

Electoral campaigns with strategic  
candidates: a theoretical and empirical  
analysis

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# Declaration

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# Abstract

The main focus of this thesis is the analysis of political campaigns when candidates choose their statements in a strategic way.

In the first chapter, 'Discretion and renegotiation in electoral campaigns', I present a model of electoral campaigning as a problem of competitive delegation. The chapter considers a situation in which there is uncertainty about what the optimal policy should be; in this environment voters may want to leave discretion to a candidate, in order to allow him to adjust his policies to the state of the world, once he is elected. The paper analyses how the ambiguity level of the political statements is influenced by the presence of uncertainty over the candidates' ideology, by the possibility of ex post renegotiation between the elected candidate and the voters and by several political variables.

In the second chapter, 'Last minute policies and the incumbency advantage', joint with Stefan Penczynski, we investigate the timing of statements in political debates and campaigns. Early statements can influence the political agenda and signal competence and vision, late statements are based on more information about appropriate measures. We find that candidates speak early on issues they are better-informed about in order to signal relevance and move them up the agenda. Since opponents benefit from this revelation, however, candidates remain silent once their information is sufficiently precise and valuable.

In the last chapter, 'Discretion and ambiguity in electoral campaigns: a look into the empirical evidence', I compare several models of ambiguity in electoral campaigns, including my own model which was introduced in the first chapter. I use the methodology of Campbell (1983) to have a proxy for ambiguity of the electoral statements, and the data from the American National Election Studies on Senate elections from 1988-1990-1992, to investigate which of the correlations predicted by these models seem to be present in the data.

Al nonno

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# Preface

Elections are an important institution in the life of a democratic country. It is therefore important to understand their mechanisms, and how the electoral rules affect their outcome. Downs (1957) was the first to develop an analysis of the electoral behaviour of voters and candidates moving from the assumption that individuals seek their self interest even in an election; in his work, therefore, voters vote for the candidate who will implement their preferred policy, and candidates promise to implement the policy that will maximise their chances of winning the election. By introducing these assumptions he built the basis of the classical theory of elections, and he changed the approach to politics by introducing the economic methodology and the use of game theory in the field.

Starting from Downs' work, economists and political scientists have studied in details several aspects of elections and electoral campaigns. In this thesis I consider two different aspects of the politicians' strategic behaviour during the electoral campaigns: in Chapter 1 and Chapter 3 I focus on the vagueness of the candidates' promises during the electoral campaigns and in Chapter 2 I develop a model of timing of their announcements.

The analysis of candidates' ambiguity has been first introduced by Shepsle (1972) who showed that candidates may have an incentive to be ambiguous when voters are risk loving. Shepsle's work was discussed by Page (1976) who criticized in particular the assumption that voters are risk loving. Page proposed a different explanation for candidates' ambiguity, obtained by modelling the optimal allocation of emphasis in the campaign. In his model, a candidate will optimally take a precise stand on non controversial issues, while remaining vague on the more controversial ones; this is due to the possibility that his opponent will use any statement on a controversial issue against him.

The recent political economy literature contains several alternative explanations for the presence of candidates' ambiguity. The possible causes of ambiguity have been identified for example in the uncertainty over the median voter's policy preference (Glazer, 1990), in the incumbent's willingness to disguise his ideological position (Alesina and Cuckierman, 1990), and in the trade-off between moving towards the median voter's position and being more extreme so to increase the campaign contributions (Alesina and Holden, 2008).

Ambiguity in election has been analysed also from an empirical point of view. Focusing on American Presidential election, Campbell (1983) and Bartels (1986) propose two parallel analyses of the effects of uncertainty and ambiguity over the election outcome. Campbell searches for the most relevant explanatory variables for the level of ambiguity of the politicians. In order to do so, he considers the questions from the 1968 to 1980 Presidential elections surveys in which the respondents are asked

to position the candidates' stand on a specific issue on a seven point scale; he then estimates the candidates' ambiguity levels on the different issues as the standard deviation of such positioning. Bartels develops instead a model of survey response under the assumption that the respondent places the candidate if he is sufficiently certain of his position, and that he refuses to position the candidate if the uncertainty level is higher than a certain threshold. By doing so he has an estimate of the uncertainty level about the candidate for each respondent and he can focus his analysis only on data from one Presidential election.

In the first chapter I analyse an alternative cause of ambiguity. I consider an electoral setting in which two candidates compete for office over a unidimensional policy space. Each candidate is characterized by an ideological bias from the median voter equal to  $t_j$ . The political environment is such that the optimal policy does depend on a state of the world that will be known only after the election; commitment over the electoral promises is assumed. In this case the election itself can be seen as a competitive delegation problem; the voters have to decide whether to leave the candidate the freedom to adjust his policy to the realized state of the world or to bind him to a specific policy (i.e. the expected value of the optimal policy). Essentially the model investigate how the vagueness of the candidates can arise from the median voter's trade-off between the bias coming from the candidate's ideology and the one coming from the variability of the state of the world. In this case there is no policy convergence between the candidates, and the candidates optimally commit to a policy set and not to a specific policy. The chapter also investigates how the level of candidates' vagueness changes in presence of asymmetries in the biases, when we introduce uncertainty over the candidates' ideological positions, and when renegotiation is allowed after observing the state of the world.

In the third chapter I investigate how the implications of several models of ambiguity relate to the empirical evidence. I consider the National Election Studies dataset on the Senate Elections from 1988 to 1992. Following the methodology introduced by Campbell (1983) I measure ambiguity as the standard deviation of the candidate's position on a seven points liberal-conservative scale as perceived by the voters. I then present a descriptive analysis of the empirical correlations between the level of candidate's ambiguity and other relevant variables, such as the dispersion of voter's preferences, or the incumbent's approval rate, or the uncertainty over the state of the National Economy. I compare these empirical correlations with the implications of four models of ambiguity: the one contained in Chapter 1, Alesina and Cuckierman (1990), Chappell (1994) and Glazer (1990) to have a first look into the level of consistency with the data that the different models display.

The second aspect of the electoral campaigns that I consider in this thesis is the optimal timing of electoral announcements. The related literature includes papers on the effect of media on the public opinion, as Berliant and Konishi (2005) who model

the campaign debate so to consider the effects of the salience of the topics when they were discussed by the politicians. Amoros and Puy (2007) assume that parties spend resources on one of two salient issues, and focus on whether parties spend resources on the same or on different topics; this papers are related to the influence of candidates' on the debate through the media channel. Closer to the model proposed in Chapter 2 are Levy and Razin (2009, 2010) who model agenda formation as a result of costly influence seeking of two candidates.

The second chapter, which draws on joint work with Stefan P. Penczynski, proposes a model of timing of electoral announcements in which the timing is important both to candidates and voters for informational reasons. In this model we study the effect of having a specialised incumbent on the electoral outcome when there is a multidimensional policy space. We focus on the incumbent's trade-off between speaking early so to influence the focus of the electoral campaign, and taking a late stand to preserve his strategic positioning. In particular we analyse the effects that the level of specialisation has on the voters' welfare, measured as the probability of electing a politician who implements the best policy on the most relevant issue.

# 1 Discretion and renegotiation in electoral campaigns

## 1.1 Introduction

Vagueness of electoral campaign statements is a common element of the political competition and a widely studied phenomenon in political science and economics.

Consider the following anecdotal evidence from past Italian elections. During the electoral campaign in 2001 Berlusconi signed in front of the population the so called Contract with the Italians. An example of its contents was the following point about taxes:

“First: the reduction of the fiscal burden with total exemption for incomes up to 22 million of Italian liras per year, the reduction of the tax rate for incomes up to 200 million to 23%; the reduction of the tax rate for incomes above 200 million to 33%.”<sup>1</sup>

Clearly, this is quite a precise statement. Now, let’s consider what Berlusconi promised about taxes in the 2008 electoral campaign. Presenting his electoral program, the “Seven missions to relaunch Italy”, he said:

“[...] our first promise is that we will not steal money from the Italians and that we will reduce the fiscal burden below 40% of the GDP.”<sup>2</sup>

It is easy to argue that the second statement is more vague than the first one, since it doesn’t quantify the tax reduction precisely, does not specify who will gain, and simply imposes a bound on the politician’s actions. The second promise allows the candidate to retain more freedom in the post-election implementation of the policy. It would be interesting to understand what changes in the political arena that induces Berlusconi to release a more vague statement in his 2008 campaign. This paper provides a simple model in which such comparative analysis can be made explicit, and the description of some of the political variables that can affect the precision of the electoral statements can be identified.

I study a model in which ambiguity of the electoral promises results in an elementary fashion from a “delegation objective”: depending on how changing the environment is, the tension between rigidity and discretion that the electorate experiences

<sup>1</sup>In the original language: “Punto primo: Abbattimento della pressione fiscale con l’esenzione totale dei redditi fino a 22 milioni di lire annui; riduzione al 23 per cento dell’aliquota per i redditi fino a 200 milioni; riduzione al 33 per cento dell’aliquota per i redditi sopra i 200 milioni.” From “Corriere della Sera”, online version, 3<sup>rd</sup> March 2008.

<sup>2</sup>In the original language: “[...] la nostra prima promessa [...] è che non metteremo mai le mani nelle tasche degli italiani e che abbasseremo la pressione fiscale sotto il 40% del Pil.” From “Corriere della Sera”, online version, 29<sup>th</sup> February 2008.



may be resolved with voters having a preference for some degree of discretion. In this way they leave the politicians free to operate in a particular policy region once they are elected, so as to target their policy better to the particular state of the world. In particular, the level of discretion that the voters are willing to concede to the candidates is inversely related to their bias (where the bias is defined with respect to the median voter's preferences). Moreover, the welfare of the electorate depends, in the vast majority of cases, only on the characteristics of the most biased candidate, where the good candidate's characteristics become relevant when the opponent is too extreme to be a credible competitor. I analyse how this delegation effect modifies the structure of the optimal campaign promises when there is uncertainty over the politicians' preferences and on the variability of the state of the world; the analysis is developed with a particular attention at the interplay between the delegation aspects of the electoral campaign, and the competition effects. The same tension, although in a different setting, is described by Battigalli and Maggi (2002) where the authors analyse the determinants of discretion and rigidity in incomplete contracts, in the presence of writing costs. The findings are ambiguous in determining the relation between the level of discretion and the uncertainty over the candidates' types; in some parametric regions an increase in the uncertainty over the candidate's types decreases the level of discretion that the voters' are willing to leave, as one would expect given that the voters are risk averse. In other parametric regions, however, the effect is the opposite and more uncertainty implies more discretion for the candidates; this is due to an insurance effect that the bounds on the set of promises exert: increasing the upper or lower bound (depending on whether the candidate is right-wing, or left-wing) has the effect of giving more discretion to good candidates' types, and not so much to bad candidates' types, who will hit the bound more often and will be constrained by it anyway.

I also consider how the actual discretion that a candidate can retain changes when the possibility of ex-post renegotiation is introduced. Introducing the possibility of renegotiating under certain conditions the campaign promises modifies the structure of the problem in a way which makes the comparison of two sets of promises in terms of levels of discretion less intuitive.

In this paper a statement is defined more vague (or, equivalently, leaving more discretion to the candidate) than another one if it allows for more policies to be implemented. For example the statement: "The policy will be  $p^*$ " is less vague than a statement such as "The policy will be at most  $p^*$ ". When renegotiation is indeed possible the set of promises influences the ex post implemented policy through two channels: it changes what policies are allowed without renegotiation, but it also changes the likelihood and the extent of the possible renegotiation. Therefore a smaller set of promises is not necessarily a less permissive one, and a deeper analysis is required; whether one set is more or less ambiguous therefore will depend on the conditions under which renegotiation is allowed.

The renegotiation analysis is introduced by allowing full renegotiation, under the constraint that the median voter cannot have a lower utility than the highest one he would have without renegotiation. In the full renegotiation benchmark case, given the uniformly distributed state of the world, a continuum of equivalent sets of promises can be implemented. After that, possible constraints to the renegotiation process are introduced; nice results are obtained when there are convex costs of renegotiation that depend on the distance between the renegotiated policy and the promised set. In this case more extreme politicians are the ones with the largest incentives to constrain themselves *ex ante*, while renegotiating and implementing more extreme policies *ex post*. Notice that this is fully anticipated by the voters, and therefore it's not a fooling process but an equilibrium phenomenon.

Several papers analyse the causes of ambiguous statements in electoral campaigns. In his seminal work Shepsle (1972) analyses an electoral competition where a challenger can choose to be ambiguous in order to win against an incumbent who presents himself with a point policy. Shepsle shows that an ambiguous statement may be preferred to the median voter's preferred outcome, when many voters are risk loving. If the majority of voters are risk averse, Black's median voter theorem still applies, and ambiguity decreases the candidate's appeal at least as long as the majority of voters are risk averse. Page (1976) wrote a critique of Shepsle's model, stressing two problematic assumptions. In particular, he challenged the plausibility of individuals being risk loving, and candidates using lotteries. He viewed political statements not as distributions over the possible policies, but more as subsets of the possible outcomes, as appears from his writing: "This interpretation is supported by candidates' frequent proclamations of what they don't stand for [...] as if they were putting boundaries on their ambiguity, within a range of risk acceptance."<sup>3</sup> Starting from this observation, he proposes a different explanation for the ambiguity of a politician's statement, based on the optimal allocation of emphasis and politicians' resources in the electoral campaign. Page considers multidimensional policies, and assumes that candidates can only partially control the emphasis that is put on their statements. In this setting, therefore, a candidate will find it optimal to be precise on non controversial issues, and to be vague on issues that are controversial, because any detailed statement on a controversial issue can be used against him by his opponent.

There are many recent works on vagueness in electoral campaigns. Most of the models present ambiguity as a candidate-driven phenomenon, which arises despite voters being ambiguity averse. These works are somehow tangential to the objective of this paper in which ambiguity arises rather directly from the joint uncertainty of the candidates and the voters. In particular, Glazer (1990) models ambiguity as generated by uncertainty on the bliss point of the median voter. Alesina and Cuckierman (1990) explain ambiguity as a device to conceal, at least partially, a

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<sup>3</sup>Page (1976)

politician's ideology; in their setting the incumbent can choose the level of ambiguity of his actions to avoid being locked in his ideological position, and losing votes in the subsequent election. Aragonés and Neeman (2000) have similar results which exploit the candidate's tradeoff between committing to his most preferred strategy to increase his own utility *ex post*, and committing to the median voter's preferred point to maximize the probability of being elected; ambiguous promises arise as an optimal solution to this tradeoff.<sup>4</sup> Meirowitz (2005) has a model of primaries in which candidates may choose strategically to remain ambiguous because they are aware of the fact that in the future they will become better informed on the preferences of the voters. Alesina and Holden (2008) model ambiguity in electoral campaigns as arising from a trade-off that the candidates face between moving towards the median voter's preferred outcome, to increase the chances of being elected, and taking a more extreme stand, to have more campaign contributions which help influencing the median voter's position.

In this paper, the vagueness of the electoral statements arises in a natural way from a competitive delegation environment; the main objective of the paper is to see the consequences of this fairly standard way to generate ambiguity and to have a model which can be used to analyse the effect that several political variables have on the ambiguity levels of an electoral campaign. It is also worth noting that the form of ambiguity which features in my model is the one which Page found more appealing: ambiguous politicians simply put bounds on their own actions, and don't specify precisely which policy they will choose in the set of the possible ones.

In the setting I analyse, both the candidates and the voters have a joint interest in discretion; this has similar effects to those described by Alonso and Matouschek (2008). They analyse the problem of an uninformed principal who wants to delegate an action to an informed agent; the authors characterise the optimal delegation as a function of the relationship between the agent's and the principal's preferences; the authors are interested in understanding the nature of the optimal delegation set, and derive that, if the agents' preferences are sufficiently aligned, interval delegation is optimal. These findings are compatible with the results contained in Section 1.2 of this chapter. Since in this model candidates' and voters' preferences are assumed to be aligned sufficiently, median voter's utility maximisation problem under complete information replicates the findings of Alonso and Matouschek. However, given the more detailed set of assumptions, this paper analyses in detail the effect of competition between candidates in the final choice of the set of promises, the consequences of incomplete information on the candidates' biases and the consequences of *ex post* renegotiation, after the realisation of the state of the world is observed.

As for many delegation models, voters can benefit from discretion. Indeed, there is now evidence that ambiguity might not be fully disliked by voters. Tomz and

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<sup>4</sup>Other related works by Aragonés includes Aragonés et al. (2005) and Aragonés and Postlewaite (2002).

Houweling (2009) present an experimental setting in which they show that ambiguous candidates are not less likely to win the election even when they tie with the opponent in terms of the (expected) proposed policy; ambiguous candidates may even be more likely to win than unambiguous ones when they belong to a specific party.

The paper is structured as follows. Section 1.2 introduces the static version of the model, the settings, the description of the state of the world, and of the agents' preferences. It then shows the equilibria in this setting, under the assumption that the preferences (types) of the politicians are known to the voters. Section 1.3 analyses what happens if there is some uncertainty on the types of the politician with a particular focus on the comparative statics which describe what happens to the level of ambiguity of the campaign if we change the level of uncertainty on the politicians' types. Section 1.4 introduces the problem of renegotiation, and discusses what renegotiation can mean in an electoral campaign setting, presenting how the renegotiation process differs depending on the limits to renegotiation that exist in the electoral system; in particular I study how renegotiation affects the set of promises and the effective implemented policies *ex post*.

## 1.2 The model

I consider a political system characterized by two parties,  $L$  and  $R$ , competing in one election. The electoral competition is based on one unidimensional policy decision  $\hat{p} \in \mathbb{R}$ . The environment is characterised by a state of the world,  $\omega$ , which influences the optimal choice of the candidates and the preferences of the voters.

The electoral period is divided into three different stages:

*Campaign stage:* the candidates simultaneously announce their platforms. They can choose whether to announce a specific policy (a point) or some larger set of policies.

*Voting stage:* each voter casts his vote.

*Office stage:* the state of the world  $\omega$  is realized and the appointed candidate implements a policy.

The state of the world  $\omega$  is unknown in the first two stages, and realised in the office stage. I assume that both the voters and the candidates know the state of the world *ex post*. The value of  $\omega$  is a random variable distributed uniformly over  $[-q, q]$ .

During the campaign stage each candidate announces a set of policies  $P$  to which his future policy will belong. We assume  $P$  to be a closed set. In the first specification of the model a candidate cannot choose a policy outside the announced set  $P \subseteq \mathbb{R}$ . This is meant to be a reduced form of a multiperiod model in which if the candidate does not keep his word he will be punished in future election periods.<sup>5</sup> Section 1.4

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<sup>5</sup>An example of such a model is given by Aragones et al. (2005). For the main issues related to dynamic version of electoral models see Alesina (1988).

partially relaxes this assumption introducing the possibility of ex-post renegotiation of the promise between the appointed candidate and the voters.

The optimal policy for the candidates and the voters depends on their ideological type and on the state of the world  $\omega$ .

Voters care about which policy is implemented; each voter has a bliss point that depends on the realisation of the state of the world and on his ideological type. Calling  $\widehat{p}$  the policy that is implemented, voter  $i$ 's preferences are described by the following quadratic loss function:

$$u_i(\widehat{p}) = -(t_i + \omega - \widehat{p})^2$$

where  $t_i$  is the type of the voter and  $t_i + \omega$  is his preferred policy given the state of the world. The median voter's type  $t_m$  is common knowledge and normalised to zero.

There are two types of candidates: candidate  $L$ , with ideological type  $\tau_L \in [-1, 0]$ , and candidate  $R$ , with ideological type  $\tau_R \in [0, 1]$ . Candidates have utility only from being in power; moreover, once they are in power, they suffer a disutility if they are not able to implement their preferred policy. Once elected, they are constrained by the promises they made in the campaign stage. Therefore the utility function that represents the preferences of candidate  $j \in \{L, R\}$  is:

$$u_j(\widehat{p}, \omega) = Pr(j \text{ is elected} | P(\tau_j), \tau_j) [K - (\tau_j + \omega - \widehat{p})^2].$$

where  $K$  is the candidate's rent from being in power and  $P(\tau_j)$  is candidate  $j$ 's set of promises.

A strategy for candidate  $j$  is a function:

$$s_j : (\tau_j, \omega) \mapsto (P(\tau_j), \widehat{p}(\tau_j, \omega))$$

with  $j = L, R$ . The function  $s_j$  associates a set of promises and an implemented policy to every pair of ideology and realisation of the state of the world. Notice that the set of promises  $P$  can depend only on the candidate's ideology because the state of the world is not known ex ante. Therefore there are no signalling issues in the decision of the set  $P$ .

I will consider only equilibria in pure strategies. In this case, provided that  $K$  is large enough, the candidate behaves as if he had lexicographic preferences and he cared first about being elected and then about which policy he is able to implement, as the probability of being elected is either 0 or  $\frac{1}{2}$  or 1. Consider now a candidate who changes his strategy from  $(P_1, \widehat{p}_1(\omega))$  to  $(P_2, \widehat{p}_2(\omega))$ . This change can either affect the probability of being elected or not. If it does not affect it, the candidate will choose the new strategy if it allows him to implement his preferred policy more often ex post; if it does change his probability, the candidate will choose the set of promises that allows him to have the greater probability of being elected, regardless of the constraint

that this set may impose ex post on his actions: if  $K$  is large enough,  $\frac{1}{2}K$  is greater than any possible gain that can be obtained from changing the set of promises.

From now on, we will assume that  $K$  is sufficiently large, and most of the analysis will focus on candidate  $R$  as the analysis for candidate  $L$  is similar, with opposite signs.

### 1.2.1 Candidate's behaviour once elected

For the moment we will assume that the candidates are committing to their set of promises, which is equivalent to say that there is a restriction on the strategy space that imposes that  $\hat{p}(\tau_j, \omega) \in P(\tau_j)$ . This assumption will be relaxed in section 1.4.

Assume that candidate  $R$  has been elected after he promised  $P(\tau_R)$  in the campaign stage. His optimal behaviour once elected, given that he is constrained to choose a policy in the set  $P(\tau_R)$ , is to choose  $\tau_R + \omega$  if  $\tau_R + \omega \in P(\tau_R)$ , and to choose the policy  $p \in P(\tau_R)$  that minimises the distance between  $p$  and  $\tau_R + \omega$  otherwise. For example if  $P(\tau_R) = (-\infty, \bar{p}]$ , the optimal strategy ex post for the candidate is to choose  $\tau_R + \omega$  when  $\tau_R + \omega \leq \bar{p}$  and  $\bar{p}$  otherwise. Whenever a candidate is indifferent between two policies, we assume that he chooses in a way that makes his best response function upper hemicontinuous. For example, if  $P(\tau_R) = (-\infty, a] \cup [b, \infty)$  the candidate's best response will be to choose  $\tau_R + \omega$  if  $\tau_R + \omega \in P(\tau_R)$ , to choose  $a$  if  $a \leq \tau_R + \omega < \frac{a+b}{2}$  and to choose  $b$  otherwise.

### 1.2.2 Voters' behaviour

Voters in this model observe the set of promises made by each candidate. Since they know each candidate's type, they choose the candidate that maximises their expected utility  $EU_i(\tau_j, P(\tau_j))$ . Given that the voters are risk averse, as shown in Shepsle (1972), Black's median voter theorem applies; therefore the winning candidate is the one which maximises the expected utility of the median voter  $EU_m(\tau_j, P(\tau_j))$ . As a tie-breaking rule, I assume that whenever a voter is indifferent between two candidates he chooses the one whose ideology (type) is closer to his own, and he randomises with equal probabilities between the candidates if they have the same bias.<sup>6</sup>

The next proposition characterises the optimal promises. It shows that the optimal promise is an interval in the politician's policy space, which prevents the politician from undertaking actions towards which he is biased. For example, a right-winged politician's set of promises will sound like the following statement: "I will not implement a policy to the right of policy  $p^*$ ". Define  $p_R^*$ , and  $p_L^*$  as follows:

$$p_R^* = \begin{cases} q - \tau_R & \text{if } \tau_R < q \\ 0 & \text{otherwise} \end{cases} \quad p_L^* = \begin{cases} -q - \tau_L & \text{if } |\tau_L| < q \\ 0 & \text{otherwise} \end{cases}$$

<sup>6</sup>This tie-breaking rule is chosen to guarantee the existence of the equilibrium in pure strategies in a way that is analogous to a Bertrand problem with asymmetric costs.

**Proposition 1** *A promise of candidate R that is optimal for the median voter is  $P(\tau_R) = [-q, p_R^*]$ ; a promise of candidate L that is optimal for the median voter is  $P(\tau_L) = [p_L^*, q]$ . These sets are not the unique optimal promises, but every other optimal set differs from the ones above only by including or excluding actions that will never be implemented by the candidate, regardless of the state of the world.*

**Sketch of proof.** (See the appendix for the complete proof.) To show that the statement of the proposition is true, I proceed in two steps. First I show that the optimal set of promises, when we restrict it not to include policies which will be implemented with zero probability, must be an interval, then I derive the optimal bounds of the interval.

The first step can be proved by showing that the presence of any gap in the set of promises is equivalent to a mean preserving spread on the ex post actions of the candidate. Therefore a gap is suboptimal for the median voter, given his risk aversion.

