

## **Appendix**

Table A1 and Figures A1 and A2 present the results of a set of models estimating the impact of the same right-hand side variables on the likelihood of transitions from autocracy to democracy using the alternative measure of autocratic regime spells derived from the CGV data. Here, we are estimating a more specific kind of regime event—turning dictatorships into democracies. We might hypothesize democratic transitions to have different dynamics than simple autocratic breakdowns, and in fact that intuition is borne out by the results. Oil wealth—whether we take it as a function of dependence (rent leverage) or abundance (oil income per capita)—fails to be significantly related to democratic transitions in all but one of our models. However, the stability of our battery of control variables suggest that it is the type of regime change, rather than a quirk of model specification, that renders oil insignificant.

### **Table A1 and Figures A1 and A2 about here**

Table A2, and Figures A3 and A4, present our survival models estimating the effects of oil on autocratic breakdowns leading to democracy, again per CGV. Once again, the results of these survival analyses accord with our logit analysis with one exception. Models a9-a13 all employ the standard data, in the first two with the post-1980 dummy but not its interaction effect. Here, again neither rent leverage nor oil income significantly affect the likelihood of an autocratic breakdown, and neither does the interaction effect when included in the latter two models in this set.

When we move to models a13 through a16, we employ the counterfactual data again. While the results of models a9 through a12 are all in line with both our previous logit and survival analysis, in model a15 oil income in the counterfactual setting now is significantly, and negatively, related to a reduction in the proportional hazard rate, but only when the post-1980/oil interaction is excluded. The size of the effect is substantively small, but this is the singular model of sixteen specifications in which the expectations of the regime resource curse find support using our counterfactual data.

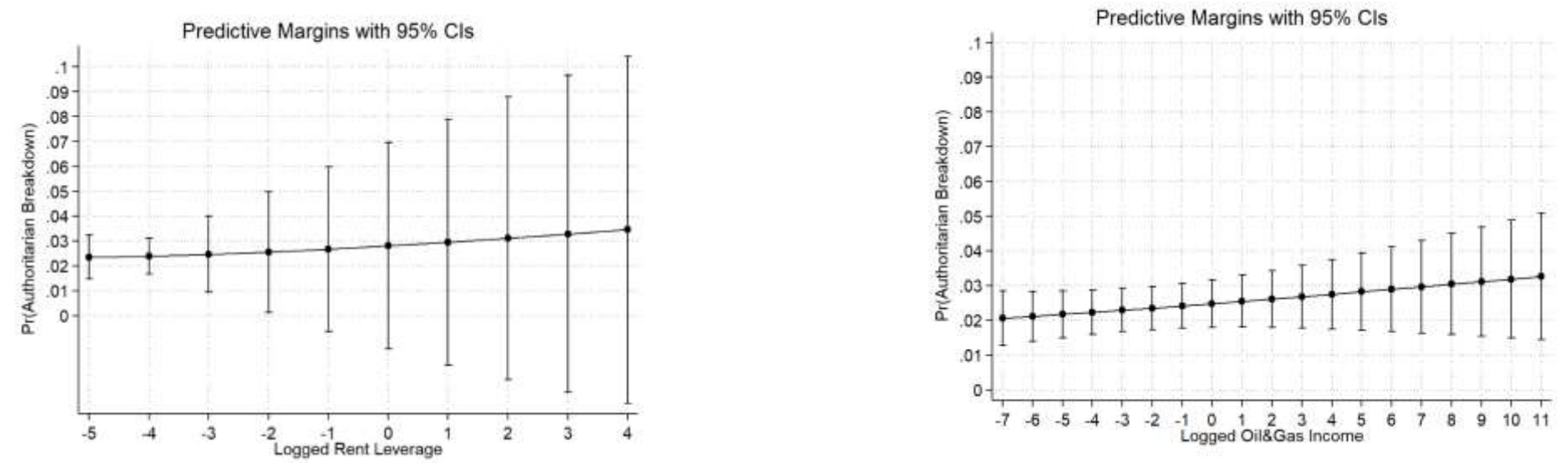
### **Table A2 and Figures A3 and A4 about here**

