The Political Business Cycle for Climate Legislation

By

Johann Caro-Burnett
(Hiroshima University)
Eric Weese
(The University of Tokyo)

June 2022

CREPE DISCUSSION PAPER NO. 123

CENTER FOR RESEARCH AND EDUCATION FOR POLICY EVALUATION (CREPE)
THE UNIVERSITY OF TOKYO
http://www.crepe.e.u-tokyo.ac.jp/

The Political Business Cycle for Climate Legislation*

Johann Caro-Burnett† Eric Weese‡

June 7, 2022

Abstract

The political economy literature has established the existence of a political business cycle, where politicians act primarily near election years in order to improve their party's prospects of victory. We use monthly panel data at the country level to show that climate legislation tends to occur just before elections. More climate laws than average are passed in the six months before an election, and fewer climate laws than average are passed in the six months after the election winners begin their terms in office. We then look into democracy indicators, to find that unconsolidated democracies are drive the increase in climate legislation before elections while consolidated democracies drive the decrease in legislation at the beginning of a new term. Autocracies do not follow this cycle, and more climate laws are passed at the beginning of a new term in these countries. Climate legislation thus appears to be a form of political advertising, and is used before elections in democracies and after elections in autocracies.

Keywords: Clientelism; Climate Laws; Elections; Environmental Laws

JEL: D72; Q5

*We thank Oskar Escobar-Sossa for valuable research assistance.

†Hiroshima University and NERPS. Higashihiroshima - Japan. johanncb@hiroshima-u.ac.jp.

‡Institute of Social Science, The University of Tokyo. Tokyo-Japan. weese@iss.u-tokyo.ac.jp

1 Introduction

Political business cycle (PBC) theory states that governments strategically send signals of "good performance" preceding elections in order to increase their chances of victory. This theory has been studied since Nordhaus (1975), and there are several empirical studies testing the existence of a political business cycle on fiscal and monetary policy.[1]

We study environmental legislation, which is an easy-to-observe outcome. In previous research, Fankhauser et al. (2015) analyze annual election data using a multi-country panel. They show that there is no increase in the amount of climate legislation in the year before an election year, but there is an increase the amount of climate legislation in election years themselves. However, they also find that although democratic countries pass more climate laws on average, the number of laws passed by democracies is actually significantly *reduced* during election years. These results present a puzzle in light of political business cycle theory: why would the observed increase in the number of laws passed in election years be mostly explained by non-democratic countries, where elections are presumably less important?

In this paper, we present a resolution of the puzzle posed by Fankhauser et al. (2015). We do this by using monthly rather than annual data for both climate laws and elections. We also take into account differences between countries with respect to the length of the transition period between the election date and the actual start date for newly elected politicians.

Using this new monthly data, we find results that are more closely in line with what would be predicted by political business cycle theory. Specifically, we find that climate laws are more likely to be passed during the six months preceding an election. In addition, we find evidence that the

[1] For example Blomberg and Hess (2003); Abrams and Iossifov (2006); Rose (2006); Aidt et al. (2011) and many others.

average country passes less climate legislation during the first six months of the new term.

We then use democracy scores to study which countries are driving these results. We find that the increase in pre-election climate legislation is strongest in non-consolidated democracies ("anocracies").[2] Climate legislation at the beginning of a new term, on the other hand, is driven by autocracies, with democracies less likely to pass legislation during this period. The inconsistency between the results in Fankhauser et al. (2015) and political business cycle theory is thus resolved: democracies do in fact display the expected political business cycle, but this is only visible when examining data at the monthly level. The decrease in election year legislation observed for democracies when using annual data is entirely due to a post-election decrease in the amount of climate legislation.

1.1 Literature Review

The PBC theory states that "easy-to-observe" signals are used as political advertisement. The two most prominent and well established examples of such signals are fiscal policy (i.e. government expenditure) and monetary policy (i.e. the supply of money). Nevertheless, other tools can be used for that purpose, such as (zero cost) climate legislation, as shown theoretically and empirically in List and Sturm (2006).

Only a few papers have focused on how the PBC relates to climate and the environment. Near election years, public spending on natural disasters relief increases (Klomp, 2020) as well as the declaration of events as "disaster" in the US (Downton and Pielke Jr, 2001). The approval of environmental licenses for new industrial plants licenses follows the electoral cycle in Brazil (Ferraz,

[2]This result is the similar as the finding in Dreher and Vaubel (2009) regarding a PBC for monetary policy in middle-income countries.