Note that candidate R's set of promises must have no effective lower bound, and candidate L's must have no upper bound. In fact, the median voter doesn't want to prevent a right-wing politician from implementing a leftist policy because he'll do so only when the median voter would have liked an even more leftist one (and viceversa). In practice, the sets of promises may be bounded, given that the support of the distribution of the state of the world itself is bounded; however, the lower bound of candidate R's set of promises must be at most  $-q$  and the upper bound of candidate L's set of promises must be at least  $q$ . For proof purposes we will assume the set of promises to be bounded, but this is ex post equivalent to the unbounded case. Then I find the  $p_i$  by minimising the median voter's disutility given the type of the politician. Intuitively the lower bound can be found with the following argument. Consider what happens when you set  $p = q - \tau_R$ ; the distance between the implemented policy and the state of the world (where  $\hat{p}$  is a function of  $\omega$ ) is represented in the following graph:

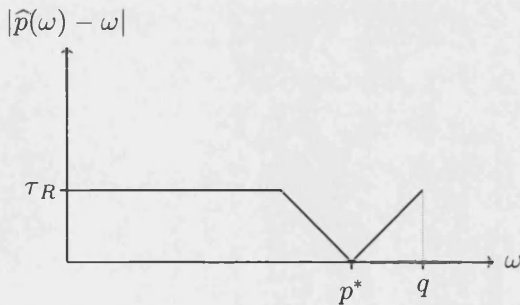


Figure 1: Optimal bound

Notice that the distance is never greater than  $\tau_R$ , and that the distance at  $\omega = q$ ,  $|\hat{p}(q) - q| = \tau_R$ . Let's now consider what happens if  $p < q - \tau_R$ , or when  $p > q - \tau_R$ .

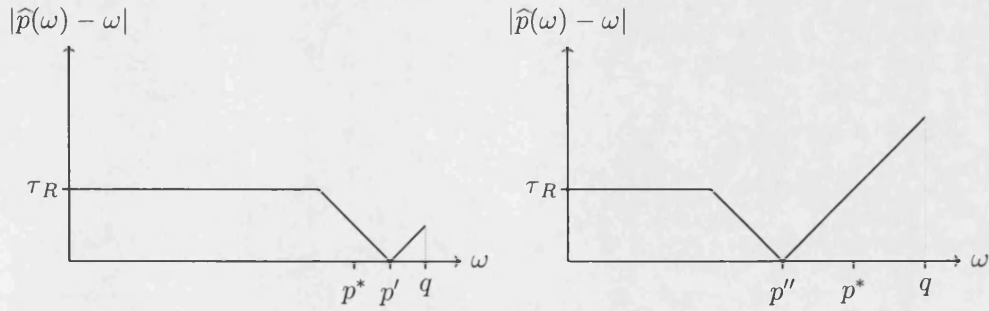


Figure 2: Suboptimal bounds

The figures show that in both cases, we increase the distance for some values of  $\omega$ , and decrease it for other values of  $\omega$ ; however, given the assumption that  $\omega$  is uniformly distributed, and given that the length of the segment where the distance is reduced is smaller than the length of the segment where it is increased, we can conclude that  $p^* = q - \tau_R$  is the optimal bound.

In order to formally find the optimal bound I analyse the median voter's disutility, which is a piecewise function defined over three different intervals. If you consider the evaluation of candidate  $R$ 's set of promises, the expected disutility of the median voter is defined over the three intervals presented in the following figure:

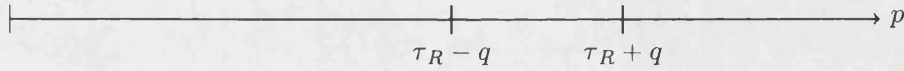


Figure 3: Intervals in the complete information case

If the bound is very low (in particular if  $p < \tau_R - q$ ), it will be binding for any possible realisation of the state of the world; in this case the expected disutility for the median voter is simply a function of the expected distance between the bound and the state of the world. On the contrary, if the bound is very high it will never be binding, and the median voter's disutility only depends on the candidate's bias; this happens if  $p > \tau_R + q$ . For intermediate values of  $p$  the expected disutility function incorporates both the variables.

### 1.2.3 Analysis of the equilibria

Consider now the electoral competition between the two candidates in two different cases.

**Both candidates have the same distance from the median voter** Assume that, from the median voter's point of view, both candidates' ideologies are the same, that is  $|\tau_L| = |\tau_R|$ ; in this case the only equilibrium in pure strategies is the following: candidate  $R$  promises  $P(\tau_R) = [-q, p_R^*]$ , and candidate  $L$  promises  $P(\tau_L) = [p_L^*, q]$ ,



where  $p_j^*$ , for  $j = L, R$  is:

$$|p_j^*| = \begin{cases} q - |\tau_j| & \text{if } |\tau_j| < q \\ 0 & \text{otherwise} \end{cases}$$

where  $p_L^* \leq 0 \leq p_R^*$  and each candidate wins with probability  $\frac{1}{2}$ . If we consider any other pair of strategies, there is at least one candidate who has an incentive to deviate by increasing the utility of the median voter and thus winning with certainty.

**The candidates have different distances from the median voter.** Suppose that candidate  $L$ 's ideological type is closer to the median voter's preferences than candidate  $R$ 's:  $|\tau_L| < |\tau_R|$ .

The median voter will choose the candidate that can ensure him the lowest expected disutility; moreover, as a tie-breaking rule, which is necessary to guarantee the existence of an equilibrium, the median voter will select the candidate with the smallest bias whenever the two candidates will give him the same expected disutility.<sup>7</sup>

The unique equilibrium is therefore the following: candidate  $R$  promises  $P(\tau_R) = [-q, p_R^*]$ , and candidate  $L$  wins by promising  $P(\tau_L) = [p_L, q]$ , where

$$p_R^* = \begin{cases} q - \tau_R & \text{if } \tau_R < q \\ 0 & \text{otherwise} \end{cases}$$

and  $p_L$  is the preferred policy bound of candidate  $L$  between the two bounds that make the median voter indifferent between  $L$  and  $R$ ; that is,  $p_L$  is the maximum zero of the following equation:

$$EU_m(\tau_R, p_R) = EU_m(\tau_L, p_L).$$

Intuitively, candidate  $L$ , when competing with a more extreme type, can buy himself more freedom and still leave the median voter indifferent between him and his opponent.

Notice that candidate  $L$  has as in the original problem an incentive to announce a set of promises which has the shape of an interval. The intuition is easy to understand: imagine that instead of an interval the set of promises has a hole. The same set of promises without the hole will be preferred both by the median voter and by the candidate because the ex post policy the first case is a mean preserving spread of the case in which the set is an interval. The formal proof is an analogous of the proof of Proposition 1.

If the bias of the extreme candidate is too large compared to the bias of his opponent, it can be the case that, for every  $p_L$  the following inequality holds:

<sup>7</sup>The median voter randomizes with equal probability between the two candidates if they have the same bias and induce the same expected utility.

$$EU_m(\tau_R, p_R^*) < EU_m(\tau_L, p_L).$$

In this case  $p_L = \tau_L - q$ , candidate  $L$  is elected and the median voter has a higher expected utility than the one promised by candidate  $R$ .

**Equilibrium discretion** From the previous equilibrium analysis it is possible to observe that the introduction of asymmetries in the candidates' types leads to an increase in the ambiguity level of the announcements. This happens because the power relation between the different agents of the model changes depending on the symmetry or asymmetry of the candidates' positions. When the candidates are symmetrically positioned with respect to the median voter, the desire to be elected forces them to promise the median voter's most preferred set. When the situation is asymmetric, the less extreme candidate retains more discretion for himself, because the median voter has no good outside option; this happens because the type of the other candidate is more extreme. Ambiguity appears in this model because of the voters' desire of delegating the policy choices to an informed candidate; however in this analysis the level of discretion that a winning candidate can manage to keep for himself is often greater than the one which is optimal for the voters themselves, due to the competition with a possibly more biased politician.

**Comparative statics** In general, the level of discretion that the candidates can retain for themselves decreases with their bias. However, it is not always the case that the overall level of discretion goes down when one of the biases increases. Let's analyse the different situations in detail:

- $|\tau_R| = |\tau_L| = \alpha$  and  $\alpha$  increases: if we are in a symmetric equilibrium and we move to another symmetric situation with larger biases the level of candidates' discretion weakly decreases. In particular, it decreases unless the amount of discretion is already at its minimum in equilibrium (where  $p_L = p_R = 0$ ).
- $|\tau_R| = |\tau_L|$  and  $\tau_R$  increases: candidate  $R$  is now the extreme one; this will decrease  $R$ 's level of discretion ( $p_R$  goes down) and increase  $L$ 's level of discretion ( $p_L$  goes down as well), given that  $L$  find himself in a more favourable position than before.
- $|\tau_L| < |\tau_R|$  and  $|\tau_L|$  increases slightly (so that the order of the biases is preserved): this will reduce the discretion that  $\tau_L$  can ensure for himself ( $p_L$  increases), and it will not affect candidate  $R$ 's behaviour at all; the expected utility of the median voter is left unchanged.
- $|\tau_L| < |\tau_R|$  and  $\tau_R$  increases: the effect on the ambiguity level is twofold:  $R$ 's discretion decreases, as  $p_R$  does; on the contrary, given that his opponent's type

is worsened,  $L$ 's discretion increases as  $p_L$  decreases; the expected utility of the median voter goes down.

- the level of discretion is for every candidate weakly increasing in the uncertainty on the underlying state of the world (which in this case can be parametrized by  $q$ ).

**A shift in the median voter position** It seems natural to ask ourselves what happens when the median voter's preferences shift, for example, to the right. In the model this question is ill-posed, since the median voter's preferences are assumed to be given. But we can interpret the position of the median voter as a normalization. In this case, a shift to the right of the median voter would be perceived as a shift to the left of the candidates' types. The consequences of this shift would be that  $R$  can retain more discretion than before, and  $L$  can retain less (both  $p_L$  and  $p_R$  increase).

**Berlusconi: an example** Consider again the example introduced at the beginning of the paper. In the 2001 campaign, Berlusconi promised a very specific reduction of the income tax, explaining in detail the income brackets that would have benefited from the reduction, and the entity of the reduction. In the 2008 campaign, Berlusconi chose a different approach: he still promised a tax reduction, but he did not focus on the income tax anymore, and he promised a generic reduction of the fiscal burden below 40%. Although not directly comparable in terms of dimension, both policies belong to a right-wing vision of the State that should provide less services and ask smaller contributions. However, in the second case, Silvio Berlusconi did not identify which taxes he wanted to reduce, and which income groups he planned to target. So, what changed between the two electoral campaigns that can explain the second more ambiguous approach? The above analysis suggests us two potential candidates:

1. an increase in  $q$ : the 2008 campaign was run after the beginning of the financial crisis; although the crisis itself had not reached its peak yet, there was plausibly more uncertainty on the state of the economy than in 2001.<sup>8</sup>
2. a shift of the median voter preferences to the right: in 2008 the main right-wing parties collected around 49.5% of the votes<sup>9</sup> while in 2001 the equivalent set of parties (corrected for changes in names, and merges) only collected about 46% of the votes<sup>10</sup> which supports the view that the median voter shifted to the right between the two elections.

<sup>8</sup>Notice that it doesn't matter whether the support of the distribution of  $\omega$  increases in a symmetric or asymmetric fashion, as we normalized  $E(\omega) = 0$ .

<sup>9</sup>PDL 37.4%, LEGA NORD 8.3%, MOVIMENTO PER AUTONOMIA DEL SUD 1.1%, LA DESTRA 2.4%, FORZA NUOVA 0.3%. Data from the Ministero degli Interni website.

<sup>10</sup>FORZA ITALIA 29.4%, AN 12%, LEGA NORD 3.9%, FIAMMA TRICOLORA 0.4%, FORZA NUOVA 0.1%. Data from the Ministero degli Interni website.

### 1.2.4 Welfare

Each voter  $i$  is characterised by a type  $t_i$  which represents his preferences; in particular, given  $t_i$ ,  $\omega$  and the implemented policy  $\hat{p}$ , voter  $i$ 's utility function is:

$$u_i(\hat{p}) = -(t_i + \omega - \hat{p})^2.$$

Therefore the overall expected welfare of the electorate is:

$$EW = - \int_{-q}^q \int_{-\infty}^{\infty} \frac{(t_i + \omega - \hat{p})^2}{2q} dF(t_i) d\omega,$$

where  $F(t_i)$  is the distribution of the voters' types. Given the independence assumption on the distribution of  $\omega$  and  $t_i$  we can rewrite the welfare as follows:

$$EW = -E(t_i^2) - 2E(\omega - \hat{p})E(t_i) - E((\omega - \hat{p})^2).$$

Notice now that  $E((\omega - \hat{p})^2)$  in equilibrium depends, generically, only on the type of the most extreme candidate: the candidate with the smallest bias with respect to the median voter preferences, will choose a set of promises that leaves the median voter indifferent between his opponent and himself. Therefore  $E((\omega - \hat{p})^2)$  is just the optimised median voter's utility, when facing the candidate with the most extreme bias. If the voter's types are distributed in a symmetric fashion, so that  $E(t_i) = 0$  as well, the expected welfare (but the reasoning holds for the ex post welfare as well) simply depends on the "worst" politician, and not on the type of the best one. If  $E(t_i) = 0$ , we have

$$EW = -E(t_i^2) - E((\omega - \hat{p})^2);$$

given that  $E((\omega - \hat{p})^2)$  is pinned down by the characteristics of the extreme candidate, and considering that  $E(t_i^2)$  is related only to the voters' preferences, the welfare is completely independent of the elected candidate's quality (bias).

The only case in which the type of the good candidate matters in the voters' expected welfare is when the bad candidate is so biased that the good one can set  $|p| = |\tau_g| + q$ , where  $\tau_g$  is his type, thus retaining all the discretion that is relevant. In this case the expected welfare is:

$$EW = E(t_i - \tau_g)^2,$$

and it depends on the elected candidate's bias.

## 1.3 Uncertainty

In this section I consider the case in which the type of the candidate is uncertain. I will focus only on pooling equilibria to understand the effects of uncertainty on candidates'

discretion, disentangling them from the possible signaling effects. For simplicity I will assume that candidate  $R$  has type  $\tau - x$  with probability  $\frac{1}{2}$  and type  $\tau + x$  with probability  $\frac{1}{2}$ .<sup>11</sup> In this case  $\tau = E(\tau_R)$ , and the parameter  $x$  describes the variability of  $R$ 's type around the mean. The symmetric assumption holds for  $L$ .

To study the effect of the uncertainty on the optimal behaviour of the politicians I will first consider, for a given expected bias  $\tau$  and uncertainty level  $x$ , what is the best set of promises that the candidate can announce in order to please the median voter. The analysis will then focus on the case of symmetric equilibria, where both the absolute value of the bias and the level of the uncertainty are constant across candidates; finally, I will discuss the asymmetric case and its comparative statics.

### 1.3.1 Candidate's behaviour once elected

The winning candidate's behaviour after election is obviously the same as in section 1.2. The behaviour of the voters changes with uncertainty about the candidates' types. Section 1.3.2 investigates how this behaviour is affected. Notice, however, that if only pooling equilibria are considered, the optimal set of promises is still an interval.

### 1.3.2 Voters' behaviour

As in the previous analysis, the median voter chooses the candidate with the set of promises that gives him the lower expected disutility; to break ties, when he is indifferent between candidates he chooses first the one who is less biased in expectation; if the candidates have the same bias he chooses the one whose type is less variable, and he randomises if they also have the same variability. The median voter's expected disutility is now the weighted sum of the expected disutility when the type is  $\tau - x$  and when the type is  $\tau + x$ . From the above discussion, the reduced form of the expected disutility when the type is  $\tau \pm x$  is:

$$\left\{ \begin{array}{ll} \frac{q^2}{3} + p_R^2 & \text{if } p_R < \tau \pm x - q \\ \frac{1}{2q} \left( \begin{array}{l} \frac{q^3}{3} - \frac{p_R^3}{3} - \frac{2}{3} (\tau \pm x)^3 - p_R q^2 + p_R^2 q \\ + q (\tau \pm x)^2 + p_R (\tau \pm x)^2 \end{array} \right) & \text{if } p_R \in [\tau \pm x - q, \tau \pm x + q] \\ (\tau \pm x)^2 & \text{if } p_R > \tau \pm x + q \end{array} \right.$$

Given that the objective function is a weighted average of the two disutilities above, it is defined over five intervals. Depending on whether  $q$  is smaller or greater than  $x$ , the order of the bounds of these intervals differs, therefore the objective function is different in the two cases. However, the case in which  $q < x$  is not interesting: it can trivially be shown that the optimal bound is given by  $p_R = p_L = 0$ . The result is intuitive, because  $q < x$  implies that leaving any form of discretion to the candidate in

<sup>11</sup>Notice that it must be that  $\tau > x$ , since we are keeping the assumption that the candidate is a right candidate, so both  $\tau - x$  and  $\tau + x$  belong to the interval  $[0, 1]$ .

the direction of his bias does not compensate the variability of the state of the world, but exposes the median voter to the candidate's bias.

Let's therefore consider the case in which the state of the world is more variable than the type of the candidate, that is  $q > x$ . The median voter's expected disutility is a weighted average of the disutility given by a candidate who has type  $\tau + x$ , and the disutility the voter gets from a candidate with type  $\tau - x$ . Therefore it is a piecewise function defined over the following intervals:

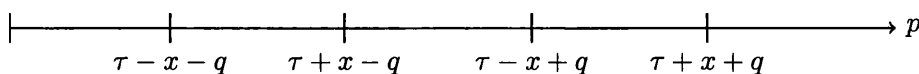


Figure 4: Intervals with uncertainty

When the promised upper bound  $p$  is smaller than  $\tau - x - q$ , it is so low that it is always binding, no matter what the type of the politician and the realisation of the state of the world are; this implies that the candidate always chooses the policy  $p$ , and the expected disutility is simply a function of the distance between  $p$  and the state of the world. Symmetrically, on the other side of the spectrum, if the bound is large enough (in particular if  $p > \tau + x + q$ ) it will never be binding for any candidate in any state of the world; in this case the expected disutility depends only on the bias of the politician. For intermediate values,  $p$  is less binding for a candidate with type  $\tau - x$  than it is for a candidate with type  $\tau + x$ . In particular if  $p \in (\tau - x - q, \tau + x - q)$  the constraint is still binding for  $\tau + x$  in any state of the world, while this is no longer true for  $\tau - x$ ; if  $p \in (\tau + x - q, \tau - x + q)$  both candidates will be constrained by  $p$  only in some states of the world; finally if  $p \in (\tau - x + q, \tau + x + q)$  the promise will never be binding for a type  $\tau - x$  candidate, while it will bind a type  $\tau + x$  candidate in some states of the world.

The complete analysis of this optimisation problem is contained in Appendix A.2, which also contains the functional form of the expected disutility function. The Appendix discusses the behaviour of the function in each one of the five regions described above; the optimal solution is the following:

$$p_R^x = \begin{cases} q - (\tau^2 + x^2)^{\frac{1}{2}} & \text{if } \tau < \frac{2q(q-x)}{2q-x} \\ 3q - (8q^2 + (\tau - x)^2)^{\frac{1}{2}} & \text{if } \tau \in \left[ \frac{2(q-x)}{2q-x}, q + x \right] \\ 0 & \text{otherwise} \end{cases}$$

Notice that as  $x \rightarrow 0$  the solution converges to the complete information one, with the middle region disappearing as  $q + x \rightarrow q$  and  $\frac{2(q-x)}{2q-x} \rightarrow q$ .

### 1.3.3 Equilibrium analysis: symmetric equilibria

Let's consider the easiest case in which  $\tau_R = -\tau_L = \tau$  and  $x_R = x_L$ . Let's define  $p^x = p_R^x = -p_L^x$ . In this case

$$p^x = \begin{cases} q - (\tau^2 + x^2)^{\frac{1}{2}} & \text{if } \tau < \frac{2q(q-x)}{2q-x}, q > x \\ 3q - (8q^2 + (\tau - x)^2) & \text{if } \tau \in \left[ \frac{2(q-x)}{2q-x}, q + x \right], q > x \\ 0 & \text{otherwise} \end{cases}$$

where  $p_L^* \leq 0 \leq p_R^*$ .

Both candidates have exactly the same attractiveness ex-ante from the median voter's perspective. They therefore propose symmetric platforms, and each one wins with probability  $\frac{1}{2}$ .

The comparison of this solution with the one obtained under complete information leads to some interesting considerations about the links between the uncertainty on the type of the candidate and the discretion that the voter wants to leave him.

The first notable point is that the candidates can always retain some discretion for themselves. This is due to the fact that some information (whether the candidate is right-wing or left-wing) is always common knowledge: as a consequence, a right-wing candidate will always be allowed to implement policies that are ex-ante perceived as leftist, and viceversa.

**Effects of the introduction of uncertainty.** If the type is less variable than the state of the world, there are conditions under which the median voter leaves some discretion to the candidate. More interestingly, if we move from a case in which the candidate's type is known to be  $\tau$ , to one in which it is expected to be  $\tau$  (if, for example, it is  $\tau + x$ , or  $\tau - x$  with equal probability) the level of discretion can increase or decrease, depending on the parameters. For example if  $q < \tau < q + 0.1$ ,  $p = 0$  if  $x = 0$ , while  $p = 3q - (8q^2 + (\tau - 0.1)^2)$  if  $x = 0.1$ : more discretion is left to the candidate in the uncertain case. On the contrary, if  $\tau < q$ ,  $p = q - \tau$  in the case where the type of the candidate is known, which is larger than any bound that the candidate can achieve in the uncertain situation.

**Comparative statics on the variability of the type. (x)** Notice moreover that this is the same effect that can be observed if  $x$  increases when all the other parameters,  $\tau$  in particular, are kept fixed. In this case an increase in  $x$  affects both the two different solutions and the parametric regions in which they apply. In particular, a greater  $x$  reduces  $q - (\tau^2 + x^2)^{\frac{1}{2}}$  and increases  $3q - (8q^2 + (\tau - x)^2)$ ; it as well increases  $q + x$  moving some types  $\tau$  from having an optimal solution of 0 to an optimal solution of  $3q - (8q^2 + (\tau - x)^2)$ . The overall effect on  $3q - (8q^2 + (\tau - x)^2)$  is interesting because it is related to the insurance effect that this part of the solution has: when this is the optimal level of discretion, the more extreme candidate will hit the bound

significantly more often than the less extreme candidate; an increase in  $x$ , in this case, makes the insurance effect even stronger, because the moderate candidate moves closer to the median voter's preferred policy, and the extreme candidate hits the bound more often.

**Effects of changes in the expected type. ( $\tau$ )** Let us now analyse the effect of a change in the expected type, while keeping the variability of the candidate's type fixed. If candidate  $R$ 's expected type increases from  $\tau$  to  $\tau' > \tau$ , the level of discretion he can achieve is unambiguously reduced. It is easy to see, in fact, that  $p^x$  is a decreasing function of  $\tau$ .

### 1.3.4 Asymmetric candidates

To analyse the characteristics of the equilibrium when the candidates have different expected biases, or different level of uncertainty or both, let's call  $\tau_j$  the expected bias of candidate  $j$ , and  $x_j$  his variability. We first consider the effects that a change in  $\tau_j$  or  $x_j$  has on the maximised value of the utility of the median voter. The following considerations can be easily drawn by looking at the partial derivative of the maximised function.

1. the maximum expected utility is decreasing in the bias of the candidate;
2. the maximum expected utility is decreasing in the variability of the type only when  $|\tau_j| > \frac{2(q-x_j)}{2q-x_j}$  and  $q > \tau_j + \frac{(\tau_j^2+x_j^2)^{\frac{1}{2}}}{2}$ ; in any other parametric region the maximum expected utility is increasing in the variability of the candidate's type.

**Asymmetric bias:** consider candidates having  $x_R = x_L$  and  $|\tau_R| < |\tau_L|$ ; in this case, as in the complete information case, the worse candidate is the one with the highest bias, that is candidate  $L$ , in our example. As a consequence, the median voter's expected utility is determined in equilibrium by the characteristics of  $L$ , whereas  $R$  exploits his advantageous position to retain a greater discretion than he could if he was to face a symmetric candidate. Therefore the level of discretion in the system (weakly) increases.

**Asymmetric variability:** consider now what happens when  $|\tau_R| = |\tau_L|$  and  $x_R < x_L$ ; the crucial issue in this case is to understand who is the 'worse' candidate. Once the bad candidate is identified, the consequence on the equilibrium is that the candidate that is better from the median voter's point of view wins the elections retaining for himself more discretion than he would have otherwise.



## 1.4 Ex-post renegotiation

So far we have considered a model in which the politicians commit to the promise they make. However, voters have complete information ex post about the realised state of the world.<sup>12</sup> For any given promise that binds the right-wing candidate somewhere to the left of  $q$  (that is for any given set of promised policies that does not include all the possible realisations of the state of the world) it may happen that both the elected candidate and the median voter would prefer to deviate to a policy  $\pi$  that is not in the set. It seems therefore plausible to assume that voters would not punish a candidate who deviates in this way. This section investigates the consequences of the possibility of renegotiation in the following way: first, as a benchmark, we consider what happens if the elected politician is constrained simply by the voters' preferences; then we introduce limits to the possibility of renegotiation that depend on the set of promises ex ante.

