increase as a result of autocrats’ policies. Further, it is highly reasonable to assume that oil reserves’ effects on electoral systems should only run through the size of oil money, the instrumented variable. Additionally, these instrumental variables are jointly statistically significant at the 0.1 percent level in the first stage,[[5]](#footnote-5) suggesting the instruments are good predictors of oil-gas value per capita. Also, Hansen's J-test of the over-identifying restrictions cannot reject the null hypothesis that instruments are not correlated with the error term in the second-stage estimation, suggesting the instruments are valid. Importantly, our IV estimation reaches the same conclusion that dictators’ resource wealth is associated with the adoption of PR systems in electoral authoritarian regimes (Table E8).

Table E-1: Robustness Check – Logged Oil-Gas Value per capita

|  |  |  |
| --- | --- | --- |
|  | Model E1-1 | Model E1-2 |
|  | Country FE | Country FE |
| Logged EET | 0.901\*\*\* | 0.881\*\*\* |
|  | (0.0239) | (0.0263) |
| Logged oil-gas value per capita | -0.371\* | -0.465\*\* |
|  | (0.208) | (0.230) |
| Collective action |  | 0.0618\* |
|  |  | (0.0344) |
| Trade openness |  | 0.00306 |
|  |  | (0.00541) |
| Logged population |  | 1.319 |
|  |  | (1.109) |
| Duration of EA regimes |  | -0.00597 |
|  |  | (0.0209) |
| Regional democracy |  | 0.0988 |
|  |  | (0.137) |
| Neighbors’ electoral systems |  | 0.0245 |
|  |  | (0.0235) |
| Civil war |  | 0.327 |
|  |  | (0.591) |
| Constant | 2.287\*\*\* | -17.47 |
|  | (0.721) | (16.59) |
| *Country FE* | Yes | Yes |
| *Year FE* | Yes | Yes |
| *Observations* | 1,619 | 1,480 |
| *Number of countries* | 90 | 86 |

Note:

* Cluster-robust standard errors in parentheses.
* *\* p*<0.1, \*\* *p*<0.05, \*\*\* *p*<0.01.

Table E-2: Robustness Check – Different Measurement of Natural Resource Endowments

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | Model E2-1 | | Model E2-2 | |
|  | | Country FE | | Country FE | |
| Lagged EET | | 0.901\*\*\* | | 0.869\*\*\* | |
|  | | (0.0246) | | (0.0305) | |
| Fuel income per capita (100 USD) | | -0.0126\*\*\* | | -0.0393\*\*\* | |
|  | | (0.00304) | | (0.0132) | |
| Collective action | |  | | 0.0669\* | |
|  | |  | | (0.0370) | |
| Trade openness | |  | | 0.00155 | |
|  | |  | | (0.00600) | |
| Logged population | |  | | 1.829 | |
|  | |  | | (1.312) | |
| Duration of EA regimes | |  | | -0.00421 | |
|  | |  | | (0.0223) | |
| Regional democracy | |  | | 0.119 | |
|  | |  | | (0.138) | |
| Neighbors’ electoral systems | |  | | 0.0311 | |
|  | |  | | (0.0253) | |
| Civil war | |  | | 0.391 | |
|  | |  | | (0.674) | |
| Constant | | 5.172\*\*\* | | -24.87 | |
|  | | (1.266) | | (19.64) | |
| *Country FE* | | Yes | | Yes | |
| *Year FE* | Yes | | Yes | |
| *Observations* | 1,525 | | 1,337 | |
| *Number of countries* | | 93 | | 86 | |

Note:

* We use Haber and Menaldo’s (2011) fuel income per capita that includes oil, natural gas, and coal.
* Cluster-robust standard errors in parentheses.
* *\* p*<0.1, \*\* *p*<0.05, \*\*\* *p*<0.01.

