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ORIGINAL ARTICLE





Electing in the dark? Voting behavior in light of polarization

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Abstract

This paper develops a behavioral public choice model. It provides testable hypothesis to explain voter shifts in European national elections in the last decade. The model comprises three blocs of parties, the government, the opposition and socalled "profiteers". Retrospective voters evaluate the performance of each bloc. Furthermore, it introduces an exogenous polarizing event that can affect the government's and the profiteers' chance to satisfy voters. Moreover, voters are subject to the negativity bias, which means that negative changes in probabilities to satisfy are stronger than positive changes. This framework yields various results on voting behavior under polarization. Most are robust to the introduction of non-voting. The government only profits from polarization iff sufficiently many positively voters are polarized in their favor to outweigh both the negativity bias and the increased competitiveness by profiteers due to polarization. Profiteers, strengthened by polarization, harm the opposition and increase voter turnout. Additionally, a higher negativity bias impairs the government, decreases voter turnout and benefits the opposition and profiteers.

Keywords Voting behavior · Elections · Retrospective voting · Polarization · Negativity bias · Decision-making

Introduction

National elections in European countries in the previous decade were characterized by substantial shifts of voter shares. In many Southern and Western European countries, the government lost large numbers of voters. At the same time, certain parties, especially from the populist right-wing, such as the AfD in Germany, the FPÖ in Austria and the Lega in Italy, gained a lot of electoral support. Contrarily, various opposition parties in these countries could not profit from the losses the respective governments incurred. Besides the similar patterns in the development of electoral

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support for specific parties, there is another characteristic which these national elections have in common. All elections took place in light of a polarizing event. Elections in Western Europe and Italy took place in course of the refugee crises, which led to major discrepancies between voters' satisfaction with the government (Akkerman 2018; Chiaramonte et al. 2018; Vries and Catherine 2018; Halikiopoulou 2018; Jesse 2018; Niedermayer 2018; Di Mauro and Verzichelli 2019). Further, in Spain and Greece, the euro crisis had a major impact on voters' perception of the performance of their government. This led to similar structures of voter shifts, yet the parties taking advantage of this development stem from various wings (Bosco and Verney 2016; Orriols and Cordero 2016; Tsatsanis and Teperoglou 2016; Tsirbas 2016).

In this paper, I develop a behavioral public choice model to account for the patterns from above. Modeling retrospective voters and polarization as an exogenous shock to the voters' perception of the governments' performance and to the one of so-called "profiteers", several insights about the effects of polarizing events on elections can be elicited. The government may only profit from a polarizing event iff there are enough voters polarized in its favor to outweigh first the more pronounced effects of polarization against the government and second the profiteers' increased chance to satisfy voters who are polarized against the government. The effect of polarization against the government on profiteers unambiguously profits them and harms all other blocs. This implies both that not all opposition parties may gain under polarization and that voter turnout may increase due to mobilization by profiteers. The less likely profiteers are to satisfy voters per se, the more likely they profit from polarization. Polarization rather benefits the opposition if profiteers are strong even without polarization. The model relies on the basic idea of retrospective voting and subsequent literature. In the following, I outline this idea and the modifications which I make in this paper.

In its most basic terms, retrospective voting describes that voters compare the economic performance of the government to a subjective standard of performance (Key 1966; Kramer 1971; Nordhaus 1975). Only in case the government meets an arbitrary voter's standard, the latter votes for the government. This theory, later on called economic voting (e.g., Lewis-Beck and Stegmaier 2000; Nadeau and Lewis-Beck 2001), has been substantiated by empirical literature and is still a common tool to study voting behavior and electoral results (e.g., Duch and Stevenson 2008; Campbell et al. 2010; Debus et al. 2014; Plescia and Kritzinger 2017; Shin 2018). Despite its explanatory power, economic voting lacks some characteristics to cover the prementioned patterns from Europe. Societal topics, such as migration, are excluded by this theory. Therefore, voters decide retrospectively based on several issues in this paper. This approach is supported by empirical findings (e.g., Achen Christopher and Bartels Larry 2004) and Achen and Bartels 2016) and implemented by other theoretical work on retrospective voting (e.g., Bendor et al. 2010 and Bendor et al. 2011). In addition to this adapted scope of retrospective voting, two aspects of the patterns from above are addressed.

First, polarization played a key role in all aforementioned elections. More precisely and as outlined above, both the refugee and euro crisis led to significant changes in voters' satisfaction across different groups of voters. Polarization can be modeled as a shock on the performance evaluation. Such shocks are not included in economic voting, but can be accounted for if modeled precisely. Second, according to economic voting, voters only assess the performance of the government. This scope of evaluation does not offer an explanation for the rise of certain parties in Europe, especially from the populist right-wing. Consequently, the question why other opposition parties often did not enjoy increases in their voter shares remains open. To embrace these developments in a theoretical framework, voters' evaluations of multiple parties are required. Recent empirical work on retrospective voting also supports this idea. Several studies (e.g., Plescia and Kritzinger 2017; Carolina 2017; Stiers 2018; Stiers and Dassonneville 2020) suggest that voters also evaluate the performance of opposition parties.

The incorporation of polarization, accounting for the first point, is considered rarely in theoretical literature on retrospective voting. Importantly, the aforementioned patterns show that specific topics and the reactions by some parties led to shocks in voters' satisfaction with parties. Work focusing on the entire policy mix that results in payoffs and polarization as by, e.g., Esponda and Pouzo (2019) is not sufficiently precise to address this aspect. The model by Bendor et al. (2011) allows for variations in the probability to obtain a high payoff by the government over time. While they do not focus on shocks within an election period, their framework may provide a suitable approach to model polarization acting as a shock to voters' perception of the work by parties. The second issue, the introduction of multiple parties and performance evaluations on party level, is covered scarcely by theoretical literature. Most work features two-party models (e.g., Bendor et al. 2010; Bischoff and Siemers 2013; Ashworth and De Mesquita 2014; Esponda and Pouzo 2019). Modeling the underlying political landscapes and discrepancy in gains between different opposition parties appropriately requires more parties or blocs. Bendor et al. (2011) feature competition of three or more parties. Yet, they neglect payoffs by non-governmental parties.

Using the existing literature on retrospective voting as a basis, I establish a threeparty model with retrospective voters, allowing for polarizing events that act as a shock to voting behavior. The framework allows for the analysis of voting behavior and voter turnout for elections under polarization. For instance, it provides a testable approach to explain the voter shifts from recent European elections, consisting of a heavily losing government but only specific parties in the opposition profiting from this. The rest of this paper is organized as follows: in Sect. 2, the model is established and discussed. Section 3 comprises the results of the analysis. Section 4 contains the introduction of non-voters and non-voting as an extension to the basic model. Additionally, it contains an analysis of this modified version of the model analogous to the approach in Sect. 3. In Sect. 5, I discuss the results from Sects. 3 and 4. Moreover, I outline ideas for subsequent research. Proofs may be found in the appendix.

The model

In the following, I outline the basic three-party-bloc and two-period model and define key terms. At first, the assumptions on parties and the assignment of voters in period 1 are established. After that, I characterize the probabilities with

which voters receive payoffs by parties before election in period 2. Finally, the voters' decision rule at election in period 2 is defined and the order of steps is summarized.