### 1.4.1 Full renegotiation: a benchmark

When renegotiation takes place, the situation is asymmetric between the two types of agents: the appointed candidate is already in power, and the voters have to wait until the following election to be able to punish him. Moreover, the politician can at this point in time implement whatever policy he likes, and voters have no veto power. Given the reduced form nature of this model, where commitment on the set of promises is used to internalise the effects of the presence of future elections, I assume the following renegotiation procedure: the only way the candidate can deviate from his set of promised policies is to implement a policy that either leaves the median voter indifferent with his best alternative in the set of promised policies, or makes him better off. In a dynamic setting, this would be motivated by a desire to implement a policy that the median voter does not perceive as a negative deviation, so as not to be punished in the following election. The candidate, whose first objective is to be reelected, would minimise his disutility from deviating to a policy which is not his preferred one, under the constraint that this does not appear as a negative deviation to the median voter. As mentioned before, the model analysed here is a reduced form of such a strategic interaction, in which the voters who are better off will not punish the candidate; therefore the renegotiation in this setting is a unilateral deviation which can be made only to a particular set of policies, in a way that mimics an implicit renegotiation between the candidate and the voters.

Given the unilateral nature of the renegotiation process, and the preferences of the voters, it is sufficient to leave the median voter indifferent between the original policy and the renegotiated one. To see this let  $\pi$  be the renegotiated policy and consider

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<sup>12</sup>Remember that it is not possible in this setting to have state contingent promises; this can be justified for example with the complexity of communicating state contingent promises to the electorate. For a more complete discussion of why state contingent promises (or contracts) may not be a realistic assumption see Anderlini and Felli (1994, 1998, 1999).

the case in which  $p < \omega < \pi$ ; if the median voter is indifferent between  $p$  and  $\pi$ , all the voters with type  $t_i < 0$ , that is all the voters to the left of the median voter, will be worse off, and all the voters to the right of the median voter, with type  $t_i > 0$ , will be better off. The opposite reasoning applies if  $p > \omega > \pi$ . The median voter will be pivotal in both cases; therefore I will focus uniquely on the effect that the change in policy has on the median voter.

How does the possibility of a renegotiation affect the final outcome? We have four possible cases:

- $p > \tau_R + \omega$ : in this case there is no scope for renegotiation because the politician is at his bliss point;
- $\omega < p < \tau_R + \omega$ : in this case there is no scope for renegotiation either; in fact the policy chosen without renegotiation is  $p$ : the voter would like the politician to implement a smaller policy, while the politician would like to implement a larger one.
- $p < \omega$ , and  $\tau_R > \omega - p$ : in this case the renegotiation leaves the voter indifferent, and increases the politician's utility; the politician implements  $2\omega - p$ , which makes him better off (given that under the above assumption  $\tau_R + \omega > 2\omega - p$ ), and leaves the voter with a disutility  $(\omega - p)^2$  as before;
- $p < \omega$ , and  $\tau_R < \omega - p$ : in this case, after the renegotiation the politician implements  $\tau_R + \omega$ , and the disutility for the voter is reduced to  $\tau_R^2$ .

Notice that in many cases the ex-post renegotiation does not change the median voter's disutility, but it simply improves the politician's position. If the politician is right-wing this is true as long as  $\omega \leq p + \tau_R$ ; if  $\omega > p + \tau_R$  the benefits from renegotiation reach the median voter as well.

**Voters' behaviour** Given the above analysis of the effects of renegotiation, it is clear that the median voter's expected disutility from candidate  $R$  who promises  $[-q, p]$  is the weighted average between the expected value of  $(\omega - p)^2$ , which is the median voter's disutility when the state of the world assumes intermediate values, and  $\tau_R^2$  which is the expected disutility when the state of the world is either very low, so that the candidate can implement directly his optimal point, or very high, so that he has all the freedom of renegotiating up to his optimal point. To maximise the median voter's utility we choose:

$$\begin{aligned} \min_p \Pr(\omega \in (p - \tau_R, p + \tau_R)) E((\omega - p)^2 \mid \omega \in (p - \tau_R, p + \tau_R)) \\ + \Pr(\omega \in (-q, p - \tau_R] \cup (p + \tau_R, q]) \tau_R^2. \end{aligned}$$

**Proposition 2** *When  $q \geq \tau_R$  the median voter is indifferent between any set of promises characterised by  $p \in [0, q - \tau_R]$ ; when  $q < \tau_R$  the median voter's disutility is minimised at  $p = 0$ .*

Since the voter is never worse off in this situation, he prefers the possibility of a renegotiation; moreover, given the renegotiation, he is indifferent between any policy bound that belongs to the interval  $[0, q - \tau_R]$ . This is a consequence of the uniform distribution of  $\omega$ . As shown in the figure below, the median voter's disutility is bounded at  $\tau_R^2$  for all the values of  $\omega$  outside  $[p - \tau_R, p + \tau_R]$ ; inside this interval, the disutility of the median voter is  $(\omega - p)^2$ .

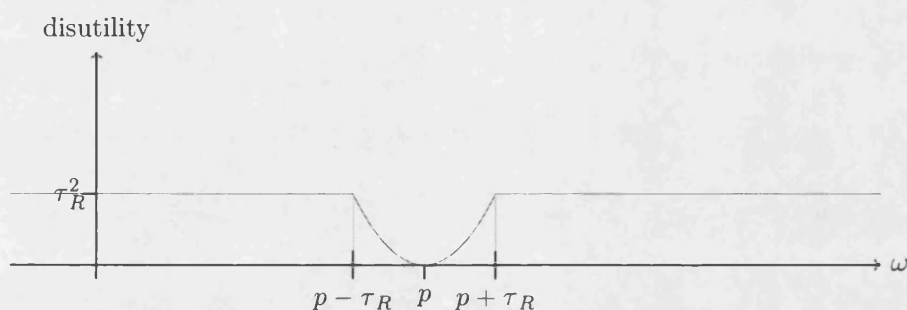


Figure 5: Disutility with full renegotiation

Therefore any value of  $p$  such that  $p + \tau_R \leq q$  is acceptable, because it lets the median voter fully profit from the reduced disutility that can be experienced in the interval  $[p - \tau_R, p + \tau_R]$ . Notice that this is true only because in the uniform distribution the probability that  $\omega$  lies in a specific interval is proportional to the length of the interval itself.

**Effects of uncertainty.** Let us now consider what happens if we introduce uncertainty about the candidates' types.

**Proposition 3** *When the politician's type is either  $\tau - x$  or  $\tau + x$  with equal probability, the median voter is indifferent between any set of promises of candidate  $R$  with  $p \in [0, q - \tau_R - x]$  if  $q - \tau_R - x > 0$ ; the median voter strictly prefers candidate  $R$  to promise  $p = 0$  otherwise.*

The effect of uncertainty over the candidate's type is therefore to reduce the maximum ex-ante discretion that the candidate can retain for himself. The median voter is effectively targeting the optimal bound on the best type that the candidate can have.

**Candidate's behaviour** Now let's consider the elected candidate's point of view. If  $q < \tau$  the median voter has a strict preference for  $p = 0$ , and the candidate will comply with that. Therefore the question we need to answer is whether the candidate

has some preference among the promises that are optimal from the median voter's point of view when  $q > \tau_R$ .

From the candidate's perspective, the best possible outcomes occur when the state is either very low or very high. If  $\omega < p - \tau_R$  the candidate implements his bliss point; if  $\omega > p + \tau_R$  the renegotiation allows him to implement his optimal point. In both cases his disutility is 0.

In the two intermediate regions he suffers a disutility from the distance between his preferred policy and the best he can implement. The expected disutility given  $p$  is therefore:

$$\begin{aligned} & \Pr(\omega \in (p - \tau_R, p]) E\left((\tau_R + \omega - p)^2 \mid \omega \in (p - \tau_R, p]\right) \\ & + \Pr(\omega \in (p, p + \tau_R]) E\left((\tau_R - \omega + p)^2 \mid \omega \in (p, p + \tau_R]\right) \end{aligned}$$

that is, in our region of interest, the objective function is:

$$\min_p \frac{\tau_R}{2q} \left( \int_{p-\tau_R}^p \frac{1}{\tau_R} \omega^2 d\omega + 2(\tau_R - p) \int_{p-\tau_R}^p \frac{1}{\tau_R} \omega d\omega + (p - \tau_R)^2 + \int_p^{p+\tau_R} \frac{1}{\tau_R} \omega^2 d\omega - 2(\tau_R + p) \int_p^{p+\tau_R} \frac{1}{\tau_R} \omega d\omega + (p + \tau_R)^2 \right)$$

with the domain restriction that  $p \leq q - \tau_R$ .

**Proposition 4** *When  $q > \tau_R$  the right-wing politician is indifferent between any set of promises characterised by  $p \in [0, q - \tau_R]$ .*

Clearly this indifference result depends on the absence of any kind of attrition in the renegotiation process. However the full renegotiation can be taken as a benchmark to understand in which direction the limits to renegotiation change what is preferred by the median voter and the candidates, and what is effectively implemented.

**Effects of uncertainty** Candidates are also indifferent between any of the promises with  $p \leq q - \tau - x$ ; in fact if the candidate's type is  $\tau_R = \tau + x$ , the candidate is indifferent between any  $p \in [0, q - \tau_R]$ , that is between any  $p \in [0, q - \tau - x]$ ; if the candidate's type is  $\tau - x$ , the candidate is indifferent between any set of promises characterised by  $p \in [0, q - \tau + x]$ , that is, in particular, between any  $p \in [0, q - \tau - x]$ , given that the second set is included in the first one. Therefore an outcome where all candidates pool on the set of promises with  $|p| \in [0, q - \tau - x]$  is sustainable as an equilibrium.

#### 1.4.2 Limited renegotiation I: $\varepsilon$ -renegotiation

The previous analysis considered the two extreme cases: a situation in which there is no possible renegotiation after elections, and a situation in which the only constraint

to renegotiation is that the median voter cannot be made worse off. It seems however plausible to assume that in the political arena renegotiation is possible, but the possibilities of renegotiation are somehow constrained.

The constraints to renegotiation can assume different shapes; the politician could not be able to implement extreme policies unless the voters explicitly expressed their opinion on them (i.e. unless the policies were included in the original platform); or the candidate could have costs from the change in policy that depend on the extent of the policy change.

The following analysis is focused on a particular limit to renegotiation: the candidate can renegotiate his policy only in an interval of length  $\varepsilon$  outside the original promised set.

The effects of renegotiation on the final outcome are now as follows:

- $p > \tau_R + \omega$ : as before, there is no scope for renegotiation because the politician is at his bliss point;
- $\omega < p < \tau_R + \omega$ : again, there is no scope for renegotiation as in the full renegotiation case;
- $p < \omega$ , and  $(\omega - p)^2 < \tau_R^2$ : in this case renegotiation leaves the voter indifferent, and increases the politician's utility; the politician would like to implement  $2\omega - p$ , which makes him better off (given that under the above assumption  $\tau_R + \omega > 2\omega - p$ ), and leaves the voter with a disutility  $(\omega - p)^2$  as before; if  $2\omega - p > p + \varepsilon$ , the candidate implements  $p + \varepsilon$ .
- $p < \omega$ , and  $(\omega - p)^2 > \tau_R^2$ : in this case after the renegotiation the politician implements  $\min\{\tau_R + \omega, p + \varepsilon\}$ , and the disutility for the voter is reduced to  $\min\{\tau_R^2, (p + \varepsilon - \omega)^2\}$ .

**Proposition 5** *When the appointed politician's possibilities of renegotiation are  $\varepsilon$ -restricted, and  $\tau_R < q$ , the median voter's preferred promise from candidate R is:*

$$p^\varepsilon = \begin{cases} q - \tau_R - \varepsilon & \text{if } \tau_R \leq q - \varepsilon \\ [0, q - \tau_R] & \text{if } \varepsilon \geq q + \tau_R \text{ and } q \geq \tau_R \\ 0 & \text{otherwise} \end{cases}$$

Therefore increasing the possibility of renegotiation decreases the discretion that the candidate can retain ex ante; from the voters' point of view a larger  $\varepsilon$  is associated to a greater possibility of renegotiating ex post to a more extreme policy, and therefore an increase in  $\varepsilon$  is associated to a lower level of discretion ex-ante. This happens up to the point in which the limit to renegotiation is no longer binding, and the set of optimal promises converges to the unlimited renegotiation one.

**Optimal limits to renegotiation ( $\varepsilon$ )** Suppose now that the median voter could target the limits to renegotiation exactly on the candidates' bias. What would be the optimal  $\varepsilon$  given, for example, that the right-wing candidate has tipe  $\tau_R$ ? It can be shown that

$$\varepsilon^* = \begin{cases} |\tau_j| & \text{if } |\tau_j| < \frac{q}{2} \\ \frac{q}{2} & \text{otherwise} \end{cases}$$

where  $j$  is the elected candidate. Notice that a larger  $\varepsilon$  has two effects: it reduces the ex-ante promised policies, and it increases the extent of ex-post renegotiation. Notice moreover that this does not affect the most extreme implemented policy that is anyway  $q - |\tau_j|$  in absolute value and is decreasing in  $|\tau_j|$ .

### 1.4.3 Limited renegotiation II: convex costs

The above example of limited renegotiation can be thought as a case in which there are convex costs of renegotiation, where the costs are equal to zero if the renegotiated policy is less than  $\varepsilon$  away from the set of promises, and equal to infinity otherwise. Let's now consider a more general class of convex costs of renegotiation, where the cost of renegotiation is  $\gamma(p^* - \pi)^2$ ,  $\gamma > 0$ , where  $p^*$  is the bound of the candidate's set of promises, and  $\pi$  is the renegotiated policy.

**Candidate's optimal behaviour ex post** Notice that the optimal renegotiated policy from candidate  $R$ 's point of view is  $\pi$  that minimizes:

$$(\tau_R + \omega - \pi)^2 + \gamma(\pi - p^*)^2$$

that is  $\pi = \frac{\tau_R + \omega + \gamma p^*}{1 + \gamma}$ , given  $p < \tau_R + \omega$ . The candidate's optimal behaviour ex post is therefore the following, given the possibility of renegotiation and its costs:

- $p^* > \tau_R + \omega$ : the candidate implements  $\pi = \tau_R + \omega$ ;
- $\omega < p^* \leq \tau_R + \omega$ : the chosen policy is  $\pi = p^*$ , given that the interests of the candidate and the median voter are not aligned;
- $p^* < \omega$  and  $\omega - p^* < \frac{\tau_R}{1 + 2\gamma}$ , the implemented policy is  $\pi = 2\omega - p$ , because the median voter's indifference condition is binding;
- $p^* < \omega$  and  $\omega - p^* > \frac{\tau_R}{1 + 2\gamma}$ , the implemented policy is  $\pi = \frac{\tau_R + \omega + \gamma p^*}{1 + \gamma}$

**Median voter's preferred set** We need to compute the new optimal bound to the candidate's set of promises. If candidate  $R$  is elected the median voter's expected utility is:

$$\begin{aligned}
& Pr\left(\omega \in \left[p - \tau_R, p + \frac{\tau_R}{1 + 2\gamma}\right]\right) E\left((\omega - p)^2 \mid \omega \in \left[p - \tau_R, p + \frac{\tau_R}{1 + 2\gamma}\right]\right) \\
& + Pr\left(\omega \in \left[p + \frac{\tau_R}{1 + 2\gamma}, q\right]\right) E\left(\left(\frac{t + \gamma(p - \omega)^2}{1 + \gamma}\right)^2 \mid \omega \in \left[p + \frac{\tau_R}{1 + 2\gamma}, q\right]\right) \\
& + Pr(\omega \in [-q, p - \tau_R]) \tau_R^2,
\end{aligned}$$

which is optimized at

$$p_\gamma^* = \begin{cases} q - \tau_R \left(1 + \left(1 + \frac{1}{\gamma\tau_R} + \frac{2}{\tau_R}\right)^{\frac{1}{2}}\right) & \text{if } \tau_R \left(1 + \left(1 + \frac{1}{\gamma\tau_R} + \frac{2}{\tau_R}\right)^{\frac{1}{2}}\right) \leq q \\ 0 & \text{otherwise.} \end{cases}$$

Notice that the bound is decreasing in the candidate's bias, as it was always the case in the previous specifications of the model. There are however other more interesting effects:

- the bound is increasing in the weight of the renegotiation costs in the candidates' utility function  $\gamma$ ; the more the candidates will find difficult to renegotiate their policy ex post, the more the median voter is ex ante willing to give them discretion;
- as it can be seen studying the sign of  $\frac{\partial p_\gamma^*}{\partial \tau_R}$ , the ex post implemented policy is under some parametric conditions increasing in the candidate's bias; this is interesting because it reflects an intuitive characteristic of policy implementation, that is that more extreme candidates implement more extreme policies. This is combined however with the fact that more extreme candidates need to specify their electoral agenda much more in detail to have a chance of being elected given that they need to convince the less extreme voters as well. In fact, given their bias, they are forced to have a smaller set of promises; this implies that the renegotiation is more frequent, and that its extent is larger.

This last effect works despite the fact that the voters anticipate that the more biased candidate will renegotiate to extreme policies ex post.

#### 1.4.4 Considerations on renegotiation in elections

The process described above is essentially characterised by an asymmetric distribution of power between the candidate and the median voter. It is interesting however to analyse more in detail what this implies for the whole set of voters, and for the freedom that the candidate has in choosing the policy.

**Gains from renegotiation** In order to develop a better understanding of the renegotiation process described above, and of the reasons for which it is natural to fo-

cus the attention on the median voter's choice, it is interesting to understand who gains and loses in the process. Assume that candidate  $R$  is elected after he promised  $P(\tau_R) = [-q, p_R]$ ; consider now the case in which the state of the world is  $\omega > p_R$ , and the candidate renegotiates his promises by implementing the policy  $2\omega - p_R$ . It was argued before that this renegotiation leaves the median voter indifferent; what happens to all the other voters? The voters who gain from this renegotiation are those with a positive bias with respect to the median voter; this means that the right-wing candidate is effectively renegotiating his promises by setting a policy which favours his electorate and displeases his opponent's electorate. This behaviour grants him the future approval of his own electorate, in a way that makes the median voter the decisive one in future elections as well.

**Discretion and renegotiation** There is an important feature of renegotiation that is notable. In the first part of the paper, where renegotiation was not a possibility, a candidate had more discretion the larger was the set of promises; in a model where renegotiation is possible, discretion comes to the candidate from two different sources: if the set of promises is large, the candidate has discretion in the choice of a policy from the set, while if the set is small, the candidate will more often be able to renegotiate his promises. This is a consequence of the fact that the smaller is the set of promises the more it is probable that both the candidate and the median voter will dislike the outcome that will be possible by choosing a policy among the promised ones.

**Renegotiation and uncertainty** When renegotiation is allowed after the election has taken place, an increase in the uncertainty over the candidates' types reduces the space of the optimal set of promises. In fact, if we consider for example candidate  $R$ , the set of promises is optimally bounded by  $p \in [0, q - \tau - x]$ ; clearly the largest possible bound is decreasing in the level of uncertainty  $x$ . However this does not predict that increasing uncertainty will reduce the effective level of discretion in the campaign, because it does not say anything about which of the possible bounds is chosen as a function of  $x$ . It may as well be that the equilibrium bound is increasing or decreasing in  $x$ .

**Importance of information** In these models the voters know  $\omega$  as soon as it is realised. It may be interesting to understand how the renegotiation process differs when the voters are only provided with coarse information on the state of the world. This may be a sensible assumption for example when  $\omega$  is interpreted as the state of the economy. This extension of the model, however, can be analysed only in the extensive form of the dynamic setting.

**Extreme politicians** In the general case of convex costs, we can notice that it allows for a case of comparative statics that it is perceived to be intuitive: there are



parametric values in which a more extreme candidate will ex post implement more extreme policies than a less biased one, despite being more constrained ex ante. The effect of an increase in  $|\tau_j|$  over the final implemented policy is threefold:

- it reduces the set of promised policies: the voters allow less discretion ex ante to an extreme candidate;
- it increases the possibility of renegotiation ex post: given that the set of promises is smaller, it happens more frequently that the state of the world  $\omega$  is such that renegotiation is possible;
- it changes the desired policy that the politician wants to implement ex post: given the existence of renegotiation costs that depend on the distance between the set of promises and the implemented policy the direction of this effect is not clear. A more extreme candidate has more incentive to move closer to what he perceives as optimal policy; however, he is in general also more distant from it, given that his set of promises is smaller. Therefore the effect on the desired policy ex post depends on the importance of the renegotiation costs.

When the renegotiation costs are low ( $\gamma$  small) the ex post implemented policy is increasing with the candidate's bias. Therefore we have that more extreme candidates make more restrictive promises in order to be elected, but also they end up implementing more extreme policies ex post. The mechanism is very interesting: extreme candidates find necessary to restrain their set of promises more than moderate candidates to be elected; as a consequence of the smaller set of promises it is more often the case that they can appeal to the circumstances (that is to a realisation of  $\omega$  which is far away from the set of promises) and induce an ex post implemented policy that is increasingly far away from the median voter's optimal policy, the more extreme the candidate is. Notice that this is an equilibrium phenomenon that is fully anticipated by the voters, and it is not due to any fooling process that the candidates may try, given that the information on the candidates' types is complete. This result seems consistent with what we observe in reality, that is often more extreme policies are implemented by extreme candidates.

## 1.5 Conclusions

This paper analyses an electoral contest as a competitive delegation problem. The aim of the paper is to investigate, with a simple model, what are the characteristics of an election that favor the politicians' vagueness, for example the structure of the electoral system, or the nature of the candidates.

I show that the level of ambiguity of the electoral campaign is determined by two different factors. The first one is related to the the median voter's willingness to delegate, at least partially, policy decisions to an informed candidate, despite his bias.

However, this factor only accounts for part of the discretion that the candidates are able to retain for themselves. Candidates are able to increase their freedom through electoral competition, when their preferred policies are not symmetric. The candidates' discretion depends negatively on their own bias with respect to the median voter's preferred policy.

The interaction between the median voter's preferences and the candidates' ones is analysed both in the case of complete information and in the case of private information on the candidates' preferred policies. In the first case it is relevant to notice that in most cases the welfare of the electorate depends uniquely on the characteristics of the more extreme candidate; the moderate candidates' characteristics are important only when the type of the bad candidate is really extreme. In the latter case, an increase in the uncertainty about the candidates can increase or decrease the level of ambiguity of the system. Ambiguous promises have in fact a different effect on moderate and extreme candidates; they bind extreme candidates more often, thus providing some insurance for the median voter. This effect is more relevant when the candidate's expected type is extreme; if this is the case, an increase in the uncertainty about the candidate's type increases the likelihood that he is a less biased type, and the willingness of the median voter to give him discretion about the future policies, without worries about the more biased type, given the insurance effect of the promises.

The last part of the paper relaxes the assumption of commitment on the promised sets of policies, and considers a case in which the elected candidate can renegotiate his promises after he has observed the state of the world. One interesting feature of renegotiation in this setting is that it changes our perspective of what is ambiguous and what is not. A general promise, in fact, allows the candidate to choose among a large set of policies *ex post*; a very specific promise, on the other hand, allows him to renegotiate his promises in a larger number of cases, increasing his discretion once elected. This effect is even more relevant in the case in which we impose limits on the renegotiation process; when this happens, we observe that relaxing the constraints on renegotiation reduces the discretion that the candidate can retain *ex-ante*.

I moreover analyse the consequences of different limits to renegotiation. By doing this I obtain that convex costs to renegotiation may generate a very interesting consideration on extreme politicians: in general extreme politicians are the ones that are more limited in their *ex ante* set of promises, given their need to reassure the median voter that they will not implement policies that are too far away from the median voter's optimal one. However, under convex costs of renegotiation it may be the case that *ex post* more biased candidate are indeed the ones that implement more extreme policies, which seems an intuitive result.

## A Appendix

### A.1 Proof of Proposition 1

As mentioned in Section 2, the proof is composed of two steps; in the first one it is shown that the optimal set of promises will be an interval of the shape  $P(\tau_R) = [-q, p_R]$  and  $P(\tau_L) = [p_L, q]$ , and in the second step the optimal  $p_R$  and  $p_L$  are derived.