**Table A1. Logit Models on the Impact of Oil Wealth on Authoritarian Breakdown with CGV Autocratic Spell**

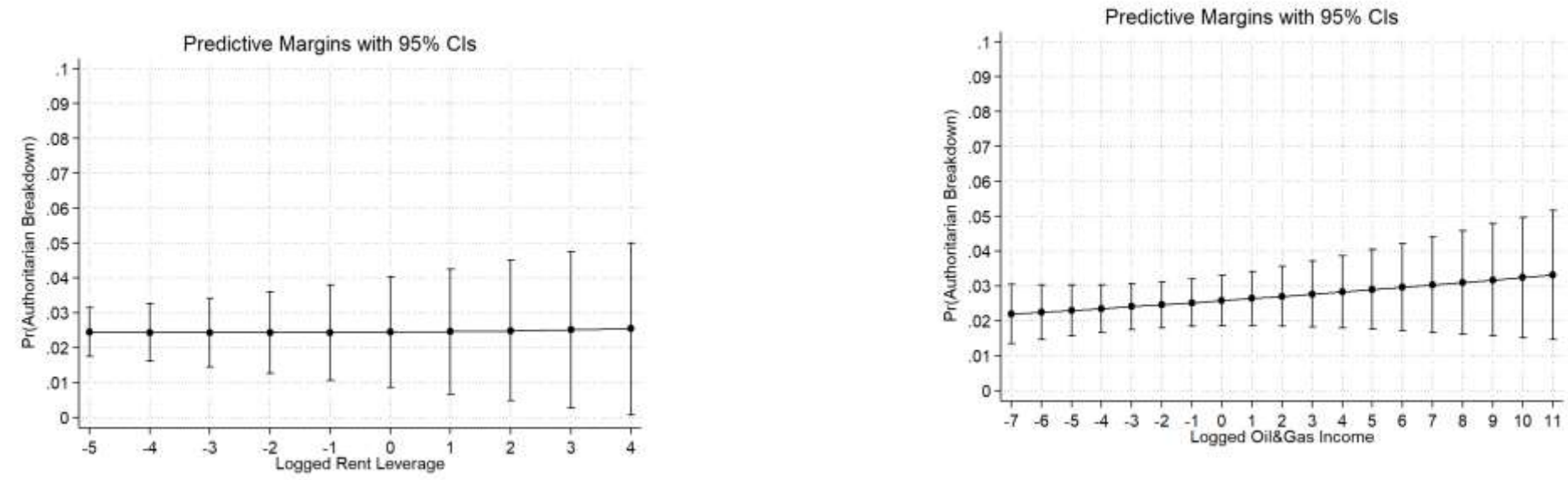
Models	a1	a2	a3	a4	a5	a6	a7	a8
Variables	Base Models				Saudi Counterfactual			
GDP	0.000** (0.000)	0.000** (0.000)	0.000 (0.000)	0.000 (0.000)	0.000* (0.000)	0.000* (0.000)	0.000* (0.000)	0.000* (0.000)
Growth Rate	-3.589** (1.643)	-3.787** (1.702)	-3.495** (1.566)	-3.912** (1.572)	-3.761** (1.727)	-3.673** (1.786)	-3.621** (1.659)	-4.195** (1.654)
Democratic Neighbors	-2.795*** (0.771)	-2.793*** (0.775)	-2.969*** (0.858)	-2.929*** (0.871)	-2.810*** (0.806)	-2.805*** (0.787)	-2.979*** (0.862)	-2.933*** (0.881)
Rent Leverage ( <i>logged</i> )	-0.049 (0.357)	-0.232 (0.494)						
Oil & Gas Income ( <i>logged</i> )			0.038 (0.039)	-0.005 (0.059)				
Counterfactual RL ( <i>logged</i> )					-0.019 (0.071)	-0.142 (0.094)		
OG Counter ( <i>logged</i> )							0.034 (0.039)	-0.021 (0.061)
Post 1980 Dummy	-0.098 (0.415)	1.639 (1.467)	0.003 (0.398)	0.051 (0.395)	-0.094 (0.413)	1.038 (0.825)	-0.01 (0.406)	0.056 (0.408)
Rent Leverage ( <i>logged</i> )*Post 1980		0.404 (0.375)						
Oil & Gas Income ( <i>logged</i> )*Post 1980				0.069 (0.062)				
Counterfactual RL ( <i>logged</i> )*Post 1980						0.196 (0.123)		
OG Counter ( <i>logged</i> )*Post 1980								0.086 (0.063)
Constant	0.238 (1.618)	-0.513 (2.162)	0.532 (0.393)	0.517 (0.403)	0.351 (0.640)	-0.347 (0.774)	0.541 (0.403)	0.517 (0.420)
Observations	3807	3807	3807	3807	3616	3616	3616	3616
AIC	379.872	380.65	377.488	377.503	367.493	366.252	365.771	364.855
BIC	429.829	436.852	427.444	433.705	417.038	421.99	415.316	420.594

*Note:* \*\*\* p<0.01, \*\* p<0.05, \* p<0.10. Analysis is by logistic regression. Robust standard errors in parentheses. Natural cubic splines of peace years are included in all models but not shown in this table. RL Counter – Rent Leverage Counterfactual; OG Counter – Oil/Gas Income Counterfactual. The coefficients of GDP are eighth decimal points.

