Asymmetric information, Reelection Pressure and Political Decision Making under Uncertainty

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Abstract

This paper examines the interaction of re-election pressure and asymmetric information in decision making under uncertainty by politicians. Politicians and voters form their beliefs and update their information in a Bayesian way. Politicians have asymmetric information and seek re-election. I show that election timing interacts with the decision quality of the politicians. The closer the election, the higher the incumbent politicians refrain from implementing the welfare-maximizing policy and deviate towards their voting base's bias. Endogenizing the politicians' information gathering leads to a higher level of information asymmetry between the politicians and voters. The theoretical model's implications are tested with a dataset on gubernatorial decisions during the national Covid-19 crisis. A difference-in-differences empirical strategy shows that the governors who had an upcoming election in 2020 were biased towards their base. The Democrat and Republican governors who did not face a forthcoming election behaved statistically similar to each other.

Keywords:

JEL Codes:

1 Introduction

Elected governments in representative democracies must act in the public's interest. The ballot box's pressure dissuades the politician from acting against the public interest, or in more divided countries, against the politician's voting base's interest. Voters would not support politicians who act against their interests, and the politician cannot remain in office. This proposition is the foundational premise of a well-functioning democratic government and would seem to be self-evident.

Nevertheless, this proposition does not hold, even in a democracy, with a competent incumbent who is motivated to seek re-election. The public relies on the politician to acquire relevant information and make informed decisions. The politician is better-informed, but the relatively ill-informed electorate chooses the politician's re-election fate. The information asymmetry creates tension in decision-making between decisions in the voting base's interest and the ones that merely look good to the voting base. This tension manifests itself in the decisions that the politician makes and the politician's information-gathering efforts.

This paper studies different aspects of this tension, theoretically and empirically. I examine the interaction of next election proximity with politicians' distortion towards policies that appear to be in the public's interest - but are not. We expect the asymmetry of information between politicians and the public to diminish over time. Therefore, the politicians who have an imminent upcoming election will be more likely to act towards the ill-informed voters' beliefs. On the other hand, the politicians facing distant elections can act based on voters' interests (and ignore voters' misguided beliefs), knowing that they will update their belief until the election. I also examine how a lack of incentive for the politician to act in the public's interest leads to the politician's sub-optimal information acquisition.

In the paper's theory section, an incumbent politician has to decide on independent issues in an uncertain environment (e.g., response to a crisis). Each particular issue consists of two opposing extremes (e.g., act forcefully or ignore the crisis). The politicians can choose anywhere between the two extremes.

The politicians' objective is to get re-elected (or their party to stay in power). They act to maximize their re-election probability at the election date in expectation. The voters are not active players. They judge politician's actions based on the information available to them. The incumbent politicians' chance of re-election declines if their decision deviates from the public's belief about the optimal action. The decline is proportional to the size of the deviation and the quality of public information.

The politician receives an unbiased signal of the best policy before making her decision. Before making any decision, the public receives a noisier version of the same signal. The politician forms an expectation of the public's belief on the election day and takes action. The public receives many more independent signals until the election day and keeps updating its belief. The public can have a diffuse or non-diffuse prior, and their signals may be more or less informative than the politician's signal.

I consider two possibilities for the public's belief and solve the model for those cases: unified and polarized. A unified public means that voters agree about the probabilities of the optimal action. On the other hand, a polarized public means that voters sort themselves into two opposing groups. The group members agree within itself but disagree between the two groups.

In either case, with an innocuous assumption about information asymmetry, I show that the politician deviates from implementing the best action conditional on her information set. Moreover, the closer the election, the more the politician deviates from implementing the welfare optimizing policy, holding everything else constant. The required assumption is that the politician has superior information at the time of decision making about the best action compared to the public. Some (but not all) of this superior information fades away over time as the public receives more informative signals.

A polarized public implies that any politician must consider two opposing beliefs and its effect on her popularity when making a decision. Polarized elections are decided by voter turn-out, and turn outs are proportional to candidates' popularity. Following this logic, I

assume that the politicians care about their popularity among their supporters, hoping to excite them to turn-out, more than their popularity among her opposition. This assumption allows me to pin down that the direction of the politicians' deviation from the optimal decision. Their bias is towards their voting base.

As the last theoretical contribution, I endogenize the quality of the politician's signal. Exogenous signal quality is unrealistic since the politician can exert time and resources to obtain a higher quality signal. We should investigate if endogenizing the signal quality affects the result. I show that previous results still hold. Moreover, I show that the signal's quality is directly proportional to voters' signal quality and is inversely proportional to the election timing. A politician with a later election spends more resources to acquire a higher quality signal.

In the empirical section of the paper, I use a difference-in-differences strategy to test the following prediction: Two politicians who are identical except for their next election's timing behave differently during the crisis. In early 2020, United Stated was hit by the Covid-19 pandemic. In this setting, the governors are responsible for deciding on multiple policies to limit business activities and protect citizens' health in their state. About half of these governors are Republican, and the other half are Democrats. One-fifth of these governors have an upcoming election in 2020.

The voting base of Democrats assess the threat of the disease higher than the Republicans and required a more robust response from the government. The voting base of Republicans, on the other hand, emphasize the individual liberties of citizens and oppose decisive government intervention. The situation is highly uncertain since the threat of the disease's infectivity and lethality is unknown, and there are doubts about the effectiveness of different policies.

Eventually, the data shows that the Democrat governors who have an upcoming election in 2020 are the most likely to close economic activity. The Democrats and Republicans who do not have an upcoming election behave statistically similar to each other. Finally,

the Republicans who have an upcoming election in 2020 are the least likely to close any economic activity.

The empirical data is consistent with the hypothesis that the governors with an upcoming election are biased towards their voters. In contrast, the ones without an upcoming election implement their best expectation. It is worth noting that this empirical strategy does not require knowing what the optimal (correct and informed) action is. It only relies on the observed decisions made by politicians.

In the next section, I review the relevant literature. Then, in section 3, I proceed to explain the model and derive the theoretical results. In section 4, I explain the data, set up the model's empirical implications, and present the results. And I finally conclude in section 5.

2 Literature Review

Retrospective voting is the idea that voters hold the politicians (or parties) accountable for their actions during their tenure. Key (1966) has formalized this idea in his seminal work, the responsible electorate. Retrospective voting readily invites the idea of the Principal-Agent problem faced by the public. Barro (1973) and Ferejohn (1986) modeled the moral hazard problem in the accountability of the politician to allocate economic resources efficiently. Reed (1994) addressed the adverse selection problem by introducing heterogeneous politicians.

Nordhaus (1975) introduced the idea of political business cycles. If the electorate votes retrospectively, the incumbent chooses the economic policy that maximizes its probability of re-election, which is different from the optimal policy. The incumbent increases its re-election chance by "manipulating" the economy and increasing welfare in the election year [Nordhaus (1975); Suzuki (1992)]. The incumbent may also "surf" the economy, i.e. to call elections more [Palmer and Whitten (2000); Roper and Andrews (2003)] or less Smith (2003) opportunistically in favorable economic times. Kayser (2005) studies the case where

the incumbent both surfs and manipulates the economy for re-election.

In recent years researchers started to focus more on studying retrospective voting on issues other than national macroeconomic policies [e.g. school performance Berry and Howell (2007), handling disasters Healy and Malhotra (2010), and relative unemployment in a city Hopkins and Pettingill (2018)]. This literature concludes that if a policy influences a tangible outcome and is within the politician's sphere of control, then the incumbent's poor decisions harm her chances in the next election. Moreover, these papers suggest that the incumbent's punishment is mediated by media attention level on an issue.

A laboratory experiment by Woon (2012) confirms these conclusions. It asserts that "retrospective voting is a simple heuristic that voters use to cope with a cognitively difficult inference and decision problem and, in addition, suggest that voters have a preference for accountability."

Healy and Malhotra (2013), raise a few open research questions. I partially address two of them in this paper. They uncovered that no one have studied the effect of retrospective voting on policy outcomes. They also stated that no one have studied the interaction of polarization and political sorting with retrospective voting.