**Step 1:**  $P(\tau_R) = [-q, p_R]$  and  $P(\tau_L) = [p_L, q]$ . Let's prove the result for candidate  $R$ . Consider first the fact that, being  $P$  a closed set and a subset of  $\mathfrak{R}$ ,  $P$  is the finite union of closed intervals and points. Assume now that policy  $p_R$  is optimally included in the set of promises, and let's show that if  $p$  is included in the optimal promise set, then any point smaller than  $p$  must be included too. To do so, we first show that the optimal promise has to be an interval, that is, that the set of promises cannot contain any hole. Suppose there is an interval  $(a, b) < p$  which is not included in the promise. Then the candidate will ex post choose  $a$  for  $\tau + \omega < \frac{a+b}{2}$ , and  $b$  otherwise. His best response is therefore upper hemicontinuous. This is a mean preserving spread compared to the situation in which the interval belongs to  $P(t)$  and the candidate chooses  $\tau + \omega$  whenever  $\tau + \omega \in (a, b)$ . Since the median voter is risk averse, his utility is lower with the mean preserving spread; the same reasoning can be extended to  $P$  being an interval and a point, and a finite collection of points. The optimal set of promises is therefore an interval. Let now  $\underline{p}$  be the lower bound of this interval and consider a policy  $x < \underline{p}$ . If  $x$  is not in the set of promises, the candidate will choose  $\underline{p}$  whenever the state of the world is smaller than  $\underline{p} - \tau$ ; when  $x$  is made available, the candidate will choose it when  $\omega < \frac{1}{2}(\underline{p} + x) - \tau$ , and he will implement  $\underline{p}$  when  $\omega \in [\frac{1}{2}(\underline{p} + x) - \tau, \underline{p} - \tau]$ . In the last case the expected disutility of the median voter for states  $\omega < \underline{p} - \tau$  in the case in which  $\frac{1}{2}(\underline{p} + x) - \tau > -q$  is:

$$\begin{aligned} & \frac{\Pr\left(\omega \leq \frac{\underline{p}+x}{2} - \tau\right)}{\Pr(\omega < \underline{p} - \tau)} E\left((\omega - x)^2 \mid \omega < \frac{\underline{p}+x}{2} - \tau\right) \\ & + \frac{\Pr\left(\omega \in \left(\frac{\underline{p}+x}{2} - \tau, \underline{p} - \tau\right]\right)}{\Pr(\omega < \underline{p} - \tau)} E\left((\omega - \underline{p})^2 \mid \omega \in \left(\frac{\underline{p}+x}{2} - \tau, \underline{p} - \tau\right]\right) \end{aligned}$$

which becomes:

$$\frac{1}{\underline{p} - \tau + q} \left[ \int_{-q}^{\underline{p} - \tau} \omega^2 d\omega - 2x \int_{-q}^{\frac{\underline{p}+x}{2} - \tau} \omega d\omega - 2\underline{p} \int_{\frac{\underline{p}+x}{2} - \tau}^{\underline{p} - \tau} \omega d\omega + \underline{p}^2 \frac{\underline{p} - x}{2} + x^2 \left(\frac{\underline{p} + x}{2} - \tau + q\right) \right];$$

the above disutility is smaller than the expected disutility over states smaller than  $\underline{p} - \tau$  when  $x$  is not available:

$$\begin{aligned} & E\left((\omega - \underline{p})^2 \mid \omega < \underline{p} - \tau\right) = \\ & \frac{1}{\underline{p} - \tau + q} \left[ \int_{-q}^{\underline{p} - \tau} \omega^2 d\omega - 2\underline{p} \int_{-q}^{\underline{p} - \tau} \omega d\omega + (\underline{p} - \tau + q) \underline{p}^2 \right] \end{aligned}$$

in fact the difference between the two function is

$$\frac{(\underline{p} - x)}{\underline{p} - \tau + q} \left[ \tau^2 - \left(\frac{\underline{p} + x}{2} + q\right)^2 \right]$$

which is negative given that  $\frac{\underline{p}+x}{2} - t + q > 0$  by assumption. The median voter disutility is the same for states that are greater than the threshold because the policy that the candidate implements ex post is the same. Finally we can notice that including  $x$  in the set of promises does not make any difference when  $\frac{1}{2}(\underline{p} + x) - \tau < -q$  given that  $x$  will never be chosen. Combining all these observation we can conclude that there is a continuum of sets that are optimal for candidate  $R$ :  $P(\tau_R) = [\underline{p}, p_R]$ , with  $\underline{p} \in (-\infty, -q + \tau]$ . We choose  $\underline{p} = -q$ , linking the promised set to the true possible realizations

of the state of the world. Notice that in this way the set of promises is closed and bounded.

The result for candidate  $L$  is proved analogously.

**Step 2: the optimal  $p_R$  and  $p_L$ .** Let's assume that candidate  $R$  will make a promise  $P(\tau_R) = [-q, p_R]$ , and candidate  $L$  a promise  $P(\tau_L) = [p_L, q]$ . Their sets of promises are now fully described by their bounds  $p_L$  and  $p_R$ . The optimal behaviour of the median voter is to vote for the candidate with a promise and a type such that  $EU_m(\tau_j, P(\tau_j))$  is the highest between the available candidates.

Let's focus again on candidate  $R$ . The median voter's expected disutility when the candidate type is  $\tau_R$ ,  $\omega \sim U[-q, q]$ , and  $P(\tau_R) = [-q, p_R]$  is:

$$\Pr(\tau_R + \omega > p_R)E((\omega - p_R)^2 \mid \tau_R + \omega > p_R) + \Pr(\tau_R + \omega \leq p_R)\tau_R^2$$

For a given ideology of candidate  $R$ , the problem is now to compute the optimal promise to please the median voter, that is, to minimise his expected disutility. The problem is therefore:

$$\min_{p_R} \Pr(\tau_R + \omega > p_R) [E(\omega^2 \mid \tau_R + \omega > p_R) - 2p_R E(\omega \mid \tau_R + \omega > p_R) + p_R^2] + \Pr(\tau_R + \omega \leq p_R)\tau_R^2$$

where  $\Pr(\tau_R + \omega > p_R) = \frac{q - p_R + \tau_R}{2q}$  and  $\Pr(\tau_R + \omega \leq p_R) = \frac{q + p_R - \tau_R}{2q}$ .

The objective function includes the probability that  $\tau_R + \omega > p_R$ , and the complementary probability. Since the two probabilities must be bounded between zero and one, the objective function is a piecewise function defined over three intervals: when  $p_R < \tau_R - q$ ,  $\Pr(\tau_R + \omega > p_R) = 1$  and the objective function is  $E(\omega - p_R)^2$ ; when  $p_R > \tau_R + q$ ,  $\Pr(\tau_R + \omega \leq p_R) = 1$ , and the objective function is  $\tau_R^2$ ; for intermediate values both probabilities are between zero and one.

Summarizing, the median voter's problem is:

$$\min_p \begin{cases} E(\omega^2) + p_R^2 & \text{if } p_R < \tau_R - q \\ \frac{q - p_R + \tau_R}{2q} (E(\omega^2 \mid \tau_R + \omega > p_R) - 2p_R E(\omega \mid \tau_R + \omega > p_R) + p_R^2) \\ \quad + \frac{q + p_R - \tau_R}{2q} \tau_R^2 & \text{if } p_R \in [\tau_R - q, \tau_R + q] \\ \tau_R^2 & \text{if } p_R > \tau_R + q \end{cases}$$

which, expanding and substituting for the expected values<sup>13</sup>, becomes:

$$\min_p \begin{cases} \frac{q^2}{3} + p_R^2 & \text{if } p_R < \tau_R - q \\ \frac{1}{2q} \left( \frac{q^3}{3} - \frac{p_R^3}{3} + \frac{\tau_R^3}{3} - p_R \tau_R^2 + p_R^2 \tau_R + \frac{q^2}{2} - \frac{p_R^2}{2} - \frac{\tau_R^2}{2} + p_R \tau_R \right) \\ \quad + \frac{(q - p_R + \tau_R)}{2q} p_R^2 + \frac{q + p_R - \tau_R}{2q} \tau_R^2 & \text{if } p_R \in [\tau_R - q, \tau_R + q] \\ \tau_R^2 & \text{if } p_R > \tau_R + q \end{cases}$$

The following subsection discusses in detail the minimisation of this function, studying its be-

<sup>13</sup>The expected values in question are:

- $E(\omega^2) = \int_{-q}^q \omega^2 \frac{1}{2q} d\omega = \frac{q^2}{3}$ ;
- $E(\omega^2 \mid \tau_R + \omega > p_R) = \int_{p_R - \tau_R}^q \omega^2 \frac{1}{q - p_R + \tau_R} d\omega = \frac{1}{q - p_R + \tau_R} \frac{q^3 - (p_R - \tau_R)^3}{3}$ ;
- $E(\omega \mid \tau_R + \omega > p_R) = \int_{p_R - \tau_R}^q \omega \frac{1}{q - p_R + \tau_R} d\omega = \frac{1}{q - p_R + \tau_R} \frac{q^2 - (p_R - \tau_R)^2}{2}$ .

haviour in every region and analysing the properties of the global minimum.

As discussed above, the objective function relative to candidate  $R$  is defined over the three different intervals represented in the following figure:

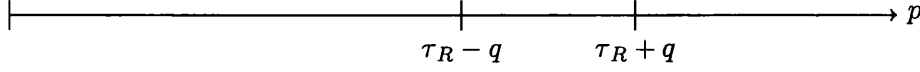


Figure 6: Intervals in the complete information case

- *Region 1:*  $p_R < \tau_R - q$ . The first thing to notice is that this region belongs to the space of the parameter  $p_R$  only when  $\tau_R > q$ . In this region the objective function is defined as:

$$E(\omega^2) + p_R^2 = \int_{-q}^q \frac{1}{2q} \omega^2 d\omega + p_R^2 = \frac{q^2}{3} + p_R^2$$

The minimum of the objective function in this region is therefore reached where  $2p_R = 0$ , which implies  $p_R = 0$ . The second order condition for a minimum is satisfied since  $2 > 0$ . The value of the function at  $p_R = 0$  is  $\frac{q^2}{3}$ .

- *Region 2:*  $p_R \in [\tau_R - q, \tau_R + q]$ . In this region the objective function is:

$$\begin{aligned} & \frac{q - p_R + \tau_R}{2q} (E(\omega^2 \mid \tau_R + \omega > p_R) - 2p_R E(\omega \mid \tau_R + \omega > p_R) + p_R^2) \\ & + \frac{q + p_R - \tau_R}{2q} \tau_R^2 \end{aligned}$$

The first order condition is:

$$\frac{1}{2q} (-p_R^2 - q^2 + 2p_R q + \tau_R^2) = 0$$

Therefore the two possible solutions are  $p_R = q + \tau_R$ , and  $p_R = q - \tau_R$ , which both belongs to the interval, provided that  $q > \tau_R$ . The second order condition for a minimum states that  $-2p_R + 2q > 0$ , which implies  $p_R < q$ . Therefore the solution in this region is  $p_R = \min\{0, q - \tau_R\}$ , and the value of the function at the minimum is  $t^2 - \frac{2}{3} \frac{t^3}{q}$ , whenever  $\tau_R < q$ , and it is bounded above at  $\frac{q^2}{3}$ , when  $\tau_R \geq q$ .

- *Region 3:*  $p_R > \tau_R + q$ . This region is relevant only when  $\tau_R + q \leq 1$ . In this region the objective function is  $\tau_R^2$ , which is independent of  $p_R$ . So any promise  $p_R > \tau_R + q$  is equivalent from the median voter point of view, and delivers disutility  $\tau_R^2$ .

It is possible to see that a promise in region 3 is never optimal from the median voter's point of view, because for every  $\tau_R$  it delivers  $\tau_R^2$ , while the value of the objective function in region 2 is  $\min\left\{\tau_R^2 - \frac{2}{3} \frac{\tau_R^3}{q}, \frac{q^2}{3}\right\} < \tau_R^2$ . The overall solution, therefore is the following:

$$p_R^* = \begin{cases} q - \tau_R & \text{if } \tau_R < q \\ 0 & \text{otherwise} \end{cases}$$

which implies that the median voter has disutility  $\min\left\{\tau_R^2 - \frac{2}{3} \frac{\tau_R^3}{q}, \frac{q^2}{3}\right\}$ .

In a similar way, the solution of the analogous problem referred to candidate  $L$  yields to the following optimal promise:

$$p_L^* = \begin{cases} q + \tau_L & \text{if } |\tau_L| < q \\ 0 & \text{otherwise} \end{cases}$$

The optimal set of promises will therefore be  $P(\tau_R) = [-q, p_R^*]$ , and  $P(\tau_L) = [p_L^*, q]$  where  $p_R^*$  and  $p_L^*$  are the bounds defined above. ■

## A.2 Minimisation in the uncertainty case, $q > x$ .

Remember that the function we want to minimise, in the case in which  $q > x$ , is:

$$\left\{ \begin{array}{ll} \frac{q^2}{3} + p_R^2 & \text{if } p_R < \tau - x - q \\ \frac{1}{4q} \left[ \frac{q^3 - p_R^3 - 2(\tau - x)^3}{3} - p_R q^2 + p_R^2 q + q(\tau - x)^2 + p_R(\tau - x)^2 \right] \\ + \frac{1}{2} \left[ \frac{q^2}{3} + p_R^2 \right] & \text{if } p_R \in [\tau - x - q, \tau + x - q] \\ \frac{1}{4q} \left[ \frac{q^3 - p_R^3 - 2(\tau - x)^3}{3} - p_R q^2 + p_R^2 q + q(\tau - x)^2 + p_R(\tau - x)^2 \right] \\ + \frac{1}{4q} \left[ \frac{q^3 - p_R^3 - 2(\tau + x)^3}{3} - p_R q^2 + p_R^2 q + q(\tau + x)^2 + p_R(\tau + x)^2 \right] & \text{if } p_R \in [\tau + x - q, \tau - x + q] \\ \frac{1}{4q} \left[ \frac{q^3 - p_R^3 - 2(\tau + x)^3}{3} - p_R q^2 + p_R^2 q + q(\tau + x)^2 + p_R(\tau + x)^2 \right] \\ + \frac{1}{2} [(\tau - x)^2] & \text{if } p_R \in [\tau - x + q, \tau + x + q] \\ \frac{1}{2} [(\tau - x)^2] + \frac{1}{2} [(\tau + x)^2] & \text{if } p_R > \tau + x + q \end{array} \right.$$

subject to  $p_R \in [0, 1]$  and remember also that given our definition of the types, we have the implicit assumption that  $\tau > x$ . In order to minimise the median voter's expected disutility, we need to study the behaviour of the function in every region.

The objective function is a piecewise function defined over the following intervals:

**Region 1:**  $p < \tau - x - q$ . The objective function in this region is  $\frac{q^2}{3} + p^2$ , therefore, as we show in the case where the type is known, the optimal promise from the median voter's point of view is  $p = 0$ .

**Region 2:**  $p \in [\tau - x - q, \tau + x - q]$ . In this case the objective function that the median voter wants to minimise is:

$$\frac{1}{4q} \left[ \frac{q^3}{3} - \frac{p^3}{3} - \frac{2}{3} (\tau - x)^3 - p q^2 + p^2 q + q(\tau - x)^2 + p(\tau - x)^2 \right] + \frac{1}{2} \left[ \frac{q^2}{3} + p^2 \right],$$

therefore the first order condition is

$$-p^2 - q^2 + \tau^2 + x^2 - 2\tau x + 6pq = 0,$$

which gives us the following candidates for the solution:

$$p = 3q \pm (8q^2 + (\tau - x)^2)^{\frac{1}{2}}.$$

The second order condition says that this is a minimum provided that  $-2p + 6q > 0$ , that is provided that  $p < 3q$ . Therefore the only candidate to be a minimum in this region is  $p = 3q - (8q^2 + (\tau - x)^2)^{\frac{1}{2}}$ ; we need to check if  $3q - (8q^2 + (\tau - x)^2)^{\frac{1}{2}} \in [\tau - x - q, \tau + x - q]$ .

- $3q - (8q^2 + (\tau - x)^2)^{\frac{1}{2}} > \tau - x - q$  whenever  $4q - (\tau - x) > (8q^2 + (\tau - x)^2)^{\frac{1}{2}}$ . If  $\tau - x < 4q$  the inequality is never satisfied. If  $\tau - x < 4q$  both sides are positive, so the inequality holds if and only if  $(4q - (\tau - x))^2 > 8q^2 + (\tau - x)^2$ , that is iff  $16q^2 + (\tau - x)^2 - 8q(\tau - x) > 8q^2 + (\tau - x)^2$ . The inequality reduces to  $8q(q - \tau + x) > 0$ , which is satisfied when  $\tau < q + x$ .

- $3q - (8q^2 + (\tau - x)^2)^{\frac{1}{2}} < \tau + x - q$  whenever  $4q - \tau - x < (8q^2 + (\tau - x)^2)^{\frac{1}{2}}$ . If  $\tau + x < 4q$  the inequality is always satisfied, because the left handside is negative and the right one is positive. If  $\tau + x > 4q$  the inequality holds if and only if  $16q^2 + \tau^2 + x^2 + 2\tau x - 8q\tau - 8qx < 8q^2 + \tau^2 + x^2 + 2\tau x$ , that is, iff  $8q^2 + 4\tau x - 8q(\tau + x) < 0$ . The inequality is satisfied when  $\tau > \frac{2q(q-x)}{2q-x}$ . Notice that  $\frac{2q(q-x)}{2q-x} < 4q - x$ , which implies that the inequality is satisfied for every  $\tau$ .

This implies that whenever  $\tau < q + x$ , the minimum of the objective function in this region is attained at  $p = 3q - (8q^2 + (\tau - x)^2)^{\frac{1}{2}}$ , while when  $\tau > q + x$ , the minimum is attained at  $p = \tau - x - q$ .

The expected disutility at  $3q - (8q^2 + (\tau - x)^2)^{\frac{1}{2}}$  is:

$$\frac{1}{4q} \left[ -50q^3 + 18q^2(8q^2 + (\tau - x)^2)^{\frac{1}{2}} - 2q(\tau - x)^2 - \frac{2}{3}(\tau - x)^3 \right].$$

**Region 3:**  $p \in [\tau + x - q, \tau - x + q]$ . In this region the objective is to minimise:

$$\frac{1}{2} \left[ \frac{1}{2q} \left( \frac{q^3}{3} - \frac{p^3}{3} - \frac{2}{3}(\tau - x)^3 - pq^2 + p^2q + q(\tau - x)^2 + p(\tau - x)^2 \right) \right] \\ + \frac{1}{2} \left[ \frac{1}{2q} \left( \frac{q^3}{3} - \frac{p^3}{3} - \frac{2}{3}(\tau + x)^3 - pq^2 + p^2q + q(\tau + x)^2 + p(\tau + x)^2 \right) \right].$$

The first order condition is  $-p^2 - q^2 + 2pq + \tau^2 + x^2 = 0$ , therefore the possible solutions are  $p = q \pm (\tau^2 + x^2)^{\frac{1}{2}}$ . The second order condition for a minimum requires  $-2p + 2q > 0$ , that is  $p < q$ , hence the solution in this region is  $p = q - (\tau^2 + x^2)^{\frac{1}{2}}$ , which belongs to  $[\tau + x - q, \tau - x + q]$  when  $\tau \leq \frac{2q(q-x)}{2q-x}$  and  $\tau < 2q - x2$ .

The expected disutility at  $p = q - (\tau^2 + x^2)^{\frac{1}{2}}$  is

$$\left[ -\frac{1}{3} \frac{\tau^3}{q} + x^2 + \tau^2 - \frac{1}{3} \frac{(\tau^2 + x^2)^{\frac{3}{2}}}{q} - \frac{\tau x^2}{q} \right].$$

**Region 4:**  $p \in [\tau - x + q, \tau + x + q]$ . In this region the objective is to minimise

$$\frac{1}{2} \left[ \frac{1}{2q} \left( \frac{q^3}{3} - \frac{p^3}{3} - \frac{2}{3}(\tau + x)^3 - pq^2 + p^2q + q(\tau + x)^2 + p(\tau + x)^2 \right) \right] + \frac{1}{2} [(\tau - x)^2].$$

The first order condition is:  $-p^2 - q^2 + 2pq + \tau^2 + x^2 + 2\tau x = 0$ , implying that the possible solutions are  $p = q \pm (\tau + x)$ . The second order condition imposes that  $p < q$ , so the only candidate for a local minimum is  $q - (\tau + x)$ , while  $q + \tau + x$  is a local maximum. However  $q - (\tau + x)$  does not belong to this region. Therefore the minimum in this region is attained at  $\tau - x + q^{14}$ , where the expected disutility is:

$$-\frac{1}{3} \frac{x^3}{q} + \tau^2 + x^2.$$

**Region 5:**  $p > \tau + x + q$ . In this region the objective function is  $\frac{1}{2} [(\tau - x)^2] + \frac{1}{2} [(\tau + x)^2]$  which does not depend on  $p$ . Any  $p$  in the region is equivalent to the median voter and gives expected disutility  $\frac{1}{2} [(\tau - x)^2] + \frac{1}{2} [(\tau + x)^2] = \tau^2 + x^2$ .

### Overall solution.

1. Solutions in region 4 and 5 are never global optima: a solution in region 5 is always dominated by a solution in region 4;

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<sup>14</sup>Over the interval  $[\tau - x + q, \tau + x + q]$  the function in question is concave, with its local maximum at  $\tau + x + q$ . Therefore the local minimum is at the other extreme of the interval.

2. Whenever  $\tau > q + x$  the solution is  $p = 0$ , because all the other solutions collapse to  $p = 0$ ;
3. When  $\frac{2(q-x)}{2q-x} < \tau < q + x$  the minimum is at  $3q - (8q^2 + (\tau - x)^2)$ , because region 1 is not relevant ( $\tau - x - q < 0$ ) and the solution in region 3 belongs to region 2 as well (we know by the optimisation in region 2 that  $3q - (8q^2 + (\tau - x)^2)$  is better than  $\tau + x - q$ ).
4. When  $\tau < \frac{2(q-x)}{2q-x}$  the minimum is at  $q - (\tau^2 + x^2)^{\frac{1}{2}}$  because the solution in region 2 collapses to  $\tau + x - q$  which is also a solution in region 3.

All this taken into account, the solution has the following shape:

$$p_R^x = \begin{cases} q - (\tau^2 + x^2)^{\frac{1}{2}} & \text{if } \tau \leq \frac{2q(q-x)}{2q-x} \\ 3q - (8q^2 + (\tau - x)^2) & \text{if } \tau \in \left[ \frac{2q(q-x)}{2q-x}, q + x \right] \\ 0 & \text{otherwise.} \end{cases}$$

### A.3 Proof of proposition 2

**Proof:** Let's start considering the case in which  $q \geq \tau_R$ . Taking into account that  $p \geq 0$ , and that  $\omega \in [-q, q]$ , when  $q > \tau_R$  the objective function becomes:

$$\min_p \begin{cases} \frac{2\tau_R}{2q} \left( \int_{p-\tau_R}^{p+\tau_R} \frac{1}{2\tau_R} \omega^2 d\omega - 2p \int_{p-\tau_R}^{p+\tau_R} \frac{1}{2\tau_R} \omega d\omega + p^2 \right) + \frac{2q-2\tau_R}{2q} \tau_R^2 & \text{if } p \leq q - \tau_R \\ \frac{q-p+\tau_R}{2q} \left( \int_{p-\tau_R}^q \frac{1}{q-p+\tau_R} \omega^2 d\omega - 2p \int_{p-\tau_R}^q \frac{1}{q-p+\tau_R} \omega d\omega + p^2 \right) + \frac{q+p-\tau_R}{2q} \tau_R^2 & \text{if } p > q - \tau_R \end{cases}$$

which can be simplified to become:

$$\min_p \begin{cases} 1 - \frac{2}{3} \frac{t^3}{q} & \text{if } p \leq q - \tau_R \\ \frac{1}{2q} \left( \frac{q^3 - p^3 - 2\tau_R^3}{3} - pq^2 + p\tau_R^2 + p^2q + qt^2 \right) & \text{if } p > q - \tau_R \end{cases} ;$$

therefore the median voter is indifferent between any set of promises characterized by  $p \leq q - \tau_R$ , given that  $\frac{2\tau_R^3}{3q}$  does not depend on  $p$ . Moreover, the minimum of the function in the second interval is attained at  $p = q - \tau_R$  where the disutility is the same as in the first interval, given the continuity of the function.<sup>15</sup>

Let us now consider the case in which  $q < \tau_R$ ; in this case  $p > q - \tau_R$  always, and the median voter's problem is:

$$\min_p \frac{q-p+\tau_R}{2q} \left( \int_{p-\tau_R}^q \frac{1}{q-p+\tau_R} \omega^2 d\omega - 2p \int_{p-\tau_R}^q \frac{1}{q-p+\tau_R} \omega d\omega + p^2 \right) + \frac{q+p-\tau_R}{2q} \tau_R^2$$

which can be rewritten as:

$$\min_p \frac{1}{2q} \left( \frac{q^3 - p^3 - 2\tau_R^3}{3} - pq^2 + p\tau_R^2 + p^2q \right)$$

and the only solution is  $p = 0$ .<sup>16</sup> ■

<sup>15</sup>The first order condition is  $-p^2 - q^2 + \tau_R^2 + 2pq = 0$ , which gives as possible solutions  $p = q \pm \tau_R$ ; looking at the second order condition it is clear that  $p = q - \tau_R$  is the minimum.

<sup>16</sup>The unconstrained minimum is at  $p = q - \tau_R < 0$ ; given that  $p \geq 0$ , the minimum in the domain is at  $p = 0$ .