Table E-3: Adding Personalist and Party-Based Regimes

|  |  |
| --- | --- |
|  | Model E3-1 |
|  | Country FE |
| Lagged EET | 0.841\*\*\* |
|  | (0.0451) |
| Oil-gas value per capita (100 USD) | -0.0432\*\*\* |
|  | (0.00788) |
| Collective action | 0.0694\* |
|  | (0.0380) |
| Trade openness | 0.00298 |
|  | (0.00622) |
| Logged population | 2.323 |
|  | (1.866) |
| Duration of EA regimes | 0.00219 |
|  | (0.0184) |
| Regional democracy | 0.0596 |
|  | (0.162) |
| Neighbors’ electoral systems | 0.0124 |
|  | (0.0257) |
| Civil war | 0.465 |
|  | (0.616) |
| Personalist regimes | 0.822 |
|  | (0.813) |
| Party-based regimes | -0.210 |
|  | (0.928) |
| Constant | 0.841\*\*\* |
|  | (0.0451) |
| *Country FE* | Yes |
| *Year FE* | Yes |
| *Observations* | 1,186 |
| *Number of countries* | 73 |

Note:

* Country cluster-robust standard errors in parentheses.
* \* *p*<0.1, \*\* *p*<0.05, \*\*\* *p*<0.01.

Table E-4: Considering Proportions of Legislator Appointments in the Upper/Lower Houses

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | Model E4-1 | | Model E4-2 | | Model E4-3 | |
|  | | Country FE | | Country FE | | Country FE | |
|  | |  | |  | |  | |
| Lagged EET | | 0.869\*\*\* | | 0.880\*\*\* | | 0.879\*\*\* | |
|  | | (0.0280) | | (0.0263) | | (0.0261) | |
| Oil-gas value per capita (100 USD) | | -0.0273\*\* | | -0.0252\*\* | | -0.0254\*\* | |
|  | | (0.0120) | | (0.0117) | | (0.0118) | |
| Collective action | | 0.0660\* | | 0.0614\* | | 0.0617\* | |
|  | | (0.0366) | | (0.0346) | | (0.0344) | |
| Trade openness | | 0.00102 | | 0.00101 | | 0.000956 | |
|  | | (0.00552) | | (0.00531) | | (0.00536) | |
| Logged population | | 1.342 | | 1.365 | | 1.378 | |
|  | | (1.258) | | (1.154) | | (1.149) | |
| Duration of EA regimes | | -0.0156 | | -0.00600 | | -0.00589 | |
|  | | (0.0221) | | (0.0203) | | (0.0205) | |
| Regional democracy | | 0.0535 | | 0.0841 | | 0.0836 | |
|  | | (0.114) | | (0.128) | | (0.129) | |
| Neighbors’ electoral systems | | 0.0276 | | 0.0254 | | 0.0257 | |
|  | | (0.0250) | | (0.0234) | | (0.0236) | |
| Civil war | | 0.517 | | 0.329 | | 0.341 | |
|  | | (0.616) | | (0.602) | | (0.596) | |
| Appointment in lower house | | 0.0803\*\* | |  | |  | |
|  | | (0.0327) | |  | |  | |
| Bicameralism | | 0.0276 | | -0.175 | |  | |
|  | | (0.0250) | | (0.611) | |  | |
| Bicameralism with partially-appointed upper house | | 0.517 | |  | | -0.214 | |
|  | | (0.616) | |  | | (0.657) | |
| Constant | | -17.78 | | -17.95 | | -11.12 | |
|  | | (18.80) | | (17.25) | | (17.18) | |
| *Country FE* | | Yes | | Yes | | Yes | |
| *Year FE* | Yes | | Yes | | Yes | |
| *Observations* | 1,432 | | 1,480 | | 1,480 | |
| *Number of countries* | | 85 | | 86 | | 86 | |

Note:

* Country cluster-robust standard errors in parentheses.
* \* *p*<0.1, \*\* *p*<0.05, \*\*\* *p*<0.01.