**Figure A1. Predicted Probabilities of Authoritarian Breakdown as a Function of Rent Leverage (Model a1) and Oil & Gas Income (Model a3) with CGV Autocratic Spell**



**Figure A2. Predicted Probabilities of Authoritarian Breakdown by Counterfactual Rent Leverage (Model a5) and Oil & Gas Income (Model a7) with CGV Autocratic Spell**

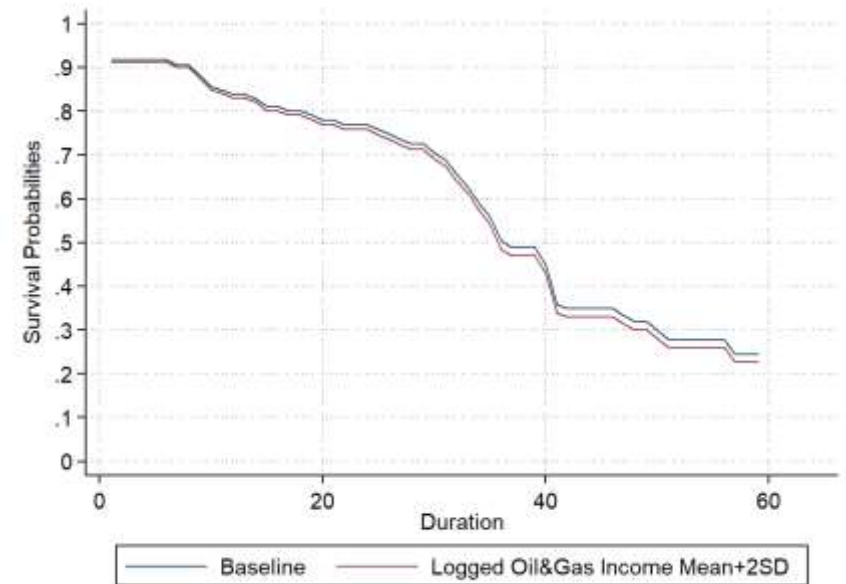
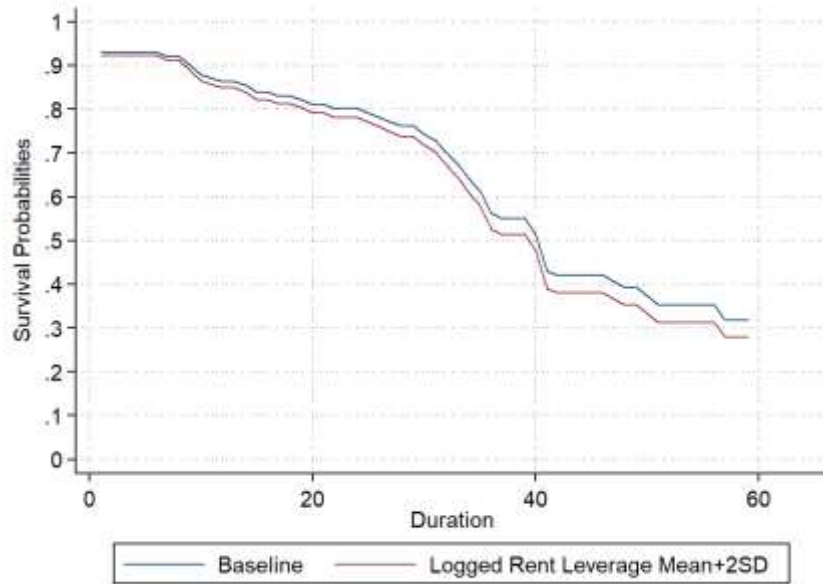


**Table A2. Survival Models on the Impact of Oil and Gas Revenues on Authoritarian Breakdown with CGV Autocratic Spell**

Models	a9	a10	a11	a12	a13	a14	a15	a16
Variables	Base Models			Saudi Counterfactual				
GDP	0	0	0	0	0	0	0	0
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Growth Rate	0.86	0.823	0.613	0.399	1.618	1.622	1.183	0.803
	(1.367)	(1.425)	(1.271)	(1.191)	(1.325)	(1.334)	(1.247)	(1.150)
Democratic Neighbors	-1.158*	-1.216*	-0.77	-0.574	-1.281*	-1.289*	-0.739	-0.435
	(0.655)	(0.652)	(0.631)	(0.652)	(0.692)	(0.706)	(0.622)	(0.643)
Rent Leverage ( <i>logged</i> )	-0.049	0.045						
	(0.234)	(0.390)						
Oil & Gas Income ( <i>logged</i> )			-0.042*	-0.104				
			(0.024)	(0.070)				
RL Counter ( <i>logged</i> )					-0.018	-0.01		
					(0.035)	(0.062)		
OG Counter ( <i>logged</i> )							-0.053**	-0.157*
							(0.022)	(0.090)
Post 1980 Dummy	0.582	-0.294	0.592	0.694	0.944	0.857	0.990*	1.238*
	(0.653)	(2.141)	(0.662)	(0.744)	(0.576)	(0.957)	(0.588)	(0.701)
Rent Leverage ( <i>logged</i> )*Post 1980		-0.201						
		(0.407)						
Oil & Gas Income ( <i>logged</i> )*Post 1980				0.093				
				(0.070)				
RL Counter ( <i>logged</i> )*Post 1980						-0.014		
						(0.077)		
OG Counter ( <i>logged</i> )*Post 1980								0.142
								(0.093)
Observations	3086	3086	3086	3086	2932	2932	2932	2932
AIC	116.994	118.82	115.648	116.019	106.832	108.825	104.843	103.998
BIC	147.167	155.027	145.822	152.227	136.749	144.725	134.76	139.898