### A.4 Proof of proposition 3

**Proof:** Consider candidate  $R$ . The objective function in this case is an average between the expected disutility with renegotiation when the type is  $\tau + x$ , and when the type is  $\tau - x$ , as follows:

$$\begin{cases} \frac{(\tau-x)^3 + (\tau+x)^3}{3q} & \text{if } p \leq q - \tau - x \\ \frac{1}{4q} \left( \frac{q^3 - p^3 - 2(\tau+x)^3}{3} - pq^2 + p(\tau+x)^2 + p^2q \right) + \frac{(\tau-x)^3}{3q} & \text{if } p \in [q - \tau - x, q - \tau + x] \\ \frac{1}{4q} \left( \frac{q^3 - p^3 - 2(\tau-x)^3}{3} - pq^2 + p(\tau-x)^2 + p^2q \right) + \frac{1}{4q} \left( \frac{q^3 - p^3 - 2(\tau+x)^3}{3} - pq^2 + p(\tau+x)^2 + p^2q \right) & \text{if } p > q - \tau + x \end{cases}$$

Clearly the median voter is indifferent between any set of promises characterised by  $p \leq q - \tau - x$ , given that the objective function does not depend on  $p$  in that region. In the interval where  $p \in [q - \tau - x, q - \tau + x]$  the minimum is attained at  $p = q - \tau - x$ ;<sup>17</sup> in the third region the minimum is attained at  $p = q - \tau + x$ . Therefore the overall minimum, given the continuity of the function is for any  $p \in [0, q - \tau - x]$ . ■

### A.5 Proof of proposition 4

**Proof:** The objective function described above can be rewritten as follows:

$$\min_p \frac{\tau}{2q} \left( \frac{p^3 - (p-\tau)^3}{3\tau} + (\tau - p) \frac{p^2 - (p-\tau)^2}{\tau} + (p - \tau)^2 \right) + \frac{(p+\tau)^3 - p^3}{3\tau} - (\tau + p) \frac{(\tau+p)^2 - p^2}{\tau} + (p + \tau)^2$$

which, simplifying becomes  $\frac{\tau^3}{3q}$ . Therefore the objective function does not depend on  $p$ , for the range of parametric values in which  $q > \tau_R$  and  $p \leq q - \tau_R$ , and the candidate is as well indifferent between any set of promises characterised by  $p \in [0, q - \tau_R]$ . ■

### A.6 Proof of proposition 5

Let's consider first the case in which  $q > \tau > \frac{\varepsilon}{2}$ . In this case  $\min \{2\omega - p, p + \varepsilon\} = 2\omega - p$  if  $\omega < p + \frac{\varepsilon}{2}$ , and  $\min \{\tau + \omega, p + \varepsilon\} = p + \varepsilon$  always. Therefore the objective function becomes:

$$\begin{aligned} & \min_p \Pr \left( \omega \in \left( p - \tau_R, p + \frac{\varepsilon}{2} \right) \right) E \left( (\omega - p)^2 \mid \omega \in \left( p - \tau_R, p + \frac{\varepsilon}{2} \right) \right) \\ & + \Pr \left( \omega \in \left( p + \frac{\varepsilon}{2}, q \right) \right) E \left( (\omega - p - \varepsilon)^2 \mid \omega \in \left( p + \frac{\varepsilon}{2}, q \right) \right) \\ & + \Pr(\omega \in (-q, p - \tau_R)) \tau_R^2 \end{aligned}$$

When  $p < q - \frac{\varepsilon}{2}$  the objective function is

$$\frac{1}{2q} \left[ -\frac{p^3}{3} + p^2(q - \varepsilon) - p(q^2 + \varepsilon^2 - 2\varepsilon q - \tau^2) + q\tau^2 - \varepsilon q^2 + \varepsilon^2 q + \frac{q^3 - 2\tau^3}{3} \right].$$

The first order condition therefore is:

$$-p^2 + 2p(q - \varepsilon) - (q^2 + \varepsilon^2 - 2\varepsilon q - \tau^2) = 0$$

which gives as possible solutions  $q - \varepsilon \pm \tau$ . The second order condition reveals the solution to be  $q - \varepsilon - \tau$ .

<sup>17</sup>The first order condition implies that the possible candidates are  $p = q \pm (\tau + x)$ , and the second order condition indicates that the minimum is attained at  $p = q - \tau - x$ .

When  $p > q - \frac{\varepsilon}{2}$  the objective function is:

$$\begin{aligned} & \min_p \Pr(\omega \in (p - \tau_R, q)) E((\omega - p)^2 \mid \omega \in (p - \tau_R, q)) \\ & + \Pr(\omega \in (-q, p - \tau_R)) \tau_R^2 \end{aligned}$$

which becomes

$$\frac{1}{2q} \left[ \frac{q^3 - p^3 - 2\tau_R^3}{3} - pq^2 + p^2q + q\tau_R^2 + p\tau_R^2 \right].$$

The first order and second order condition would place the minimum at  $q - \tau_R$  which is outside the range, therefore the minimum is at the lower bound of the interval, where  $p = q - \frac{\varepsilon}{2}$ . We can therefore conclude that the minimum is at  $p = q - \tau_R - \varepsilon$ , when  $p \geq 0$ , and  $p = 0$  otherwise.

Let's now consider the case in which  $\tau_R < \frac{\varepsilon}{2}$ . In this case  $\min\{2\omega - p, p + \varepsilon\} = p + \varepsilon$  always, and  $\min\{\tau_R + \omega, p + \varepsilon\} = \tau_R + \omega$  when  $\omega < p + \varepsilon - \tau_R$ . Therefore the objective function is:

$$\begin{aligned} & \min_p \Pr(\omega \in (p - \tau_R, p + \tau_R)) E((\omega - p)^2 \mid \omega \in (p - \tau_R, p + \tau_R)) \\ & + \Pr(\omega \in (p + \varepsilon - t, q)) E((\omega - p - \varepsilon)^2 \mid \omega \in (p + \varepsilon - t, q)) \\ & + \Pr(\omega \in (-q, p - \tau_R) \cup (p + \tau_R, p + \varepsilon - t)) \tau_R^2. \end{aligned}$$

If  $p > q - \varepsilon + \tau_R$  the objective function is the same one described in proposition 2, and the median voter is indifferent between any set of promises  $[\max\{0, q - \varepsilon + t\}, q - \tau_R]$ . If  $p < q - \varepsilon + \tau_R$  the objective function becomes

$$\frac{1}{2q} \left[ \frac{q^3 - (p + \varepsilon)^3}{3} - 2\tau_R^3 - (p + \varepsilon)q^2 + (p + \varepsilon)^2q + q\tau_R^2 + p\tau_R^2 + \varepsilon\tau_R^2 \right].$$

The first order condition is

$$-(p + \varepsilon)^2 - q^2 + 2(p + \varepsilon)q + \tau_R^2 = 0$$

which gives as a solution  $p = q - \tau_R - \varepsilon$ . Therefore the solution is  $p = q - \tau_R - \varepsilon$  as long as this is greater than zero,  $p = 0$  when  $\varepsilon \in [q - \tau_R, q + \tau_R]$ , and any  $p \in [0, q - \tau_R]$  if  $\varepsilon > q + \tau_R$ .

## A.7 Optimal $\varepsilon$

Assume that  $R$  is the elected candidate. The median voter's expected loss given  $p = q - \tau_R - \varepsilon$  is:

$$\frac{1}{2q} \left\{ \frac{\varepsilon^3}{3} - \tau_R^2\varepsilon - \frac{4}{3}\tau_R^3 + 2\tau_R^2q \right\};$$

this is the median voter's expected loss when  $\tau_R < q - \varepsilon$ . The first order condition gives  $\varepsilon^* = \tau_R$ . Notice that this is a solution for  $\tau_R < \frac{q}{2}$ .

If  $\tau_R > q - \varepsilon$  the relevant function becomes:

$$\frac{1}{2q} \left\{ q\tau_R^2 - \varepsilon q^2 + \varepsilon^2 q + \frac{q^3}{3} - \frac{2}{3}\tau_R^3 \right\}$$

where the first order condition gives  $\varepsilon = \frac{q}{2}$ . The result for  $j = L$  can be proved analogously.

## 2 Last minute policies and the incumbent advantage<sup>18</sup>

### 2.1 Introduction

In political debates and election campaigns, politicians always face an important trade-off. On the one hand, taking an early and firm stand on a particular topic signals competence and vision, creates media presence, and allows to actively shape the course of the debate. On the other hand, later positioning has the advantage that more information is available both on the topic and on the stand of political competitors. Hence, decisions can potentially be better for the politician and for the society as a whole.

This trade-off can be illustrated by the German federal election in 2002. Amidst economic problems of unemployment and recession, the incumbent coalition of Social-Democrats and Greens was a clear second in polls behind the conservative opposition. While the campaign had understandably focused on issues of domestic economic policy, with 85% of Germans seeing unemployment as the single most important problem in the country, the “party council of [chancellor] Schroeder’s Social Democratic Party (SPD) decided on 1 August to begin the final phase of the re-election campaign earlier than planned.” (Fürting, 2007, p. 315) After the meeting, Schröder publicly announced that there are “alarming news from the Middle East” (p. 316) and made clear that Germany would not participate under any circumstances militarily or financially in disarming Iraq. Thus, the German government put the Iraq issue on the political agenda and took a strong position that most of the German voters agreed on. They did so although it was very uncertain that a war would ever be fought and German support ever requested from the US. In addition, this move nullified Schröder’s agreement with US President George W. Bush to put the Iraq situation on the agenda only after the election, so that a pro-American stance would not harm the incumbent coalition. Consequently, the perceived importance of the Iraq conflict jumped from 6th to 2nd rank within one month. In the September elections, the incumbent coalition was confirmed.

This example shows vividly the trade-off in the timing of political statements which we model in this paper. To capture facets of the trade-off, we will consider an environment of agenda formation in which candidates are competent – or well-informed – on one particular topic and compete in competencies, not in ideologies (Petrocik, 1996). While a political statement indicates a proposed policy of a candidate on a particular topic, the timing of messages allows voters to infer about the relevance of the issue for society. We model the electoral incentives by assuming that voters

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<sup>18</sup>This chapter draws on work that was carried out jointly with equal share by Stefan P. Penczynski and me.

follow a simple behavioural rule. Each voter  $i$  cares only about one of the issues and votes only when the probability that his preferred issue is relevant for the future government period is greater than a cutoff. Since different voters have different cutoffs, the probability of relevance affects the participation of voters.

We investigate under what circumstances an incumbent has any incentive to lead the policy debate towards a certain issue. We find that the quality of information affects the choice of the incumbent in two ways. First, the incumbent has a natural tendency towards influencing the electoral debate in a way that stresses the importance of the issue on which he is better at (*effect of the relative advantage*). Second, trying to influence the debate induces the incumbent to reveal his strategic position earlier, and allows the challenger to respond optimally; as a consequence, if the information on the relatively better issue is very precise, the incumbent may decide not to influence the debate, in order not to lose his strategic advantage on the issue (*effect of the absolute advantage*).

Section 2.2 presents the relevant literature related to our model. Section 2.3 introduces the general features of the model. The analysis of the equilibria is contained in section 2.4 and 2.5, treating the simultaneous and sequential cases, respectively. Section 2.7 analyses the situation of information asymmetries between voters and candidates regarding the competencies. Section 2.9 contains the welfare analysis and section 2.11 the discussion of the model and possible extensions. Section 2.12 concludes.

## 2.2 Literature

Political science has a long tradition of considering agenda setting in the context of political elections and the formation of public opinion. Lippmann (1922) argued that mass media often constitutes the sole information source for the general public in an election campaign. McCombs and Shaw (1972) and many following studies show empirically how strong the influence of the media is on the public's perception of key political issues.

The relevance of agenda setting is emphasised by the idea of issue ownership (Petrocik, 1996). Traditionally, the election outcome is thought to depend on how close politicians' decisions are to voters' preferences (Downs, 1957). Petrocik (1996) introduces the view that the perceived competence of a politician in a particular field ('issue ownership') is relevant for his success. Consequently, politicians' success depends on whether their core competencies are 'high on the agenda'. Abbe, Goodliffe, Herrnson and Patterson (2003) find evidence of the relevance of issue salience in elections. In this line of argument, recent work in both political science and economics has considered how politicians structure their campaigns.

Puglisi (2004) models endogenous agenda setting in a multi-dimensional policy space where citizen vote on 'salient' issues, which were reported by the media to

require attention. Incumbents can make statements about particular issues to be urgent for media coverage. Predictions of the model are directly related to the agenda setting process, namely that the incumbent's messages are more prominent in the media and that politician who were covered more often are more successful.

Berliant and Konishi (2005) model the campaign debate and consider topics to be salient if they were discussed by the politicians. They find that the office-motivated politicians want to talk about as many topics as possible. Amoros and Puy (2007) assume that parties spend resources on one of two salient issues. Their analysis focuses on whether parties spend resources on the same or on different topics. All of these papers revolve around the concept of issue ownership and agenda-setting. Our paper differs in that it considers the timing of the announcement to be important for the shaping of the discussion and the gathering of information without going into details on media channels.

The timing of announcements in this context has been studied by Bar-Isaac (2008), who applies the model of bounded memory by Wilson (2003) to explain voter's degrees of receptiveness for information at various points in the campaign. The largest receptiveness of voters' state-limited memory is in the beginning and at the end of the campaign, in line with empirical observations on campaign activities. Levy and Razin (2009, 2010) model agenda formation as a result of costly influence seeking of two candidates. Since agenda formation is modeled sequentially and policy decisions are made each period based on the agenda, results include an initial tendency of extremists to place items on the agenda and a slow evolution of the agenda. In our model, the timing is important to the candidates and voters for informational reasons during one election campaign.

Since the election campaign can be viewed as a special case of a debate, the papers by Glazer and Rubinstein (2001, 2004) on debates and persuasion share some features with the current model. In Glazer and Rubinstein (2001), two speakers try to show evidence in order to convince a third party of their position. The model involves the timing of an argument, but is focused on the content of the arguments and counterarguments. In our model, the third party, i. e. the electorate learns about the relevance of the issue irrespective of the content of the statement. Before this happens, though, the early statement can help an incumbent's cause.

### 2.3 General features of the model

We consider a two-period campaign in which an incumbent  $I$  and a challenger  $C$  campaign on two issues  $a$  and  $b$ . They compete to be elected by a continuum of heterogeneous voters.

**Issues.** As mentioned above, there are two issues,  $a$  and  $b$ . The optimal policy on issue  $i$  is equal to the state of the world on that issue, where  $\omega_i \in \{-1, 1\}$ ,  $i = a, b$ . The

states of the world are unknown during the campaign, but become known before the voters cast their vote. Only one of the issues is relevant, but the identity of the relevant issue is discovered only after the election has taken place. The prior probability that issue  $a$  is relevant is  $r$ , which is a public information signal drawn from a uniform distribution over  $[0, k]$  with  $\frac{1}{2} < k < 1$ . The signal  $r$  becomes public after the electoral campaign, when the voters are about to decide their electoral behaviour. Notice that  $k > \frac{1}{2}$  ensures that both issues have a positive probability of being perceived as ‘more likely to be relevant’. The ex-ante probability that  $a$  is the more relevant issue, however, is  $\frac{2k-1}{2k} < \frac{1}{2}$ , while  $\frac{1}{2k}$  is the ex ante probability for  $b$ . With probability  $z$  the relevant issue can also be urgent. Urgency is a characteristic that only relevant issues can have, and it implies that the incumbent is forced to act upon that issue in the first of the two periods;  $z$  is therefore the conditional probability that the issue is urgent given that it is relevant. To understand the difference between relevance and urgency, think of issue  $a$  as the national economy, and issue  $b$  as the immigration policy of the country. We could have that the relevant issue is the national economy, but this could mean that we need to reform the pension scheme over the course of the new Parliament (relevant but not urgent), or it could mean that the national debt is so high that we need to impose immediately a one-off tax to avoid bankruptcy (relevant and urgent). The first would be an example of the national economy being a relevant but not urgent issue, the second one would be the case in which the economy is both relevant and urgent. The same reasoning can be made about immigration policy. We might want to reform the rights of the immigrants (relevant but not urgent), or we might need to deal with boats of irregulars landing on our coasts (relevant and urgent).

**Voters.** There is a continuum of voters, each of them caring only about one issue. We call the voters’ ideological types  $\theta_a$  or  $\theta_b$ , where having an ideological type  $\theta_j$  means that  $j$  is the issue that the voter cares about; the probability that voter  $i$ ’s ideological type is  $\theta_a$  is  $\frac{1}{2}$ . Each voter follows a simple behavioural rule; he goes to cast his vote if and only if the (posterior) probability that the issue he cares about will be relevant for the next government is greater than  $c_i$ , which could be interpreted for example as a cost of voting. This variable  $c_i$  is independently drawn from the uniform distribution on  $[0, 1]$  for each voter. Therefore the voters are heterogeneous along two dimensions, their ideological type and their cost of voting.

Since there is a continuum of voters and the cost distribution is the same across the two ideological groups, the election will be determined by the ideological group associated with the issue that has the largest ex post probability of being the relevant one. This can be seen by noticing that, given an ex post probability  $\rho$  of issue  $a$  being the relevant one, the fraction of voters of that group who will actually vote is  $F(\rho) = \rho$ , while the fraction of voters with ideological type  $b$  who will vote is  $F(1 - \rho) = 1 - \rho$ .

If the voters are indifferent on the issue they care about because both candidates proposed the same policy, we assume that they vote randomly. One can think of details

in the campaign being relevant, which are not modelled explicitly, for example the result of the last TV debate on this issue or the candidates' credibility to also prioritise this issue. To facilitate the analysis, we assume that voters of one group randomise in a coordinated way, voting all for the same candidate. This again, can be thought of as coming from details in the campaign which group  $j$  voters evaluate similarly. Therefore the median voter will always belong to the largest group of voters. It will hence be ex ante unpredictable which candidates he will endorse. The candidates' positions on the issue preferred by the minority group will not influence neither the median voter's decision<sup>19</sup> nor the election outcome. Given that the two groups of potential voters are equally large, and given their coordinated randomisation in case of ties, the median voter will belong to group  $a$  if and only if  $\rho > 1 - \rho$ , that is if  $\rho > \frac{1}{2}$ . In this case the election will be determined by the position of the candidates on issue  $a$ .

**Candidates.** As mentioned above, there are two candidates, an incumbent  $I$  and a challenger  $C$ . Candidates maximise the probability of being elected by taking one of two positions  $\{-1, 1\}$  on both issues. At the beginning of period 1 each candidate receives two signals, one per issue. We denote with  $s_j \in \{-1, 1\}$  the incumbent's signal on issue  $j$ , and with  $t_j \in \{-1, 1\}$  the challenger's one,  $j = a, b$ .  $I$ 's signal on issue  $j$  is correct with probability  $\gamma_j$ .  $C$ 's signal  $t_j$  is correct with probability  $\delta_j = \frac{2}{3}$  for both issues. This implies that the challenger's signals are equally good; he does not have a preference for either of the issues. The incumbent is instead specialised on issue  $a$ , where  $\gamma_a > \frac{1}{2} + \varepsilon$ . We assume his signal on  $b$  to be basically uninformative, but, to avoid a complete indifference of the incumbent on issue  $b$  we assume that  $\gamma_b = \frac{1}{2} + \varepsilon$ , so that he has a weak incentive to follow his own signal. The structure is such that the incumbent can have an objectively worse ( $\gamma_a < \frac{2}{3}$ ) or better ( $\gamma_a > \frac{2}{3}$ ) signal than the challenger on the issue he is specialised in.

In both periods the incumbent is governing the country, but we interpret only the second one as the proper electoral campaign. Therefore we assume that only the incumbent can take a stand on the different issues in the first of the two periods.<sup>20</sup> Every politician can take a stand on each issue only once because they can effectively commit on the proposed policies.

The challenger's strategy maps from the signal space into the action space

$$\sigma^C : \{-1, 1\}^2 \rightarrow \{-1, 1\}^2$$

associating a pair  $(p_a^C, p_b^C)$  of promises to the pair  $(t_a, t_b)$  of signals.

<sup>19</sup>This can be justified by the strong sense of preference for one issue.

<sup>20</sup>This is without loss of generality. As will be clear from the description of the model, the challenger has no extra information on the issues' relevance that can induce the voters to update their beliefs. Therefore an early announcement by the challenger would simply reveal his strategic position to the incumbent, without changing the probability that the election focuses on a specific issue.

The incumbent's strategy is more elaborate, and contains two extra elements. First, he receives an extra signal  $\zeta \in \{a, b, \emptyset\}$  that, in case the relevant issue is urgent, tells him what the relevant issue is, and force him to act on it. The urgency of the issue implies that, if the incumbent remains inactive on that issue, its urgency will be revealed to the voters, and the incumbent will not be elected in the following period as a punishment for the absence of timely measures. Several examples fit the idea of politicians making the electorate believe that an issue is urgent when it is not, while they have hard time hiding an urgent issue from the public. For example, in the case of a potentially pandemic flue, the government can promote a plan of vaccinations and a set of restrictive measures to protect the country. In this case, if the people get the vaccine, they cannot know for sure whether it was really a critical situation or not; on the contrary, if the government does not adopt any special measure and the flu spreads quickly, everyone will know that the government failed to act on time. Similarly, a politician could argue to increase the number of prisons because they are overcrowded and a potential source of rebellion. If the government builds new prisons (or relaxes the criteria of arrest) nobody will be sure of the level of urgency of the matter; however, after riots in the prisons, it will be obvious to the electorate that the government has underestimated the situation.

Even when the relevant issue is not urgent (in which case the incumbent's information on the issue relevance is the same as the challenger's), the incumbent still has the extra choice to commit to a policy in the first period or not. Therefore the action space becomes  $\{A, B, \emptyset\} \times \{-1, 1\}^2$ , where  $A$  indicates the choice of promising  $p_a^I$  in the first period,  $B$  the choice of promising  $p_b^I$  in the first period, and  $\emptyset$  the choice of waiting until the second period. The incumbent's strategy therefore is:

$$\sigma^I : \{a, b, \emptyset\} \times \{-1, 1\}^2 \rightarrow \{A, B, \emptyset\} \times \{-1, 1\}^2,$$

where the following restrictions apply:

- $\sigma^I(a, s_a, s_b) \in \{A\} \times \{-1, 1\}^2$ ;
- $\sigma^I(b, s_a, s_b) \in \{B\} \times \{-1, 1\}^2$ .

No restriction applies to  $\sigma^I(\emptyset, s_a, s_b)$ .

**Timing.** We can now summarise the timing of the electoral campaign. The voters are characterised by their ideological type  $\theta_i$ , and by their cost variable  $c_i$ . At the beginning of the first period the incumbent receives his triple of signals  $(\zeta, s_a, s_b)$  and the challenger receives his pair of signals  $(t_a, t_b)$ . In the first period the incumbent decides whether to promise  $p_a^I$ ,  $p_b^I$  or nothing (where his choice is constrained in the case of an urgent issue), all other promises are revealed in the second period. Then  $r$ ,  $\omega_a$  and  $\omega_b$  are revealed, and the voters cast their vote. The situation is represented



in the figure below, where  $p_j^I$  in period 2 needs to be equal to  $p_j^I$  in period 1 if it has been expressed.

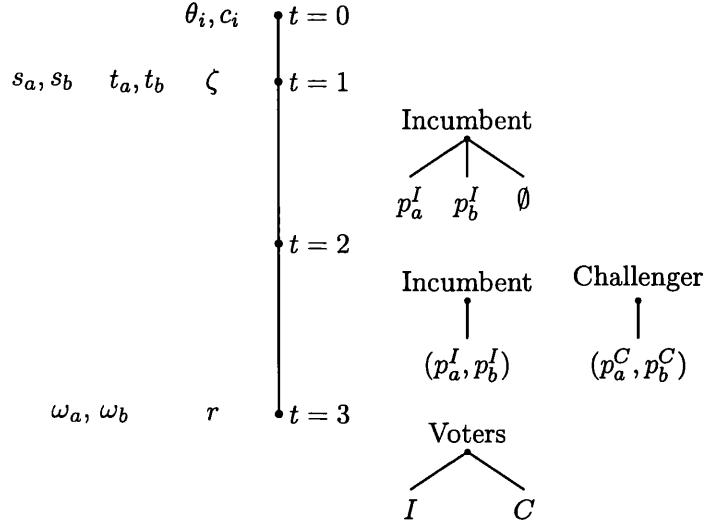


Figure 7: Timing

## 2.4 The simultaneous choice

In this section, we consider the optimal behaviour of the candidates when nothing is announced in the first period. In this case, competition is simultaneous in that both candidates announce their positions in the same period. Therefore we restrict the incumbent's strategy to be a vector of positions. The challenger and the incumbent are in a completely symmetric position, and the only aspect that distinguishes them is the precision of their signals.

Notice that the candidates can optimise their behaviour on each of the issues independently. Recall that voters know the state  $\omega_j$  when they cast their votes. The choice of the optimal strategy on  $a$  affects the probability of winning if the voter considers  $a$  as the relevant issue, and the choice of the strategy on  $b$  affects the probability of winning on  $b$ . Whenever nothing is said in the first period the two issues are fully independent, as the probability of the voter considering either of the issues is independent of the policies chosen by the candidates in the second period.

**Proposition 6** *If the incumbent chooses  $\emptyset$  in the first period, it is a dominant strategy for both candidates to follow their own signals in the second period.*

**Proof.** Let the incumbent  $I$  be the row player, and the challenger  $C$  the column player. The challenger has only four pure strategies: to play  $p_j^C = 1$  regardless of the signal, to play  $p_j^C = -1$  regardless of the signal, to follow his own signal on both issues, or to go against his own signal on both issues. For the incumbent, consider

the two possible choices of  $p_j^I = \{-1, 1\}$  when his signal on issue  $j$  is  $s_j = 1$ . The matrix below shows the incumbent's expected probability of winning given his signal and given the four pure strategies of the challenger.

$s_j = 1$		Challenger			
		$p_j^C = 1$	$p_j^C = -1$	$p_j^C = t_j$	$p_j^C = -t_j$
Incumbent	$p_j^I = 1$	$\frac{1}{2}$	$\gamma_j$	$\frac{1}{6} + \frac{\gamma_j}{2}$	$\frac{1}{3} + \frac{\gamma_j}{2}$
	$p_j^I = -1$	$1 - \gamma_j$	$\frac{1}{2}$	$\frac{2}{3} - \frac{\gamma_j}{2}$	$\frac{5}{6} - \frac{\gamma_j}{2}$

Table 1: Incumbent's expected probability of winning

For example the probability of winning when  $s_j = 1$  and both the incumbent and the challenger follow their signal is

$$\begin{aligned} & \Pr(t_j = 1 | \omega_j = 1) \Pr(\omega_j = 1 | s_j = 1) \frac{1}{2} + \Pr(t_j = -1 | \omega_j = 1) \Pr(\omega_j = 1 | s_j = 1) \\ & + \Pr(t_j = 1 | \omega_j = -1) \Pr(\omega_j = -1 | s_j = 1) \frac{1}{2} = \frac{1}{6} + \frac{\gamma_j}{2}. \end{aligned}$$

Given that  $\gamma_j > \frac{1}{2}$ , it can easily be seen that following his signal is optimal for the incumbent in this case. The reasoning can be generalised to  $s_j = -1$  and to the challenger's choice. ■

## 2.5 The sequential game

In the previous section we considered the optimal behaviour of the candidates when they both speak in the second period. We consider now the sequential game. The incumbent's advantage from taking a stand in the first period is related to the possibility of shaping the electoral debate by shifting the attention of the voters towards one specific issue. Without this effect, instead, the campaign game displays a first mover disadvantage, since whoever reveals his position earlier allows the opponent to infer his signal (or in a more general setting to infer something about his signal) and eliminates any possible information advantage. In order to develop the analysis of the sequential game we now begin with the challenger's optimal behaviour.