2007). When looking at real climate related outcomes, politicians prioritize political campaigning and economic outcomes ahead of environmental quality when an election is near. As a consequence of this behavior: wildfires increase in election years in Greece (Skouras and Christodoulakis, 2014); air quality decreases in Mexico as elections approach (Shen et al., 2021) or electoral competition is too high (Su et al., 2021); and a similar effect on air quality is observed when political promotions are due in China (Cao et al., 2019). This literature generally shows politicians sacrificing difficult-to-observe environmental quality near elections in favour of easier-to-observe economic performance.

In our paper, we consider the passage of new environmental laws, which is easily observed by voters. The previous research just discussed has generally found that, given a trade-off between difficult to observed environmental protection and easy to observe economic outcomes, politicians focus on economic outcomes. Both our results and the previous literature are thus in accordance with the PBC model because both sets of results show politicians prioritizing easy to observe outcomes in the run-up to elections.

The remainder of this paper is organized as follows: in section 2, we describe the estimation strategy. In section 3 we summarize the variables used and their source. Section 4 shows and analyzes the results. Finally, we conclude in section 5.

2 Model Specification

Our unit of observation is a month-year pair for each country. We model two measures of climate legislation: first, a dichotomous variable for whether any laws were passed, and second, the number of laws passed. For the former case, we use either a logistic or least squares specifications. For the later case, we use either an ordered logistic or a least squares specification. We pay special attention

to the dichotomous variable, because counting laws is challenging due to the heterogeneous goals, scope, and details of each law.[3]

We model the outcome variable as a function of a linear combination of periods preceding and following elections, variables for democracy quality and their interaction. Our specifications are all generalized linear models taking the form

$$\begin{aligned} E[Y_{i,t,m}] &= f\Big(\beta_0 + \beta_1 before_{i,t,m} + \beta_2 transition_{i,t,m} + \beta_3 new\_term_{i,t,m} \\ &+ \beta_4 before_{i,t,m} \times autocracy_{i,t} + \beta_5 new\_term_{i,t,m} \times autocracy_{i,t} \\ &+ \gamma X_{i,t} + u_i + v_t + z_m\Big). \end{aligned}$$

In the case of the logistic specification, f is the logistic curve. $Y_{i,t,m}$ is a dichotomous variable indicating that at least one climate law was approved in country i, year t and month m. Regarding election variables, $before_{i,t,m} = 1$ if there is an election in months one to six after (t, m); $transition_{i,t,m} = 1$ in the month of an election, the month that the next term began, and all months in between; $new\_term_{i,t,m} = 1$ in the fist six full months after the elected leader's term started (i.e. excluding the inaugural month). Regarding democracy indicators, $autocracy_{i,t} = 1$ is a yearly variable coded for countries with a polity index of at most -6. In some specifications, we also consider the difference between full democracies (with a polity index of at least 6) and "anocracies" (with a polity index between -5 and 5). Finally, $X_{i,t}$ is a vector of year-covariates described in Table 1, and u_i, v_t, and z_m are country, year, and month (seasonal) fixed effects.

For the least squares specification with a dichotomous outcome variable, we use the same defi-

[3]Since we look at monthly data, specifications that are more appropriate for large discrete outcome variables (such as poisson) are not a good fit. In our data, out of 111,744 observations, only 1942 months have one law passed, 181 months have between two and five laws passed, and no country has ever passed more than five laws in a month.

nition of the outcome variable and f is just the identity function. For the count variable, $Y_{i,t,m}$ is the number of laws approved by month, which ranges between zero and five, but the vast majority of observations are either zero or one. Under the ordered logistic specification, f is an extension of the logistic curve with five cutoff points instead of a constant term (β_0). Finally, for the count variable under the least squares specification, f is the identity function.

3 Data

We combine data from several sources to create a large panel of 194 nations and 576 month-year pairs ranging from January 1971 to December 2017. Our outcome variable is climate legislation from the LSE/Grantham Research Institute on Climate Change and the Environment. The main explanatory variables are dichotomous indicators for three stages of the events related to an election: the six-month period preceding an election, the transition period between the election month and the beginning of the new term, and the first six-month period of the new term. To code these three periods, we use the REIGN dataset that contains monthly data on elections, coups, and the beginning and end of each politician's term.[4] Although the original data has information regarding the beginning of each leader's period in power, reelections are not coded. Thus, we estimate the plausible beginning of each election-winner's term based on known transition period lengths by country. See the Appendix for the exact details of how we coded missing information.