This brings us to the literature on political polarization in general, specifically the effects of polarization on political decision making. The consensus among political scientists is that the American political elites have become more polarized over the past few decades [Fiorina and Abrams (2008)]. Most of the literature showed polarization by focusing on congress roll calls, and deviation from the party ranks [McCarty et al. (2006)]. In addition to that, a historical analysis of politicians' speech by Gentzkow et al. (2019) showed polarization has significantly increased among the political elite since the 1990s.

But there is an ongoing debate on the degree that the American public is polarized. Some academics [Abramowitz and Saunders (2008)] assert that polarization has grown among the American public, and people hold more extreme and opposing beliefs . Others point out [Fiorina et al. (2008)] that only party sorting has increased among the public , and even

though opinions are not more polarized voter-party identification is much stronger. Political parties played a significant role in this polarization by increasing control over their members and setting a polarized agenda [Canen et al. (2020)]. Whether the public has become more polarized (holds more extreme views) or it becomes more sorted (more people self identify with political parties and its politics), it caused "the nation as a whole to hold more aligned political identities, which has strengthened partisan identity" [Mason (2015)].

Grumbach (2018) studied the interaction of decision making and polarization. He analyzed 16 issues of gubernatorial policies across US states. He showed that party control predicts socioeconomic decisions in polarized topics like health care but not in nonpolarized are like criminal justice. Moreover, the policy disparity between parties on polarized issues has increased from 1970 up to 2014.

Gentzkow and Shapiro (2010) showed that the media find it economically optimal to deviate from reporting an unbiased version of the news. They found evidence that profit-maximizing American newspapers respond to their readership biases by introducing a slant towards their base. In a similar vein, the current paper shows that incumbent politicians find it optimal to introduce a slant towards their base in implementing policies.

This paper makes use of the findings of the literature on public learning and opinion formation. Acemoglu et al. (2006) showed that it is theoretically possible for the public to be Baysian and holds polarizing opinions . Others showed that pre-existing polarized opinions might lead to a different assessment of similar information [Gerber and Green (1999); Dixit and Weibull (2007)].

This paper can be classified as part of emerging literature on responses to Covid-19. I contribute to this literature by studying how the governor's party and the election timing affect the governments' decision for implementing social distancing policies. Chernozhukov et al. (2020) studied the effect of government policies in the contagion of Covid 19. In a recent study, Allcott et al. (2020) showed that Democrats and Republicans perceive Covid-19 differently. Democrats see Covid 19 as more dangerous and expect more stringent behavior

from the government. In the absence of the aforementioned political considerations, Alvarez et al. (2020) theoretically studied the optimal policies to respond to Covid-19 . To my best knowledge, this is the first paper that discusses the political challenges in finding and implementing the optimal policy.

3 Theoretical Model

This section formalizes a game between politicians and voters. Incumbent politicians (and political parties) make decisions during their tenure. The politician wants to win re-election while the voters want the politician to make the welfare-maximizing decision. We need to formally distinguish between welfare-maximizing, the politicians' information about it, and what voters believe. These three do not always fully agree. There is an information asymmetry between politicians and voters.

This information asymmetry interacts with election timing through an information channel. Voters learn new information after the politician makes a decision. The politicians form expectations about what voters will learn until the election and bases the decision on that expectation. If the election is in the distant future and enough information becomes available to the voters at the election day, the politicians tend to act based on their superior information. Nevertheless, if the election is in the near future and politicians do not expect the voters to update their information, they tend to act more similarly to the voters' priors.

The model allows for a polarized electorate, and it also paves the way for endogenizing the information gathering efforts of the politician. The model yield a clear difference in differences prediction that can be tested with real-world data on politicians' decisions.

3.1 Setup

To formally model the interaction between the politician and voters, assume that Nature sets the welfare-maximizing action and sends a signal to the politician and the public. The

politician may be a Democrat or Republican. The public may be unified and receives a signal or polarized, and each group receives a signal separately.

Every player updates its belief according to its signal. The politician takes action. Then the public receives new signals. Finally, an election takes place. For some politicians, this election is early, and for the others, it is later.

For every politician, the model has the following timing:

- Nature sets the welfare-maximizing action for an issue
- Nature sends a signal to the politican and the politician updates her belief with a diffuse prior
- Nature sends a noisier version of the same signal to the public and the public updates its belief with its prior
- The politician chooses its action
- Public receives N independent signals from the nature and updates its beliefs until the election day
- Election takes place (Early or Later)

The real line represents the issue. A point represents the politician's decision on the real line $s \in \mathbb{R}$. I assume that there exists a unique decision point on the issue line that maximizes social welfare. Still, neither the politician nor the public knows the optimal decision point with certainty. They both have a belief about the optimal decision.

A belief is a normal distribution $\sim \mathcal{N}(s_x, \sigma_x)$ over the issue. This belief represents the true probability that a belief-holder assigns to every decision being the welfare-maximizing decision. The higher the standard deviation (σ_x), the lower the certainty of the belief holder.

Take the welfare-maximizing action to be s_o. The politician has a diffuse prior. She then receives a signal s_g about the optimal action. The signal is an unbiased random variable

with known uncertainty σ_g. Therefore, the signal has the following distribution $\mathcal{N}(s_o, \sigma_g)$. The realization of this signal is s_g. Following the Bayes rule, her belief on the best policy after receiving the signal will be $\mathcal{N}(s_g, \sigma_g)$.

Similarly, the public receives a signal $s_g + \epsilon_g$. ϵ_g is a mean-zero normally distributed random variable. The public combines the signal using its initial prior and form its belief. Therefore, the posterior belief will be normally distributed as $\mathcal{N}(s_p, \sigma_p)$. It is possible to write s_p and σ_p as a function of the prior and the signal, which will be done later. Nevertheless, this suffices for the moment.

We can think of the public's belief as the wide-held opinion of the voters. Ideology, past shared experience, and the media slant all influence public opinion. Therefore, it consists of prior information, potential bias, and a noisier version of the politician's signal. The politician knows about this belief; hence, it has no extra information for a politician's inference of s_o. She can safely ignore this belief for inferring s_o.

After the politician and the public both receive the signal, the politician chooses her action. However, the public's belief is dynamic. For simplicity, assume that the public receives exactly N signals from nature up to the election day. Each signal is consistent and distributed as $\mathcal{N}(s_o, \sigma_y)$. Label every realization of these signals as $\hat{s}_p^i$. Therefore, the public opinion on the election day would be normal with the following distribution:

$$s_p(T) \sim \mathcal{N}\left(\frac{s_p\sigma_y^2 + \sum_{i=1}^{N} \hat{s}_p^i \sigma_p^2}{\sigma_y^2 + N\sigma_p^2}, \frac{\sigma_p^2\sigma_y^2}{\sigma_y^2 + N\sigma_p^2}\right) \tag{1}$$

The public wants the politician to implement the welfare-maximizing policy, but it does not know about the information set available to her. The politician may be incompetent and have high uncertainty. She may have some ulterior motives and does not implement the best policy, or she gets unlucky, and the signal's realization is far off. Irrespective of the reason, the politician will lose popularity if she deviates from the mean of public belief.

3.2 Solution for a unified public

The politician wants to maximize her re-election probability. In appendix A, I have shown how to derive a loss-function approach for such a politician. With a unified public, the following loss-function (re-election probability) captures the politician's objective:

$$P = P_0 - \Big(\frac{s^* - s_p(T)}{\sigma_p(T)}\Big)^2 \tag{2}$$

The politician does not have to act (s^*) based on what it believes to be the best policy (s_g). As new information emerges, the public's belief about the optimality of politician's action changes. The politician wants to maximize its expected re-election probability. This probability is negatively proportional to the squared difference of what she did and what the public holds to be true on average at the election day (T). The coefficient of proportionality is the inverse of the public's certainty about the best action.

If issues are independent of each other, they enter the probability function in a separable additive way. As a result, the politician can make decisions on each issue separately. Therefore as long as each issue is independent of all others, the model can be generalized to multiple issues.