The political landscape contains three blocs of parties $i \in \{G, O, P\}$, with G being the government, O the parliamentary opposition and P profiteer parties. The latter may be parliamentary, but not part of G or O. Essentially, blocs may consist of more than one party, allowing for the application in different settings. In Europe, the blocs in consideration are often represented by several parties. The distinction between profiteer parties and the bloc of the parliamentary opposition is key to incorporate the effects of polarization on the chances to satisfy voters described later in this section properly. This issue is discussed later in this section. Voter types T^{j} , $j \in \{G, O, P\}$ are assigned according to the choice in period 1. Voters of the government are denoted by T^G , voters of the opposition by T^O and voters of profiteer parties by T^P . The respective shares are denoted by φ^G , φ^O and φ^{P} . Moreover, $\varphi^{G} + \varphi^{O} + \varphi^{P} = 1$, $\frac{1}{2} < \varphi^{G} < 1$, $0 < \varphi^{O} < \frac{1}{2}$ and $0 \le \varphi^{P} < \frac{1}{2}$. Notably, the only restriction on the share of voters who vote for bloc P in period 1, φ^{P} , is that the share does not yield a majority. This also implies that profiteer parties may stand for election in period 2 for the first time. The condition $\varphi^{G} + \varphi^{O} + \varphi^{P} = 1$ implies that non-voters are neglected. This allows to examine voting decisions only between different blocs and to examine effects on both the shares and behavior of swing voters. Therefore, a focus on voting behavior between parties is implied. Abstention is often disregarded in theoretical literature on retrospective voting (e.g., Bischoff and Siemers 2013; Malhotra and Margalit 2014; Esponda and Pouzo 2017, 2019). The goal of this paper is to provide an explanation for shifts of retrospective voters between different party blocs under polarization. Thus, non-voting is not introduced in the basic model, but serves as an extension. Next, the payoffs, depicting the voters' satisfaction with each blocs' work, are characterized.

All voters receive a payoff $R \in \{L, H\}$ with L < 0 and H > 0 by each bloc prior to period 2. The payoff reflects the voter's satisfaction with the respective bloc. Voters within an arbitrary voter type may receive different payoffs. The assumption that the payoff reveals each voter's general satisfaction with each bloc is wider than in most models and similar to the one considered by Bendor et al. (2010) and Bendor et al. (2011). It accounts for evidence highlighted by recent empiric studies which show that voters generally take various topics into account judging on the performance of parties (e.g., Fisher and Hobolt 2010; Singer 2011; Vries et al. 2014; Carolina 2017). Specifically, attitudes toward immigration (Reny et al. 2019; Dustmann et al. 2019; Dostal 2019) and the voters' general well-being (Liberini et al. 2017) may influence the performance evaluation of retrospective voters fundamentally. Moreover, I assume that all three blocs yield payoffs. This is a key difference to theoretical literature assuming that only the current government creates payoffs (e.g., Bendor et al. 2010, 2011; Ashworth and De Mesquita 2014; Esponda and Pouzo 2017). Recent empirical studies on retrospective voting (e.g., Plescia and Kritzinger 2017; Carolina 2017; Stiers 2018; Stiers and Dassonneville 2020) imply that voters also evaluate the performance

of opposition parties and that these perceptions influence their voting behavior. Thus, to account for this result, not only government parties, but also opposition parties generate payoffs in my framework. Besides, there is no clear evidence whether extra-parliamentary parties yield payoffs. Numerous much-noticed and effective campaigns conducted by parliamentary and exter-parliamentary European populist parties (e.g., Schmuck and Matthes 2017; Nai 2018; Silva 2018) and their strong presence in media (e.g., Sheets et al. 2016; Ernst et al. 2019) yet suggest that voters have sufficient information about these parties to assess their performance. As these parties can be considered profiteer parties by my definition, I assume that bloc P also generates payoffs.

Between period 1 and period 2, an exogenous polarizing event occurs. This event may be within or not within control of the government and not even related to strategic political action. Thus, not only broader topics such as migration or economic crises, but also shark attacks and droughts (see (Achen Christopher and Bartels Larry 2004) and (Achen and Bartels 2016)) as well as scandalous behavior by the incumbent are considered. This definition therefore accounts for literature identifying that a lot of different events can affect retrospective voting behavior (e.g., Achen Christopher and Bartels Larry 2004; Vries et al. 2014; Achen and Bartels 2016 and Liberini et al. 2017). Voters of each type T^{j} may be not polarized, in favor of government (henceforth "positively polarized") or against the government (henceforth "negatively polarized") by the event. Within an arbitrary voter type T^{j} , voters may be polarized in different directions toward the government. The shares of non-polarized voters, positively polarized voters and negatively polarized voters toward bloc G, are denoted by φ_N^i, φ_+^j and, φ_-^j , respectively. $\theta_{\varphi^j} = \frac{\varphi'_+}{\varphi'_-}$ is the ratio of positively and negatively polarized voters of an arbitrary voter type T^{j} . The shares of polarized voters are exogenous.

The probabilities for each voter type T^{j} to receive a high payoff *H* by each bloc *i* are assumed to depend on the direction of polarization as follows:

Parameters are exogenous, such that all probabilities are bigger than 0 and smaller than 1, with $\Delta h > 0$ and $\lambda > 1$.

 $\Delta h > 0$ depicts the degree to which the polarizing event may polarize voters. Importantly, the assumption that the degree of polarization is exogenous matches the characteristic that the polarizing event acts as a shock to the convincing power of the government. The values h_i^j are the probabilities to receive a high payoff *H* if polarization was absent. Intuitively, h_i^j can be considered as a measure of the alignment between the interests of the respective voter type and the respective bloc. Interpreted differently, these probabilities can be regarded the competitive strength or convincing power of a bloc. Given that probabilities are treated as exogenous, parties cannot increase their convincing power by, e.g., setting policies.¹ There are few restrictions on probabilities. Neither restrictions hinting at party affiliation, e.g., $h_G^G > h_O^G$, nor restrictions on the blocs' combined competitive powers, e.g., $h_G^G + h_O^G + h_P^G = 1$, are

¹ The reaction on the polarizing event may result in changes in these probabilities by the degree of polarization Δh . Yet, these changes are also exogenously given.

Direction of polarization / Party bloc	No polarization: Share φ_N^i	Positive polarization: Share φ_+^i	Negative polarization: Share φ^{j}_{-}
Government bloc G	h_G^j	$h_G^j + \Delta h$	$h_G^j - \lambda \Delta h$
Opposition bloc O	h_{O}^{j}	h_{O}^{j}	h_{O}^{j}
Profiteer bloc P	h_P^{j}	h_P^{j}	$h_{P}^{j} + \Delta h$

 Table 1
 Probabilities to receive a high payoff by each party bloc under different directions of polarization

made. The changes regarding the strength of bloc G stem from empirical evidence that such events are associated with the government (e.g., Lewis-Beck and Stegmaier 2000; Campbell et al. 2010; Stanig 2013; Passarelli and Tuorto 2014; Achen and Bartels 2016). Further, Table 1 depicts an increase in the competitive power of profiteer parties concerning negatively polarized voters. This may be induced by special campaigns addressing these voters. Recent studies have shown that social media is an attractive tool for populists to address voters [e.g., (Tufekci 2018) and (Zhuravskaya et al. 2020)] that and they utilize social media to increase their support (e.g., Allcott and Gentzkow 2017; Guess et al. 2020 and Liberini et al. 2020). The unique characteristic of bloc P in terms of probabilities to yield a high payoff also suggests the term and the role of profiteer parties in the political landscape. This bloc contains parties that have unambiguously better chances to satisfy negatively polarized voters under polarization and is thus separated from bloc O, whose competitiveness is not affected at all by polarization. Moreover, negatively polarized voters' probability to gain a high payoff by the government features another key ingredient of the model. The decrease in the probability that the government satisfies due to negative polarization is stronger than the increase in case of positive polarization, which is denoted by $\lambda > 1$. With this specification, λ depicts the negativity bias, which generally implies that individuals value negative outcomes stronger than positive outcomes of the same amount Rozin and Royzman (2001). Albeit empirical studies show that this bias plays an important role within voting behavior (e.g., Burden and Wichowsky 2014; Hansen et al. 2015), theoretical models on retrospective voting consider it rarely.²

The assumptions on voters hint at some homogeneity within and partially across voter types, since some characteristics are equal. Yet, both the direction of polarization and the realization of the payoff may differ within voters of a specific type. This heterogeneity is implied by heterogeneous mental models (Johnson-Laird 1983; Denzau and North 1994).