In order to distinguish the effect of the political business cycle between democracies and autocracies, we use the Polity5 database. The main variable in this database is the polity2 index, which ranges from -10 to 10. According to Polity5, an *autocracy* has a score of -6 or less, an

[4]For more details about the REIGN dataset, see Bell (2016).

Table 1: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
any law	111,744	0.019	0.137	0	1
number of laws	111,744	0.021	0.159	0	5
before	111,744	0.083	0.275	0	1
transition	111,744	0.037	0.190	0	1
beginning	111,744	0.081	0.273	0	1
autocracy (polity2≤-6)	83,784	0.312	0.463	0	1
anocracy (-5≤polity2≤5)	83,784	0.246	0.431	0	1
democracy (polity2≥6)	83,784	0.442	0.497	0	1
eu	111,744	0.047	0.212	0	1
kyoto	111,744	0.037	0.189	0	1
log gdp/pc	90,576	8.275	1.452	5.040	12.044
log population	109,092	15.185	2.216	8.655	21.057
log emissions	98,724	8.828	2.677	1.299	16.120
system:					
presidential	81,492	0.565	0.496	0	1
assembly-elected president	81,492	0.101	0.301	0	1
parliament	81,492	0.334	0.472	0	1
orientation:					
right	80,184	0.218	0.413	0	1
center	80,184	0.074	0.261	0	1
left	80,184	0.304	0.460	0	1
polarization	72,288	0.365	0.733	0	2
competitive	86,772	32.997	33.975	0.005	0.995
log damages	111,744	2.290	4.694	0	19.370
log deaths	111,744	1.331	2.184	0	12.613
log affected	111,744	3.817	5.270	0	19.664

The climate laws data comes from the LSE/Grantham Research Institute on Climate Change and the Environment. Elections related events were coded using the REIGN dataset. The autocracy, anocracy and democracy indicators are based on the polity index from the POLITY5 database version. The macroeconomic variables come from the World Bank; gdp/pc is expressed in millions 2015 real USD; population is expressed in millions; emissions are expressed in million metric CO2eq tons. The political system, government orientation and polarization variables are from the DPI. Polarization is obtained by assigning numbers of -1,0 and 1 to the orientation of each party and then finding the maximum difference between the executive party and the four principle parties of the legislature. The variable *competitive* captures how competitive were the most recent elections, it was coded by the authors using the vote shares from the DPI, and it is defined as the absolute value of the winner's vote share minus 0.5. The data on natural disasters comes from the CRED/UCLouvain International Disaster Database; damages refer to economic damages expressed in thousand USD; deaths and affected people are expressed in number of humans.

anocracy (or partial democracy) has a score between -5 and 5, and a (full) democracy has a score of 6 or more. Lastly, we use yearly macroeconomic variables from the World Bank, political indicators from the Database of Political Institutions 2017 (DPI) and natural disasters data from the

CRED/UCLouvain International Disaster Database. Summary statistics are displayed in Table 1.

4 Results

Table 2 shows our estimates of the political business cycle in an average country, regardless of their democracy level. Columns I-V show our main specification, which is the logistic model, as explained in Section 2. Column VI uses a least squares specification, but still using the dichotomous variable for *any law*. On the other hand, columns VII and VIII use the number of laws, and the model specifications are an ordered logit and least squares respectively.

First, we note that in all cases, the coefficient for the six months *before* an election are positive and statistically significant. This confirms the PBC hypothesis: it appears that politicians pass legislation for campaigning purposes. The coefficient of the *transition* is negative, suggesting that there may be fewer environmental laws passed during the transition period; however, this coefficient is never statistically significant and is small in magnitude, and thus we do not explore transition period effects further. The coefficient for the be period at the *beginning* of the term following an election is consistently negative and sometimes statistically significant. We will later see that this 6-month period's effect is related to the degree of democracy in each country.