Table E-5: Considering Ethnic Diversity and Its Interaction with Civil War

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | Model E5-1 | | Model E5-2 | |
|  | | Country FE | | Country FE | |
| Lagged EET | | 0.880\*\*\* | | 0.880\*\*\* | |
|  | | (0.0262) | | (0.0255) | |
| Oil-gas value per capita (100 USD) | | -0.0253\*\* | | -0.0255\*\* | |
|  | | (0.0118) | | (0.0118) | |
| Collective action | | 0.0617\* | | 0.0604\* | |
|  | | (0.0345) | | (0.0351) | |
| Trade openness | | 0.00114 | | 0.000854 | |
|  | | (0.00537) | | (0.00536) | |
| Logged population | | 1.414 | | 1.462 | |
|  | | (1.164) | | (1.169) | |
| Duration of EA regimes | | -0.00626 | | -0.00700 | |
|  | | (0.0206) | | (0.0208) | |
| Regional democracy | | 0.0905 | | 0.102 | |
|  | | (0.135) | | (0.133) | |
| Neighbors’ electoral systems | | 0.0258 | | 0.0274 | |
|  | | (0.0237) | | (0.0246) | |
| Civil war | | 0.347 | | -0.988 | |
|  | | (0.597) | | (1.490) | |
| Ethnic fractionalization (ELF) | | -0.380 | | -1.116 | |
|  | | (3.804) | | (4.117) | |
| Civil war\*ELF | |  | | 2.025 | |
|  | |  | | (2.165) | |
| Constant | | -18.57 | | -16.36 | |
|  | | (17.48) | | (17.38) | |
| *Country FE* | | Yes | | Yes | |
| *Year FE* | Yes | | Yes | |
| *Observations* | 1,480 | | 1,480 | |
| *Number of countries* | | 86 | | 86 | |

Note:

* Country cluster-robust standard errors in parentheses.
* \* *p*<0.1, \*\* *p*<0.05, \*\*\* *p*<0.01.

Table E-6: Two-Way Clustering Standard Errors and the Driscol-Kraay Standard Errors

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Model E6-1 | Model E6-2 | Model E6-3 | Model E6-4 |
|  | Country FE | Country FE | Country FE | Country FE |
| Standard Errors | Two-Way Clustering | Two-Way Clustering | Driscol-Kraay | Driscol-Kraay |
| Logged EET | 0.900\*\*\* | 0.876\*\*\* | 0.900\*\*\* | 0.880\*\*\* |
|  | (0.0261) | (0.0310) | [0.0232] | [0.0281] |
| Logged oil-gas value per capita | -0.0146\*\*\* | -0.0252\*\* | -0.0146\*\* | -0.0253\*\*\* |
|  | (0.00454) | (0.0119) | [0.00550] | [0.00857] |
| Collective action |  | 0.0638 |  | 0.0617 |
|  |  | (0.0423) |  | [0.0387] |
| Trade openness |  | 0.00176 |  | 0.00114 |
|  |  | (0.00572) |  | [0.00433] |
| Logged population |  | 1.571 |  | 1.416\* |
|  |  | (1.312) |  | [0.714] |
| Duration of EA regimes |  | -0.00549 |  | -0.00622 |
|  |  | (0.0218) |  | [0.0134] |
| Regional democracy |  | 0.0927 |  | 0.0900 |
|  |  | (0.129) |  | [0.0847] |
| Neighbors’ electoral systems |  | 0.0263 |  | 0.0258 |
|  |  | (0.0284) |  | [0.0215] |
| Civil war |  | 0.344 |  | 0.347 |
|  |  | (0.640) |  | [0.427] |
| Constant | 2.321\*\*\* | -21.09 | 2.305\*\* | -18.60\* |
|  | (0.788) | (19.65) | [0.903] | [10.50] |
| *Country FE* | Yes | Yes | Yes | Yes |
| *Year FE* | Yes | Yes | Yes | Yes |
| *Observations* | 1,616 | 1,433 | 1,619 | 1,480 |
| *Number of countries* | 87 | 83 | 90 | 86 |

Note:

* \* *p*<0.1, \*\* *p*<0.05, \*\*\* *p*<0.01.
* Two-way clustered standard errors in parentheses and the Driscoll-Kraay standard errors in brackets.

**E-7: Heckman’s Selection Model**

Table E7-1. First Stage

|  |  |
| --- | --- |
|  | Model E7-1 |
|  | Logit |
|  |  |
| Oil-gas value per capita (100 USD) | -0.00695 |
|  | (0.00724) |
| Regional electoral autocracy (EA) | 0.924 |
|  | (0.887) |
| Regional democracy | 0.126\*\* |
|  | (0.0526) |
| Logged GDP per capita | -0.0433 |
|  | (0.228) |
| Economic growth | -0.00481 |
|  | (0.0167) |
| Recent coup | 0.811\* |
|  | (0.481) |
| Recent irregular turnover from below | 0.231 |
|  | (0.253) |
| Recent regular turnover | -0.183 |
|  | (0.392) |
| Urbanization | 0.0135\* |
|  | (0.00766) |
| ELF | -0.0728 |
|  | (0.509) |
| Logged population | 0.000821 |
|  | (0.0985) |
| Prior EA spells | 0.755\*\*\* |
|  | (0.158) |
| Prior democratic spells | -0.0423 |
|  | (0.108) |
| Year | 0.0280\*\* |
|  | (0.0137) |
| Constant | -59.46\*\* |
|  | (28.18) |
| *Duration cubic splines* | Yes |
| *Observations*  *Number of countries*  *Pseudo R2*  *Pseudo log likelihood* | 2,100  101  0.1466  -317.06 |