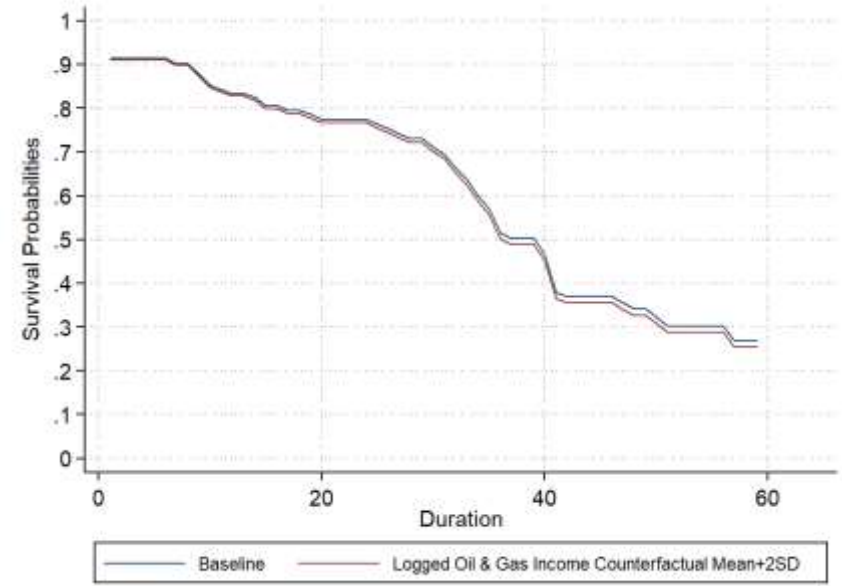
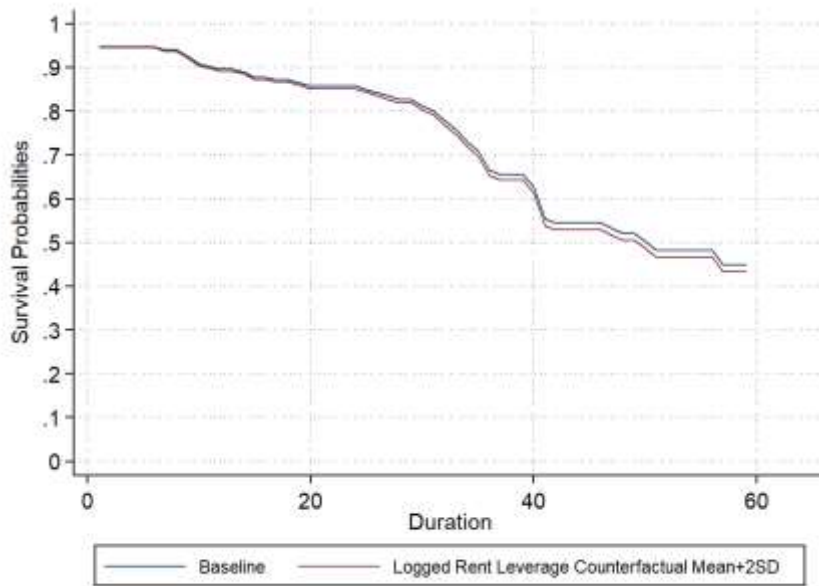
*Note:* \*\*\* p<0.01, \*\* p<0.05, \* p<0.10. Analysis is by Cox proportional hazards conditional risk set (time from the previous event) models. Multiple autocratic breakdowns are allowed and stratified by breakdown order. Coefficients are represented. Robust standard errors in parentheses. RL Counter – Rent Leverage Counterfactual; OG Counter – Oil/Gas Income Counterfactual. The coefficients of GDP are eighth decimal points.

**Figure A3. Predicted Survival Probabilities of Authoritarian Regimes by Rent Leverage (Model a9) and Oil & Gas Income (Model a11) in 1955-2010 with CGV Autocratic Spell**



*Note:* In the baseline survival functions, all covariates are set to zero. To test the impact of logged rent leverage and logged oil and gas income on survival probabilities, these covariates are set to the mean value plus two standard deviations. In order to clearly demonstrate the difference between the original data and counterfactual data, the Cox proportional hazard models used to generate all the graphs do not allow multiple autocratic breakdowns.