The politician acts to maximize her expected re-election probability conditional on the information set she has at the decision-making time:

$$s^* = \underset{s}{\text{argmax}} P_0 - \mathbb{E}[(\frac{s - s_p(T)}{\sigma_p(T)})^2 | \mathcal{I}] \tag{3}$$

Proposition 1 *With a unified public, the politician's optimal action is a linear combination of the politician's belief and public's belief.*

$$s^* = \frac{1}{\sigma_y^2 + N\sigma_p^2}(s_p\sigma_y^2 + N s_g \sigma_p^2) \tag{4}$$

Proof. From equation 1, the politician knows the voters' uncertainty on the election day:

$$\sigma_p(T) = \frac{\sigma_p^2 \sigma_y^2}{\sigma_y^2 + N\sigma_p^2}$$

Therefore, the following first-order condition is obtained:

$$s^* = \mathbb{E}[s_p(T)|\mathcal{I}] \tag{5}$$

Using the linearity of the expectation operator and equation 1 we get:

$$s^* = \frac{s_p \sigma_y^2 + \sum_{i=1}^{N} \mathbb{E}[\hat{s}_p^i|\mathcal{I}]\sigma_p^2}{\sigma_y^2 + N\sigma_p^2} \tag{6}$$

The politician's expectation of the optimal action given her information ($\mathbb{E}[\hat{s}_p^i|\mathcal{I}]$) is s_g, hence equation 4 holds. ■

The welfare-maximizing action from the societal perspective, conditional on the information available at the decision-making time, is s_g. This information is available to the politician, yet proposition 1 tells us that she refrains from implementing the optimal action. The amount of deviation decreases with voters' informedness. This channel is the "action channel" of political inefficiency.

Corollary 1.1 *The politician's deviation from the welfare-maximizing action reduces with voters information.*

$$\frac{\partial(|s^* - s_g|)}{\partial \sigma_y^2} > 0, \frac{\partial(|s^* - s_g|)}{\partial N} < 0 \tag{7}$$

Proof. The deviation from the welfare-maximizing action is given by:

$$|s^* - s_g| = \frac{\sigma_y^2}{\sigma_y^2 + N\sigma_p^2}|s_p - s_g| \tag{8}$$

Higher N means the voters receive more signal and lower σ_y means that the voters receive better quality signals. Both increase voters' information.

$$\frac{\partial(|s^* - s_g|)}{\partial \sigma_y^2} = \frac{N\sigma_p^2}{(\sigma_y^2 + N\sigma_p^2)^2}|s_p - s_g| > 0$$

and,

$$\frac{\partial(|s^* - s_g|)}{\partial N} = \frac{-\sigma_p^2}{(\sigma_y^2 + N\sigma_p^2)^2}|s_p - s_g| < 0$$

■

Note that if the public will be adequately informed by the election day, meaning that either $\sigma_y \to 0$ or $N \to \infty$, the politician will act based on her best knowledge.

3.3 Solution when the voters are sorted

If there is more than one group in public, a single number cannot summarize the public belief, and the politician pays attention to multiple opposing opinions. The case where voters sort themselves into two groups is most relevant in a polarized society. In the American society, Democrats hold more left-leaning ideologies and pay attention to similar media and similarly so for the Republicans and right-leaning ideologies.

The loss function introduced in equation 2 should be modified to incorporate both opposing views. The problem is set for an incumbent Democrat, but the logic is similar if the incumbent is Republican. If the incumbent's base judges the politician's action poorly, they might get demoralized, refrain from voting, or even switch to the opposition. On the other hand, if the opposition's base judges the politician's action poorly, they might get mobilized and turn out more than usual for the opposition. Hence, each action affects the two groups separately to make different decisions (For more discussion, see Appendix A). The following expression gives the incumbent Democrat's re-election probability:

$$P = P_0 - \alpha\Big(\frac{s^* - s_d(T)}{\sigma_d(T)}\Big)^2 - \Big(\frac{s^* - s_r(T)}{\sigma_r(T)}\Big)^2 \tag{9}$$

The subscript r denotes Republican, and d denotes Democrat. The parameter α denotes

the relative strength of the politician's decision effect on different voting groups' turnout. With costly voting and a large enough ideological distance between two parties, the elections are decided by turnouts and less so by voters switching parties. In such an environment, it is plausible that a Democrat cares more about exciting her base, rather than influencing Republican voters' opinion. Therefore, for a Democrat politician $\alpha > 1$.

The politician chooses the action that maximizes the expected weighted re-election probability among both groups conditional on her information set:

$$s^* = \underset{x}{\text{argmax}} \left\{ P_0 - \mathbb{E}[\alpha(\frac{s^* - s_d(T)}{\sigma_d(T)})^2 - (\frac{s^* - s_r(T)}{\sigma_r(T)})^2 | \mathcal{I}] \right\} \tag{10}$$

Proposition 2 *With a polarized public, the politician's optimal action is a linear combination of the politician's belief and both groups' beliefs.*

$$s^* = \frac{1}{\sigma_d^2 + \alpha\sigma_r^2}(\frac{\alpha\sigma_r^2}{\sigma_y^2 + N\sigma_d^2}(s_d\sigma_y^2 + Ns_g\sigma_d^2) + \frac{\sigma_d^2}{\sigma_y^2 + N\sigma_r^2}(s_r\sigma_y^2 + Ns_g\sigma_r^2)) \tag{11}$$

Proof. Since the politician knows $\sigma_D(T)$ and $\sigma_R(T)$ at the time of decision-making, we can bring those out of expectations. The first-order condition for this maximization problem is the following:

$$s^* = \frac{1}{\sigma_d^2 + \alpha\sigma_r^2}(\alpha\sigma_r^2\mathbb{E}[s_d(T)|\mathcal{I}] + \sigma_d^2\mathbb{E}[s_r(T)|\mathcal{I}])$$

Using the equation 1 for both Democrats and Republicans and linearity of the expectation operator we get:

$$s^* = \frac{1}{\sigma_d^2 + \alpha\sigma_r^2}(\alpha\sigma_r^2\frac{s_d\sigma_y^2 + N\sigma_d^2\mathbb{E}[\hat{s}_d^i|\mathcal{I}]}{\sigma_y^2 + N\sigma_d^2} + \sigma_d^2\frac{s_r\sigma_y^2 + N\sigma_r^2\mathbb{E}[\hat{s}_r^i|\mathcal{I}]}{\sigma_y^2 + N\sigma_r^2})$$

The fact that $\mathbb{E}[\hat{s}_d^i(t_e)|\mathcal{I}] = \mathbb{E}[\hat{s}_r^i(t_e)|\mathcal{I}] = s_g$ gives equation 11. ■

From equation 11, we can derive the comparative statics for how partisanship interacts with election timing. Equation 11 gives the incumbent Democrat's action (s_d^*). We can

obtain a similar expression for an incumbent Republican (s_r^*) by symmetry ($d \to r, r \to d$). Then by calculating $s_d^* - s_r^*$ we can compare the level of partisanship for earlier vs. later election timing (small vs. larger N).

From this point onward, I set $\sigma_d = \sigma_r := \sigma_p$. Mainly because there is no evidence that Democrats and Republicans' uncertainty levels are different, and this assumption marginally simplifies the results. Moreover, by abstracting away from the effects caused by the voting groups' uncertainty levels, we can focus on the effects caused by their belief's difference, which is empirically documented.

The next corollary that readily follows from proposition 2 is the foundation for the main empirical tests. This corollary gives a testable difference-in-differences prediction for the behavior of politicians. Specifically, the following equation $\frac{\partial |s_d^* - s_r^*|}{\partial N} < 0$ predicts that the difference between Democrats and Republicans who face an imminent election is larger than the similar difference if the election is in the distant future.