Note:

* Model specification in the first stage is based on Miller (2017).
* Country cluster-robust standard errors in parentheses.
* \* *p*<0.1, \*\* *p*<0.05, \*\*\* *p*<0.01.

Table E7-2. Second Stage

|  |  |
| --- | --- |
|  | Model E7-2 |
|  | Country FE |
| Lagged EET | 0.868\*\*\* |
|  | (0.0270) |
| Oil gas value per capita (100 USD) | -0.0291\* |
|  | (0.0158) |
| Collective action | 0.0657\* |
|  | (0.0374) |
| Trade openness | 0.00179 |
|  | (0.00594) |
| Logged population | 2.786 |
|  | (2.074) |
| Duration of EA regimes | -0.00952 |
|  | (0.0238) |
| Regional democracy | 0.113 |
|  | (0.236) |
| Neighbors’ electoral systems | 0.0285 |
|  | (0.0290) |
| Civil war | 0.266 |
|  | (0.628) |
| Inverse Mill’s Ratio | 0.345 |
|  | (1.859) |
| Regional electoral autocracy | 0.509 |
|  | (2.073) |
| Logged GDP per capita | 0.0431 |
|  | (0.638) |
| Economic growth | -0.0212 |
|  | (0.0195) |
| Recent coup | -0.392 |
|  | (1.595) |
| Recent irregular turnover from below | -0.263 |
|  | (0.560) |
| Recent regular turnover | -0.308 |
|  | (0.441) |
| Urbanization | 0.0413 |
|  | (0.0454) |
| Constant | -42.13 |
|  | (31.93) |
| *Country FE* | Yes |
| *Year FE* | Yes |
| *Observations* | 1,344 |
| Number of countries | 82 |

Note:

* Country cluster-robust standard errors in parentheses.
* \* *p*<0.1, \*\* *p*<0.05, \*\*\* *p*<0.01.
* In addition to the predictors of electoral systems, we also control for the variables included in the first stage model because there is no guarantee of exclusive restriction, or that the explanatory factors possibly affecting the origins of electoral autocracies are orthogonal to electoral system choice (cf. Pepinsky 2014: 647-648). Two variables in the first-stage “Prior EA spells” and “Prior Democratic spells” are also added yet dropped due to collinearly.

Table E8: Instrumental Variables Estimation (IV-GMM)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | Model E8-1  (Fist Model) | | Model E8-2 | |
| Dependent variable | | Oil-Gas Value per capita | | EET | |
| Oil-gas reserves (billion USD) | -0.135\*\*\* | |  | |
|  | (0.03) | |  | |
| Oil-gas reserves/country size | 371032.7\*\*\* | |  | |
|  | (17072.42) | |  | |
| Oil-gas reserves in region | -0.0022 | |  | |
|  | | (0.0066) | |  | |
| Oil-gas value per capita | |  | | -0.0312\*\* | |
|  | |  | | (0.0127) | |
| Lagged EET | | -0.1097 | | 0.861\*\*\* | |
|  | | (0.089) | | (0.0341) | |
| Collective action | | -0.012 | | 0.0712\* | |
|  | | (0.023) | | (0.0431) | |
| Trade openness | | 0.003 | | -0.00108 | |
|  | | (0.0207) | | (0.00500) | |
| Logged population | | 11.23\*\* | | 1.087 | |
|  | | (4.87) | | (0.967) | |
| Duration of EA regimes | | -0.022 | | -0.00201 | |
|  | | (0.028) | | (0.0155) | |
| Regional democracy | | 0.698\* | | 0.157 | |
|  | | (0.394) | | (0.102) | |
| Neighbors’ electoral systems | | 0.144\* | | 0.0365 | |
|  | | (0.073) | | (0.0252) | |
| Civil war | | 0.198 | | 0.264 | |
|  | | (0.42) | | (0.447) | |
| *Year FE* | | Yes | | Yes | |
| *Country FE* | | Yes | | Yes | |
| *Observations* | | 1,320 | | 1,320 | |
| *Number of countries* | | 85 | | 85 | |
| *F-test on the instruments in first stage*  *Hansen J statistics of overidentifying restrictions* | | 242.45\*\*\*    0.3933 | |  | |