**Figure A4. Predicted Survival Probabilities of Authoritarian Regimes by Counterfactual Rent Leverage (Model a13) and Oil & Gas Income (Model a15) in 1955-2010 with CGV Autocratic Spell**



*Note:* In the baseline survival functions, all covariates are set to zero. To test the impact of logged rent leverage counterfactual and logged oil and gas income counterfactual on survival probabilities, these covariates are set to the mean value plus two standard deviations. In order to clearly demonstrate the difference between the original data and counterfactual data, the Cox proportional hazard models used to generate all the graphs do not allow multiple autocratic breakdowns.

Figures A5 and A6 and Table A3 present the results of a set of logistic regression models estimating the relationships between rent leverage and oil/gas income per capita, respectively, and the likelihood of an autocratic regime failure (as coded by GWF) in any given country year. We include, but do not report coefficients for, three cubic splines in each model. In our baseline models (a17-a20), rent leverage has the expected result that constitutes the resource curse: oil wealth measured as rent leverage lowers the risk of autocratic breakdown in any given country-year, both with and without the inclusion of the post-1980 dummy and interaction with rent leverage. Model a17 estimates the impact of rent leverage accounting for development, growth, democratic neighbors, and the post-1980 effect. Here, rent leverage is significant ( $p < .05$ ) but loses statistical significance when we include the post-1980 interaction variable. Similarly, oil income per capita is statistically significant in the same specification, but only when we omit the post-1980/oil interaction (models a19 and a20). When we include that interaction, the coefficient for oil income is negative (i.e. lowering risk of breakdown) but, like rent leverage, not significant. Each element of our limited battery of control variables generally comports with the extant literature. Economic growth is consistently and significantly stabilizing for autocracies, in all model specifications, and proximate democracies are consistently and significantly related to a greater likelihood of breakdown. GDP per capita, the post-1980 dummy variable, and the post-1980/oil interaction all fail to achieve statistical significance.<sup>1</sup>

**Figures A5 and A6 and Table A3 about here**

When we shift in models a21-a24 to estimating these same models using our counterfactual dataset in which Saudi Arabia has conquered its five eastern neighbors prior to 1950 and thus absorbed their oil wealth, none of the oil variables remain statistically significant. This difference is substantively the same as the hazard models reported in the main text of the paper; in a global dataset covering nearly sixty years, the presence of five small Gulf kingdoms entirely accounts for the observed relationship between oil wealth and autocratic regime stability. This finding is even more striking when we realize that the control variables have stable effects across all models. Figures A5 and A6 present these

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<sup>1</sup> We note here for the reader that in all of our reported results GDP per capita appears to be a zero effect. It is not—it is positive and non-zero—but the coefficient size is more than three zero decimal places because of its small size in all model specifications, and thus *substantively* near to zero.

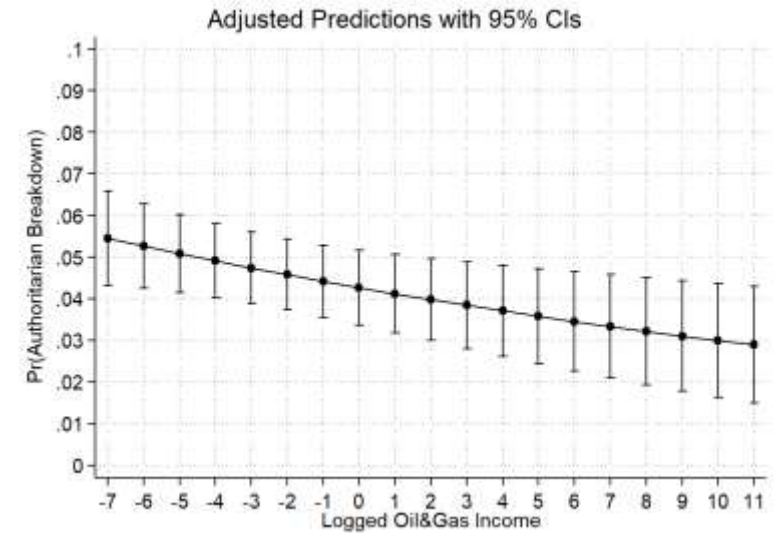
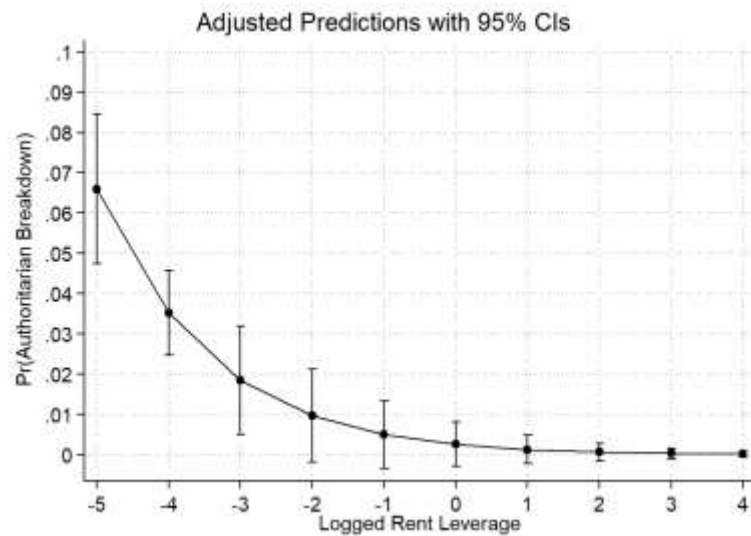
changing results visually: given the small size and disproportionate dependence on oil production of the five principalities, the dramatic difference in the rent leverage predicated probability curve is not surprising. The predicted probability curve for oil income looks generally similar with the raw and counterfactual data, respectively, but with a much wider confidence interval in the latter.