Corollary 2.1 *The difference in politicians' actions is proportional to the difference in their bases' opinion.*

$$s_d^* - s_r^* = \frac{\alpha - 1}{(1+\alpha)(1+\sigma_p^2 \frac{N}{\sigma_y^2})}(s_d - s_r) \tag{12}$$

The difference size shrinks with better-informed voters.

$$\frac{\partial |s_d^* - s_r^*|}{\partial N} < 0, \frac{\partial |s_d^* - s_r^*|}{\partial \sigma_y^2} > 0 \tag{13}$$

Proof. Replace both σ_d and σ_r with σ_p in equation 11 to get s_d^* for the Democrat incumbent:

$$s_d^* = \frac{1}{\sigma_p^2 + \alpha\sigma_p^2}\left(\frac{\alpha\sigma_p^2}{\sigma_y^2 + N\sigma_p^2}(s_d\sigma_y^2 + Ns_g\sigma_p^2) + \frac{\sigma_p^2}{\sigma_y^2 + N\sigma_p^2}(s_r\sigma_y^2 + Ns_g\sigma_p^2)\right)$$

This yields:

$$s_d^* = \frac{\sigma_y^2(\alpha s_d + s_r) + N\sigma_p^2 s_g(1+\alpha)}{(1+\alpha)(\sigma_y^2 + N\sigma_p^2)}$$

Using the symmetry $d \to r, r \to d$ we can similarly obtain for the Republican incumbent:

$$s_r^* = \frac{\sigma_y^2(\alpha s_r + s_d) + N\sigma_p^2 s_g(1+\alpha)}{(1+\alpha)(\sigma_y^2 + N\sigma_p^2)}$$

Subtracting s_r^* from s_d^* gives:

$$s_d^* - s_r^* = \frac{\alpha - 1}{(1+\alpha)(1+\sigma_p^2\frac{N}{\sigma_y^2})}(s_d - s_r)$$

By taking the derivative of $|s_d^* - s_r^*|$ with respect to N:

$$\frac{\partial|s_d^* - s_r^*|}{\partial N} = -\frac{\sigma_p^2}{\sigma_y^2}\frac{\alpha - 1}{(1+\alpha)(1+\sigma_p^2\frac{N}{\sigma_y^2})^2}|s_d - s_r| < 0$$

, and σ_y^2:

$$\frac{\partial|s_d^* - s_r^*|}{\partial \sigma_y^2} = \frac{\sigma_p^2 N}{\sigma_y^4}\frac{\alpha - 1}{(1+\alpha)(1+\sigma_p^2\frac{N}{\sigma_y^2})^2}|s_d - s_r| > 0$$

■

Informative signals reduce polarization. The more efficient the voters become in getting informed, the less polarized the politicians would act. We expected this result since voters' initial bias is the source of polarization, and with better information, this initial bias fades away.

It is evident from equation 13 that as elections are getting closer, the politicians start to act more partisan. So in the cross-section, we expect politicians who have an upcoming election act more partisan than politicians who would not face an upcoming election.

In addition to the comparative statics, it is insightful to examine expression 11 for politician's action s^* in the limiting cases. The next corollary concerns two limiting cases that the new incoming signals are highly informative (large N and small σ_y) and not informative at all ($N = 0$ and large σ_y). Define the variable $I_y \equiv \frac{\sigma_y^2}{N}$, as the measure of new signals' informativeness.

Corollary 2.2 *If signals are highly informative, $I_y \to 0$, both Democrat and Republican incumbents act based on their best information s_g.*

$$\lim_{I_y \to 0} s_d^* = \lim_{I_y \to 0} s_r^* = s_g \tag{14}$$

If signals are not informative, $I_y \to \infty$, both Democrat and Republican incumbents ignore their information (s_g) and act closer to their base's beliefs, respectively.

$$\lim_{I_y \to \infty} s_d^* = \frac{1}{1+\alpha}(s_r + \alpha s_d) \tag{15}$$

$$\lim_{I_y \to \infty} s_r^* = \frac{1}{1+\alpha}(s_d + \alpha s_r) \tag{16}$$

Proof. The result follows from taking the limit of equation 11 for Democrats and the corresponding equation for Republicans. ■

Highly informative signals fully break inefficiencies. Both politicians implement their expectation of the optimal policy, and they behave similarly. On the other hand, when the new signals are not informative, politicians ignore facts and implement a policy biased towards their base.

Polarization stems from two different sources, both of which are necessary for a disparity in politicians' behaviors. The first one is a divergence in initial opinions (bias) of different groups $s_d \neq s_r$. However, as it is evident is equation 12, it is not enough that these two social groups have different opinions for politicians to act differently. It is also necessary that the relative influence that the politician's actions have over her political base to be larger than her influence on the opposition $\alpha > 1$.

3.4 Endogenizing Politician's information gathering

The politician's action in both unified and polarized cases crucially depends on the ratio of the public's uncertainty (σ_p) and the signal's quality (σ_y). In the previous sections, I have

assumed that Nature gives this information structure. This assumption is not realistic because, in many situations, a substantial amount of public learning depends on the politicians' information gatherings.

The public's information has no predictive value conditional on politician's information, and it consists of the politician's signal plus noise. We can interpret the noise as a measure of the politician's transparency and political the public's political awareness. The prior belief of the public is normally distributed with a standard deviation of σ_0, and the noise's standard deviation is σ_n then:

$$\sigma_p = \frac{(\sigma_g^2 + \sigma_n^2)^{0.5}\sigma_0}{(\sigma_g^2 + \sigma_n^2)^{0.5} + \sigma_0} \tag{17}$$

The politician chooses the quality of her signal (σ_g). She can increase her effort to get a better signal(lower σ_g) of the optimal action. The cost of getting better information is proportional to the inverse of the signal's variance: $\frac{\theta}{\sigma_g^2}$

Since the intuition does not change with heterogeneous voters, I set the case up with a unified public for the sake of expositional simplicity. As in equation 2, the politician cares about her popularity in public:

$$P = P_0 - \Big(\frac{s^* - s_p(T)}{\sigma_p(T)}\Big)^2$$

The timing of events is similar to before, except for the first step. After nature chooses the optimal action, the politician decides on the quality of the signal. She faces a tradeoff between being more informed and paying an extra cost of information. Her utility is given by:

$$U = P - \frac{\theta}{\sigma_g^2} \tag{18}$$

The politician does not know what her realization or the public's realizations would be. However, she knows the public's ability to accurately determine the optimal decision by the

election day (σ_y, σ_p). Therefore, she maximizes her (unconditional) expected utility.

$$\sigma_g^* = \underset{\sigma_g}{\text{argmax}}\mathbb{E}[P_0 - \Big(\frac{s^* - s_p(T)}{\sigma_p(T)}\Big)^2 - \frac{\theta}{\sigma_g^2}] \tag{19}$$

The politician optimizes the equation with backward induction. First, she solves how she would act given a signal quality (as in proposition 1) and then chooses the optimal signal quality that maximizes her utility.