Table 2: Climate Laws and Elections

	at least one law						number of laws	
	logit					least squares	ordered logit	least squares
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
before election	0.150*	0.150*	0.154*	0.170*	0.163#	0.00448*	0.160#	0.00467#
	(0.0734)	(0.0738)	(0.0740)	(0.0835)	(0.0836)	(0.00204)	(0.0833)	(0.00239)
transition period	-0.0662	-0.0721	-0.0986	-0.0935	-0.0993	-0.00306	-0.116	-0.00438
	(0.111)	(0.111)	(0.113)	(0.128)	(0.128)	(0.00302)	(0.128)	(0.00353)
beginning of administration	-0.130	-0.129	-0.136	-0.210*	-0.218*	-0.00496*	-0.233*	-0.00668**
	(0.0835)	(0.0838)	(0.0844)	(0.0985)	(0.0986)	(0.00211)	(0.0985)	(0.00247)
eu		1.754***	2.046***	2.120***	2.123***	0.0845***	2.147***	0.0959***
		(0.214)	(0.223)	(0.253)	(0.253)	(0.00394)	(0.254)	(0.00461)
kyoto		-0.240*	-0.0457	0.137	0.146	0.0605***	0.133	0.0691***
		(0.111)	(0.128)	(0.144)	(0.145)	(0.00422)	(0.145)	(0.00494)
log gdp/pc			-0.728**	-0.755**	-0.742**	-0.00471	-0.736**	-0.00533
			(0.230)	(0.267)	(0.268)	(0.00309)	(0.268)	(0.00361)
log pop			0.618	0.771	0.783	-0.0147*	0.798	-0.0164*
			(0.482)	(0.559)	(0.559)	(0.00596)	(0.559)	(0.00698)
log emissions			0.571***	0.626***	0.621***	0.00679**	0.612***	0.00763**
			(0.149)	(0.176)	(0.177)	(0.00226)	(0.177)	(0.00264)
observations	97,272	97,272	76,440	57,864	57,864	64,884	64,884	64,884
mean dep. var.	0.022	0.022	0.027	0.028	0.028	0.025	0.028	0.028
political covariates				✓	✓	✓	✓	✓
natural disasters covariates					✓	✓	✓	✓
country F.E.	✓	✓	✓	✓	✓	✓	✓	✓
year F.E.	✓	✓	✓	✓	✓	✓	✓	✓
month F.E.	✓	✓	✓	✓	✓	✓	✓	✓

$^{\#}$ $p < 0.1$,* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. *Before election* is a dichotomous variable that equals one on months one to six before an election happened. *Transition period* is a dichotomous variable that equals one on months (estimated to occur) between an election month and the beginning of the next administration. *Beginning of administration* is a dichotomous variable that equals one on months one to six of the (estimated) new administration. See Section 3 for more details.

In addition to the main results that climate legislation increases before an election and decreases following an election, Table 2 also shows that EU countries and high emission countries pass more climate laws. We observe that after controlling for EU, emissions and country fixed effects, nations with higher gdp per-capita pass fewer laws. As country fixed effects are included, this means that countries that have experienced fast economic growth then pass fewer climate laws.

In Table 3, we now interact our election-stage variables with indicators for democracy. We consider both comparisons that distinguish only between autocratic countries and non-autocratic countries (grouping "anocracies" together with democracies) as well as comparisons that include separate dichotomous variables for autocracy, anocracy, and democracy. Elections in autocratic countries do not involve campaigning and voting in the same way as in democracies, and we would thus not expect the same sort of political business cycle effect in these countries. In all columns of Table 3, we restrict attention to the outcome variable that indicates whether at least one law has been passed in that month-year.

In Table 3, we display the rows showing the coefficients for our interaction effects in a non-standard order. This allows us to more easily show the relationship between the results in Columns I-III, where democratic countries and "anocracies" are grouped together, and the results in Columns IV-VI, where democracies, "anocracies", and autocracies are all examined separately. We indicate with braces the three cases where a single interaction effect in Columns I-III expands to two separate interaction effects in Columns IV-VI, as well as where the main "non-autocracy" effect expands to separate "democracy" and "anocracy" main effects.

Table 3: Climate Legislation and Democracy Level. Dependent Variable: at least one law passed