Next, the decision rule voters employ is defined:

² There is few theoretical literature on retrospective voting covering the negativity bias and loss aversion. Kappe (2013) examines how the negativity bias affects the quality and reelection chances of the government. Moreover, Lockwood and Rockey (2020) provide evidence on how loss aversion influences electoral competition and especially the behavior of parties.

Definition 1 (Decision rule) Voters employ satisficing under multiple payoffs to decide what party to vote for in period 2. This is based on the following criteria:

Criterion 1: An arbitrary voter reelects the party bloc the voter has chosen in period 1 if and only if the voter receives a high payoff by this bloc. Obtaining a low payoff the voter shifts to another bloc with the following order:

Criterion 2: The voter shifts to a bloc yielding a high payoff. If two blocs fulfill this criterion, there are equal probabilities to choose each bloc.

Criterion 3: In case criterion 2 is not fulfilled by any bloc, the voter elects another bloc generating a low payoff. If two blocs meet this criterion, each of these will be chosen with equal probability.

In its basic terms, the voting behavior outlined in Definition 1 is characterized by satisficing.³ Satisficing voters, as described by Kramer (1971), Nordhaus (1975) and Fair (1978), vote for the government only in case economic measures meet their subjective aspiration levels. I adjust this basic decision rule in two ways to render it suitable for my model. First, a voter's decision is based on the payoff a bloc generates, which is not necessarily based on economic outcomes as defined. Second, since all three considered blocs generate payoffs, the rule has to be extended, so that more than one payoff can be considered. Moreover, a performance standard that serves voters as a reference to evaluate the work of parties is required. Definition 1 implicates that this standard for each party is such that a high payoff always satisfies and a low payoff dissatisfies an arbitrary voter in period 2, which is a simplification of the approach employed by Bendor et al. (2011). In Definition 1, all features are combined under the term satisficing under multiple payoffs. Notice that with this rule an arbitrary party bloc *i* cannot entice voters from their prior choice away if the latter yields a high payoff for these voters, even if *i* also generates a high payoff.

With this framework, the order of steps within the model can be summarized as follows:

Definition 2 (Order of steps) The order of steps is as follows:

- 1. Voters are assigned to the voter types after the election in period 1.
- 2. A polarizing event occurs between period 1 and period 2.
- 3. Payoffs of all blocs realize just before election in period 2.
- 4. In period 2, the next election takes place and voters elect using satisficing under multiple payoffs.

From Definition 1, all combinations of payoffs inducing voter type T^{j} to vote for bloc *i* can be derived. The following table depicts those combinations.

³ One might suggest that the voters' decision-making rule is more complex, e.g., considering a history of payoffs or a stochastic process (as, e.g., (Bendor et al. 2011) and Kappe (2013) employ). Yet, the availability heuristic Kahneman and Tversky (1973) and representative heuristic Kahneman and Tversky (1972) imply a simpler rule based on the latest experiences. Both heuristics essentially affect voting behavior (e.g., Huber et al. 2012; Healy and Malhotra 2013; Healy and Lenz 2014).

Note that each line vector in each cell denotes an individual combination of payoffs. Within each vector, the first entry is associated with the payoff generated by the government, the second entry the payoff by the opposition and the third entry a payoff by the profiteer bloc. A * indicates that the payoff can be either low or high.

Using the linearity of probabilities, Table 2 enables to calculate the expected voter share for each party bloc with and without polarization. These are defined as follows:

Definition 3 (Expected voter shares) The expected voter share under polarization in period 2 is denoted by V_i^{PC} for an arbitrary bloc *i*, the expected voter share without polarization by V_i^{NPC} . Moreover, the difference between shares, $V_i^{PC} - V_i^{NPC}$, is denoted by ΔV_i .

All expected voter shares can be found in the appendix. The analysis in the next sections distinguishes between core voters and swing voters. At this, I use the following definition:

Definition 4 (Core voters and swing voters) An arbitrary voter is called a core voter if the voter votes for the same party bloc in period 2 as the voter did in period 1. If the voter votes for a different bloc in period 2, the voter is called a swing voter.

Results

In the following section, I will analyze the effects of polarization and the negativity bias on retrospective voting behavior within the basic case comprising three blocs. I will therefore study the marginal effects of the negativity bias parameter λ and the difference between the expected shares with and without polarization for each bloc. This allows to gain insights about effects on the expected shares of core voters and swing voters for each bloc and thus to obtain a deep understanding of voting behavior in the model. Deriving the marginal effects of the degree of polarization Δh can be another potential point of analysis. Despite the important role of this parameter, I focus on the aforementioned two aspects. The reason is that polarization causes all changes in probabilities to receive a high payoff and thus in expected voter shares.⁴ This makes the analysis of differences in expected voter shares very similar to a study of marginal effects of polarization.⁵ A sketch of the latter can yet be found in the appendix, as well as the proofs for all propositions.

I start with the analysis of the marginal effect of the negativity bias on the expected voter shares with polarization. This effect corresponds to the partial derivative $\frac{V_i^{PC}}{\Delta \lambda}$ for each bloc *i*. The results are as follows:

⁴ Changes due to the negativity bias are only applicable if voters are also polarized.

⁵ There are differences between the two analyses, because taking differences and differentiating with respect to Δh yields different results for all terms in V_i^{PC} that feature $\lambda \Delta h$ or Δh^2 . These differences are nevertheless not as significant to render an additional analysis noteworthy in this section.

Table 2 Voter decision table for basic setting	51		
Voter type / Party bloc voted for	T^G	T^O	T^{p}
Government bloc G	H, *, *	$H,L,L,\frac{1}{2}(H,L,H)\frac{1}{2}(L,L,L)$	$H, L, L, \frac{1}{2}(H, H, L), \frac{1}{2}(L, L, L)$
Opposition bloc O	$L, H, L \frac{1}{2}(L, H, H) \frac{1}{2}(L, L, L)$	*, H, *	$L, H, L^{\frac{1}{2}}(H, H, L)^{\frac{1}{2}}(L, L, L)$
Profiteer bloc P	$L,L,Hrac{1}{2}(L,H,H)rac{1}{2}(L,L,L)$	$L, L, H rac{1}{2}(H,L,H) rac{1}{2}(L,L,L)$	*,*,H ~ ~ ~

Proposition 3.1 (Marginal effects of the negativity bias) In the basic setting, the marginal effects of the negativity bias are as follows:

- 1. For the government, there are negative effects from all voter types.
- 2. The opposition enjoys positive effects from voter types T^G and T^P .
- 3. There are positive effects from types T^G and T^O for the profiteer bloc.

Effects across voter types stem from negatively polarized voters and add up to 0. The magnitude of the effects from swing voter types T^{O} and T^{P} increases in the probability to be disappointed by the prior choice.

Proposition 3.1 shows that the government unambiguously suffers from an increase in the negativity bias, while the opposition and profiteers unequivocally profit from it. Thus, the more the electorate is focused on the negative, the higher are the expected losses in voter shares for the government and vice versa for the other blocs. The intuition behind these results becomes clear considering the influence of the negativity bias on probabilities to obtain a high payoff. The negativity bias only affects the probability to enjoy a high payoff by bloc G in a strictly negative direction. Consequently, there is no way for the government to keep more core voters nor to entice more swing voters from other blocs in expectation if the negativity bias increases. On the opposite, the probabilities to obtain a high payoff by blocs O and P are not altered by this bias for neither direction of polarization. Therefore, these blocs do not profit directly from an electorate more focused on the negative based on a higher chance to satisfy voters. The opposition and profiteers can take advantage of this effect indirectly via gaining more swing voters in expectation compared to the absence of polarization, because the government is less likely to make negatively polarized voters content. Moreover, the insignificance of the negativity bias for the general convincing power of the blocs O and P also shows why their core voter channel is not affected. Satisficing under multiple payoffs implies that voters stick to their prior choice if the performance of the respective bloc is good. Because the negativity bias does not alter the binding power of the opposition and profiteers, the core voter channels of these blocs are not changed in expectation. The mechanic to keep core voters, creating a high payoff, accounts for the finding that swing voter channels from types T^{O} and T^{P} increase in the probability that voters are discontent with their prior choice. If there are high chances that blocs O and P disappoint their prior voters, there is more potential for the remaining blocs to attract these voters. This potential is, facing a higher negativity bias, rather utilized by the opposition or the profiteers, respectively, as the convincing power of the government is hampered by a stronger focus on the negative. For swing voter channels of voter type T^G , this intuition does not apply. The number of negatively polarized voters shifting from the government to another bloc depends directly on the negativity bias, since it deteriorates the binding power of the government. The magnitude of swing voter channels from this type, T^G , for the opposition and the profiteers then increases with the own convincing power and decreases with the convincing

power of the competitor. This relation highlights the importance of per se high chances to deliver a good performance to attract swing voters.