Proposition 3 *The signal quality must satisfy the following first-order condition:*

$$\frac{2\theta}{\sigma_g^3} = \frac{\partial}{\partial \sigma_g}\left(\frac{N\sigma_p^2(\sigma_y^2 + N\sigma_g^2)}{\sigma_y^2(\sigma_y^2 + N\sigma_p^2)}\right) \tag{20}$$

Proof. Use equations 1 and 4 to replace the values of $s^*, s_p(T), \sigma_p(T)$ and write down the first-order condition of equation 20:

$$\frac{2\theta}{\sigma_g^3} = \frac{\partial}{\partial \sigma_g}\left(\frac{\sigma_y^2 + N\sigma_p^2}{\sigma_y^2\sigma_p^2}\mathbb{E}\big[\Big(\frac{s_p\sigma_y^2 + Ns_g\sigma_p^2}{\sigma_y^2 + N\sigma_p^2} - \frac{s_p\sigma_y^2 + \sum_{i=1}^N \hat{s}_p^i\sigma_p^2}{\sigma_y^2 + N\sigma_p^2}\Big)^2\big]\right)$$

Which will be further simplified to:

$$\frac{2\theta}{\sigma_g^3} = \frac{\partial}{\partial \sigma_g}\left(\frac{\sigma_p^4}{\sigma_y^2\sigma_p^2(\sigma_y^2 + N\sigma_p^2)}\mathbb{E}\big[\Big(Ns_g - \sum_{i=1}^N \hat{s}_p^i\Big)^2\big]\right)$$

After adding Ns_0 and subtracting it from the term inside the expectation, and noting that s_g and $\hat{s}_p^i$ are independent random variables with mean s_0 we get:

$$\frac{2\theta}{\sigma_g^3} = \frac{\partial}{\partial \sigma_g}\left(\frac{\sigma_p^2}{\sigma_y^2(\sigma_y^2 + N\sigma_p^2)}\big[\mathbb{E}[N^2(s_g - s_0)^2] + \mathbb{E}[\big(\sum_{i=1}^N(\hat{s}_p^i - s_0)\big)^2]\big]\right)$$

Which yields the result. ■

By plugging the definition of σ_p (equation 17) into equation 20 we can numerically solve for the optimal quality of the signal. However, it is possible to study two limiting behaviors relevant to the intuition analytically. One is when the public's initial signal is very noisy;

hence politician's signal quality does not affect the public. The other is when the public has a diffuse prior and maximally learns from the politician's signal.

In the next corollary, we consider the case that the public receives a very noisy signal ($\sigma_n \to \infty$). Label this signal quality as $\hat{\sigma}_g$. Recall that we have shown new signals' informativeness with $I_y \frac{\sigma_y^2}{N}$

Corollary 3.1 *If the public receives a very noisy signal ($\sigma_n \to \infty$), the optimal signal quality increases with voters' signal informative quality.*

$$\hat{\sigma}_g^2 := \lim_{\sigma_N \to \infty} \sigma_g^* = \sqrt{I_y \theta \big(1 + \frac{\sigma_y^2}{N\sigma_0^2}\big)} \tag{21}$$

Proof. First, calculate the limit for σ_o from equation 17:

$$\lim_{\sigma_N \to \infty} \sigma_p = \sigma_0$$

Then use the first-order condition in proposition 3 and replace σ_p with σ_0 to get:

$$\frac{2\theta}{\sigma_g^3} = \frac{N\sigma_0^2}{\sigma_y^2(\sigma_y^2 + N\sigma_0^2)} \frac{\partial}{\partial \sigma_g}(\sigma_y^2 + N\sigma_g^2) = \frac{2N^2\sigma_0^2\sigma_g}{\sigma_y^2(\sigma_y^2 + N\sigma_0^2)}$$

By moving the terms around, we get:

$$\hat{\sigma_g}^4 = \frac{\theta\sigma_y^2(\sigma_y^2 + N\sigma_0^2)}{N^2\sigma_0^2}$$

The square root of it gives equation 21. ■

Since the initial signal that the public receives is not informative, the public's belief's uncertainty on the election day is proportional to the information quality (I_y) and their initial uncertainty. Since this initial information is a form of bias, the more assured of their initial biased opinion, the less the politician can dissuade them, and her information will not be useful. Smaller σ_0 decreases politician's incentive to obtain higher quality information.

Next, consider the case that the public has a diffuse prior ($\sigma_0 \to \infty$). Label this signal quality as $\tilde{\sigma}_g$.

Corollary 3.2 *If the public has a diffuse prior ($\sigma_0 \to \infty$), the optimal signal quality increases with voters' signal informative quality.*

$$\tilde{\sigma}_g^2 = \lim_{\sigma_0 \to \infty} \sigma_g^* = \sqrt{I_y \theta} \frac{1}{\sqrt{1 - \frac{N\sigma_n^2 \sigma_y^2}{(\sigma_y^2 + N\tilde{\sigma}_p^2)^2}}} \tag{22}$$

Proof. The proof is similar to the proof of corollary 3.1. ■

In the first scenario, the noise shields the politician's information from the voters; therefore, she can use all of that information to her benefit. On the other hand, in the second scenario, some of the information would leak to voters, and they use that to judge the politician. Controlling for the signal quality, the politician seeks a lower quality signal if the voters can learn from the politician's information.

The next proposition concerns the general relationship between voters' signal's informative quality and the politician's signal quality.

Proposition 4 *The optimal signal quality increases with voters' signal's informative quality.*

$$\frac{\partial \sigma_g^*}{\partial \sigma_y} > 0, \frac{\partial \sigma_g^*}{\partial N} < 0 \tag{23}$$

Moreover, if voters are uninformed ($I_y \to \infty$), the politician obtains no signal.

$$\lim_{I_y \to \infty} \sigma_g^* = \infty \tag{24}$$

Proof. For the first part of the proposition, use the envelope theorem on equation 19 and use the results from equation 20 to write the following equation for the derivative with respect

to σ_y:

$$\frac{\partial \sigma_g^*}{\partial \sigma_y} = -\frac{\partial}{\partial \sigma_y}\left(\frac{N\sigma_p^2(\sigma_y^2 + N\sigma_g^2)}{\sigma_y^2(\sigma_y^2 + N\sigma_p^2)}\right)$$

Taking the partial derivative gives:

$$\frac{\partial \sigma_g^*}{\partial \sigma_y} = -N\sigma_p^2 \frac{2\sigma_y(\sigma_y^4 + N\sigma_y^2\sigma_p^2) - (\sigma_y^2 + N\sigma_g^2)(4\sigma_y^3 + 2N\sigma_y\sigma_p^2)}{(\sigma_y^4 + N\sigma_y^2\sigma_p^2)^2}$$

Which gives:

$$\frac{\partial \sigma_g^*}{\partial \sigma_y} = N\sigma_p^2 \frac{2\sigma_y^5 + (N\sigma_g^2)(4\sigma_y^3 + 2N\sigma_y\sigma_p^2)}{(\sigma_y^4 + N\sigma_y^2\sigma_p^2)^2} > 0$$

And similarly for the derivative with respect to N:

$$\frac{\partial \sigma_g^*}{\partial N} = -\frac{\partial}{\partial N}\left(\frac{N\sigma_p^2(\sigma_y^2 + N\sigma_g^2)}{\sigma_y^2(\sigma_y^2 + N\sigma_p^2)}\right) < 0$$

For the second part of the proposition, assume the contrary and call the finite value of the limit S:

$$\lim_{I_y \to \infty} \sigma_g^* = S$$

Then take the limit of the first-order condition given by proposition 3 (equation 20):

$$\lim_{I_y \to \infty} \frac{2\theta}{\sigma_g^3} = \lim_{I_y \to \infty} \frac{\partial}{\partial \sigma_g}\left(\frac{N\sigma_p^2(\sigma_y^2 + N\sigma_g^2)}{\sigma_y^2(\sigma_y^2 + N\sigma_p^2)}\right)$$

We can change the order of derivative and limit, and use the fact that the limit of σ_p and σ_g are finite to get:

$$\lim_{I_y \to \infty} \frac{2\theta}{\sigma_g^3} = \frac{\partial}{\partial \sigma_g} \lim_{I_y \to \infty}\left(\frac{N\sigma_p^2}{\sigma_y^2}\right) = \lim_{I_y \to \infty}\left(\frac{\sigma_p^2}{I_y}\right)$$

The left-hand side is finite by assumption, but the right-hand side grows unboundedly. ■

In the first two propositions, we explored the "action channel" of political inefficiency. The politician has the relevant information, yet she refrained from implementing the effi-

cient option. Nevertheless, proposition 4 tells us that if voters cannot collect information by election time, the politician will not have any incentives to obtain any information. Proposition 4 is the "information channel" that prevents the political system from implementing an efficient solution.

4 Empirics

The empirical section is an indirect test of the theory developed in the previous section. Specifically, I test the implication of proposition 2, corollary 2.1. Corollary 2.1 states that the difference between Democrats and Republicans shrinks the further their election since the politicians expect the voters to be more informed for later elections than earlier ones. The context of this section is gubernatorial decisions regarding the economy shut down during the Covid-19 crisis.