	autocracy versus non-autocracy				democracy, anocracy and autocracy		
	(I)	(II)	(III)		(IV)	(V)	(VI)
before×non-autocracy	0.149#	0.156#	0.150#	before×democracy	0.0999	0.0899	0.0821
	(0.0793)	(0.0877)	(0.0879)		(0.0882)	(0.0977)	(0.0979)
				before×anocracy	0.363*	0.467*	0.465*
					(0.179)	(0.196)	(0.196)
before×autocracy	0.296	0.319	0.308	before×autocracy	0.305	0.325	0.314
	(0.360)	(0.383)	(0.382)		(0.361)	(0.383)	(0.383)
				transition×democracy	-0.151	-0.150	-0.157
transition×non-autocracy	-0.102	-0.0715	-0.0764		(0.130)	(0.144)	(0.144)
	(0.119)	(0.131)	(0.131)	transition×anocracy	0.132	0.323	0.329
					(0.284)	(0.309)	(0.309)
transition×autocracy	0.901*	-0.00212	-0.0200	transition×autocracy	0.921*	0.0213	0.00197
	(0.458)	(0.742)	(0.742)		(0.459)	(0.742)	(0.742)
				beginning×democracy	-0.272**	-0.347**	-0.355**
beginning×non-autocracy	-0.157#	-0.255*	-0.262*		(0.101)	(0.114)	(0.114)
	(0.0904)	(0.104)	(0.104)	beginning×anocracy	0.351#	0.187	0.183
					(0.197)	(0.245)	(0.245)
beginning×autocracy	0.817*	0.708#	0.693#	beginning×autocracy	0.827*	0.715#	0.699#
	(0.339)	(0.385)	(0.385)		(0.339)	(0.385)	(0.385)
non-autocracy	0.644**	0.682*	0.681*	democracy	0.879**	1.091***	1.091***
	(0.244)	(0.267)	(0.267)		(0.269)	(0.308)	(0.308)
				anocracy	0.512*	0.537*	0.535*
					(0.248)	(0.272)	(0.272)
observations	64,668	53,292	53,292	observations	64,668	53,292	53,292
mean dep. var.	0.029	0.029	0.029	mean dep. var.	0.029	0.029	0.029
macroeconomic covariates	✓	✓	✓	macroeconomic covariates	✓	✓	✓
political covariates		✓	✓	political covariates		✓	✓
natural disasters covariates			✓	natural disasters covariates			✓
all fixed effects	✓	✓	✓	all fixed effects	✓	✓	✓

$^{\#}$ $p < 0.1$,* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. *Before election* is a dichotomous variable that equals one on months one to six before an election happened. *Transition period* is a dichotomous variable that equals one on months (estimated to occur) between an election month and the beginning of the next administration. *Beginning of administration* is a dichotomous variable that equals one on months one to six of the (estimated) new administration. Democracy=1 if polity2$\geq$ 6, anocracy=1 if $-5 \leq$ polity2$\leq$ 5, autocracy = 1 if polity2≤ -6. non-autocracy = democracy + anocracy. All columns have macroeconomic covariares, country fixed effects, year fixed effects, and month fixed effects. Some columns have political and natural disaster covariares. Non-relevant coefficients were not displayed for brevity. See Section 3 for more details on the data.

The interaction effect of periods before election and non-autocracies in Columns I-III of Table 3 suggests that the political business cycle effect observed in Table 2 is due to non-autocracies passing more laws than average in the six months preceding an election; however, this effect is only statistically significant at the 10% level. In Columns IV-VI we see that this effect is mainly due to a statistically significant result for anocracies, with democracies displaying a coefficient close to zero.

The first result from Table 3 is thus that the political business cycle in environmental legislation is driven mainly by anocracies. One potential explanation for this is that in anocracies politicians must campaign for election, and use environmental legislation as part of their campaigning, but they do not actually intend for this legislation to be enforced. There are thus no interest groups of voters that are upset by this legislation, because the voters who would be negatively affected understand that the laws will not be enforced. In contrast, if environmental legislation were passed in consolidated democracies, it would likely be enforced: this would be salient for the voters who would be negatively affected, and thus environmental legislation is a more effective campaign tool in anocracies (where it is more likely to be talk without action) than in consolidated democracies (where the laws would need to be enforced).[5] This explanation would be in accordance with the findings in Dreher and Vaubel (2009), where the monetary political business cycle is stronger in

[5]We can identify two types of legislation that would be likely used as a campaign tool: First, laws that are obviously campaigning and have zero cost to any of the parties involved. These laws may exhort people to mitigate emissions or adapt to climate change or simply declare the government's "good intentions," but do not actually have any sections that would be enforceable with legal penalties (for mitigation) or a clear plan how to improve the livelihood of those affected (for adaptation). For example, in January 2014, Afghanistan (with a polity2 score of -1) passed a law ahead of the April 2014 election. This law regards disaster risk management, but has no clear information to what are the actions to be taken nor the source of funding (https://reliefweb.int/sites/reliefweb.int/files/resources/morrd_disaster_management_-_final_-_june_2014_2.pdf). Second, laws that would be actually enforceable, but where enforcement would be out of character with what is generally known about the country. For example, Bangladesh passed a law in September 2013, ahead of the January 2014 election. This law has very specific targets regarding national energy savings (https://policy.asiapacificenergy.org/sites/default/files/EEC_Master_Plan_SREDA_2.pdf). See Appendix Table A2 for a full list of anocracies that have passed laws ahead of elections.

middle-income countries, rather than the most developed countries.