Next, I investigate how expected voter shares in period 2 differ between an election with and without polarization. Therefore, I calculate ΔV_i for every party bloc *i*. The results can be summarized as follows:

Proposition 3.2 (Differences in expected voter shares) For the basic setting with three blocs, there are thresholds $\hat{\theta}^i_{\varphi^j}$ for swing voter channels for which the difference between expected voter shares with and without polarization is 0. These critical values can be written as in Table 3:

At this, λ expresses the ratio $\hat{\theta}^i_{\varphi^j}$ if polarization only affected the convincing power of G. The second summand is a ratio of the positive effect of polarization on the convincing power of P and the effect on the convincing power of G. The threshold for core voters of bloc G is $\hat{\theta}^G_{\varphi^G} = \lambda$. Regarding core voters of bloc O, there is no difference. Bloc P is able to bind more core voters under polarization, with the difference being $\varphi^P_-\Delta h > 0$.

Magnitudes of core voter channels and swing voter channels of voter type T^O , of type T^G for bloc P and core voter effects increase in Δh . For swing voter channels of voter types T^P and T^G only for bloc O, the marginal effect of Δh is ambiguous.

It is furthermore possible to obtain all values $\hat{\theta}^{G}_{\varphi^{P}}, \hat{\theta}^{O}_{\varphi^{G}}, \hat{\theta}^{O}_{\varphi^{P}}$ and $\hat{\theta}^{P}_{\varphi^{G}}$ can take.

Corollary 1 The intervals for thresholds $\hat{\theta}^G_{\omega^P}$, $\hat{\theta}^O_{\omega^G}$, $\hat{\theta}^O_{\omega^P}$ and $\hat{\theta}^P_{\omega^G}$ are as follows:

$$\hat{\theta}^{G}_{\varphi^{P}} : (\lambda, \frac{2}{\Delta h} - 1), \hat{\theta}^{O}_{\varphi^{G}} : (\lambda - \frac{1}{\Delta h}, \lambda(1 - \frac{\Delta h}{2}) - \frac{\Delta h}{2}),$$

$$\hat{\theta}^{O}_{\varphi^{P}} : (\lambda - \frac{2}{\Delta h}, \lambda(1 - \Delta h) - \Delta h) and \hat{\theta}^{P}_{\varphi^{G}} : (\lambda(1 + \frac{\Delta h}{2 - \Delta h}) + \frac{\Delta h}{2 - \Delta h}, \infty).$$

Contrary to marginal effects of polarization, Proposition 3.2 shows that not only negatively polarized voters, but also positively polarized voters play an important role studying differences in expected voter shares. Notably, the ratio of positively and negatively polarized voters required for each bloc to make polarization advantageous in expectation can be calculated. Intuitively, polarization only leads to more voters for the government if there are sufficiently positive polarized voters to outweigh the two negative effects of polarization. First, the decrease in the own convincing power by $\lambda \Delta h$ accounts for the λ in thresholds, because this decrease is λ times as high as the increase in convincing power, Δh , due to positive polarization. Second, negative polarization leads to a higher probability that profiteers satisfy voters which enhances their competitiveness. Facing a stronger competitor, the number of positively polarized voters the government needs to be better off with polarization is even higher. The effect of the second mechanism is depicted in the numerator of the second summands of thresholds. The denominators can be explained by the

Table 3 Voter decision table for basic setting			
Voter type / Party bloc	T^G	T^O	T^{p}
Government bloc G Higher expected voter share with polarization iff θ_{ϕ} exceeds $\hat{\theta}_{\phi}^{G}$	No swing voters	$\hat{\theta}^G = \lambda + \frac{1 - h^O_O}{1 - h^O_O} = \lambda + 1$	$\hat{\theta}^{G}_{c} = \lambda + \frac{h^{p}_{G} - \lambda \Delta h + 1 - h^{p}_{O}}{1 - h^{p}_{p}}$
Opposition bloc O Higher expected voter share with polarization iff θ_{ϕ} undercuts $\hat{\theta}^{O}_{\phi}$	$\hat{ heta}^O{}_{O_{C}}=\lambda^{-rac{1-h^G_G+\lambda\Delta h}{1-h^G_P+h^G_O}}$	v_{ϕ^0} No swing voters	$\hat{\theta}_{O_{a}}^{p} = \lambda - \frac{1 - h_{O}^{p} + \lambda \Delta h + h_{O}^{p}}{1 - h_{P}^{p}}$
Profiteer bloc P Higher expected voter share with polarization iff θ_{φ^j} undercuts $\hat{\theta}_{\varphi^j}^p$	$\hat{\theta}_{\varphi^G}^{P} = \lambda + \frac{1 - h_G^G + \lambda \Delta h}{1 - h_G^G + h_P^G}$	$\hat{\theta}^P_{\varphi^O} = \hat{\lambda} + \frac{1 - h^O_O}{1 - h^O_O} = \hat{\lambda} + 1$	w No swing voters

deteriorating effect on the convincing power of the government induced by negative polarization. Checking for the magnitudes of swing voter channels from marginal effects of the negativity bias, it becomes clear that they are identical to the denominators here, except for the missing positive effects of polarization on the convincing power of profiteers in denominators, denoted by Δh .

This pattern to interpret the critical thresholds $\hat{\theta}^i_{ai}$ can also be employed to grasp the different effects of polarization on differences in expected voter shares for the opposition. The first summand summarizes that if polarization only affected the probability to be content with the government, the opposition would profit for ratios of positively and negatively polarized voters lower than the negativity bias λ . This is the exact opposite of the direction observed for the government, since the opposition can take advantage of negative polarization and is worse off with positive polarization on side of the government. The second effect, which contains the increased probability that negatively polarized voters are satisfied by profiteers, affects the opposition negatively in an indirect manner. While swing voters are not less likely to be attracted by the opposition, voters are more likely convinced by profiteers. This increase in competition deteriorates the chances for the opposition to gain from swing voter channels. Not enjoying a higher probability to satisfy negatively polarized voters, or put differently, being neutral with respect to polarization, is therefore in regard of this effect disadvantageous for the opposition when it comes to expected voter shares.

Concerning the intuition behind the swing voter thresholds for profiteers, $\hat{\theta}_{\varphi^j}^p$, the pattern from the analysis of the prior two blocs pertains again. Analogously to the opposition, profiteers gain from the effects from polarization on the convincing power of the government as long as there are sufficiently negatively polarized voters to keep the ratios θ_{φ^j} lower than the negativity bias λ . Contrarily to the other two blocs, profiteers enjoy direct gains from the second effect, which is an increased chance to content negatively polarized voters. This is reflected by a positive second summand, implying that the condition to render polarization profitable for profiteers is relaxed. For instance, even if the ratio of positively and negatively polarized voters is exactly λ , implying neither gains nor losses for profiteers based on the first effect, the second effect induces expected gains in swing voter shares under polarization for profiteers. Intuitively, positive and negative polarization solely on side of the government cancel out, but the higher competitiveness of profiteers allows them to achieve more swing voter shares.