Note: The left-hand column shows the results of the first-stage estimation, where the dependent variable is oil-gas value per capita. Instrumental variables are (1) proven oil reserve in billion dollars, (2) proven oil reserve divided by country size, and (3) proven oil reserve in regions (Haber and Menaldo 2011). The right-hand side model is the second-stage estimation where instrumented oil-gas value per capita is used to predict EET. Cluster-robust standard errors in parentheses.

\* *p*<0.1, \*\* *p*<0.05, \*\*\* *p*<0.01.

**Appendix F: The SMD Seat Premium**

Figure F1 - Kernel Density Plots

../ESC_tex/kdensity.pdf

Note:

* The left figures show shares of votes and seats for ruling parties (Figure [a]) and those for opposition parties (Figure [c]) in majoritarian electoral systems (where the EET is more than 10).
* The graphs suggest that ruling parties tend to gain more seats relative to their votes, whereas opposition parties’ seat shares in legislatures are underrepresented relative to their vote shares.
* Contrastingly, in proportional representation systems (where the EET is less than 10), shares of seats are more aligned with the vote shares for both ruling parties and opposition parties. The overall results suggest the SMD seat premium exists and favors ruling parties.

Table F1: Regression Results

|  |  |  |
| --- | --- | --- |
|  | Model F1 | Model F2 |
| DV | Seats-Votes Gap of Ruling Parties (%) | Seats-Votes Gap of Ruling Parties (%) |
| Effective electoral threshold (EET) | 0.120\*\* | -0.327\* |
|  | (0.0579) | (0.192) |
| Vote share of ruling parties |  | -0.206\*\*\* |
|  |  | (0.07) |
| EET x ruling parties’ vote share |  | 0.00709\*\* |
|  |  | (0.003) |
| Vote share of independents (previous elections) | -0.0375 | -0.03 |
|  | (0.04) | (0.04) |
| Logged assembly size | -0.00746 | -0.53 |
|  | (1.35) | (1.37) |
| Parliamentarism | -0.0428 | -0.701 |
|  | (1.38) | (1.36) |
| Constant | 9.457 | 25.97\*\* |
|  | (7.64) | (10.41) |
| *Regional dummies* | Yes | Yes |
| *Half-decade dummies* | Yes | Yes |
| *Number of countries* | 73 | 73 |
| *Observations* | 268 | 268 |
| *R-squared* | 0.144 | 0.183 |

Note:

* Panel-corrected standard errors in parentheses. AR (1) process is computed to deal with possible autocorrelation.
* \* *p*<0.1, \*\* *p*<0.05, \*\*\* *p*<0.01.
* Model A1 shows that EET is positively correlated with discrepancies between seats and votes.
* Model F2 suggests that the SMD seat premiums tend to become larger as ruling parties obtain more vote shares. The interaction effect in Model F2 is graphically presented in Figure F2.

Figure F2: Marginal Effect of EET on Seat Premium Conditional on Vote Share



Note:

* This figure is based on Model F2. The dotted lines are the 95% confidence intervals.
* It shows that the SMD seat premium tends to magnify as ruling parties obtain more vote shares.