The second result in Table 3 concerns the amount of environmental legislation at the beginning of new terms for elected officials. In Columns I-III, we examine beginning of term effects for autocracies and non-autocracies. On the one hand, we observe that the coefficient for the interaction term of beginning of a new term and non-autocracies is negative and statistically significant. On the other hand, the coefficient for the interaction term of beginning of a new term and autocracies is positive and statistically significant. To better understand these two results, we must look at Columns IV-VI.

In Columns IV-VI, we examine beginning of term effects for non-autocracies more carefully. The interaction coefficient on beginning of a new term and democracy is negative and statistically significant, while the coefficient for beginning of a new term and anocracy is not significant. Together, these two results indicate that only (consolidated) democracies are less likely to pass environmental legislation immediately after elections.

This decrease in legislation in democracies at the beginning of a new term could be due to the fact that the legislation that would have been passed in this period was brought forward because of its advertising function. Alternatively, it could be that in consolidated democracies the opposing political parties have much higher decision-making power, due to institutional differences between countries. Thus, in order to design and pass new laws, politicians need time to bargaining with the opposition before the approval of new legislation. Since we observe that, although positive, there is no statistically significant effect of the period before election in consolidated democracies on climate legislation, perhaps the second explanation is more likely.

Thus, it appears that democracies pass fewer laws at the beginning of a new term because it takes more time to reach to a resolution between the government and the opposition in those countries.

On the other hand, despite electing their leaders in elections, the lack of clear checks an balances in anocracies makes it possible to more quickly pass laws at the beginning of a new term. This particular six-month period in anocracies is no different from any other period of a politician's term.

Turning finally to autocracies, in both Columns I-III and IV-VI the effect of the beginning of a new term for autocracies is positive and statistically significant (although sometimes only at the 10% level). This indicates that autocrats are likely to pass new environmental legislation at the beginning of their terms. One explanation for this result would be that elections are not emphasized in autocracies, and autocrats prefer instead to draw attention to continuation of their rule. One way to do this is to announce new laws around the time when they are beginning a new term in office. Another reason would be to advertise to foreign investors that, despite elections being just nominal, politicians in power have liberal and cooperative policies in their agenda.[6]

5 Conclusions

We study the political business cycle for climate legislation in a large monthly panel that includes the vast majority of countries. We find that, in the average country, more laws are passed just before election and fewer laws are passed at the beginning of a new term. We then examine how differences in the level of democracy in a country affect these results.

First, we examine our finding that environmental legislation is often passed right before elections. Here, we observe that this result is mainly driven by anocracies. The increase in legislation in anocracies would be easily explained if the legislative activity we observe is intended mainly as political advertising to ensure winning at the election. This leads to a question for future research:

[6]See Appendix Table A2 for a full list of autocracies engaging in this behavior.

how much of the legislation that we observe in our dataset is actually intended to have an effect such as mitigating or adapting to climate change? There may even be a political business cycle effect with respect to the enforcement of laws, where laws that were passed immediately before an election are not actually intended to be enforced, whereas those passed at other times are more carefully written and are more likely to be intended for actual enforcement.

Second, we consider the decrease in climate legislation following an election. This result turns out to be entirely driven by consolidated democracies. We believe that this decrease is because of the time required for bargaining between various parties in the legislature, which would result in a slowdown in legislation at the beginning of a new administration, but the precise mechanism at work here is an area for future research.

In contrast, we find that autocracies pass more laws at the beginning of a new term. The explanation for this effect in autocracies is not as obvious. One potential reason could be to attract foreign investment by showing "liberal policies." Another reason could be to prevent coups by showing the population that, even if elections are just nominal, the leader is "still benevolent." A third alternative explanation is that elections are not a meaningful event in those countries, and autocrats prefer instead to draw attention to continuation of their rule. We leave these ideas for future research.

The political business cycle literature can be seen as a critique of politicians who use economic outcomes as a campaigning tool. Unlike fiscal and monetary policy, the adoption and enforcement of climate laws, especially in large economies, may affect other countries. One obvious effect is via carbon leakage: countries with weaker regulations may end up increasing their emissions. In addition, a not-so-obvious effect regards signalling and setting precedents. It is possible that "green voters" in smaller economies demand their politicians to follow the climate agenda that richer

countries are pursuing. Nevertheless, if those laws are simply nominal and not intended to impose significant changes, not much will be accomplished. Thus, the findings that climate legislation also follow a political business cycle is discouraging.