Notably, the interpretation outlined above holds for all swing voter types. There is yet a key difference between swing voter channels of types T^G and T^P on the one hand and of type T^O on the other hand. The second summand of thresholds concerning this type, $\hat{\theta}^i_{\varphi^O}$, only depends on the probability to obtain a high payoff by the prior choice and cancels out to 1. All other thresholds depend on all three probabilities. The reasons behind this finding are that polarization does not alter the convincing power of the opposition and that, following satisficing under multiple payoffs, only low payoffs let voters shift. Thus, polarization does not change the expected amount of swing voters of type T^O . This amount is $(1 - h_O^O)\varphi^O$. Polarization affects the distribution of this number of swing voters

between the two remaining blocs, the government and profiteers, though. As pointed out above, polarization influences the competitiveness of these two blocs and therefore their ability to entice swing voters.

The analysis and interpretation of thresholds $\hat{\theta}^i_{\varphi^i}$ allows for the following insights:

Corollary 2 In case all ratios of θ_{φ} are equal to the parameter of the negativity bias λ , the increase in the probability to enjoy a high payoff by profiteers for negatively polarized voters leads strictly to expected losses in swing voter shares for the government and opposition and to expected gains for themselves. If the effect of polarization on profiteers was absent, expected swing voter shares with and without polarization would be equal.

Corollary 3 If there are equally many positively and negatively polarized voters of each type, $\theta_{\varphi^i} = 1$, the government is unambiguously worse off and profiteers are unequivocally better off in expectation regarding achieved swing voter shares. For the opposition, the direction is ambiguous.

Both Corollary 2 and 3 underline the essential role of the increased convincing power of profiteers for negatively polarized voters. Corollary 2 shows how it shapes the expected outcomes if the influence of polarization on the chance to be satisfied by the government delivers neutral effects in expectation. Corollary 3 highlights that the government requires more positively than negatively polarized voters to gain from polarization given the assumption that the parameter λ exceeds 1. Due to higher competition by profiteers, polarization can be disadvantageous for the opposition despite the effect from the government side leading to a summand bigger than 1. The direction of the gross effect of polarization depends on the second summand, which covers the effects from the profiteer side. I analyze the latter effects and their implications henceforth.

While the first summand, depicting the effects of polarization on the convincing power of the government, is the same across swing voter types and party blocs and fixed at the parameter of the negativity bias λ , the second summand varies a lot across swing voter types. For swing voters of type T^{O} , the ratios constituting this summand are equal to 1, which has already explained above. On the contrary, swing voters of types T^G and T^P feature summands including all three probabilities to get a high payoff. As shown previously, the numerators depict the effects induced by polarization on the side of profiteers and the denominators denote the pure effect of negative polarization on the convincing power of the government. This implies that the latter effect scales the first effect. In case the effect from the side of the government is relatively stronger than the effect stemming from profiteers, the summand is relatively low and vice versa. Having grasped the mechanism behind the second summand, it is then essential to study how each probability affects each effect and therefore also the aforementioned mechanism. From the analysis above, it is clear that both the government and opposition prefer low magnitudes of the second summand, implying a low

influence of the effect stemming from profiteers. Profiteers are better off with a high effect from their side. Further, considering that low thresholds $\hat{\theta}^i_{\varphi^i}$ are favorable for the government and high thresholds $\hat{\theta}^i_{\varphi^j}$ advantageous for the opposition and profiteers, the influence of probabilities on thresholds can be summarized as follows:

Corollary 4 For swing voters of type T^G the opposition is relatively better off if they and the government are likelier and profiteers less likely to satisfy T^G . Favorable conditions for profiteers are also high h_O^G and low h_P^P , but low h_G^G . For swing voters of type T^P , the government is relatively better off in case they and profiteers are less likely and the opposition likelier to satisfy T^P . For the opposition, advantageous conditions are also low h_P^P , but low h_O^P and high h_G^P .

The first part of Corollary 4, which elaborates on thresholds $\hat{\theta}^i_{\varphi^G}$, can be explained intuitively this way: If the opposition has high chances to satisfy the underlying swing voters and profiteers do not, the first is able to withstand the increased competitiveness of profiteers, which is embodied by the second summand, the best. Yet, profiteers gain in relative terms most competitive strength if these conditions on probabilities are met. There is a difference in preferences for the binding power of the government for their prior voters, though. Profiteers can employ their increased competitive power the most if there are more swing voters of T^G , which pertains if the government probably discontents its previous voters. The opposite is true for the opposition. This bloc is protected by a strong government from the adverse effect of more appealing profiteers. In other words, the opposition can lose less swing voters to profiteers if there are not many swing voters, which applies if the government tends to bind its prior voters.

For the second part of Corollary 4, covering characteristics of thresholds $\hat{\theta}_{\varphi}^{i}$, another perspective is required, since swing voters shift from profiteers here, whose binding power is increased within the regarded effect in the second summand. Both the government and opposition suffer the least from strengthened profiteers in case these are per se weak. This is due to the fact that the relative decrease in expected swing voters of type T^{P} is more pronounced for stronger profiteers. The disadvantageous effect of stronger profiteers, resulting in less swing voters, is minimized for each the government and opposition if their competitiveness is relatively low compared to the convincing power of the respective opponent. Another short and precise interpretation of this mechanism is that both the government and the opposition suffer less from an increase in the binding power of profiteers the lower their potential to gain swing voters of type T^{P} is per se.

The highest effects of the second summands on thresholds $\hat{\theta}^i_{\varphi^j}$ are already depicted in Corollary 1. These show that very strong effects of polarization on the strength of profiteers can render conditions to profit from the respective swing voter channels very restrictive for the government and opposition and very relaxed for profiteers. This is especially noteworthy for the case of the opposition, because their convincing power is not affected by polarization.

The effects of polarization on differences in expected core voter shares can be grasped concerning satisficing under multiple payoffs, which implicates that voters decide for their previous bloc again if they are content with it. For the government, this means that the stronger effect of negative polarization compared to positive polarization has to be offset by sufficiently more positively polarized voters. This mechanism is identical to the first summand of swing voter thresholds $\hat{\theta}^i_{\varphi^j}$. Because the binding power of the opposition is not affected by polarization, there is no difference in expected core voter shares for this bloc. Polarization unambiguously increases the binding power of profiteers for negatively polarized voters, leading to higher expected core voter shares.

Swing voter channels described in Proposition 3.2 increase in the parameter of polarization Δh with few exceptions. Intuitively, the stronger an event polarizes, the more voters of an electorate change their opinion about the performance of parties. Thus, stronger effects for electoral results can be expected. Exceptions are swing voter channels of type T^P and the swing voter channel of type T^G for the opposition. Recalling from previous analysis, these are swing voter channels characterized by disadvantageous effects from the increased strength of profiteers. For these channels, marginal effects of polarization are positive except for cases in which $\lambda \Delta h^6$ is very high, so that this term exceeds the magnitude of the entire channel. Additionally, these cases require low competitiveness by the considered bloc compared to the competitor and few expected swing voters.