**Table A3. Logit Models on the Impact of Oil Wealth on Authoritarian Breakdown with Geddes Autocratic Spell**

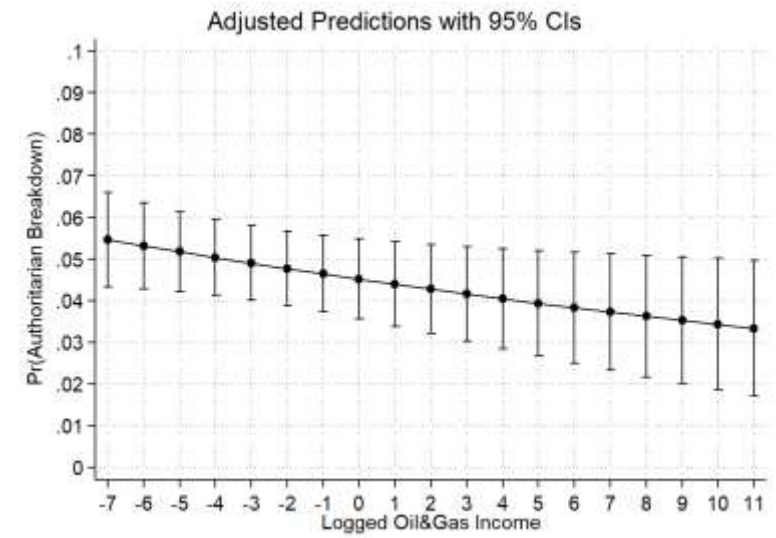
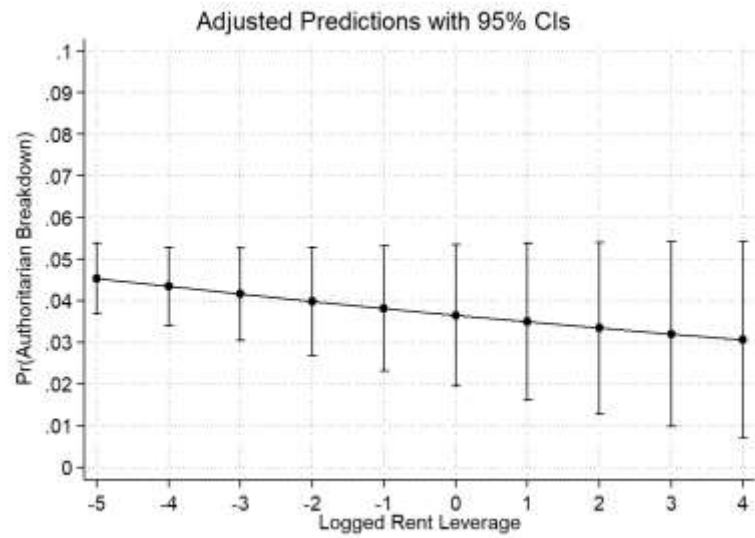
Models Variables	a17	a18	a19	a20	a21	a22	a23	a24
	Base Models			Saudi Counterfactual				
GDP	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Growth Rate	-6.392*** (1.374)	-6.419*** (1.363)	-6.050*** (1.261)	-6.091*** (1.248)	-6.226*** (1.346)	-6.227*** (1.358)	-6.230*** (1.316)	-6.270*** (1.300)
Democratic Neighbors	1.588*** (0.345)	1.561*** (0.342)	1.698*** (0.346)	1.660*** (0.352)	1.451*** (0.365)	1.451*** (0.365)	1.627*** (0.343)	1.591*** (0.349)
Rent Leverage ( <i>logged</i> )	-0.605*** (0.210)	-0.372* (0.202)						
Oil & Gas Income ( <i>logged</i> )			-0.038** (0.017)	-0.012 (0.024)				
RL Counter ( <i>logged</i> )					-0.045 (0.042)	-0.046 (0.054)		
OG Counter ( <i>logged</i> )							-0.030* (0.017)	-0.004 (0.025)
Post 1980 Dummy	-0.101 (0.179)	-2.331 (1.717)	-0.077 (0.179)	-0.165 (0.171)	-0.079 (0.178)	-0.069 (0.441)	-0.077 (0.179)	-0.166 (0.173)
Rent Leverage ( <i>logged</i> )*Post 1980		-0.5 (0.388)						
Oil & Gas Income ( <i>logged</i> )*Post 1980				-0.043 (0.028)				
RL Counter ( <i>logged</i> )*Post 1980						0.002 (0.066)		
OG Counter ( <i>logged</i> )*Post 1980								-0.044 (0.029)
Constant	-5.667*** (1.011)	-4.614*** (0.944)	-3.093*** (0.255)	-3.015*** (0.248)	-3.172*** (0.323)	-3.177*** (0.399)	-3.048*** (0.254)	-2.968*** (0.247)
Observations	3349	3349	3349	3349	3234	3234	3234	3234
AIC	1305.884	1306.038	1314.967	1314.53	1310.538	1312.537	1308.125	1307.748
BIC	1367.048	1373.319	1376.131	1381.81	1371.353	1379.434	1368.94	1374.645

Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ . Analysis is by logistic regression. Robust standard errors in parentheses. Natural cubic splines of peace years are included in all models but not shown in this table. RL Counter – Rent Leverage Counterfactual; OG Counter – Oil/Gas Income Counterfactual. The coefficients of GDP are eighth decimal points.

**Figure A5. Predicted Probabilities of Authoritarian Breakdown as a Function of Rent Leverage (Model a17) and Oil & Gas Income (Model a19) with Geddes Autocratic Spell**



**Figure A6. Predicted Probabilities of Authoritarian Breakdown by Counterfactual Rent Leverage (Model a21) and Oil & Gas Income (Model a23) with Geddes Autocratic Spell**





## ADDITIONAL TESTS RESULTS

### Cubic Polynomials

All of the original logit models in the manuscript, and the ones above, include cubic splines, although we do not report their coefficients. Below, we report a set of robustness tests that replace the splines with the cubic polynomials of each authoritarian regime's duration in years. In these logit models, we follow Carter and Signorino (2010)'s recommendation:

$$P(y_i = 1|x_i, t) = \frac{1}{1 + \exp [-(x_i\beta + \alpha_1 t_i + \alpha_2 t_i^2 + \alpha_3 t_i^3)]}$$

This is the logic equation where  $s(t_i) = \alpha_1 t_i + \alpha_2 t_i^2 + \alpha_3 t_i^3$  is a cubic polynomials approximation. With the cubic polynomials, there is no substantial change in all the logic models. See Tables A4 and A5.

**Table A4. Logit Models on the Impact of Oil Wealth on Authoritarian Breakdown with Geddes Autocratic Spell with Cubic Polynomials**

	Model a25	Model a26	Model a27	Model a28	Model a29	Model a30	Model a31	Model a32
	Base Models			Saudi Counterfactual				
GDP	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Growth Rate	-6.331*** (1.371)	-6.360*** (1.360)	-5.987*** (1.260)	-6.027*** (1.248)	-6.265*** (1.358)	-6.262*** (1.368)	-6.251*** (1.326)	-6.280*** (1.312)
Democratic Neighbors	1.562*** (0.342)	1.534*** (0.339)	1.668*** (0.340)	1.633*** (0.345)	1.463*** (0.366)	1.463*** (0.367)	1.637*** (0.344)	1.604*** (0.349)
Rent Leverage ( <i>logged</i> )	-0.596*** (0.211)	-0.365* (0.206)						
Oil & Gas Income ( <i>logged</i> )			-0.037** (0.017)	-0.011 (0.024)				
RL Counter ( <i>logged</i> )					-0.048 (0.041)	-0.046 (0.054)		
OG Counter ( <i>logged</i> )							-0.029* (0.017)	-0.004 (0.025)
Post 1980 Dummy	-0.097 (0.177)	-2.299 (1.747)	-0.075 (0.177)	-0.162 (0.172)	-0.086 (0.180)	-0.106 (0.439)	-0.085 (0.180)	-0.17 (0.176)
Rent Leverage ( <i>logged</i> )*Post 1980		-0.494 (0.395)						
Oil & Gas Income ( <i>logged</i> )*Post 1980				-0.043 (0.028)				
RL Counter ( <i>logged</i> )*Post 1980						-0.003 (0.066)		
OG Counter ( <i>logged</i> )*Post 1980								-0.042 (0.029)
Authoritarian Regime Duration	-0.037*** (0.014)	-0.038*** (0.014)	-0.044*** (0.015)	-0.046*** (0.014)	-0.009 (0.030)	-0.009 (0.030)	-0.012 (0.030)	-0.016 (0.030)