Climate legislation is extremely important and urgent due to the already observed effects of climate change. Thus, more research is needed to understand what drives countries to not only increase the amount of legislation, but to actually create meaningful and enforceable laws.

References

Abrams, Burton A and Plamen Iossifov (2006) "Does the Fed contribute to a political business cycle?" *Public Choice*, 129 (3), 249–262.

Aidt, Toke S, Francisco José Veiga, and Linda Gonçalves Veiga (2011) "Election results and opportunistic policies: A new test of the rational political business cycle model," *Public choice*, 148 (1), 21–44.

Bell, Curtis (2016) "The Rulers, Elections, and Irregular Governance (REIGN) Dataset," Broomfield, CO: OEF Research. https://oneearthfuture.org/datasets/reign.

Blomberg, S Brock and Gregory D Hess (2003) "Is the political business cycle for real?" *Journal of Public Economics*, 87 (5-6), 1091–1121.

Cao, Xun, Genia Kostka, and Xu Xu (2019) "Environmental political business cycles: the case of PM2. 5 air pollution in Chinese prefectures," *Environmental science & policy*, 93, 92–100.

Downton, Mary W and Roger A Pielke Jr (2001) "Discretion without accountability: Politics, flood damage, and climate," *Natural Hazards Review*, 2 (4), 157–166.

Dreher, Axel and Roland Vaubel (2009) "Foreign exchange intervention and the political business cycle: A panel data analysis," *Journal of International Money and Finance*, 28 (5), 755–775.

Fankhauser, Sam, Caterina Gennaioli, and Murray Collins (2015) "The political economy of passing climate change legislation: Evidence from a survey," *Global Environmental Change*, 35, 52–61.

Ferraz, Claudio (2007) "Electoral politics and bureaucratic discretion: Evidence from environmental licenses and local elections in Brazil," Researchgate WP-228536375. https://www.researchgate.net/publication/228536375.

Klomp, Jeroen (2020) "Election or disaster support?" *The Journal of Development Studies*, 56 (1), 205–220.

List, John A and Daniel M Sturm (2006) "How elections matter: Theory and evidence from environmental policy," *The Quarterly Journal of Economics*, 121 (4), 1249–1281.

Nordhaus, William D (1975) "The political business cycle," *The review of economic studies*, 42 (2), 169–190.

Rose, Shanna (2006) "Do fiscal rules dampen the political business cycle?" *Public choice*, 128 (3-4), 407–431.

Shen, Shiran Victoria, Cesar Martinez Alvarez, and Edgar Franco-Vivanco (2021) "When Electoral Responsiveness Harms Voters: Evidence from Electoral Pollution Cycles in Mexican Municipalities," SSRN-3758310.

Skouras, Spyros and Nicos Christodoulakis (2014) "Electoral misgovernance cycles: evidence from wildfires and tax evasion in Greece," *Public Choice*, 159 (3-4), 533–559.

Su, Zheng, Anthony Pezzola, Amanda Fidalgo, and Xun Cao (2021) "Electoral competition, party system fragmentation, and air quality in Mexican municipalities," *Environmental Politics*, 30 (6), 981–1001.

Appendix

Coding Transition Periods from the REIGN Dataset

We fist eliminated elections that are within (+/-) six months of a coup, since elections in such chaotic periods are not likely to be campaigned. Some countries have both legislative and executive elections. However, one is clearly more advertised than the other during political campaign. Thus, if a legislative election happens on the same month or up to three months after an executive election, we eliminate it. If an executive election happens between months 1 to 3 after a legislative election, we eliminate it.

Later on, we measure the time length (in months) between an election and an observed change of leader. In very rare cases, this time length was more than six months. We then estimate the average transition length by country based on the observed transition lengths truncated at six months. The rounded up integer obtained is then used to estimated the missing beginnings of each term (most likely re-elections). We then merged the known transition periods and the estimated transition periods. All months between an election (including an election month) and the beginning of a term (including the inaugural month) are coded as *transition*. Then, the six months preceding an election (excluding the election month) are coded as *before*, and the six months after the beginning of the term (excluding the inaugural month) are coded as *beginning*.

Finally, in very rare occasions, some period ended up as both *before* and *beginning* period (i.e. a president resigned due to illness). In those cases, the periods were redefined as *transition* periods. This guarantees no overlapping between the three coded variables. Lastly, Czech Republic, Vietnam and Yemen were removed from the sample since, due to them being divided and/or reunited, those countries had unclear data on elections and climate legislation.