Extension

The basic model excludes non-voters and the opportunity to abstain in general. Voter turnout and polarization are related, though, which has been demonstrated by a large body of literature (e.g., (Lachat 2008; Steiner and Martin 2012; Moral 2017; Wilford 2017). Recent electoral results also suggest that polarization can affect voter turnout. For instance, voter turnout increased from 71.5 % to 76.2 % in Germany in 2017. In addition, there is evidence that populist parties enjoy substantial gains from prior non-voters. The Alternative für Deutschland earned around 35 % of their total share of 12.6 % from previous non-voters in the German national election in 2017 (Hilmer and Gagné 2017; Pickel 2019). To account for non-voting, I now allow for a fourth voter type, which comprises all voters who did not vote in period 1. It is denoted by T^{NV} and its respective share is φ^{NV} . To ensure the majority of the government, voter shares from period 1 have to be such that $\varphi^G > \frac{1}{2}(1 - \varphi^{NV})$. Non-voters, like all other voter types, obtain a payoff by each of the blocs G, O and P. Non-polarized non-voters gain a high payoff by

⁶ This term stems from terms $\frac{1}{2}\lambda\Delta h^2$ when negative polarization on the government side and the positive effect of polarization for profiteers are multiplied.

each bloc *i* with probability h_i^{NV} . Changes for polarized voters are as for polarized voters of other types. Non-voting itself does not yield a payoff as the "non-voting bloc" is not a politically active bloc. Non-voters also apply satisficing under multiple payoffs for the election in period 2. Importantly, Criterion 3 of Definition 1 is changed in a way that an arbitrary voter decides for a bloc not generating a payoff instead of a bloc also yielding a low payoff. Additionally, up to three blocs may meet Criterion 2. These are then again selected with equal probability. From these adaptions of the decision rule and the introduction of non-voting, there are implications for all voter types.

Corollary 5 Voters only abstain from voting in period 2 iff all blocs yield low payoffs.

Corollary 5 is a direct result of the assumption that there is no payoff from nonvoting. Further, it indicates that non-voting is the result of a single reason: Voters who are disappointed by all parties opt for a neutral alternative, which they find in non-voting. Other motives for abstaining from election do not exist in the model. Although there is empirical evidence for additional causes for non-voting, such as political ignorance, indifference, selective awareness, and conditional inactivity Ragsdale and Rusk (1993), there are two reasons why the model by its nature draws a realistic picture why voters abstain. First, there is huge body of empirical literature on non-voting and voter turnout implying that discontent with political parties accounts for a large share of non-voters (e.g., Pammett and LeDuc 2003; Hooghe et al. 2011; Kemmers 2017; Rich and Treece 2018). Second, except for indifference, the additional causes for non-voting are excluded by assumption. Therefore, the model is neither imprecise nor specified incorrectly, but to some extent limited as not all reasons are covered. Within scope, the model comprises the main reason for abstention, dissatisfaction, adequately and precisely.

Using all assumptions and Corollary 5, the decision table for a three-party setting and including non-voters is as follows (Table 4):

The expected voter shares for all blocs including and neglecting polarization can be found in the appendix.

Analogous to prior analysis, I analyze the marginal effects of the negativity bias and differences in expected voter shares with and without polarization. Hereby, the insights from Corollary 5 play an important role and unveil relations to the analogous parts of the three-bloc case.

Proposition 4.1 (Marginal effects of the negativity bias) Allowing for non-voting, marginal effects of the negativity bias are as follows:

- 1. For the government, there is a negative effect from all voter types.
- 2. The opposition enjoys positive effects from voter types T^G , T^P and T^{NV} .
- 3. There are positive effects from types T^G , T^O and T^{NV} for the profiteer bloc.
- 4. There are more expected non-voters from all types for an increase in λ .

Table 4 Voter decision table all	owing for non-voting			
Voter type / Decision for	T^G	T^O	T^{p}	T^{NV}
Government bloc G	H, *, *	$H, L, L, \frac{1}{2}(H, L, H)$	$H, L, L, \frac{1}{2}(H, H, L)$	$H,L,L\frac{1}{2}(H,H,L)\frac{1}{2}(H,L,H)\frac{1}{2}(H,L,H)$
Opposition bloc O	$L, H, L \frac{1}{2}(L, H, H)$	$^{*},H,^{-}$	$L, H, L^{\frac{1}{2}}(H, H, L)$	$L, H, L^{\frac{1}{2}}(H, H, L)^{\frac{1}{2}}(L, H, H)^{\frac{1}{2}}(H, H, H)$
Profiteer bloc P	$L, L, H \frac{1}{2}(L, H, H)$	$L, L, H \frac{1}{2}(H, L, H)$	*, *, H _	$L, L, H\frac{1}{2}(H, L, H)\frac{1}{2}(L, H, H)\frac{1}{2}(H, H, H)$
Abstention from voting	L, L, L^{-2}	L, L, L^{-2}	L, L, L	L, L, L

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Effects across voter types stem from negatively polarized voters and add up to 0. The magnitude of the effects for blocs O and P increase in their own probability to satisfy voters. Apart from this effect and the effect of voter type T^G on bloc G, all magnitudes increase in the probability to be discontent with blocs O and P.

The mechanisms behind Proposition 4.1 are the same as for Proposition 3.1. An electorate more focused on the negative leads to more voters disappointed by the government. This engenders not only more potential swing voters heading for the opposition and profiteers, but also leads to more non-voters in expectation. As outlined in Corollary 5, an arbitrary voter only abstains from voting in case all blocs dissatisfy, which is fostered by a higher negativity bias. Corollary 5 also accounts for the fact that channels resulting in non-voting increase in the chances that opposition and profiteers disappoint voters. The lower the convincing power of these blocs is, the lower is voter turnout in expectation. On the contrary, attractive opposition and profiteers are able to capitalize on the increased number of disappointed voters, enticing these with a good performance and thus ensure that the decrease in voter turnout is less pronounced.

In addition to marginal effects of the negativity bias including non-voters, the results for differences in expected voter shares can be summarized as follows:

Proposition 4.2 (Differences in expected voter shares) Including non-voters, there are again critical thresholds $\hat{\theta}^i_{\varphi^i}$ for swing voter channels, at which differences in expected voter shares are 0. The government enjoys expected gains in voter shares under polarization from swing voter channels iff the corresponding ratio of positively and negatively polarized voters, θ_{φ^i} , exceeds thresholds $\hat{\theta}^i_{\varphi^i}$. All other blocs profit from polarization if and only if θ_{φ^i} is lower than $\hat{\theta}^i_{\varphi^i}$. Thresholds can be written as in Table 5:

Table 5 Differen	ices in expected voter	shares anowing for i	ion-voters	
Voter type / Party bloc	T^G	T^O	T^{p}	T^{NV}
Government bloc G	No swing voters	$\hat{\theta}^{G}_{\varphi^{O}} = \lambda^{+\frac{h^{O}_{G} - \lambda \Delta h}{2 - h^{O}_{P}}}$	$\hat{\theta}^{G}_{\varphi^{p}} = \lambda^{+rac{h^{p}_{G}-\lambda\Delta h}{1-h^{p}_{p}}}$	$\begin{split} \hat{\theta}^G_{\varphi^{NV}} &= \lambda \\ &+ \frac{(1-\frac{2}{3}h^{NV}_o)(h^{NV}_G - \lambda \Delta h)}{(1-\frac{2}{3}h^{NV}_o)(1-\frac{1}{2}h^{NV}_p) + \frac{1}{3}h^{NV}_o} \end{split}$
Opposition bloc O	$\hat{\theta}^{O}_{\varphi^{G}} = \lambda^{-\frac{1-h^{G}_{G}+\lambda\Delta h}{2-h^{G}_{P}}}$	No swing voters	$\hat{\theta}^{O}_{\varphi^{P}} = \lambda^{-\frac{2-h^{P}_{G}+\lambda\Delta h}{1-h^{G}_{P}}}$	$\hat{\theta}^{O}_{\alpha^{NV}} = \lambda^{-\frac{1-\frac{2}{3}h^{NV}_{G}+\frac{2}{3}\lambda\Delta h}{1-\frac{2}{3}h^{NV}_{P}}}$
Profiteer bloc P	$\hat{\theta}^{P}_{\varphi^{G}} = \lambda^{+\frac{1-h^{G}_{G}+\lambda\Delta\hbar}{h^{G}_{p}}}$	$\hat{\theta}^{P}_{\varphi^{O}} = \lambda^{+\frac{2-h^{O}_{G}+\lambda\Delta h}{h^{O}_{P}}}$	No swing voters	$\hat{\theta}_{\varphi^{NV}}^{P} = \lambda + \frac{2 - h_{G}^{NV} + \lambda \Delta h}{h_{P}^{NV}} + \frac{h_{O}^{NV}}{h_{P}^{NV}(3 - 2h_{O}^{NV})}$
Non-voter bloc NV	$\hat{ heta}_{arphi^G}^{NV} = \lambda^{-rac{1-h_G^G+\lambda\Delta h}{1-h_P^G}}$	$\hat{\theta}_{\varphi^{O}}^{NV} = \lambda^{-\frac{1-h_{G}^{O}+\lambda\Delta h}{1-h_{P}^{O}}}$	$\hat{ heta}_{arphi^P}^{NV} = \lambda^{-rac{1-h_G^P+\lambda\Delta h}{1-h_P^P}}$	No swing voters