4.1 Empirical Setup

Alternative models that explain the difference between Democrat and Republican politicians' actions implicitly or explicitly assume preference for actions based on the politicians' types. The politician either acts in her own best judgment and preference or her voting base's best interest and preference. In either case, this should not have any interaction with the election timing. On the contrary, this paper, based on information asymmetry, predicts that the incumbent's bias will be intensified when the election is closer or the signals are noisier.

The optimal action is not directly observable. Hence, it is not possible to directly measure politicians' bias from optimal behavior. Suppose Democrats and Republicans have different optimal actions. In that case, it seems impossible to distinguish whether this action is in line with the corresponding optimal action, or it is a biased behavior to get re-elected. A general disparity of behaviors is consistent with rational decision-makers with heterogeneous preferences and strategic bias towards the base.

The Covid-19 crisis allowed us to test the idea that election interacts with political decision making. In 2020, the Covid-19 virus hit all US states. The governments at the state level were partially responsible for responding to the crisis. They enacted policies to protect civilians' life. This paper focuses on a subset of these policies that entailed a trade-off between economic objectives and health objectives.

The subset consists of governors' policies on whether to close specific businesses or not. Some governors closed all but essential businesses early on, while others allowed all businesses to remain open. These decisions embody a clear trade-off between potential health risk and imminent economic costs. Early closure of businesses guarantees that the spread of the virus slows down, but it initially hurts the local economy. The optimal decision on business closure depends on both the perceived severity and infectivity of the virus and the magnitude of economic costs.

The literature shows that in response to Covid-19, Democrats and Republicans' voting base had different opinions about how severe the condition is and what the proper response of the government should be. Democrats believed the virus to be more dangerous compared to what Republicans believed. Democrats also expected the government to react quickly and more intensely. They required the government to limit a broader range of economic activity to prevent the spread of the virus early on. On the other hand, Republicans downplayed the government's role and put more emphasis on individual freedom and economic costs of such policies.

Out of 50 US states, about half of the governors were Republicans (26), and the other half were Democrats. 11 of these governors had an upcoming election in 2020. This variation allows us to test whether the next election's timing impacts governors' decisions.

Regardless of the election timing, we expect that both parties' governors act more in line with their bases and different from each other. We expect a Democrat to limit more economic activity. Taking election timing into account, the model predicts that a Republican governor with an upcoming election will be further away from other Democrats on the issue

line than a Republican without an upcoming election. The model predicts that a Republican with an upcoming election is the least likely to close any business. In contrast, a Democrat with an upcoming election is most likely to close all businesses.

I test the implications of the theoretical model by estimating the following difference in differences linear probability regression model:

$$y_i = \beta_0 + \beta_1 I_R + \beta_2 I_{>2020} + \beta_3 I_R \times I_{>2020} + \beta_4 S_i + \epsilon_i \tag{25}$$

The dependent variable represents decisions made by governors. If a governor closes a specific business, then the corresponding y equals one; else, it is zero. The first independent variable (I_R) is an indicator function that equals one if the governor is a Republican and zero otherwise. The second independent variable ($I_R * I_{>2020}$) is the interaction of being a Republican and facing an election later than 2020. If a Republican has an upcoming election in 2020, this variable is zero. The third independent variable is the interaction of being a Republican and facing an election later than 2020. The S_i is a variable that linearly controls for the severity of the disease in the state during the decision-making period.

The difference between Democrats and Republicans who face an election in 2020 is given by:

$$\mathbb{E}[y_i|D, 2020] - \mathbb{E}[y_i|R, 2020] = \beta_0 - (\beta_0 + \beta_1) = -\beta_1 \tag{26}$$

And the difference between Democrats and Republicans who face an election later than 2020 is given by:

$$\mathbb{E}[y_i|D, > 2020] - \mathbb{E}[y_i|R, > 2020] = \beta_0 + \beta_2 - (\beta_0 + \beta_1 + \beta_2 + \beta_3) = -\beta_1 - \beta_3 \tag{27}$$

Using equation 26 and 27 we can calculate the difference of these two differences:

$$(\mathbb{E}[y_i|D, 2020] - \mathbb{E}[y_i|R, 2020]) - (\mathbb{E}[y_i|D, > 2020] - \mathbb{E}[y_i|R, > 2020]) = \beta_3 \tag{28}$$

The central coefficient of interest is β_3, which captures the change in the difference between Republicans and Democrats as the next election's time increases. The theory predicts this coefficient to be positive. A competing theory that only relies on preferences predicts $\beta_1 + \beta_3$ to be positive and β_3 to be zero.

4.2 Data

The data regarding the governors' political parties and their next election is scrapped from Wikipedia. Republicans govern 26 and Democrats govern 24 states. 11 of these states have an election forthcoming in 2020, and 39 does not have an election in the coming year.

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Table 1: Party Affiliation and Election

Party	Election 2020	Election Later	Start < 2016	Total
Repulican	7	19	7	26
Democrat	4	20	7	24

The summary statistic for governors

The data regarding the Covid-19 policies is collected by Raifman et al. (2020). This dataset contains multiple variables on how each state put some policies into place and removed. Specifically it contains data related to economics vs. health trade-off. The decisions are on whether the restaurants, the theaters, the gyms, and non-essential businesses are closed on a particular day.

Table 2: Closing Days - Summary Statistics

Variable	count	min	0.25 %	0.5%	0.75%	max
Closed Theatres	50	76	78	82	85	never
Closed Dine-in Restaurants	50	75	77	78	80	never
Closed Gyms	50	76	78	81	85	never
Closed Non-essential Businesses	50	79	84	87	92	never

The summary statistic for the day of closing, starting from the beginning of 2020

Table 2 summarizes the distribution of closing decisions for the relevant variables. Similarly table 3 summarized the distribution of re-opening decisions for those variables. From these two variables, it is possible to reconstruct whether a particular business within a state was closed on any given day.

Table 3: Re-opening Days - Summary Statistics

Variable	count	min	0.25 %	0.5%	0.75%	max
Opened Theatres	50	118	143	163	237	(not opened)
Opened Dine-in Restaurants	50	115	128	139	153	(not opened)
Opened Gyms	50	115	136	153	171	(not opened)
Opened Non-essential Businesses	50	111	122	129	138	(not opened)

The summary statistic for the day of openning, starting from the beginning of 2020

All of the decisions are included as separate decisions. For each day in the data, the dimension of y (200) would be the number of governors (50) times the number of decisions (4).

4.3 Empirical Results

The first column of table 4 shows the result of the regression equation 25 for the main specification. Columns 2 and 3 shows the regression with probit and logit specifications. In all of these specifications, he interaction coefficient is statistically significant. The ballot box's pressure makes politicians 30.5 percent more likely to act partisan and please their base without acting in their interest.

Table 4: main specifications

	Close down an activity:		
	(Linear)	(Probit)	(Logit)
Const	1.003***	7.267***	17.766***
	(0.002)	(0.758)	(1.451)
Rep	-0.249**	-5.277***	-14.242***
	(0.126)	(0.422)	(0.927)
" > 2020"	-0.071**	-4.731***	-13.275***
	(0.034)	(0.292)	(0.773)
Rep×" > 2020"	0.305**	6.115***	16.040***
	(0.131)	(0.623)	(1.437)
Severity	0.016*	5.174*	9.426*
	(0.009)	(2.697)	(5.105)
Observations	192	192	192
R^2	0.103	0.2443	0.2383
Adjusted R^2	0.084		
Residual Std. Error	0.241(df = 187)	1.000(df = 187)	1.000(df = 187)
F Statistic	2.344* (df = 4.0; 187.0)	(df = 4; 187.0)	(df = 4; 187.0)
Note:			*p<0.1; **p<0.05; ***p<0.01

Most of this effect comes from Democrats and Republicans' different behavior who have an election in 2020 ($-\beta_1 > 0$). The behavior difference of politicians from different parties who do not have an election in 2020 is not statistically significant at the 95 percent level. Moreover, the sign of this difference is in the opposite direction of the base's opinion ($-\beta_1 - \beta_3 = -0.0558 < 0$). Republicans who do not face an election in 2020 are "more" likely to limit economic activity and act not in line with their base's belief. Table 5

summarizes these results.