### 2.5.1 The challenger

The challenger only speaks in the second period. Therefore, in order to understand the differences between the simultaneous and the sequential case, we need to understand first the challenger's optimal response when he observes the incumbent's promise  $p_j^I$  in the first period.

Moreover, given the assumption on the correlated randomisation the challenger's statement in the second period does not affect the probability that the median voter is of a particular ideology. This is due to the fact that the nature of the median voter is decided simply on the base of what issue is more likely to be relevant.

**Proposition 7** *When the challenger observes  $p_j^I$  and believes that  $p_j^I = s_j$  his optimal promise in the second period is  $p_j^C = p_j^I$  if  $\gamma_j > \delta_j = \frac{2}{3}$  and  $p_j^C = t_j$  otherwise.*

**Proof.** Given that he does not affect which issue the election is decided upon, the challenger chooses his optimal promise on issue  $j$  in order to maximise the probability of winning in case the median voter is of ideological type  $\theta_j$ . This probability is equal to  $\frac{1}{2}$  if the challenger mimics the incumbent by setting  $p_j^C = p_j^I$ .

If  $t_j = p_j^I$  the challenger trivially sets  $p_j^C = t_j = p_j^I$  and wins with probability  $\frac{1}{2}$ . If  $t_j \neq p_j^I$  and the challenger does not mimic the incumbent, his probability of winning is

$$\Pr(\omega_j = t_j | t_j \neq s_j) = \frac{\delta_j(1 - \gamma_j)}{\delta_j(1 - \gamma_j) + \gamma_j(1 - \delta_j)} \left( = \frac{2(1 - \gamma_j)}{2 - \gamma_j} \right),$$

which is greater than  $\frac{1}{2}$  if  $\gamma_j > \delta_j = \frac{2}{3}$ . ■

### 2.5.2 The incumbent

For the incumbent promising  $p_j^I = s_j$  is always a weakly dominant strategy, even when the promise is made in the first period. We already showed this for the simultaneous announcements; the following proposition extends the results to the first period promises.

**Proposition 8** *It is a weakly dominant strategy for the incumbent to promise  $p_j^I = s_j$  even when speaking in the first period.*

**Proof.** There are two possible cases, depending on the challenger's behaviour:

- if the challenger mimics the incumbent, then the probability of winning on that issue is  $\frac{1}{2}$  regardless of what the incumbent promised;
- if there is a positive probability that the challenger does not mimic the incumbent, then promising  $p_j^I = s_j$  yields a strictly higher payoff, as shown in the simultaneous case.

■

Moreover, remember that there are cases in which the incumbent has a very constrained set of feasible actions. If  $\zeta \in \{a, b\}$  the incumbent is forced to act on the issue that is urgent. In that case, he will promise  $p_\zeta^I$  in the first and  $p_{-\zeta}^I$  in the second period.

To describe fully the incumbent's optimal strategy in the first period we need to know how observing a promise in the first period changes the voters' beliefs about the relevant issue. The updating is induced by the possibility that the relevant issue is urgent. Observing a promise on issue  $j$  in the first period has some informative value on its relevance.

Consider for example issue  $a$ . As we explained above, the prior probability that  $a$  is relevant for the voter is  $r \sim U[0, k]$ , with  $\frac{1}{2} < k < 1$ , where  $r$  is a public signal that is revealed just before the elections and represents the probability that issue  $a$  is relevant for the future government period. The prior probability that the voter believes that  $a$  is more likely to be relevant is  $\frac{2k-1}{2k} > 0$ . With  $z$  being the probability that the relevant issue is urgent and  $y$  the probability that  $a$  is spoken about in equilibrium, the posterior belief, via Bayes rule, becomes

$$\rho = \frac{(z + y(1 - z))r}{(z + y(1 - z))r + (1 - r)(1 - z)y}.$$

Given that we consider pure strategy equilibria (as the mixed strategy ones arise only for non-generic values of the parameters) we can focus on the case in which  $y = 1$ , so that the posterior becomes

$$\rho = \frac{r}{r + (1 - r)(1 - z)}.$$

If  $\rho$  is greater than  $\frac{1}{2}$  the median voter's ideological type is  $a$ , which occurs when  $r \geq \frac{(1-z)}{2-z}$ . Conversely, the median voter's ideological type is  $b$  when  $b$  is spoken about in equilibrium for  $r > \frac{1}{2-z}$ .

## 2.6 Equilibrium behaviour

With both the challenger's and the incumbent's incentives specified, we can now investigate which behaviour prevails in equilibrium.

**Proposition 9** *Given the challenger's optimal behaviour derived in Proposition 7, it is optimal for the incumbent in the first period to promise  $p_a^I = s_a$  if  $\gamma_a < \Xi$  and to wait until the second period otherwise, where the threshold  $\Xi = \frac{(4k - \frac{3}{2})(2-z) - (1-z)}{3(2k-1)(2-z)}$ .*

**Proof.** Given the almost uninformative signal on  $b$ , it is never optimal for the incumbent to promise something on this issue. The challenger never mimics what the incumbent says on  $b$ . Therefore the only effect of an early promise on  $b$  is to increase the probability that the median voter's ideological type is  $b$ , which lowers the incumbent's probability of winning. As a consequence, the only possible early announcement is  $p_a^I$ .

If we want to characterise the equilibrium, we can distinguish three different parametric regions:

1.  $\gamma_a < \frac{2}{3}$ . Due to the low signal precision, the challenger does not mimic the incumbent after a promise in the first period. As a consequence, the incumbent will always promise something on  $a$  in the first period and thus increase the probability that the median voter's type is  $a$ . This can be done at no cost,

because the challenger's behaviour does only depend on his signal not on the incumbent's announcement.

2.  $\frac{2}{3} < \gamma_a < \Xi$ . In this region the incumbent is better at issue  $a$  than the challenger, but he still decides to compromise his probability of winning on issue  $a$  in order to increase the probability that the median voter's type is effectively  $a$ . As a consequence, he announces  $p_a^I = s_a$  in the first period.
3.  $\gamma_a > \Xi$ . In this case the incumbent's specialisation is so strong that he would lose a significant advantage if he spoke in the first period and let the challenger mimic him. This is not counterweighted sufficiently by an increase of the probability that the median voter have ideology  $a$ . Therefore he does not announce any policy in the first period.

In fact when  $\gamma_a > \frac{2}{3}$  the incumbent's probability of winning if he announce his policy on  $a$  in the first period is

$$\frac{k(2-z) - (1-z)}{k(2-z)} \frac{1}{2} + \frac{1-z}{k(2-z)} \frac{5}{12},$$

while his probability of winning if he does not announce his policy on  $a$  in the first period is

$$\frac{2k-1}{2k} \left( \frac{1}{6} + \frac{\gamma_a}{2} \right) + \frac{1}{2k} \frac{5}{12}.$$

By comparing the two expressions we can show that  $\Xi = \frac{(4k-\frac{3}{2})(2-z)-(1-z)}{3(2k-1)(2-z)}$ .

Notice that  $\Xi > \frac{2}{3}$ , while  $\Xi < 1$  whenever  $k > \frac{4-z}{4(2-z)} > \frac{1}{2}$ .

■

To summarise, the characterisation of the equilibrium, depending on the parametric value of  $\gamma_j$  is represented in Figure 8.

Incumbent	$\begin{cases} A \\ p_a^I = s_a \\ p_b^I = s_b \end{cases}$	$\begin{cases} A \\ p_a^I = s_a \\ p_b^I = s_b \end{cases}$	$\begin{cases} \emptyset \\ p_a^I = s_a \\ p_b^I = s_b \end{cases}$
Challenger	$\begin{cases} p_a^C = t_a \\ p_b^C = t_b \end{cases}$	$\begin{cases} p_a^C = p_a^I \\ p_b^C = t_b \end{cases}$	$\begin{cases} p_a^C = t_a \\ p_b^C = t_b \end{cases}$
	$\frac{1}{2}$	$\frac{2}{3}$	$\Xi$
	$\gamma_a$		

Figure 8: Equilibrium behaviour

We can see that the incumbent's is less likely to influence the electorate when  $\gamma_a$  is high. This is due to the fact that speaking in the first period reveals useful information to the challenger. In the middle column, the challenger already makes use of that information when it is informative enough. At some point it becomes too precious to give away freely, so that the incumbent stays silent in the first period.

Notice that the threshold  $\Xi$  is decreasing in  $k$ . An increase in  $k$  increases the ex ante probability of  $a$  being the relevant issue, and therefore increases the importance of the loss of advantage on issue  $a$  due to the early announcement.

## 2.7 Unknown specialisation

So far we have assumed that the incumbent's specialisation is common knowledge. Further insights can be obtained by relaxing this assumption such that the specialisation of the incumbent is known but the extent of the specialisation,  $\gamma_a$ , is a random variable whose realisation is not known.<sup>21</sup> We assume that  $\gamma_a$  is distributed according to a continuous density function  $f(\gamma_a)$  with support  $[\frac{1}{2} + \varepsilon, 1]$ , so that it is never the case that the incumbent is more competent on issue  $b$  than on issue  $a$ . We maintain common knowledge of the fact that  $\gamma_b = \frac{1}{2} + \varepsilon$ . Now the incumbent's action provides information about his precision on either issue and the equilibrium behaviour depends on the expected  $E(\gamma_a)$  as well as  $\gamma_a$ .

**Proposition 10** *If  $E(\gamma_a) < \frac{2}{3}$  ( $= \delta_a$ ) the equilibrium of the sequential game with incomplete information on  $\gamma_a$  has the incumbent announcing  $p_a^I = s_a$  in the first period for every value of  $\gamma_a$ , and  $p_b^I = s_b$  in the second period, and the challenger announcing  $p_j^C = t_j$  in the second period,  $j = a, b$ .*

**Proof.** Assume that the challenger mimics the incumbent if he speaks in the first period, and suppose that in equilibrium it is optimal for the incumbent to speak on  $a$  for some type  $\bar{\gamma}_a$ . In this case it is optimal for him to speak also for any  $\gamma_a < \bar{\gamma}_a$ . In fact, the incumbent finds optimal to speak on  $a$  in the first period if

$$\frac{k(2-z) - (1-z)}{k(2-z)} \frac{1}{2} + \frac{1-z}{k(2-z)} \frac{5}{12}$$

is greater than

$$\frac{2k-1}{2k} \left( \frac{1}{6} + \frac{\gamma_a}{2} \right) + \frac{1}{2k} \frac{5}{12}.$$

Given that the difference between the two is decreasing in  $\gamma_a$ , if the inequality holds for  $\bar{\gamma}_a$  it holds also for every  $\gamma_a < \bar{\gamma}_a$ . Therefore, if the unconditional expected value of  $\gamma_a$  is smaller than  $\frac{2}{3}$  the challenger will never mimic the incumbent because the expected precision of the incumbent given that he speaks in the first period will never

<sup>21</sup>Another way of introducing incomplete information is to maintain common knowledge about the extent of the specialisation,  $\gamma_j \in \{\frac{1}{2}, \bar{\gamma}\}$  and  $\gamma_a \neq \gamma_b$ , but to assume private knowledge about the issue on which the incumbent is specialised.

be greater than  $\frac{2}{3}$ , given that  $E(\gamma_a) < \frac{2}{3}$ . As a consequence, promising  $s_a$  in the first period will always be optimal for the incumbent, since it will induce a gain in the probability of the median voter being of ideological type  $a$  without any loss in terms of probability of winning on issue  $a$ . ■

The actions are comparable to the case of complete information with  $\gamma_a < \frac{2}{3}$ , only that the incumbent's action now does not change with the true  $\gamma_a$ .

**Proposition 11** *If  $E(\gamma_a|\gamma_a < \Xi) > \frac{2}{3}$  in equilibrium the incumbent announces  $p_a^I = s_a$  in the first period if and only if  $\gamma_a < \Xi$ ; in this case the challenger mimicks him on  $a$ . (Otherwise, he is silent in the first period and the challenger follows his signals.)*

Like in the complete information case,  $\Xi = \frac{(4k-\frac{3}{2})(2-z)-(1-z)}{3(2k-1)(2-z)}$  is the threshold where the incumbent's behaviour switches from speaking in period 1 and being mimicked to not speaking in period 1.

**Proof.** Let's start noticing that the incumbent will speak in the first period for any  $\gamma_a < \Xi$ . As we proved in proposition 4, it is always the case that the incumbent promises  $p_a^I = s_a$  in the first period when  $\gamma_a < \Xi$ . Given this incumbent's behaviour, and the fact that  $E(\gamma_a|\gamma_a < \Xi) > \frac{2}{3}$ , moreover, the challenger will always mimic the incumbent, when  $p_a^I$  is promised in the first period. As a consequence, the incumbent will wait until the second period whenever  $\gamma_a > \Xi$ . ■

**Proposition 12** *If  $E(\gamma_a|\gamma_a < \Xi) < \frac{2}{3}$  and  $E(\gamma_a) > \frac{2}{3}$ , in equilibrium the incumbent announces  $p_a^I = s_a$  in the first period if and only if  $\gamma_a < \Xi'$ , where  $\Xi' > \Xi$  is such that  $E(\gamma_a|\gamma_a < \Xi') = \frac{2}{3}$ . The challenger mimics the incumbent with probability  $\beta$  such that the incumbent is indifferent between speaking in the first and in the second period when  $\gamma_a = \Xi'$ .*

In this intermediate region, the challenger mixes between mimicking the incumbent and following his own signal.

**Proof.** We analyse the situation by considering the challenger's possible strategies, and the incumbent's best responses to them:

- if the challenger never mimics the incumbent when he makes a promise on  $a$  in the first period, the incumbent announces  $p_a^I = s_a$  in the first period for any value of  $\gamma_a$ ; however, in this case, it is optimal for the challenger to mimic the incumbent, given that  $E(\gamma_a) > \frac{2}{3}$ .
- if the challenger always mimics the incumbent when he makes a promise on  $a$  in the first period, the incumbent announces  $p_a^I = s_a$  in the first period for any  $\gamma_a < \Xi$ ; in this case, however, the challenger has no incentive to mimic the incumbent, given that the expected precision of the incumbent signal is  $E(\gamma_a|\gamma_a < \Xi) < \frac{2}{3}$ .

- if the challenger mimics the incumbent with probability  $0 < \beta < 1$ , the incumbent has an incentive to promise  $p_a^I = s_a$  as long as the incumbent's probability of winning by announcing  $p_a^I = s_a$  in the first period,

$$\frac{k(2-z) - (1-z)}{k(2-z)} \left( \beta \frac{1}{2} + (1-\beta) \left( \frac{1}{6} + \frac{\gamma_a}{2} \right) \right) + \frac{1-z}{k(2-z)} \frac{5}{12},$$

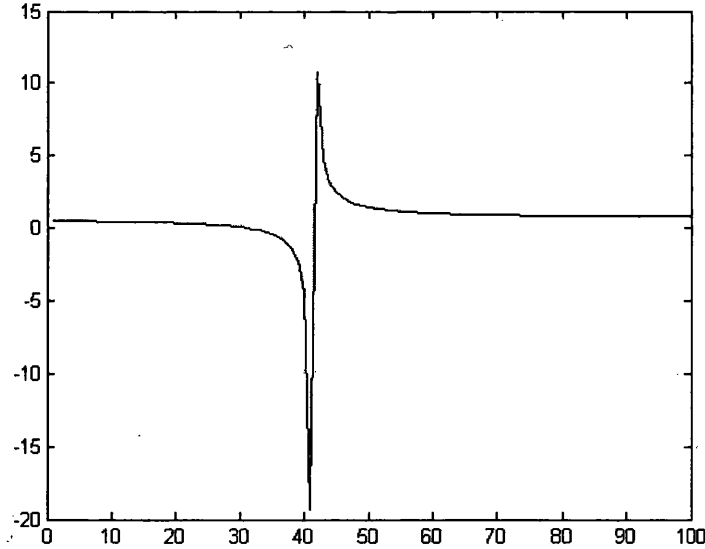
is greater than his probability of winning by being silent in the first period is

$$\frac{2k-1}{2k} \left( \frac{1}{6} + \frac{\gamma_a}{2} \right) + \frac{1}{2k} \frac{5}{12}.$$

Equating the two gives us  $\Xi(\beta) = \frac{(2k\beta - \frac{3}{4})(2-z) + (\frac{3}{2} - 2\beta)(1-z)}{3(1-\beta)(1-z) + 3(\beta k - \frac{1}{2})(2-z)}$ . It can be noticed that

- $\Xi(\beta) = \Xi$  when  $\beta = 1$ ;
- $\Xi(\beta) = \frac{1}{2}$  when  $\beta = 0$ ;
- $\Xi(\beta)$  is decreasing in  $\beta$ ;
- $\Xi(\beta)$  has a discontinuity at  $\beta = \frac{z}{2(2k-1+z-zk)}$ .

Figure 9 shows  $\Xi(\beta)$  for a specific value of  $k$  and  $z$ , but the shape of the function remains the same across parameters.



(a)  $k = 0.75$  and  $z = 0.5$

Figure 9:  $\Xi(\beta)$ .



Therefore the incumbent finds optimal to speak in the first period if:

$$\begin{cases} \gamma_a \leq \Xi(\beta) & \text{and } \beta > \frac{z}{2(2k-1+z-zk)} \\ \gamma_a > \Xi(\beta) & \text{and } \beta < \frac{z}{2(2k-1+z-zk)}. \end{cases}$$

Notice that if  $\beta < \frac{z}{2(2k-1+z-zk)}$  the incumbent finds optimal to speak in the first period for any  $\gamma_a$ , given that  $\Xi(\beta) \leq \frac{1}{2}$ .<sup>22</sup> Moreover if  $\frac{z}{2(2k-1+z-zk)} < \beta < \frac{3z}{2k-1+z-zk}$ ,  $\Xi(\beta) > 1$ , and therefore the incumbent optimally speaks in the first period for any  $\gamma_a$ . Therefore the incumbent optimally speaks in the first period if:

$$\begin{cases} \beta > \frac{3z}{2k-1+z-zk} & \text{and } \gamma_a \leq \Xi(\beta) \\ \beta \leq \frac{3z}{2k-1+z-zk}. \end{cases}$$

Given that  $E(\gamma_a) > \frac{2}{3}$  by assumption, we will never have an equilibrium where  $\beta \leq \frac{3z}{2k-1+z-zk}$ , because in this parametric region the incumbent speaks in the first period for every  $\gamma_a$  and the challenger finds strictly optimal to mimic him with probability 1. The equilibrium will then be found where  $\beta > \frac{3z}{2k-1+z-zk}$ .

In this region, for a given  $\Xi(\beta)$  it is optimal for the challenger to randomise with probability  $\beta$  if and only if  $E(\gamma_a | \gamma_a < \Xi(\beta)) = \frac{2}{3}$ , so that the challenger is indifferent between mimicking and not mimicking the incumbent. Given that  $E(\gamma_a | \gamma_a < \Xi(\beta))$  is continuous<sup>23</sup> and increasing in  $\Xi(\beta)$ , and given that  $E(\gamma_a | \gamma_a < \Xi(1)) < \frac{2}{3}$ , and  $E(\gamma_a | \gamma_a < \Xi(\frac{3z}{2k-1+z-zk})) > \frac{2}{3}$ , there exist only one  $\beta \in (\frac{3z}{2k-1+z-zk}, 1)$  such that  $E(\gamma_a | \gamma_a < \Xi(\beta)) = \frac{2}{3}$ .

Therefore the unique equilibrium in this case is the one in which the incumbent promises  $p_a^I = s_a$  in the first period if for any  $\gamma_a < \Xi'$ , such that  $E(\gamma_a | \gamma_a < \Xi') = \frac{2}{3}$ , and the challenger mimics him with probability  $\beta = \Xi^{-1}(\frac{2}{3})$ .

■

## 2.8 An example

Let's consider a distributional example of this case. Assume that  $\gamma_a$  is distributed according to a uniform distribution over  $[0, \Gamma]$ . The three equilibria described above become:

1. For  $\Gamma < \frac{5}{6}$  it is the case that  $E(\gamma_a) < \frac{2}{3}$  therefore the equilibrium is the one described in proposition 10;
2. For  $\Gamma > \frac{5}{6}$  and  $k < \frac{1}{2-z}$  it is the case that  $E(\gamma_a | \gamma_a < \Xi) > \frac{2}{3}$ , given that  $\Xi > \frac{5}{6}$ ; in this case the equilibrium behaviour is the one described in proposition 11;

<sup>22</sup>This comes from the fact that  $\Xi(\beta)$  is decreasing in  $\beta$ , and that  $\Xi(0) = \frac{1}{2}$ .

<sup>23</sup>This is implied by  $f(\gamma_a)$  being a continuous density function.

3. Finally, for  $\Gamma > \frac{5}{6}$  and  $k > \frac{1}{2-z}$  we have a mixed strategy equilibrium in which the incumbent announces  $p_a^I = s_a$  in the first period if  $\gamma_a \leq \frac{5}{6}$ . The challenger mimics him with probability  $\beta = \frac{z}{k(2-z)-(1-z)}$  that leaves the incumbent indifferent if he has  $\gamma_a = \frac{5}{6}$ .

## 2.9 Political competence and the welfare of voters

We now look at the welfare of the voters and want to understand the likelihood of electing a candidate who implements the correct policy on one or both issues. The problem is now how to weight the two issues, considering that one is relevant and the other is not. If we weight them equally, there is only one possible distortion, which comes from the challenger mimicking the incumbent when he speaks early, and therefore losing the information contained in his signal  $t_a$ . If we consider instead the case in which the welfare of the voters depends on the probability of electing a candidate who implements the correct policy on the relevant issue, the voters' expected welfare depends on the probability that at least one of the two candidates proposes a policy that is equal to the true state of the world, and on the probability of voting on the relevant issue. In the latter case an extra distortion is related to the way in which the action of the incumbent affects the probability that the median voter's ideological type is the same as the relevant issue.

We chose the latter since a voter with ideological type  $\theta_a$  will vote only if the probability that issue  $a$  is relevant is greater than a certain threshold value, which can be interpreted as a cost. Therefore it seems reasonable that the relevant issue should have a higher weight in the voter's welfare function.

In the simultaneous (benchmark) case, when the incumbent only speaks in the first period if the issue is urgent, the expected probability of voting the correct policy on the relevant issue is:

$$\begin{aligned} & z \{ E(r) (1 - (1 - \gamma_a)(1 - \delta_a)) + E(1 - r) (1 - (1 - \gamma_b)(1 - \delta_b)) \} \\ & + (1 - z) \left\{ \Pr \left( r > \frac{1}{2} \right) \left[ E \left( r | r > \frac{1}{2} \right) (1 - (1 - \gamma_a)(1 - \delta_a)) \right. \right. \\ & + E \left( 1 - r | r > \frac{1}{2} \right) \left( \frac{1 + \gamma_a - \delta_a}{2} \gamma_b + \frac{1 - \gamma_a + \delta_a}{2} \delta_b \right) \left. \right] \\ & + \Pr \left( r < \frac{1}{2} \right) \left[ E \left( (1 - r) | r < \frac{1}{2} \right) (1 - (1 - \gamma_b)(1 - \delta_b)) \right. \\ & \left. \left. + E \left( r | r < \frac{1}{2} \right) \left( \frac{1 + \gamma_b - \delta_b}{2} \gamma_a + \frac{1 - \gamma_b + \delta_b}{2} \delta_a \right) \right] \right\}. \end{aligned}$$

In fact, with probability  $z$  the issue is urgent and the incumbent is forced to act in the first period. The voters recognise that the issue must be urgent (and relevant) and only those interested in that issue vote. With probability  $1 - z$  the issue is not relevant. In this case the voters' behaviour depends on the realisation of the public signal  $r$ . If  $r > \frac{1}{2}$  the median voter's ideological type will be  $\theta_a$ ; the median voter will be able to choose a candidate with the correct proposed policy with probability

$1 - (1 - \gamma_a)(1 - \delta_a)$ . Therefore the candidate that will be elected is the one who offers the best policy on  $a$ . With probability  $(1 - r)$ , however, the relevant issue is  $b$ . If the incumbent is elected (which happens with probability  $\frac{1 + \gamma_a - \delta_a}{2}$ ) the probability of having the correct policy on  $b$  is  $\gamma_b$ ; if the challenger is elected (with probability  $\frac{1 - \gamma_a + \delta_a}{2}$ ) the probability of having a correct policy on  $b$  is  $\delta_b$ . If  $r < \frac{1}{2}$  the median voter has ideological type  $\theta_b$  and the probability of voting for the correct policy is symmetric.

Notice that in the benchmark case the probability that the incumbent is elected when the median voter's ideological type is  $\theta_a$  is increasing in  $\gamma_a$ . This implies that a high specialisation lowers the probability of a correct policy on  $b$  if  $b$  is relevant when  $r > \frac{1}{2}$ . Even in the benchmark case, therefore, it is not always the case that the candidate who proposes the best policy on the relevant issue is elected.