 Table 5
 Differences in expected voter shares allowing for non-voters

The government binds more core voters under polarization iff $\theta_{\varphi^G} > \lambda$ and profiteers bind unequivocally more voters $\varphi_{-}^P \Delta h > 0$. More non-voters abstain again in expectation if and only if $\hat{\theta}_{\varphi^{NV}}^{NV} = \lambda - \frac{1-h_G^{NV}+\lambda\Delta h}{1-h_p^{NV}}$ and there is no effect on core voters of the opposition.

Intervals for $\hat{\theta}^i_{\omega^i}$ can be found in the appendix. The introduction of non-voting does not elicit new mechanisms regarding differences in expected voter shares for the threeparty blocs and their respective voter type from the basic setting. There is a fixed parameter in thresholds $\hat{\theta}^i_{ai}$ stemming from the changes in the chances of the government to satisfy voters, which is the parameter of the negativity bias λ . The second summands are a ratio of the positive effect of polarization on the convincing power of profiteers and the respective negative effect for the government on negatively polarized voters. Notably, all of these are independent of the probability to receive a high payoff by the opposition, as these terms cancel out. This finding can be ascribed to the neutral role of the opposition concerning the effects of polarization in this summand. First, the convincing power of the opposition is not affected by polarization, and second, the opportunity to abstain from voting is utilized by all voters who are disappointed by all blocs. Additionally, the mechanisms carry over to prior non-voters T^{NV} , except for the independence of the competitiveness of the opposition. The government faces stricter restrictions to gain more non-voters in expectation due to polarization, while conditions are strictly looser for the profiteers. For the opposition, both distinguishable effects of polarization work in different directions, leading to different signs of summands.

The thresholds $\hat{\theta}^{NV}_{\omega}$ for the "non-voting bloc" are of identical structure for each voter type T^{j} as all types only abstain iff they are discontent with all blocs. Moreover, the effects behind thresholds $\hat{\theta}_{\varphi^j}^{NV}$ point in the same direction as the respective thresholds for the opposition. Both the opposition and non-voting are in a sense neutral to polarization that their chances to convince voters are not altered. Thus, thresholds $\hat{\theta}_{ai}^{NV}$ hint at lower voter turnouts or a stronger "non-voting bloc" if polarization effects on the government are high and respective effects on profiteers are low. In this sense, a relatively strong effect of polarization on the attractiveness of profiteers can protect from lower voter turnouts due to polarization. This pertains especially for a per se strong government and poor profiteers, depicted by high h'_{G} and low h'_{P} , so that an increase in the profiteers' appeal has a maximized impact. Notably, thresholds for the opposition and non-voting are of the same structure concerning the direction of each of the two effects. This hints at some relation between, e.g., gains for the opposition and a decrease in voter turnout. The different second summands account for different magnitudes of the second effects, though. Finally, Corollaries 2 and 3 can be generalized to the introduction of non-voters, with the implications for the "non-voting bloc" being identical to those of the opposition.

Discussion

Elections are often characterized by significant voter shifts. The literature has convincingly shown that retrospective voting matters when voters have to decide what party to support. Albeit various approaches to retrospective voting exist, these models cannot explain properly why incumbents lost significant shares and many opposition parties did not take advantage of these losses, while some specific parties, especially right populist ones, did so. This pattern was prevalent in many national elections in Europe during the last decade. To fill this gap, my paper incorporates polarization and the negativity bias into retrospective voting to examine the effects of polarizing events within two election periods in a three-bloc setting. In line with empirical literature, all of these blocs can satisfy voters but are subject to an exogenous polarizing event in different ways. Extending satisficing to a decision rule for multiple payoffs, my framework enables distinctions in the evaluation of different blocs and therefore a precise analysis of the voters' decision process also including non-voting. With these features, my model yields insights about the effects of polarization and the negativity bias on voting behavior with a strong emphasis on bloc-specific evaluations and voter shifts. Thus, it is an additional approach to existing theoretical models of retrospective voting (e.g., Bendor et al. 2011; Bischoff and Siemers 2013; Esponda and Pouzo 2017).

The analysis of the basic three-bloc framework reveals a rich set of results. A study of marginal effects of the negativity bias shows that the government strictly loses voter shares from all types if the electorate is more focused on the negative. Both the opposition and profiteers enjoy gains in expected swing voter shares, with the magnitude of these channels depending on their own relative competitive power.

An analysis of the differences in expected voter shares with and without polarization shows that the different impacts of polarization on the strength of the government and profiteers can be separated. The relation of the magnitudes of the effects of polarization on the chance of the government to content polarized voters accounts for the first effect. Moreover, there is an effect stemming from the increase in convincing power of profiteers for negatively polarized voters. There is a key difference between these effects: The first one contributes a constant parameter to sign-changing thresholds of positively and negatively polarized voters, given that the negativity bias does not change over time. The second one is a fraction of probabilities to satisfy voters, which can generally rather be considered variable over time Bendor et al. (2011). Both effects impair the conditions for the government to profit from polarization, while they loosen the respective conditions for profiteers. For the opposition, the effects work in opposite directions as the governmental effect is per se advantageous for low ratios, but the increase in the convincing power of profiteers lowers their relative competitiveness regarding swing voters. The detrimental impact of the latter effect is less severe for both government and opposition if their chances to entice swing voter types are small per se. Thus, higher competition by profiteers harms strong governments and oppositions harder. Regarding core voters, the restriction for the government to be better off under polarization comprises the effect of polarization on the own binding power, whereas profiteers keep unequivocally more core voter shares under polarization.

There are also insights about how the own ability to bind and convince voters affects the sign of the differences in expected swing voter shares, or, put differently, whether blocs with a specific competitive power are more or less subject to losses or gains due to polarization. Both the government and the opposition rather incur less expected swing voter shares if their relative competitive power compared to the respective competitor is high. Interpreted vice versa, government and opposition can be protected by a strong opponent from expected losses to some extent as the variable effect of the increase in the strength of profiteers is then less dominant. On the contrary, conditions for profiteers to profit from polarization are even more favorable if their general convincing power is low. In this case, the relative increase from polarization works the most.⁷ Magnitudes of swing voter channels generally increase in the degree of polarization. Intuitively, stronger polarization causes more significant effects on the competitive power of parties. Therefore, more voters are induced to decide differently in the presence of polarization.

Introducing non-voters substantiates the robustness of the results derived in the basic case. In fact, all results and mechanisms regarding the three electable blocs and their respective types carry over to this setting. For all non-voter channels, including prior non-voters, the conditions to be higher than in the absence of polarization follow the same mechanisms as swing voter channels for the opposition. The similarity to conditions for the opposition is due to the fact that polarization affects neither the probability to be satisfied with the opposition nor the absence of a payoff of non-voting. Thus, the effect from the government side induces more voters both to shift to the opposition and not to vote as long as voter types feature sufficient negatively polarized voters. Additionally, the higher strength of profiteers due to polarization deteriorates the chances of the opposition to entice swing voters and keeps more disappointed voters from non-voting. Contrarily to the basic case, a strong opposition cannot protect the government from disadvantageous conditions. The opposite effect holds, though, and also applies to non-voters, meaning that a strong government engenders declines in voter turnout. Moreover, weak profiteers and a higher negativity bias lead to a prevalence of abstention as well. With a strong government and poor performing profiteers, the increase in the convincing power of the latter tends not to mobilize enough voters to outweigh the decreasing effect of polarization from the government side on voter turnout, especially if the electorate is heavily focused on the negative. In case the opposition cannot attract many swing voters either, the magnitudes of voter channels that abstain due to polarization are maximized. Interestingly, the conditions on core voters of the three electable blocs only depend on the effect of polarization on the own binding power, yielding the same results as in the basic setting.