Table 5: summary

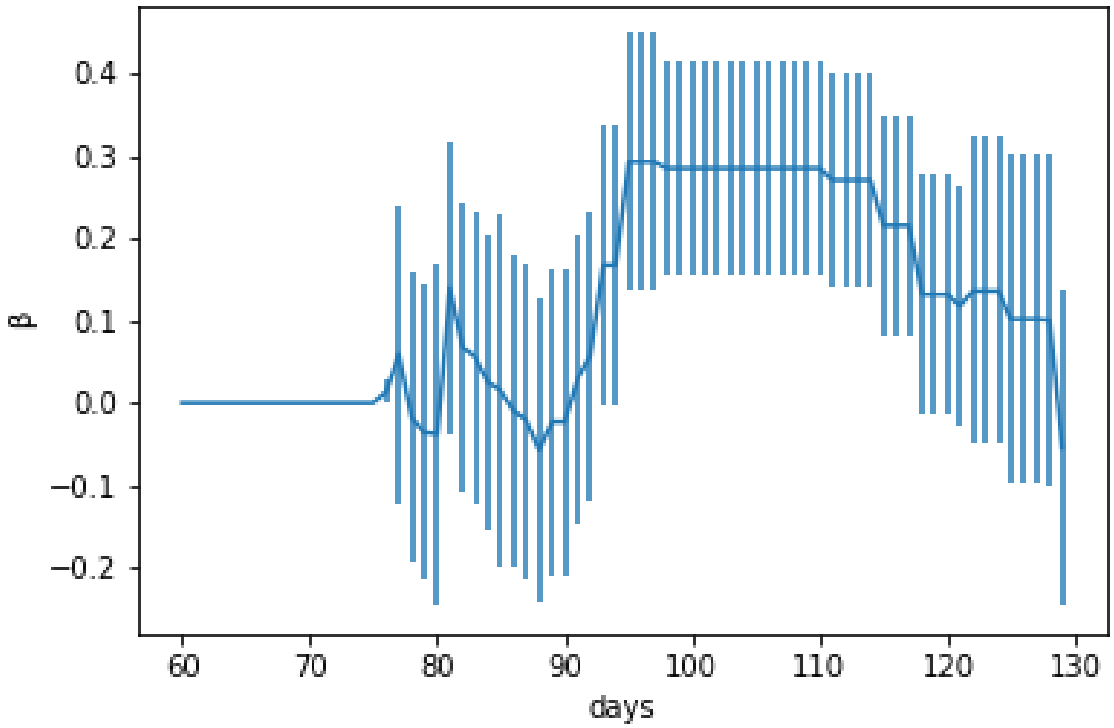
	Close down an activity:		
	(Linear)	(Probit)	(Logit)
Difference election later ($-\beta_1 - \beta_3$)	-0.0558*	-0.8384**	1.798**
	(0.0363)	(0.465)	(1.091)
Difference election 2020 ($-\beta_1$)	0.2489**	-5.277***	-14.24***
	(0.1263)	(0.422)	(0.927)
Difference in differences (β_3)	0.305**	6.115***	16.04***
	(0.131)	(0.623)	(1.437)

Partisanship increases for decisions made cloeser to elections

The decisions of each governor are correlated. It is necessary to make sure the correlation between different governors decisions does not artificially inflate the significance of the results. I have done so by clustering the standard errors around each state. The reported error bars in table 4 are robust to clustering around states.

In the main specification, the decision y is whether a business is closed as of April the 20th. On this day, states have implemented the first phase of limitations, and no state has re-opened any business yet. Figure 1 shows the evolution of this interaction term from the time that first business is closed on mid March until the time that states re-opened the businesses by early May.

Figure 1: daily β_3



Democrats and Republicans with an election in 2020 behave differently as soon as 10 days after implementing the first policy

A non-linear control for severity led to excluding two outlier states of South Dakota and Wyoming, which had the smallest number of deaths per capita in this early period, from the regression. Both results are robust to dropping/non-dropping multiple states per capita. Table 6 summarizes the regression results controlling for the different exclusion of states with low severity. Only the linear probability model is reported; nevertheless, in other specifications (Probit and Logit), the results' statistical significance does not change.

The measure of severity was the number of deaths per capita from the beginning of the epidemic until April 20th. In table 7 results, the number of infected per capita is used as a measure of severity. Another specification includes a quadratic control of severity.

The results of table 5 is robust to all of these specifications. As it is shown in the appendix,

Table 6: Robustness to outliers

		Close down an activity:	
	(No exclusion)	(Drop 3 states)	(Drop 7 states)
Const	1.004***	1.003***	1.003***
	(0.003)	(0.002)	(0.002)
Rep	-0.249**	-0.249**	-0.299*
	(0.126)	(0.126)	(0.168)
” > 2020”	-0.072**	-0.071**	-0.060*
	(0.034)	(0.034)	(0.034)
Rep ×” > 2020”	0.242*	0.305**	0.344**
	(0.141)	(0.131)	(0.172)
Severity	0.019*	0.016*	0.014
	(0.011)	(0.009)	(0.009)
Observations	200	188	172
R^2	0.060	0.101	0.132
Adjusted R^2	0.041	0.082	0.111
Residual Std. Error	0.281(df = 195)	0.244(df = 183)	0.231(df = 167)
F Statistic	2.634** (df = 4.0; 195.0)	2.340* (df = 4.0; 183.0)	1.830 (df = 4.0; 167.0)
Note:			*p<0.1; **p<0.05; ***p<0.01

the results are robust to including all states, different functional forms (polynomial) for severity, different measures of severity and the date at which the decisions to close the businesses is considered.

Table 7: Robustness to measures of severity

	Close down an activity:	
	(Cases as Severity Measure)	(Quadratic Mesaure)
Const	1.007***	1.029***
	(0.004)	(0.016)
Rep	-0.249**	-0.245*
	(0.126)	(0.126)
> 2020	-0.078**	-0.088**
	(0.036)	(0.039)
Rep$\times > 2020$	0.308**	0.315**
	(0.131)	(0.132)
Severity	0.022*	0.133**
	(0.012)	(0.064)
Severity^2		-0.019**
		(0.009)
Observations	192	192
R^2	0.106	0.114
Adjusted R^2	0.086	0.090
Residual Std. Error	0.241(df = 187)	0.240(df = 186)
F Statistic	2.374* (df = 4.0; 187.0)	1.948* (df = 5.0; 186.0)
Note:		*p<0.1; **p<0.05; ***p<0.01

5 Conclusion

This paper shows how higher election pressure can lead politicians to act more partisan. The theory suggests that voters' different priors and politicians expecting them not to learn the full truth until the next upcoming election is a potential cause of partisanship. With a longer election horizon, parties act more similarly and based on the theory more optimal.

The theory sheds light on why more polarized democracies might be poorly equipped with instruments to respond effectively to a crisis. I studied how the politician's decision to acquire information interacts with the social signals' informativeness and election dates. When the election is close, the politician spends fewer resources on information acquisition. On top of that, the closer the election, the less she weighs her decision towards that information set, controlling for her information quality.

In a more general setting, the interaction between a politician and the voting base is similar to a principal-agent "P-A" problem. The principals (here voters) choose an agent to make decisions in an uncertain environment in their benefit. Information asymmetry poses a challenge for the principal to monitor the agent's behavior efficiently and for the agent to signal the quality of her decisions.

Similar to conventional P-A problems, the politician is better informed. She makes many decisions over her tenure, and voters later evaluate her performance on election day. Not only the information asymmetry causes an opinion divide between the politician and the voters at the time of decision making, but also these opinions evolve until the election day as more information arrives.

A further avenue for research is to design mechanisms to increase politicians' incentives to acquire high-quality information and stick to the best expectation. I did not explicitly formulate the Individual Rationality and Incentive Compatibility of the politician, but a full analysis must consider.