There are three possible distortions that can reduce the citizens' welfare. First, if the incumbent makes promises in the first period, he distorts the perception of which issue is most likely to be relevant. If, as a consequence of this, the voters switch from considering one issue to considering the other one, their welfare is negatively affected.

Second, by promising something in the first period even when the issue is not urgent, he does not allow the voters to always recognise the urgency of the issues, and prevents them to have the best information for voting.

The third effect is related to the possibility that the challenger mimics the incumbent. If this is the case, the probability that the voters find a candidate who promises a policy equal to the state of the world is diminished, given that the challenger probably does not use the information contained in his signal.

There is however also a positive effect in this case: by having the challenger mimicking the incumbent, the probability that the incumbent is elected when the voters vote on issue  $a$  decreases, and therefore the probability of having a candidate who implements the correct policy on  $b$  increases.

### 2.9.1 The complete information case

In the complete information case the welfare associated to the different equilibria is as follows:

1. when  $\gamma_a > \Xi$ , the equilibrium has only one distortion, compared to the simultaneous case: if the relevant issue is  $a$ , and this issue is urgent, the incumbent is forced to act on it; in this case the challenger mimics him on  $a$ , given the incumbent's high competence on the issue, and the probability of having the correct policy on  $a$  becomes  $\gamma_a$  instead of  $1 - (1 - \gamma_a)(1 - \delta_a)$ . Therefore the citizens' welfare is:

$$\begin{aligned}
& z \{E(r)\gamma_a + E(1-r)(1 - (1 - \gamma_b)(1 - \delta_b))\} \\
& + (1-z) \left\{ \Pr\left(r > \frac{1}{2}\right) \left[ E\left(r \mid r > \frac{1}{2}\right) (1 - (1 - \gamma_a)(1 - \delta_a)) \right. \right. \\
& \left. \left. + E\left(1 - r \mid r > \frac{1}{2}\right) \left( \frac{1 + \gamma_a - \delta_a}{2} \gamma_b + \frac{1 - \gamma_a + \delta_a}{2} \delta_b \right) \right] \right. \\
& \left. + \Pr\left(r < \frac{1}{2}\right) \left[ E\left((1-r) \mid r < \frac{1}{2}\right) (1 - (1 - \gamma_b)(1 - \delta_b)) \right. \right. \\
& \left. \left. + E\left(r \mid r < \frac{1}{2}\right) \left( \frac{1 + \gamma_b - \delta_b}{2} \gamma_a + \frac{1 - \gamma_b + \delta_b}{2} \delta_a \right) \right] \right\}.
\end{aligned}$$

2. when  $\gamma_a < \frac{2}{3}$ , the two distortions are the distorted probability distribution over the relevance of the issues, and the impossibility of recognising that  $a$  is urgent when it is; notice that if  $b$  is urgent it is recognised as such, given that it is not an equilibrium behaviour for the incumbent to speak on  $b$  when it is not urgent. As a consequence the expected welfare becomes:

$$\begin{aligned}
& z \{E(1-r)(1 - (1 - \gamma_b)(1 - \delta_b))\} \\
& + (1-z + z \cdot E(r)) \left\{ \Pr\left(r > \frac{1}{2}\right) \left[ E\left(r \mid r > \frac{1}{2}\right) [1 - (1 - \gamma_a)(1 - \delta_a)] \right. \right. \\
& \left. \left. + E\left(1 - r \mid r > \frac{1}{2}\right) \left( \frac{1 + \gamma_a - \delta_a}{2} \gamma_b + \frac{1 - \gamma_a + \delta_a}{2} \delta_b \right) \right] \right. \\
& \left. + \Pr\left(\frac{1-z}{2-z} < r \leq \frac{1}{2}\right) \left[ E\left(r \mid \frac{1-z}{2-z} < r \leq \frac{1}{2}\right) [1 - (1 - \gamma_a)(1 - \delta_a)] \right. \right. \\
& \left. \left. + E\left(1 - r \mid \frac{1-z}{2-z} < r \leq \frac{1}{2}\right) \left( \frac{1 + \gamma_a - \delta_a}{2} \gamma_b + \frac{1 - \gamma_a + \delta_a}{2} \delta_b \right) \right] \right. \\
& \left. + \Pr\left(r \leq \frac{1-z}{2-z}\right) \left[ E\left(1 - r \mid r \leq \frac{1-z}{2-z}\right) [1 - (1 - \gamma_b)(1 - \delta_b)] \right. \right. \\
& \left. \left. + E\left(r \mid r \leq \frac{1-z}{2-z}\right) \left( \frac{1 + \gamma_b - \delta_b}{2} \gamma_a + \frac{1 - \gamma_b + \delta_b}{2} \delta_a \right) \right] \right\}
\end{aligned}$$

The first difference here is that voters recognise the issue as urgent only if the urgent issue is  $b$ . The second difference is that for values of  $r$  between  $\frac{1-z}{2-z}$  and  $\frac{1}{2}$  the median voter's ideological type is  $a$ , despite  $b$  being the more likely relevant issue.

3. when  $\frac{2}{3} < \gamma_a < \Xi$ , both distortions are present. In this case the expected welfare becomes:

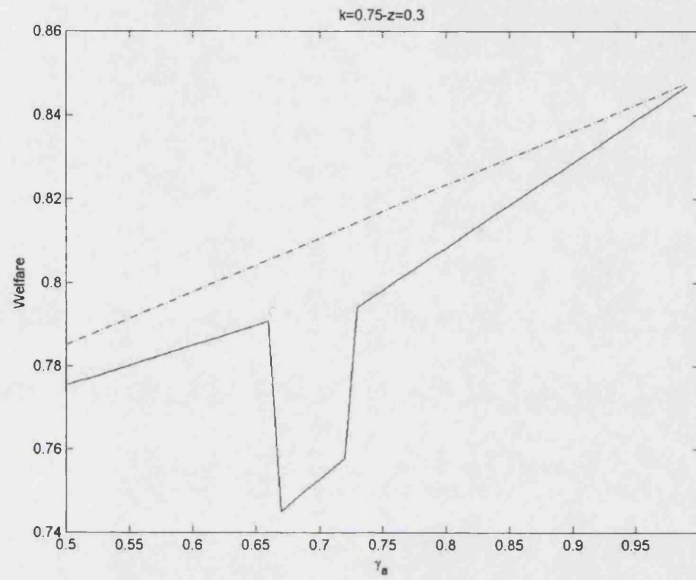
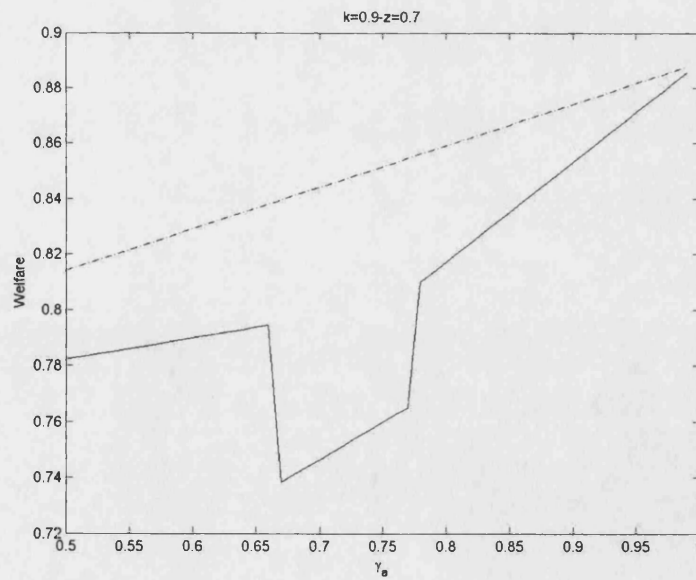
$$\begin{aligned}
& z \{E(1-r)(1 - (1 - \gamma_b)(1 - \delta_b))\} \\
& + (1-z + z \cdot E(r)) \left\{ \Pr\left(r > \frac{1}{2}\right) \left[ E(r \mid r > \frac{1}{2}) [\gamma_a] + E(1-r \mid r > \frac{1}{2}) \frac{\gamma_b + \delta_b}{2} \right] \right. \\
& \left. + \Pr\left(\frac{1-z}{2-z} < r \leq \frac{1}{2}\right) \left[ E(r \mid \frac{1-z}{2-z} < r \leq \frac{1}{2}) [\gamma_a] + E(1-r \mid \frac{1-z}{2-z} < r \leq \frac{1}{2}) \frac{\gamma_b + \delta_b}{2} \right] \right. \\
& \left. + \Pr\left(r \leq \frac{1-z}{2-z}\right) \left[ E(1-r \mid r \leq \frac{1-z}{2-z}) [1 - (1 - \gamma_b)(1 - \delta_b)] + E(r \mid r \leq \frac{1-z}{2-z}) \frac{\gamma_a + \delta_a}{2} \right] \right\}
\end{aligned}$$

Now the probability that either of the candidates promises the correct policy

on  $a$  is  $\gamma_a$  instead of  $1 - (1 - \gamma_a)(1 - \delta_a)$ , given that the challenger mimics the incumbent on  $a$ , and therefore the informational content of  $t_a$  is lost. However, in this case, the probability that the incumbent is elected when the median voter's ideological type is  $\theta_a$  is lowered, and therefore the probability that the voters elect a candidate who implements the correct policy on  $b$  is higher.

As it is shown in Figure 9, due to these distortions, the welfare is non monotonic in  $\gamma_a$ . The recurrent pattern of non-monotonicity is the following:

- in each region the voters' welfare is increasing in  $\gamma_a$ ;
- the highest welfare is attained in the region with high  $\gamma_a$ , the intermediate level of welfare is attained in the region with low  $\gamma_a$ , and the intermediate region of  $\gamma_a$  is characterized by the lowest level of voters' welfare.

(a)  $k = 0.75$  and  $z = 0.3$ (b)  $k = 0.9$  and  $z = 0.7$ Figure 10: Welfare as a function of the precision  $\gamma_a$ . The dotted line is the benchmark.

## 2.10 The unknown specialisation case

In the unknown specialisation case considered in section 2.7, the type of equilibrium implemented depends on the distribution of  $\gamma_a$  and not on its specific realisation. In this case the voters' welfare is indeed increasing in  $\gamma_a$  but is non-monotonic in  $E(\gamma_a)$ .

If  $E(\gamma_a) < \frac{2}{3}$ , the only distortion is the one related to the perceived probability that issue  $a$  is relevant. In this case, no matter what  $\gamma_a$  is, the incumbent promises  $p_a^I$  in the first period.

If  $E(\gamma_a) > \frac{2}{3}$ , instead, all the distortions are potentially present. First of all, if the incumbent speaks in the first period he is mimicked by the challenger with positive probability (either 1 or  $\beta$  depending on the value of  $E(\gamma_a | \gamma_a < \Xi)$ ). Second, as before, if the incumbent speaks in the first period he influences the perceived probability of relevance of issue  $a$ . Moreover, given that the incumbent speaks on  $a$  in the first period with positive probability even when  $a$  is not relevant, the voters are not able to recognize the urgency of  $a$ .

However, for a given distribution, the voters' welfare is increasing in  $\gamma_a$ .

## 2.11 Discussion and possible extensions

We made strong assumptions on the behaviour and the information of the agents to keep the model simple. The following are two natural directions in which the model can be extended.

### 2.11.1 A wider state space

In the basic model, both candidates could only take one of two positions on both issues. One natural extension is to allow for an intermediate position which can be thought of as maintaining the status quo on the issue at hand. The state space would then be  $\{-1, 0, 1\}$ .

The consequence of such a change is that sometimes candidates 'play safe' and do not take a firm stand, but rather announce the status quo. Moreover, one can show that there are situations in which the incumbent prefers to announce the status quo on his weak issue than following the signal on the issue he is specialised in. This happens when his signal on the issue of specialisation is very weak and it favours a change from the status quo. In this case it might be more profitable for the incumbent to attract attention to his weak issue by committing to the status quo policy on the weak issue rather than attracting attention to the issue he is better at. This is due to the fact that his knowledge of the state of the world on the issue of specialisation is not sufficiently strong to convince him to take a stand against the status quo, but it is in any case a signal of a possible change of the state.

### 2.11.2 Political debates

The trade-off between waiting to gather better information and speaking early to influence the focus of the campaign described in our paper does not only appear in election campaign, but also in everyday political debates. In US-American debate about off-shore oil drilling, new information on the risks of a preferred option was revealed after a positioning by President Obama.

“On March 31, 2010, President Obama proposed to open vast expanses of American coastlines to oil and natural gas drilling, much of it for the first time, in an apparent bid to win political support for energy and climate legislation. But that idea – which prompted distress among environmentalists and tepid support from Republicans – was sharply set back by the massive oil slick created in the Gulf of Mexico in April after a drilling rig exploded and sank off the Louisiana coast. [...] Mr. Obama ordered a freeze on new offshore drilling leases until a review of the oil rig accident could be concluded, and new safeguards put in place.” (NY Times, 14 May, 2010)

An opposite example can be found in the way German chancellor Angela Merkel behaves in political discussions. The so-called ‘Merkel method’ was described in a recent portrait as follows: “She recognizes questions early and answers very late. [...] It is this late and precise nature of her actions, which pushes others towards irrational activities, acting too early and imprecise. [...] Unafraid of phases of chaos she observes the work of collective intelligence, lets discourses mature, composed and nearly without command. She hopes that the chaos will bear an order that performs better than anything that had been in the heads of individual debaters. And the citizens shall chafe at reality, not at her.” (Die Zeit online, 9 April, 2010) The flipside of this behaviour is a lack of profile and leadership that is often criticised. “To use a phrase from Christian Wulff [a fellow Christian democrat and current German president], Angela Merkel leads ‘the herd from behind’. Often she cannot be seen behind the herd and offers few references and little superstructure for her politics. [...] It is questionable whether she works enough on developing new structures and uncovering new horizons.” New horizons for the US energy policy was exactly what Obama worked on at the end of March.

Neither of the two examples was set in a specific election campaign context. While we expect our model’s predictions to be most pertinent in situations of election campaigning, we believe that it also captures features of regular political debates outside a specific election campaign.

Within one term, many small debates might occur sequentially in each of which politicians face the choice between pushing one issue early on and waiting for more information. The successes in individual debates possibly adds up to the election outcome at the end of the term. In this case, we can think of the election outcome in our model as the evaluation of one debate, which is relevant to the politician since it contributes to his overall probability of being elected into office.



To model the idea of interlinked sequential debates, we will need to expand our model to multiperiod interaction. By analysing the time at which announcements are made one can possibly see whether debates are following a specific pattern of activity, as was discussed in Bar-Isaac (2008).

Furthermore, introducing the arrival of new issues that compete for space on the agenda could model different debates that follow each other. Such a model would endogenise the length of a particular debate and give insights in the dynamics of political discussion, complementing the discussion of Levy and Razin (2009, 2010).

## 2.12 Conclusion

In this paper we modeled the trade-off that the candidates experience in political debates between speaking early in order to influence the political agenda, and waiting for information about the opponent's position or further information about the state of the world in order to make informed decisions.

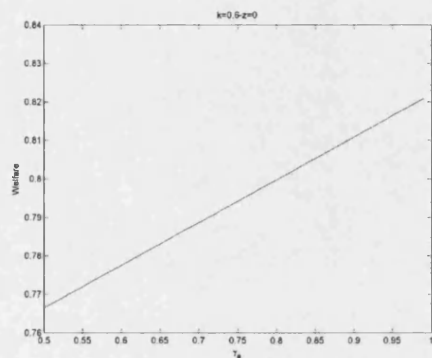
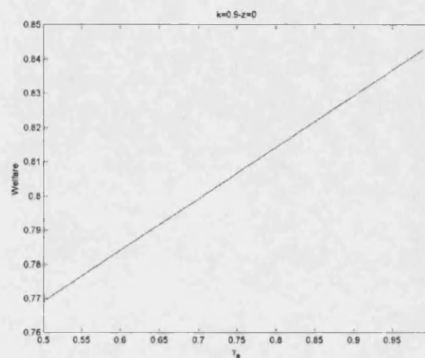
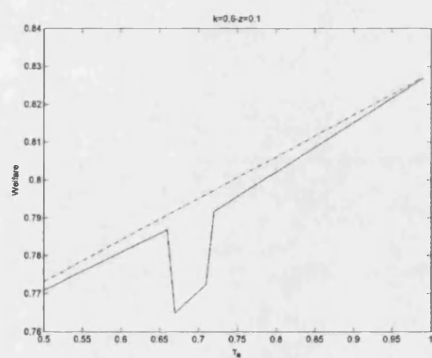
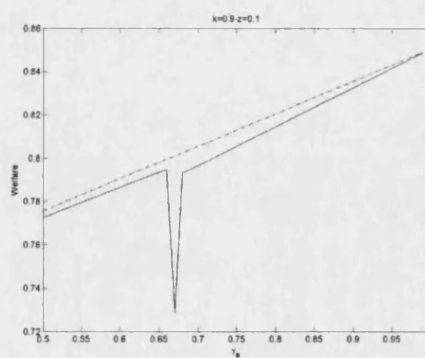
In doing so, we assumed two asymmetries between the candidates; first, the incumbent's promises have more information value than the challenger ones, and as a consequence only the incumbent has the possibility of shaping the debate. Moreover, while the incumbent is specialised on one of the issues, the challenger's signals have the same precision, regardless of the issue. We analysed under which circumstances the incumbent uses his information to shape the political discussion. So far we have three sets of results.

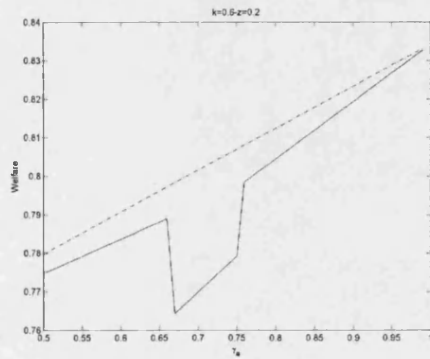
First, we show that the challenger has an incentive to mimic the incumbent when his signal is more informative than his own.

Second, we show that the incumbent does not always have the incentives to influence the debate. If his signal is very informative, he refrains from giving his opponent the possibility of copying his policy. It is then more advantageous not to increase the perceived relevance, but to rely on the strong signal on the specialised issue.

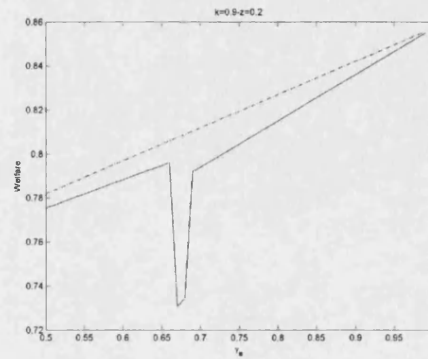
Finally, we look at the welfare implication of this behaviour. We show that the welfare of voters is not increasing in the degree of the incumbent's specialisation, and that it may be better to have a candidate that is absolutely not competent on both issues, than a candidate who is (partially) competent only on one of them.

## A Appendix

(a)  $k = 0.6$ (b)  $k = 0.9$ Figure 11: Welfare as a function of the precision  $\gamma_a$ ,  $z = 0$ .(a)  $k = 0.6$ (b)  $k = 0.9$ Figure 12: Welfare as a function of the precision  $\gamma_a$ ,  $z = 0.1$ .

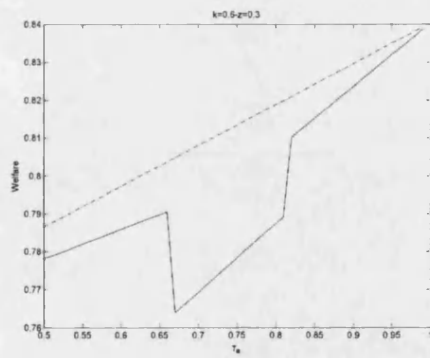


(a)  $k = 0.6$

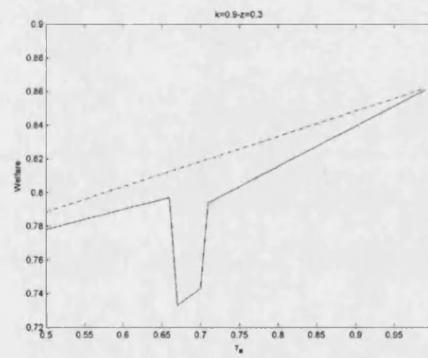


(b)  $k = 0.9$

Figure 13: Welfare as a function of the precision  $\gamma_a$ ,  $z = 0.2$ .

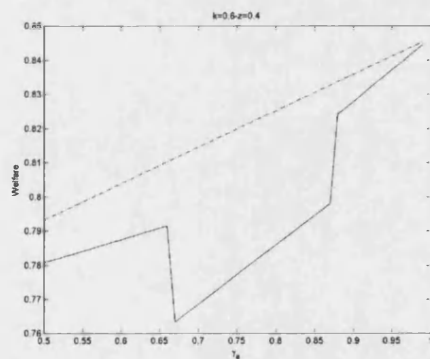


(a)  $k = 0.6$

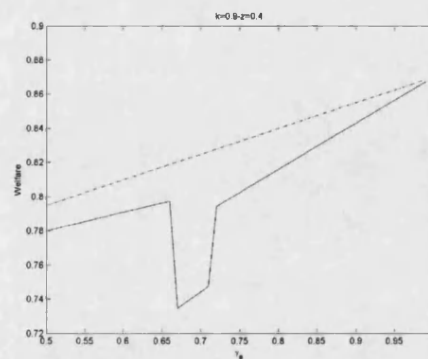


(b)  $k = 0.9$

Figure 14: Welfare as a function of the precision  $\gamma_a$ ,  $z = 0.3$ .

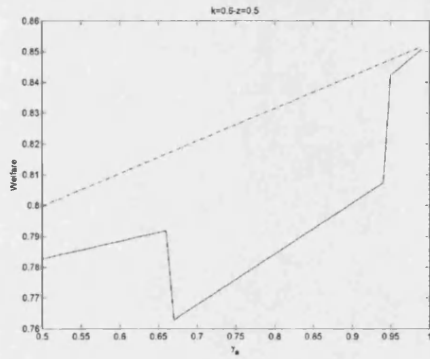


(a)  $k = 0.6$

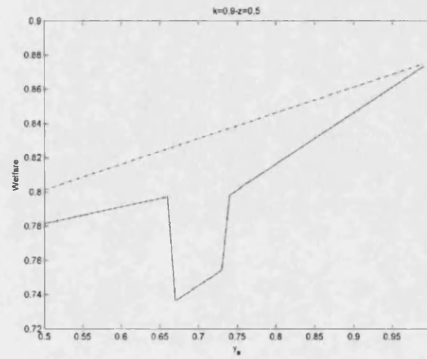


(b)  $k = 0.9$

Figure 15: Welfare as a function of the precision  $\gamma_a$ ,  $z = 0.4$ .

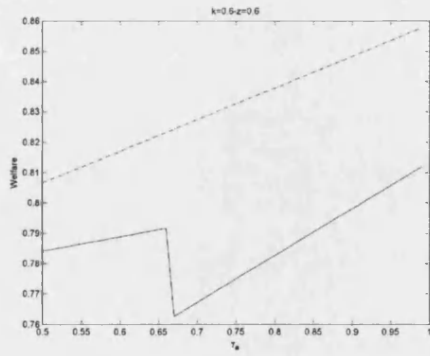


(a)  $k = 0.6$

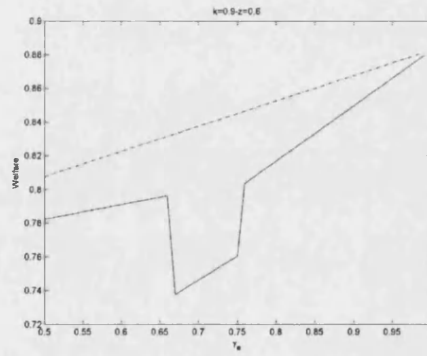


(b)  $k = 0.9$

Figure 16: Welfare as a function of the precision  $\gamma_a$ ,  $z = 0.5$ .

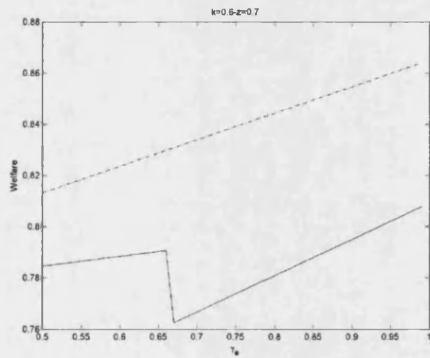


(a)  $k = 0.6$

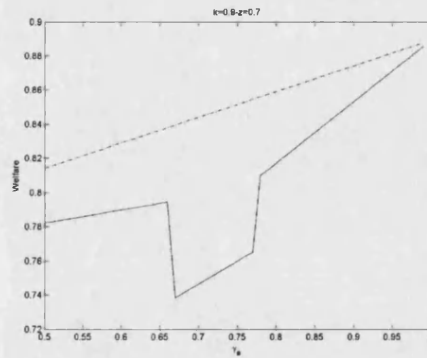


(b)  $k = 0.9$

Figure 17: Welfare as a function of the precision  $\gamma_a$ ,  $z = 0.6$ .