Table A1: Climate Laws and Elections (only countries with a polity2 score)

	at least one law						number of laws	
	logit					least squares	ordered logit	least squares
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
before election	0.146#	0.146#	0.158*	0.168#	0.161#	0.00454*	0.159#	0.00476#
	(0.0769)	(0.0773)	(0.0774)	(0.0855)	(0.0857)	(0.00216)	(0.0854)	(0.00255)
transition period	-0.0192	-0.0248	-0.0516	-0.0627	-0.0681	-0.00232	-0.0853	-0.00376
	(0.113)	(0.113)	(0.115)	(0.129)	(0.129)	(0.00317)	(0.129)	(0.00372)
beginning of administration	-0.112	-0.110	-0.103	-0.200*	-0.207*	-0.00508*	-0.225*	-0.00719**
	(0.0868)	(0.0871)	(0.0875)	(0.100)	(0.101)	(0.00224)	(0.101)	(0.00263)
eu		1.771***	2.077***	2.098***	2.101***	0.0806***	2.127***	0.0924***
		(0.218)	(0.226)	(0.256)	(0.256)	(0.00417)	(0.256)	(0.00491)
kyoto		-0.177	0.103	0.156	0.165	0.0628***	0.151	0.0703***
		(0.115)	(0.135)	(0.149)	(0.150)	(0.00445)	(0.149)	(0.00523)
log gdp/pc			-0.660**	-0.785**	-0.770**	-0.00713*	-0.764**	-0.00832*
			(0.250)	(0.279)	(0.279)	(0.00329)	(0.280)	(0.00387)
log pop			0.809	0.699	0.717	-0.0189**	0.731	-0.0220**
			(0.527)	(0.580)	(0.581)	(0.00649)	(0.581)	(0.00763)
log emissions			0.686***	0.683***	0.677***	0.00815**	0.668***	0.00931**
			(0.173)	(0.193)	(0.194)	(0.00248)	(0.194)	(0.00292)
observations	73,692	73,692	64,668	53,292	53,292	59,952	59,952	59,952
mean dep. var.	0.026	0.026	0.029	0.029	0.029	0.026	0.029	0.029
political covariates				✓	✓	✓	✓	✓
natural disasters covariates					✓	✓	✓	✓
country F.E.	✓	✓	✓	✓	✓	✓	✓	✓
year F.E.	✓	✓	✓	✓	✓	✓	✓	✓
month F.E.	✓	✓	✓	✓	✓	✓	✓	✓

This table replicates the results in Table 2 but eliminating countries that do not have a *polity* classification. $^{\#}$ $p < 0.1$,* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table A2: List of anocracies passing laws before election and autocracies passing laws after election

Anocracies before election								Autocracies after a new term			
country	year	month	polity2	country	year	month	polity2	country	year	month	polity2
Afghanistan	2014	1	-1	Ghana	1996	9	2	Azerbaijan	2003	12	-7
Algeria	2004	3	2	Guinea	1998	9	-1	Azerbaijan	2008	12	-7
Algeria	2014	2	2	Iran	2001	1	3	Azerbaijan	2013	12	-7
Angola	2008	6	-2	Madagascar	2013	8	3	Belarus	2006	5	-7
Angola	2012	2	-2	Malaysia	2007	12	3	Belarus	2006	9	-7
Angola	2017	5	-2	Mali	2013	6	5	Cuba	1993	5	-7
Angola	2017	6	-2	Mexico	1988	1	0	Iran	2006	2	-6
Armenia	2007	12	5	Mozambique	2009	5	5	Iran	2010	1	-7
Bangladesh	2013	9	4	Mozambique	2009	6	5	Kazakhstan	2011	9	-6
Bhutan	2007	12	-5	Myanmar	2015	9	2	Lao	2016	6	-7
Bhutan	2013	4	5	Papua New Guinea	1996	12	4	Turkmenistan	2012	6	-9
Bhutan	2013	2	5	Papua New Guinea	2016	12	5	Uzbekistan	2015	5	-9
Cambodia	2013	3	2	Sri Lanka	2005	5	5				
Cambodia	2013	1	2	Suriname	2015	1	5				
Cameroon	2011	8	-4	Tanzania	2010	7	-1				
Ivory Coast	2015	7	4	Tanzania	2015	5	3				
Ecuador	2012	9	5	Thailand	2007	7	-1				
Ecuador	2012	12	5	Togo	2014	12	-2				
Egypt	2011	12	-2	Tunisia	2004	4	-4				
Ethiopia	1994	12	1	Uganda	1995	12	-4				
Gabon	2005	10	-4	Uganda	2010	12	-1				