**Appendix G: Pre-Electoral Opposition Coalition in Electoral Authoritarian Regime**

Table G1: Determinants of Pre-Electoral Opposition Coalition

|  |  |  |
| --- | --- | --- |
|  | Model G-1 | Model G-2 |
| DV | Pre-Electoral Coalition | Pre-Electoral Coalition |
| Effective electoral threshold | 0.0644\*\* | 0.0783\*\*\* |
|  | (0.028) | (0.025) |
| Natural resource wealth (100 dollars) | -0.00132 | -0.00210\* |
|  | (0.001) | (0.001) |
| Age of largest opposition party | 0.194\*\* | 0.325\*\*\* |
|  | (0.081) | (0.097) |
| Number of opposition parties | 0.120\* | 0.0836 |
|  | (0.062) | (0.064) |
| Ruling party’s seat share in the previous election | 0.0166 | 0.0450\*\* |
|  | (0.013) | (0.020) |
| Parliamentarism | -0.42 | -1.634\* |
|  | (0.655) | (0.887) |
| Ethno-linguistic fractionalization | 2.856\*\* | 3.338\* |
|  | (1.236) | (1.744) |
| Economic growth (one year lagged) | 0.024 | 0.0107 |
|  | (0.042) | (0.054) |
| Logged total population (one year lagged) | -0.0611 | 0.0401 |
|  | (0.192) | (0.237) |
| Electoral violence | -0.136 | 1.011 |
|  | (0.516) | (0.843) |
| Lagged dependent variable |  | 2.862\*\*\* |
|  |  | (1.004) |
| Constant | -8.543\*\* | -13.67\*\* |
|  | (4.2) | (5.405) |
| *Regional dummies* | Yes | Yes |
| *Half-decade dummies* | Yes | Yes |
| *Number of countries* | 71 | 55 |
| *Observations* | 225 | 167 |
| *Pseudo log likelihood* | -69.75 | -42.03 |
| *Wald Chi Squared* | 104.64\*\*\* | 133.35\*\*\* |

Note:

* Cluster-robust standard errors in parentheses; \* *p*<0.1, \*\* *p*<0.05, \*\*\* *p*<0.01.
* The dependent variable, pre-electoral opposition coalition, and model specifications are based on Gandhi and Reuter (2013).

Figure G1: Predicted Probability of Pre-Electoral Opposition Coalitions



Note:

* The figure is based on Model G-1.
* The straight line represents the predicted probabilities of pre-electoral opposition coalition making. The dotted lines stand for the 95 percent confidence intervals.
* It shows that a higher level of EET (i.e., more majoritarian electoral systems) increases the likelihood of pre-electoral opposition coalition making.

**Appendix H: Determinants of Turnout in Electoral Authoritarianism**

Table H1: Determinants of Turnout

|  |  |  |
| --- | --- | --- |
|  | Model H1 | Model H2 |
| DV | Turnout | Turnout |
| Effective electoral threshold | -0.205\*\*\* | -0.185\*\*\* |
|  | (0.056) | (0.061) |
| Parliamentarism | 5.104\*\*\* | 5.880\*\*\* |
|  | (1.913) | (1.909) |
| Election violence | -2.545 | -1.087 |
|  | (1.935) | (1.928) |
| Ethno-linguistic fractionalization | -3.1 | -0.99 |
|  | (3.224) | (2.834) |
| Opposition boycott | -4.043\* | -3.012 |
|  | (2.205) | (2.183) |
| Electoral fraud | -1.699 | -1.449 |
|  | (1.605) | (1.886) |
| Logged GDP per capita | 3.402\*\*\* | 4.365\*\*\* |
|  | (0.902) | (1.017) |
| Compulsory voting system |  | -0.622 |
|  |  | (4.074) |
| Constant | 55.76\*\*\* | 34.44\*\* |
|  | (10.080) | (11.420) |
| *Regional dummies* | Yes | Yes |
| *Half-decade dummies* | Yes | Yes |
| *Number of countries* | 82 | 76 |
| *Observations* | 314 | 271 |
| *R-Squared* | 0.420 | 0.493 |
| *Wald Chi Squared* | 318.80\*\*\* | 171.53\*\*\* |

Note:

* Panel corrected standard errors in parentheses.
* \* *p*<0.1, \*\* *p*<0.05, \*\*\* *p*<0.01.
* AR (1) process is computed to deal with possible autocorrelation.
* Model H1 uses cross-national data of voter turnout that we originally collected by using several data sources.
* Model H2 introduces compulsory voting system as an additional independent variable, which comes from International IDEA (available at <http://www.idea.int/vt/index.cfm>).
* The results show that a higher level of the EET tends to suppress voter turnout.

**Appendix I: Temporal Variations of Effective Electoral Threshold in Democracy and Autocracy**

**Chart, line chart

Description automatically generated**

Note:

* The graph shows inter-temporal variations in the EET variable for both electoral authoritarian and democratic regimes. Electoral systems in democracies are more permissive and less volatile than in electoral autocracies.