Authoritarian Regime Duration <sup>2</sup>	0.001*	0.001*	0.001**	0.001***	-0.001	-0.001	-0.001	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Authoritarian Regime Duration <sup>3</sup>	-0.000*	-0.000*	-0.000**	-0.000***	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-5.544***	-4.504***	-3.000***	-2.920***	-3.235***	-3.226***	-3.086***	-3.000***
	(1.014)	(0.962)	(0.250)	(0.240)	(0.341)	(0.419)	(0.277)	(0.270)
Observations	3349	3349	3349	3349	3234	3234	3234	3234
AIC	1303.531	1303.755	1312.178	1311.805	1306.906	1308.903	1304.924	1304.767
BIC	1358.579	1364.919	1367.226	1372.969	1361.639	1369.718	1359.658	1365.582

*Note:* \*\*\* p<0.01, \*\* p<0.05, \* p<0.10. Analysis is by logistic regression. Robust standard errors in parentheses. RL Counter – Rent Leverage Counterfactual; OG Counter – Oil/Gas Income Counterfactual. The coefficients of GDP are eighth decimal points.

**Table A5. Logit Models on the Impact of Oil Wealth on Authoritarian Breakdown with CGV Autocratic Spell with Cubic Polynomials**

	Model a33	Model a34	Model a35	Model a36	Model a37	Model a38	Model a39	Model a40
	Base Models			Saudi Counterfactual				
GDP	0.000** (0.000)	0.000** (0.000)	0.000* (0.000)	0.000* (0.000)	0.000* (0.000)	0.000* (0.000)	0.000* (0.000)	0.000* (0.000)
Growth Rate	-3.674** (1.646)	-3.882** (1.695)	-3.577** (1.562)	-4.005*** (1.554)	-3.761** (1.727)	-3.673** (1.786)	-3.621** (1.659)	-4.195** (1.654)
Democratic Neighbors	-2.838*** (0.789)	-2.838*** (0.794)	-3.010*** (0.868)	-2.973*** (0.884)	-2.810*** (0.806)	-2.805*** (0.787)	-2.979*** (0.862)	-2.933*** (0.881)
Rent Leverage ( <i>logged</i> )	-0.049 (0.361)	-0.235 (0.494)						
Oil & Gas Income ( <i>logged</i> )			0.038 (0.039)	-0.006 (0.060)				
RL Counter ( <i>logged</i> )					-0.019 (0.071)	-0.142 (0.094)		
OG Counter ( <i>logged</i> )							0.034 (0.039)	-0.021 (0.061)
Post 1980 Dummy	-0.117 (0.418)	1.665 (1.443)	-0.016 (0.401)	0.032 (0.401)	-0.094 (0.413)	1.038 (0.825)	-0.010 (0.406)	0.056 (0.408)
Rent Leverage ( <i>logged</i> )*Post 1980		0.415 (0.366)						
Oil & Gas Income ( <i>logged</i> )*Post 1980				0.071 (0.062)				
RL Counter ( <i>logged</i> )*Post 1980						0.196 (0.123)		
OG Counter ( <i>logged</i> )*Post 1980								0.086 (0.063)
Authoritarian Regime Duration	-7.806*** (2.171)	-8.400*** (2.172)	-7.760*** (2.149)	-8.429*** (2.140)	3.779*** (0.936)	3.169*** (1.047)	3.676*** (0.948)	3.188*** (1.046)

Authoritarian Regime Duration <sup>2</sup>	6.847*** (2.392)	7.637*** (2.375)	6.810*** (2.370)	7.632*** (2.353)	-6.887*** (0.462)	-6.287*** (0.496)	-6.762*** (0.440)	-6.416*** (0.485)
Authoritarian Regime Duration <sup>3</sup>	-2.057*** (0.568)	-2.311*** (0.560)	-2.047*** (0.562)	-2.304*** (0.559)	0.116*** (0.008)	0.106*** (0.008)	0.113*** (0.007)	0.108*** (0.008)
Constant	0.282 (1.656)	-0.484 (2.199)	0.572 (0.401)	0.560 (0.416)	0.351 (0.640)	-0.348 (0.774)	0.541 (0.403)	0.517 (0.420)
Observations	3807	3807	3807	3807	3616	3616	3616	3616
AIC	381.028	381.749	378.654	376.565	367.493	366.252	365.771	366.855
BIC	437.229	444.195	434.856	432.767	417.038	421.99	415.316	428.787

*Note:* \*\*\* p<0.01, \*\* p<0.05, \* p<0.10. Analysis is by logistic regression. Robust standard errors in parentheses. RL Counter – Rent Leverage Counterfactual; OG Counter – Oil/Gas Income Counterfactual. The coefficients of GDP are eighth decimal points.