This paper provides evidence that the pressure of an upcoming oversight induces the decision-maker to deviate from implementing the optimal policy towards the principal's

bias. Although the example is tailored for a political representative, it can be generalized to other managerial settings. For example, a manager who faces an uncertain decision before a significant event (a merger, critical board meeting, et Cetra) deviates from implementing the optimal action. Can we find similar evidence to show that the manager is more likely to deviate towards the principal's bias if she expects it to affect their evaluation?

If this effect can be found in other settings, we should examine other possible mechanisms that would create similar empirical results. In this paper, I have explained the rational behavior of an agent who forms an expectation of voters' information set at the election date. The mechanism at play may be much more complicated than what was discussed. More research is needed to pin down how this shift occurs; Is it a deliberate calculation of the agent to implement a policy that maximizes her popularity, or is it coming from a psychological bias?

Maybe the psychological pressure of an upcoming election makes it easier for the politician to think of what voters want, which shifts her towards her base's favorite policies. Finding out the mechanism behind this bias is an avenue for further research in managerial decision making under uncertainty.

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A On the Microfoundations of the Loss Fucntion

Since the Hotelling-Downs model of spatial voting was developed, researchers have proposed numerous variants of the model to explain voters' behavior. The main theoretical result from this literature is that when two politicians compete, their platforms on relevant issues are attracted to the median voter. Short-term frictions, uncertainty about the median voter's belief, and primary elections prevent the politicians from becoming identical; nevertheless, political parties should become more similar over time and have to fight over winning the median voter.

However, in the real world, over the last four decades, not only the parties failed to converge, but also we observed an increased polarization among the political parties. Moreover, many pundits believe that elections are decided by which party can excite its base more strongly, rather than by convincing the median voter to switch to its side. Finally, the spatial voting models do not have any prediction about turn-outs.

The facts mentioned above makes it is necessary to enhance the contemporary spatial voting models to explain voters' behavior. The politician uses this enhanced model to predict voters' behavior. Exploiting the new model, I show that the politician's optimal behavior (to the first non-zero approximation) is given by a simple form, which was introduced in equations 2 and 9.

As in the discrete choice literature, voter's i utility for the incumbent I is given by u_I^i, and similarly for the opposition O, the preference is u_E^i. The voter faces a cost c^i. This cost is comprised of the actual cost and opportunity cost of going to the polling booth and casting a vote and all other emotional and intellectual costs of voting. The voter casts his vote for the incumbent (opposition) if $u_I^i - u_O^i > c^i$, $(u_O^i - u_I^i > c^i)$, and abstains from voting otherwise.

There are two eqaully large types of voters (D or R). All utility and cost terms can be written as an average plus a mean zero normal shock. For a Democrat voter, we can write:

$$
\begin{aligned}
u_I^i &= \bar{u}_{ID} + \epsilon_I^i \\
u_O^i &= \bar{u}_{OD} + \epsilon_O^i \\
c^i &= \bar{c} + \epsilon_c^i
\end{aligned}
\tag{29}
$$

And similarly for a Conservative voter, we have:

$$
\begin{aligned}
u_I^i &= \bar{u}_{IR} + \epsilon_I^i \\
u_O^i &= \bar{u}_{OR} + \epsilon_O^i \\
c^i &= \bar{c} + \epsilon_c^i
\end{aligned}
\tag{30}
$$

The incumbent's vote share is given by the following equation:

$$
\begin{aligned}
Pr(\bar{u}_{ID} - \bar{u}_{OD} - \bar{c} > \epsilon_O^i + \epsilon_C^i - \epsilon_I^i) + Pr(\bar{u}_{IR} - \bar{u}_{OR} - \bar{c} > \epsilon_O^i + \epsilon_C^i - \epsilon_I^i) = \\
2 - \Phi(\frac{\bar{u}_{ID} - \bar{u}_{OD} - \bar{c}}{\sigma_\epsilon}) - \Phi(\frac{\bar{u}_{IR} - \bar{u}_{OR} - \bar{c}}{\sigma_\epsilon})
\end{aligned}
\tag{31}
$$

Where Φ is the cumulative distribution function of the normal distribution, and σ_ϵ is the standard deviation of $\epsilon_O^i + \epsilon_C^i - \epsilon_I^i$.

The incumbent wins the election if her vote share is higher than her opponents. Therefore, the incumbent wishes to maximize the difference between her shares and her opponents. Her actions can only affect $\bar{u}_{ID}$ and $\bar{u}_{IR}$

$$
\begin{aligned}
\max \Big[\Phi(\frac{\bar{u}_{OD} - \bar{u}_{ID} - \bar{c}}{\sigma_\epsilon}) + \Phi(\frac{\bar{u}_{OR} - \bar{u}_{IR} - \bar{c}}{\sigma_\epsilon}) - \\
\Phi(\frac{\bar{u}_{ID} - \bar{u}_{OD} - \bar{c}}{\sigma_\epsilon}) - \Phi(\frac{\bar{u}_{IR} - \bar{u}_{OR} - \bar{c}}{\sigma_\epsilon}) \Big]
\end{aligned}
\tag{32}
$$

This brings us to the following first-order condition:

$$
\begin{aligned}
&-\bar{u}'_{IL}(\phi(\frac{\bar{u}_{OD}-\bar{u}_{ID}-\bar{c}}{\sigma_\epsilon})+\phi(\frac{\bar{u}_{ID}-\bar{u}_{OD}-\bar{c}}{\sigma_\epsilon}))\\
&-\bar{u}'_{IR}(\phi(\frac{\bar{u}_{OR}-\bar{u}_{IR}-\bar{c}}{\sigma_\epsilon})+\phi(\frac{\bar{u}_{IR}-\bar{u}_{OR}-\bar{c}}{\sigma_\epsilon}))=0
\end{aligned}
\tag{33}
$$

Equation 33 has an straight-forward interpretation. Every decision that the incumbent makes has four effects. It causes some of her base to switch between voting for the incumbent to 1. the opposition or 2. abstention or it causes some of her opposition base to switch between voting for the opposition to 3. her or 4. abstention.

To obtain the loss function in the theoretical section of the article, I have to specify what $\bar{u}_{IL}$ and $\bar{u}_{IC}$ are.

$$
\begin{aligned}
\bar{u}_{ID}&=\bar{u}^0_{ID}-\theta_{ID}\big(\frac{s-s_D(T)}{\sigma_D(T)}\big)^2\\
\bar{u}_{IR}&=\bar{u}^0_{IR}-\theta_{IR}\big(\frac{s-s_R(T)}{\sigma_R(T)}\big)^2
\end{aligned}
\tag{34}
$$

In equation 34, θ_{ID} is the attention that average Democrats pay to the incumbent's decisions and θ_{IR} is the attention of average Republicans to the incumbent's decision. From equations 33,and 34, the value α in 9 is reconstructed:

$$
\alpha=\frac{\theta_{ID}}{\theta_{IR}}\frac{\phi(\frac{\bar{u}_{OD}-\bar{u}_{ID}-\bar{c}}{\sigma_\epsilon})+\phi(\frac{\bar{u}_{ID}-\bar{u}_{OD}-\bar{c}}{\sigma_\epsilon})}{\phi(\frac{\bar{u}_{OR}-\bar{u}_{IR}-\bar{c}}{\sigma_\epsilon})+\phi(\frac{\bar{u}_{IR}-\bar{u}_{OR}-\bar{c}}{\sigma_\epsilon})}
\tag{35}
$$

If the preferences are symmetric ($\bar{u}_{ID}=\bar{u}_{OR},\bar{u}_{IR}=\bar{u}_{OD}$) then alpha is simplified to:

$$
\alpha=\frac{\theta_{ID}}{\theta_{IR}}
\tag{36}
$$

Therefore, $\alpha>1$ if the incumbent's decision affects the Democrat base's utility more

than it affects the Republican's base utility, which is a reasonable assumption for a Democrat incumbent.