⁷ The magnitude of expected swing voter channels is yet higher for strong profiteers, because they are then per se more appealing to voters. This measure has to be considered separately from the thresholds deciding whether polarization is in expectation advantageous for profiteers.

Consequently, the model provides a testable theoretical explanation for the pattern of the characteristic voter shifts in Europe. While the effects of polarization on the competitiveness of the government were disadvantageous for itself and profitable for the opposition and profiteers, the increased strength of profiteers prevented opposition parties from capitalizing, while they gained even more voter shares themselves. The large gains by profiteers and mixed results for the opposition hint at profiteers that would not have been likely to satisfy voters without polarization. Profiteers therefore benefited from the increase in strength from polarization, especially in the competition against the opposition. To test this hypothesis, the parameters of the model have to be obtained. At this, the parameter of loss aversion can be used for the parameter of the negativity bias. The contexts of research cover a vast number of fields, including money (e.g., Kahneman and Tversky 1991; Abdellaoui et al. 2008; Wang et al. 2017), health Bleichrodt et al. (2001), consumer behavior (Karle et al. 2015), and renewable energy Bartczak et al. (2017). Although political matters are so far neglected, this pool of estimations most probably yields an appropriate value for the negativity bias, because the mean of the parameter for loss aversion is similar across topics. There are huge differences across countries, though Wang et al. (2017), which may also provide an explanation why voter shifts may differ a lot between elections. Two additional parameters are needed to calculate these shifts. First, the degree of polarization has to be determined. Second, the probability to receive a high payoff by each parliamentary bloc is required. While the latter can be estimated using long-term data depicting the satisfaction of voters with each party, the estimation of the first may be enabled checking for positive changes in satisfaction due to the polarizing event.⁸

In general, the model emphasizes the importance of polarizing events for electoral outcomes. This is especially remarkable considering that these events may be beyond the control of the government (e.g., Achen Christopher and Bartels Larry 2004). Consequently, the government may lose significant shares due to an event it might not be responsible for. Similarly, the negativity bias, which lowers voter shares of all types for the government, is neither in the hands of the latter, but a psychological phenomenon. On the opposite, both the opposition and profiteers take advantage of a stronger bias, especially if they possess a high potential to convince swing voters. Even more importantly, this decreases voter turnout at the same time with the highest effects if both opposition and profiteers are weak.

These results may serve as an alternative starting point in empirical research on retrospective voting. While economic measures are used frequently as performance indicators (e.g., Lewis-Beck and Stegmaier 2000; Campbell et al. 2010; Plescia and Kritzinger 2017), there is also newer literature extending the array of possible performance measures (e.g., Vries et al. 2014; Liberini et al. 2017; Reny et al. 2019). Additionally, as outlined above, it is important to consider shocks to the chances

⁸ Focusing on negative changes in satisfaction would also incorporate the negativity bias, according to my framework. Thus, using data about positive changes is more appropriate to check for the degree of polarization. Yet, knowing this parameter, checking for negative changes can then yield information about the parameter of the negativity bias.

of several parties to satisfy voters. More specifically, the general satisfaction with different parties or blocs and the source of shocks to content may well explain how voter shifts emerge. Moreover, it is critical to include effects on profiteers that may be non-parliamentary or stand for election for the first time. The majority of empirical literature focusses only on performance by the government or by parliamentary parties, which may be insufficient. In light of these modifications, empirical analysis of elections during or subsequent to, e.g., the refugee crisis can provide more precise and comprising explanations of the electoral outcomes. Moreover, the set of results and relations of voter channels on bloc level from this theoretical model can be substantiated.

Besides the effects on electoral results and their respective nature, there are also insights from the framework especially for areas intersecting with voting behavior. For instance, the numbers of positively and negatively polarized voters as well as the degree of polarization are treated as exogenously given, allowing for the analysis of a fixed state. Assumptions on the process leading to the specific shares of polarized voters are not made. Since these play an important role, understanding the nature of polarization in an electorate is key. Presenting the polarizing event and the response of the government in different ways can be one piece of this explanation, hinting at the important role of framing in politics (e.g., Porto 2007; Slothuus and De Vreese 2010; Hullman and Diakopoulos 2011; Elias et al. 2015; Vliegenhart et al. 2016). Within this research area, a stronger focus on the role of political campaigns and media is revealing, notably concerning populist parties. Therefore, the increase in work on these fields (e.g., Schmuck and Matthes 2017; Bali et al. 2018; Barrio et al. 2018; Silva 2018) is supported by this paper.

Rendering polarization and polarized voters endogenously alterable variables makes these a strategic area parties might exploit. While the government always prefers more positively polarized voters and both opposition and profiteers unequivocally profit from a higher share of negatively polarized voters, their respective preferences for the degree of polarization are ambiguous. My model delivers an overview on the expected effects of polarization, which vary a lot due to the effects of the increase in convincing power of profiteers. Depending on the sign of expected effects, a bloc has an incentive to decrease or increase the degree of polarization. While the model answers the question when which incentive is valid, the question how to act accordingly is beyond its explanatory power. The aforementioned areas of framing and campaigning already yield several ways to engender polarization, but approaches to mitigate it are relatively unexplored. The establishment of factchecking measures can reduce misinformation and thus polarization. The evidence of its efficacy is yet mixed. Some studies suggest that fact-checking enhances informativeness and lowers polarization (e.g., Wintersieck 2017; Hameleers and van der Meer 2020), whereas other literature shows that the effects are very limited in terms of duration (e.g., (Swire et al. 2017)) and selective exposure of voters (e.g., Shin and Thorson 2017; Margolin et al. 2018).

Apart from potential disadvantageous regarding electoral outcomes, there are also other reasons why polarization should be diminished, especially from the perspective of the government. Different fields of research stress that polarization can have detrimental effects, e.g., decreasing economic growth due to impaired social cohesion (Goldschmidt and Wohlgemuth 2004; Ager and Brückner 2013; Aisen and Veiga 2013; Goldschmidt 2014; Pervaiz and Chaudhary 2015) and boosted potential for conflicts in society (e.g., Esteban and Ray 2011; Montalvo and Reynal-Querol 2012; Abu-Bader and Ianchovichina 2019). Consequently, there are issues far beyond electoral outcomes that have to be taken into consideration in the presence of polarization. This pertains especially if polarization is exploited as a strategy.

Abstention is the result of dissatisfaction with all blocs in this model by assumption. This framework may also include another reason why voters abstain, which is apathy (e.g., Salamon and van Evera 1973; Cammaerts et al. 2014 and Chong et al. 2015). At this, it is fruitful to investigate how apathy interacts with polarization in the model. If the model is extended to a multi-period model, apathy can be a result of receiving low payoffs by all blocs. Such voters are then subject to a parameter that represents apathy and that decreases the probability to be satisfied with any bloc in the following period. After having obtained a high payoff by any bloc, apathy and the corresponding parameter are absent again. This specification elicits the following mechanism: Polarization against the government leads to a higher probability to be dissatisfied and thus increases apathy in expectation for the following periods. With apathy decreasing the chances to be satisfied with any bloc, polarization against the government does not only elicit apathy, but decreases voter turnout indirectly via apathy. This modification as well as the above-mentioned avenues are left for future research.

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