**Appendix J: Natural Resource Wealth and Dictators’ Electoral Performance**

Table J-1: Determinants of Dictator’s Electoral Performance

|  |  |  |
| --- | --- | --- |
|  | Model I-1 | Model I-2 |
| DV: Ruling Party’s Electoral Performance | Share of Votes (%) | Margin of Victory (%) |
| Natural Resource Variable | Ross (2012) | Ross (2012) |
| Oil-gas value per capita | 0.00408\*\* | 0.00730\*\* |
|  | (0.0019) | (0.0033) |
| Ethno-linguistic fractionalization | -1.799 | -6.117 |
|  | (4.78) | (8.20) |
| Opposition boycott | 5.942\*\*\* | 14.54\*\*\* |
|  | (2.02) | (4.01) |
| Electoral fraud | -1.508 | -5.113\*\* |
|  | (1.18) | (2.45) |
| Election violence | -8.544\*\*\* | -14.45\*\*\* |
|  | (1.91) | (3.61) |
| Lagged Polity IV | -0.40 | -1.057\*\*\* |
|  | (0.25) | (0.39) |
| Parliamentarism | 4.10 | 3.91 |
|  | (2.33) | (4.25) |
| Lagged GDP per capita (logged) | -1.185 | -1.074 |
|  | (1.84) | (3.41) |
| Lagged GDP growth | 0.514\*\*\* | 1.111\*\*\* |
|  | (0.130) | (0.277) |
| Constant | 68.75\*\*\* | 69.61\*\* |
|  | (16.590) | (26.35) |
| *Regional dummies* | Yes | Yes |
| *Half-decade dummies* | Yes | Yes |
| *Number of countries* | 73 | 73 |
| *Observations* | 285 | 282 |
| *R-squared* | 0.446 | 0.271 |
| *Wald Chi Squared* | 636.73\*\*\* | 135.44\*\*\* |

Note:

* Panel-corrected standard errors in parentheses; \* *p*<0.1, \*\* *p*<0.05, \*\*\* *p*<0.01.
* AR (1) process is computed to deal with autocorrelation.
* The results show that natural resource wealth is positively correlated with both ruling parties’ share of votes and margin of victory.

**References (not cited in the main text)**

Gandhi, Jennifer. 2008. *Political Institutions under Dictatorship*. New York: Cambridge University Press.

Menaldo, Victor. 2016. *The Institutions Curse*. New York: Cambridge University Press.

Miller, Michael. 2020. “The Strategic Origins of Electoral Authoritarianism.” *British Journal of Political Science* 50-1: 17-44.

1. We also added the dummy variable of monarchy regimes, but it is dropped from the analysis due to collinearity. [↑](#footnote-ref-1)
2. It is important to note that while Lust-Okar and Jamal (2002) shed important light on various aspects of electoral rules, their study does not explicitly concern the (dis)proportionality of electoral systems. In fact, their net effect of regime types on the EET is theoretically ambiguous. For instance, while they argue that monarchs favor electoral rules that facilitate the representation of different forces, they also argue that monarchs do not necessary prefer PR since the proliferation of new political parties makes it difficult for the monarch to manage competition and remain chief arbitrator. Hence, they argue that monarchs also use small district magnitudes or even SMD systems. Similarly, while they suggest that single-party regimes prefer electoral rules that concentrate power in the dominant party, they also need multimember districts to divide their opposition. Therefore, Lust-Okar and Jamal (2002: 361) conclude their analysis “extends beyond the simple choice between first-past-the-post electoral rules or proportional representation.” [↑](#footnote-ref-2)
3. Our reasoning is consistent with Gandhi and Przeworski (2007), who show that natural resource wealth is negatively correlated with the number of parties in a legislature. [↑](#footnote-ref-3)
4. In addition to the predictors of electoral systems, we also added the variables included in the first stage model to the second stage to entertain the possibility that predictors for the emergence of electoral autocracy may also influence the choice of electoral systems. [↑](#footnote-ref-4)
5. The first-stage model includes the three instruments, country dummies, year dummies, and the same set of variables introduced in the second-stage model. [↑](#footnote-ref-5)