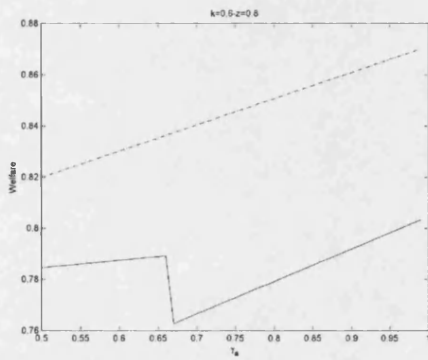


(a)  $k = 0.6$

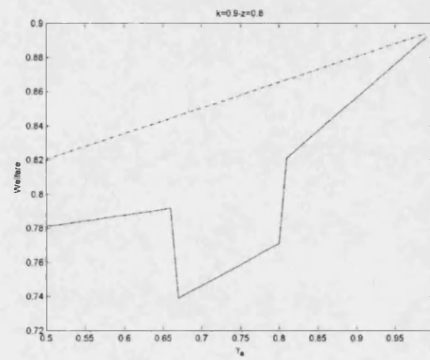


(b)  $k = 0.9$

Figure 18: Welfare as a function of the precision  $\gamma_a$ ,  $z = 0.7$ .

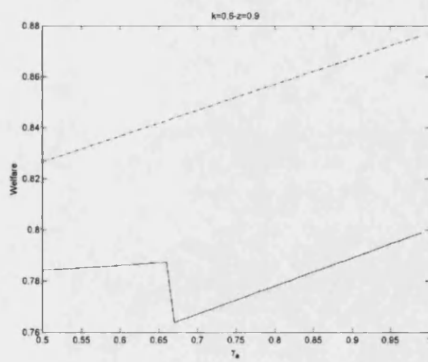


(a)  $k = 0.6$

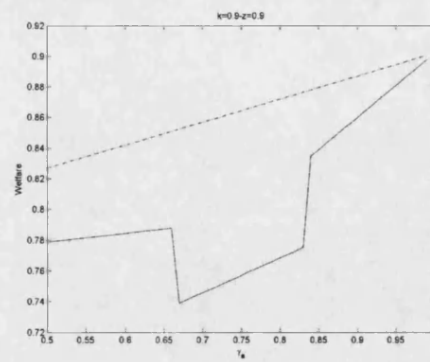


(b)  $k = 0.9$

Figure 19: Welfare as a function of the precision  $\gamma_a$ ,  $z = 0.8$ .



(a)  $k = 0.6$



(b)  $k = 0.9$

Figure 20: Welfare as a function of the precision  $\gamma_a$ ,  $z = 0.9$ .

# 3 Discretion and ambiguity in electoral campaigns: a look into the empirical evidence

## 3.1 Introduction

The announcements that candidates release during the electoral campaigns have been the subject of intense analysis by political scientists and economists. One of the features that has been focused upon is the politicians' tendency to release statements that are vague, ambiguous or not very detailed; it has been observed that rarely the promises that candidates make during the campaign pin down their preferences or intentions.

In Chapter 1 I proposed a model of discretion in electoral campaigns, that resulted from viewing elections as a competitive delegation problem. I focused on cases in which candidates and voters have a joint interest in discretion that originates from having *ex ante* a similar advantage in retaining the possibility of adapting policies to a changing world.

The issue of vagueness in political statements has been discussed in several papers in the literature. Each of the available models analyses a specific cause, which results in different implications on its comparative statics. Many of these models are not in contrast with each other; in a sense, they are horthogonal explanations of effects that can coexist in the real world. Moreover, many of these papers deliver testable predictions about the comparative statics of the candidates' discretion level. The aim of this paper is to compare the implications of these models, and look at the comparative statics displayed by the data to draw some conclusions on the plausibility of the different effects.

The work by Alesina and Cuckierman (1990) is among the most relevant theoretical papers on the issue. They present the problem of an incumbent who seeks to be reelected. His bliss point is private information and is stochastic. In this case the incumbent might have incentive to implement policies that are ambiguous (that do not reveal his bliss point) to increase his probability of being reelected *ex-post* even when the voters are risk-averse.

Glazer (1990) is more related to the model presented in Chapter 1. In his work, ambiguity of statements arises because of uncertainty in the bliss point of the median voter. As a consequence, his main prediction is that an increase in the uncertainty in the median voter's bliss point increases the ambiguity level of the candidates. Chappell (1994) has instead a model in which candidates can choose whether to advertise their position or not, under the assumption that they have to be truthful; in his model candidates with extreme positions tend not to advertise when facing an opponent

who is also an extremist, but they often will advertise when facing a centrist.

There are three other relevant papers, that however presents predictions that we cannot test with the available data. Meirowitz (2005) has a model in which the candidates' political concerns depend on the type of election that they are facing (primary or general); this is due to the different pool of voters that characterise each type of election. As a consequence, candidates will choose higher levels of ambiguity in the primaries, and they will be more precise during the campaign for the general election. In particular they will tend to be more ambiguous during the primaries because they know they will learn more before the general electoral campaign, and they don't want to commit too much while they are still informed.

Alesina and Holden (2008) propose a model where ambiguity is induced by the need to please two different groups. The two predictions of their model are that the introduction of campaign contributions increases the level of ambiguity of the politicians, and the same happens introducing primaries. Both predictions are hard to test because the data we analyse do not allow the comparison between elections with and without campaign contributions, or with and without primaries.

In Aragonés and Neeman (2000) the candidates can choose the level of ambiguity of their announcements. They have incentive to do so, because they have a 'taste for ambiguity' motivated by the fact that ambiguous statements allow them to retain more freedom *ex post* without sacrificing their credibility. On the other hand, voters have an explicit dislike for ambiguity, as it increases the probability that the candidate will *ex post* implement a policy which is far away from their most preferred one. There are two possible equilibria of this electoral competition, in terms of proposed policies: if the gain from being in power is very high, relative to the benefits of ambiguity, both candidates will converge to the median voter position with a very low level of ambiguity; if they are low there will be policy differentiation, but the candidates will promise the same level of ambiguity. The problem with the empirical investigation of this model is that a measure of rents from being in power is not available in the data. The papers by Diermeier et al. (2005) and Mattozzi and Merlo (2008) propose a theoretical and empirical analysis of political rents and of their effects that may be a starting point for such analysis.

As mentioned above, these models are distinguishable both in terms of the description of the causes of politicians' ambiguity and vagueness, and in terms of the predictions of the factors that affects these two variables. This paper tries to test which effects are present in the data, at least for those predictions that can be considered given the available dataset.

On the empirical side, there are two papers that deal with issues of ambiguity in elections. Campbell (1983) uses data from the American National Election Studies on the presidential elections from 1968 to 1980, in which respondents were asked to place themselves and the candidates on a seven points scale for several issues. Campbell estimates the ambiguity of the candidates on each issue as the standard deviation

of such positioning, where a candidate is considered more ambiguous if for example some voters consider him weakly liberal and some weakly conservative; in his paper he investigates what electoral characteristics can be considered the main determinants of the candidates' ambiguity level. He finds that candidates that are more distant from the predominant public opinion display higher ambiguity levels (negative effect of proximity), that issue salience has no direct effect on the levels of ambiguity, and that the effect of a dispersed public opinion is to increase issue ambiguity. Bartels (1986) develops a model of survey response that allows him, using the same dataset as Campbell (1983), to estimate the extent of issue ambiguity of the candidates from the data on those respondents who did not answer the questions about the candidates' positioning on the seven point scale.

We use data from the American National Election Studies, from the Senate study conducted between 1988 and 1992. The methodology used is the one contained in Campbell (1986), therefore the ambiguity level of the candidate is proxied with the standard deviation of the electorate's positioning of the candidate himself on seven point (liberal-conservative) scale. The data on Senate elections do not allow us to disentangle the effects of issue variety, as only the liberal-conservative scale is included in the questionnaire. The use of Senate data does however allow us to study a larger dataset.

The objective of this chapter is mostly descriptive. We investigate which of the correlations that are predicted by the comparative statics of the different models seem to be present in the data. At the moment we do not attempt to draw any conclusion about the causal relation that may be present between the variables that we consider. The reason for that is the presence of several endogeneity issues that may affect the analysis. Moreover, we make use of a temporal variability that we cannot use as identification method. It is however interesting, as a preliminary empirical analysis, to investigate which of the models have implications that are consistent with the observed data.

The first significant finding is that the data are consistent with the model of Alesina and Cuckierman, in that an incumbent that is more likely to be reelected will be less ambiguous. This can be seen by noticing that approval rates are negatively correlated with the ambiguity levels, so that an incumbent with a high approval rate is less likely to be ambiguous than an incumbent with a lower approval rate. This effect is consistent with Alesina and Cuckierman (1990).

The second significant effect that we find is that, even though there is no direct effect of the candidates' biases on the level of ambiguity, when we restrict attention to tight races, the level of ambiguity is negatively correlated with the candidate's own bias. Of the two models that have predictions on the correlation between biases and ambiguity, we note that the empirical correlation is consistent with the model presented in Chapter 1 but not with Chappell (1994). Interestingly enough, both models predict an increase in the ambiguity levels when facing a more biased opponent,



but this does not seem to be the case empirically.

We also find that an increase in the ambiguity levels is positively correlated with an increase in the dispersion of the voters' preferences, which is consistent with the prediction contained in Glazer (1990). The dispersion of the voters' preferences is defined as the standard deviation of their self-positioning on the seven-points liberal-conservative scale.

Lastly, there is a significant relation between the level of ambiguity in the Senate race and uncertainty over the state of the State economy. When we take the standard deviation of the respondent's opinions about the state of the economy at a State level, we can see that this is positively correlated with the level of vagueness of the campaign, and that the effect is significant. This is consistent with Chapter 1 that plainly postulates that vagueness is a consequence of unresolved uncertainty about the correct policy.

The chapter is structured as follows: section 3.2 discusses the models that we want to analyse, and their main predictions; section 3.3 describes the chosen methodology; section 3.4 describes the dataset, section 3.5 introduces the variables of interest, and the way in which they are computed; section 3.6 presents the results; section 3.7 includes some robustness checks, section 3.8 discusses possible extension of this work, and section 3.9 concludes.

## 3.2 Proposed analysis

This section introduces four models that we would like to evaluate empirically. Notice that, as suggested before, there are models that we cannot evaluate, despite their relevance in the literature. In particular we cannot test the predictions of Meiowitz (2005) and Alesina and Holden (2008) because their suggested comparative statics are related either to the existence of primaries and the comparison between the first and the second stage in an election with primaries, or to the extent of the campaigns contributions. Since I use data from the Senate elections, and I have no information on the presence and extent of campaign contributions, I cannot test the implications of these two models. Testing Aragonés and Neeman (2000) would instead require the analysis of the political rents of the different states, and is left for later work.

### 3.2.1 Alesina and Cuckierman (1990)

The model by Alesina and Cuckierman analyses one specific trade-off that a politician faces when choosing a policy that he wants to implement: the trade-off between his preferences and his popularity. Their model has the peculiarity of assuming asymmetry in the available information on the two candidates. More precisely, the bliss point of one of the candidate is known, while the bliss point of the other one is stochastic and his private information. If the candidate with the privately known bliss point gets elected in the first period, he has an incentive to disguise it by choosing ambiguous

policies. Notice that in their model only the incumbent has the power of choosing policies, and therefore he is the only one that can choose his level of ambiguity and disguise his ideological positioning it by choosing policies that have some noise. Many of the predictions of the model are hard to test, because they rely on this asymmetry with respect to the information that is available on the two candidates, and on the persistence of the ideological position of the one with stochastic positioning. However there is an interesting prediction that we can try to investigate.

**Prediction.** The level of ambiguity of the incumbent decreases when the popularity of the incumbent increases, where by popularity we mean the likelihood that the incumbent gets reelected regardless of his implemented policy.

We will investigate this effect by creating a proxy for the popularity of the incumbent from a question on the approval of the incumbent that is included in the survey; in this way it is possible to look directly into the effect that a higher popularity of the incumbent has on his choices.

### 3.2.2 Chappell (1994)

Chappell (1994) addresses the issue of ambiguity in electoral campaigns from the consideration that rational voters should be suspicious of ambiguous candidates.

In his model two randomly chosen candidates,  $X$  and  $Y$ , confront each other during the campaign; their choice variable is the amount of information they want to disclose about their preferred policies  $x$  and  $y$ ; crucially, their preferred policies are disclosed to both candidates and not to the voters. The most relevant assumptions are the absence of commitment on policies (candidates always implement their preferred policy once elected), and a strong candidates' credibility (candidates are assumed to be truthful and they are believed by voters); moreover, a candidate cannot release credible information on his opponent. The information release action is assumed to be binary: a candidate can either advertise his position, or not. If candidate  $j$  chooses to advertise his position, he will disclose it to a fraction  $F_j$  of voters; the fraction  $F_j$  is called the endowment of candidate  $j$ .

The voters in this model are assumed to be suspicious of candidates in the sense that they update their beliefs on the candidates' type via Bayes rule, so that they infer something about the candidates' types from the absence of advertisement of the candidate's position. Notice that the inference that voters can make is strong, because of the assumption that the policy positions  $x$  and  $y$  are known to both candidates. Therefore, when they see candidate  $X$  advertising the position  $x$ , and candidate  $Y$  not advertising his position they can infer that  $y$  is such that

- $X$  wants to advertise given  $(x, y)$ ;
- $Y$  does not want to advertise given  $(x, y)$ ;

where  $x$  is now known.

From the analysis of the model Chappell obtains several predictions; in particular the ones that we can investigate with our data are the following ones.

**Predictions.** Candidates with centrist positions will generally advertise; candidates with extreme positions tend not to advertise when facing an opponent who is also an extremist, but they often will advertise when facing a centrist.

Other predictions are related to the candidates' likelihood of winning, their different endowments, their expected vote share and the incumbency advantage. These cannot be analysed with the data that we use.

### 3.2.3 Glazer (1990)

In Glazer's model ambiguity arises mainly as a consequence of the interaction between the uncertainty that the candidates have on the median voter's ideal point, and the uncertainty that the median voter has on the candidates' ideal points. There are two candidates who compete for office; they can choose whether to be precise and announce a specific policy (in which case they will announce their forecast of the median voter's ideal point), or completely vague. If they are vague the median voter will evaluate them according to his beliefs on the candidate position. The model has therefore the following implication that we can analyse with the available dataset.

**Prediction** If the candidates' beliefs on the median voter are more dispersed then the policies are more ambiguous.<sup>24</sup>

The model also predicts that if the median voter's beliefs on the candidate are less dispersed, then there is more ambiguity. This is a prediction that we cannot test because, given the way in which we measure the candidates' vagueness, we cannot disentangle the dispersion of the voters' beliefs from the candidates' ambiguity level. Other predictions of the model include that if the voters are more risk averse there is less incentive to be ambiguous, and that if there are sequential announcements, than either the candidates are ambiguous, or they make their announcement at a very late stage.

### 3.2.4 Manzoni (2010)

In Chapter 1 I present a model of electoral campaign in which there is a joint interest for discretion among voters and candidates. The extent of the optimal vagueness of the campaign statements from a candidate's perspective is different from the voter's

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<sup>24</sup>To evaluate this prediction we consider the dispersion of the voters' ideological position as a proxy for the dispersion of the candidates' beliefs on the median voter's position.

perspective, but even the median voter would like in general to allow the candidates to retain some discretion. This is due to the fact that there is a state of the world that is unknown at the moment of the election, which influences both the candidates' optimal policies, and the voters' ones. The candidates are ideologically biased with respect to the median voter, but this bias is constant across states of the world. The optimal amount of discretion results therefore from the trade-off that the median voter faces, between the bias of the candidates and the variability of the state of the world.

As a consequence of that, the model has several implications on the candidates' level of ambiguity. The predictions that we can investigate are the following.

**Predictions.** First of all the model shows a negative correlation between the level of ambiguity and the ideological bias of the candidate, and a positive correlation between the level of ambiguity and the level of uncertainty over the relevant state of the world. These two effects arise because of the voters' taste for ambiguity; when the candidate's bias is smaller, or when the state of the world is more uncertain, the voter would rather allow the candidate to have more discretion. Moreover, the model displays a positive correlation between the level of ambiguity and the opponent's ideological bias. This is an equilibrium effect: when competing against a more biased opponent, the candidate can retain more discretion for himself, because he can win the election even if he pleases the electorate less.

The analysis of the extended version of model, which allows for uncertainty over the candidates' biases, suggests a positive correlation between the level of ambiguity and the level of uncertainty over the candidate's type for extreme candidates, and a negative correlation between the level of ambiguity and the level of uncertainty over the candidate's type for centrist candidates. These predictions, however, cannot be tested, because, as we will see when we introduce the definition of the relevant variables, we cannot distinguish the uncertainty on the candidate's type from the ambiguity of his statements.

### 3.3 The methodology

As mentioned in the introduction, we follow Campbell (1983) methodology in order to perform a descriptive analysis of the consistency between the theoretical models we consider and the empirical correlations between the level of ambiguity and several explanatory variables.

Campbell searches for the most relevant explanatory variables for the level of ambiguity of the politicians. In order to do so, he considers the ANES questions (from the 1968 to 1980 presidential elections surveys) in which the respondents are asked to position the candidates' stand on a specific issue on a seven point scale; he then estimates the candidates' ambiguity levels on the different issues as the standard deviation of such positioning. He then tries to explain such levels with three variables:

proximity (measured as the negative absolute value of the difference between the median of the candidate's positioning on the issue, and the median of the voters' own positioning on the same issue), issue salience (derived by specific questions on the most important problems for the country) and dispersion of the public opinion (measured as standard deviation of the voters position on the issue).

In order to increase the number of datapoints that we can consider we focus on data from the Senate elections from 1988 to 1992; this allows us to consider a larger number of candidates, but it does not allow us to separate the ambiguity levels on different issues, because only the positioning on the liberal-conservative scale is available for the Senate elections.

### 3.4 The data

The data come from the National Election Studies<sup>25</sup> and refer to three subsequent election for the Senate (1988, 1990, 1992). Voters from each one of the 50 states were interviewed, and each survey was stratified by state.

The content of the surveys is incredibly wide, but very similar across years, as they were conceived as being part of a three-part study, and as a consequence they were built in a comparable way. Each survey covers a wide range of topics, so as to collect information on the voters' preferences, on the campaign, on the candidates, but also on those Senators that are not running in the specific election that is considered. Moreover, the dataset includes contextual data, e.g. information about the Senate campaign such as election outcome predictions, and the economic outcomes of the state.

We will be focusing on a subset of the available data. The information that is used in this paper includes:

- voters' self-placement on the liberal-conservative scale;
- voters' placement of the candidates on the liberal-conservative scale;
- incumbency status of the candidate and incumbents' approval rates;
- election outcome predictions;
- general information about the candidate, such as his party affiliation, his age, education level and previous government experience;
- voters' perception of the current condition of the economy;
- voters' self reported interest and level of information about politics.

A full description of the survey questions that have been used is contained in the appendix.

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<sup>25</sup>Miller, Warren E., Donald R. Kinder, Steven J. Rosenstone, and the National Election Studies. NATIONAL ELECTION STUDIES, 1988, 1990, 1992 Pooled Senate Election Study [dataset]. Ann Arbor, MI: University of Michigan, Center for Political Studies [producer and distributor], 1999.

### 3.5 Variables of interest

As described above, we focus on the Senate data in order to investigate the correlations between the level of ambiguity of the electoral campaigns and other relevant variables. Below, we present a discussion of the variables of interest that will be later used in the empirical analysis. A full description of the survey questions that are used to create the variables, and of the way in which the variables themselves are created is contained in the appendix.

**Ambiguity.** The main variable of interest is the ambiguity of the candidates. We measure their ambiguity (*Amb*) by considering the standard deviation of the voters' perception of their positioning on the liberal-conservative scale. In doing so we follow the analysis by Campbell (1983).

**Voters.** Following Campbell (1983) we measure the dispersion of the voters' preferences as the standard deviation of the voters' own positioning on the seven point liberal-conservative scale (*Sd\_V*). We also include controls as, for example, an aggregate measure of the voters' interest in politics, or information about politics.

**Candidate variables.** We consider the candidate bias (measured as the absolute value of the difference between the mean of his positioning and the median voter positioning on the liberal-conservative seven points scale), and his opponent's bias. Moreover we add controls as the candidate's age, his education level, his previous experience in federal or local government, and his party affiliation.

**Incumbency variables.** In order to analyse the incumbency effects, we introduce a dummy (*In*) that indicates whether the candidate was the incumbent. Moreover, we use the survey question that investigates the level of approval of the incumbent, and we create the interaction term  $In * Appr\_In$  that investigates whether incumbents with high approval from the electorate have indeed higher or lower levels of ambiguity in their electoral campaigns. The approval variable is generated by taking the mean of the incumbent's approval rate. Notice that the incumbent's approval question assigns value 1 to high approval and 5 to low approval, therefore the higher the value of the variable, the lower the incumbent's approval.

**Election variables.** The main aspect of the election that we need to include as a control variable is the description of the context of the competition. We do so by including a dummy (*Close*) that describes whether the election result is perceived as being clearly in favour of one candidate, or as being uncertain. The ANES data include this information as well, coding two different polling results, one at an early stage of the campaign, and the other one at a later stage. We focus on the early one, because it is the one that better represents the situation that the candidates face

when they choose their electoral strategy. We use the late result (*Close\_Late*) as a robustness check.

**Real world variables.** In Chapter 1 the cause of candidates' vagueness during the electoral campaign is attributed to the presence of a variable state of the world that influences the optimal policy, so that an increase in the variability of the state of the world induces the candidates to retain more discretion when making the electoral promises. To look into this prediction we need possible measures of the variability of the underlying state of the world. The survey helps us in this, because it asks each respondent to answer questions about the condition of the state economy and of the national economy. We take the standard deviation of the answers to these two questions and we use them as a proxy for the voters' perception of the variability of the state of the world.

**Strategic interaction terms.** One of the concerns that we might have is that candidates behave in a different way when the election is close from when it is clearly in favour of one of the candidates. In particular, more than having a different level of ambiguity when the election is a tight one, we might be concerned by the fact that they respond in a different way to their own bias, or their opponent level of bias, or the uncertainty of the state of the world, when the strategic component is more important. For this reason we introduce a set of variables that describe this possible 'strategic interaction', showing that the candidates are induced to behave in a more strategic way when the result of the election is not easily predicted. For example the variable  $Cl * Bias$  is the interaction term between the variable *Close* and the variable *Bias*. If the variable *Close* was investigating the effects of a tight competition on the level of ambiguity, the variable  $Cl * Bias$  considers whether in case of a close race the candidate is more prone to adjust his level of vagueness to his ideological bias, or not. Even though none of the models considered includes the closeness as a possible explanatory variable, they all focus on situations in which the politicians behave strategically, maximising their chances of being elected. The idea here is to concentrate the attention on close elections because these are the ones where the strategic incentives of the candidate should prevail on other kind of goals that the politician can have (e.g. being perceived as a possible leader of the party, targeting a specific lobby group...).

### 3.6 The analysis

To analyse the empirical correlation between the ambiguity levels and the relevant variables that we want to study, we consider as dependent variable  $Amb_{ipt}$ , that is, the level of ambiguity for each candidate of party  $p$  in State  $i$  at time  $t$ .<sup>26</sup> As explanatory

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<sup>26</sup>Notice that given the structure of the election the tuple party-State-year identifies uniquely the candidate.

variables we include the variables described above, as the dispersion of the voters' preferences, the candidate's own bias, his opponent's bias, a dummy that indicates whether he is the incumbent or not, the approval rate of the incumbent and so on.

$$\begin{aligned} Amb_{ipt} = & \beta_1 Sd\_V_{it} + \beta_2 Bias_{ipt} + \beta_3 Opp\_Bias_{ipt} + \beta_4 In_{ipt} + \beta_5 In * Appr\_In_{ipt} \\ & + \gamma_1 Sd\_State\_Economy_{it} + \delta \{Interaction\ terms\}_{ipt} + \zeta \{Controls\}_{ipt} + \epsilon_{ipt} \end{aligned}$$

As mentioned above, the candidate is identified uniquely by the triple of indexes  $(i, p, t)$ , where  $i$  is the State,  $p$  is the party, and  $t$  is the year. As for the explanatory variables, there are variables that depend only on the specific election we are considering (therefore only on the pair State-year), as the dispersion of the voters' preferences, the dispersion of their opinion on the State or National economy, their interest in politics or their level of political knowledge. The other explanatory variables depend on the candidate that we are considering, as his bias, his opponent's bias, his incumbency status and some of the controls, as age, education and previous government experience.

The analysis performed in this chapter is merely a descriptive analysis, that has the purpose of taking a first look on the relation between the theoretical models presented above, and the data. I am aware of the possible existence of endogeneity problems on some of the explanatory variables considered, in particular of the variables  $In$ ,  $In * Appr\_In$ ,  $Bias$  and  $close$ . A wider description of the potential endogeneity problems is included in section 3.6.1. As we suspect that there might be correlation issues we perform an OLS estimation with robust standard errors.

We run two different regressions, using two possible proxies for the variability of the state of the world: the standard deviation of the voters' opinion on the State Economy ( $Sd\_State\_Economy$ ) and the standard deviation of the voters' opinion on the National Economy ( $Sd\_National\_Economy$ ). The results of the regressions are displayed in Table 2.

### 3.6.1 Dispersion of the voters' preferences

The first effect that can be noticed is the one signaled by the presence of a positive and significative coefficient for  $Sd\_V$ . As in Campbell (1983) we take this as a measure of the dispersion of the voters' preferences. The results show that the ambiguity level of the candidate's campaign is positively correlated with the dispersion of the voters' preferences. As a consequence whenever we observe an increase in the dispersion of the voters' preferences we should also observe an increase in the candidate's ambiguity. This is consistent with the model by Glazer (1990), that suggested that candidates' ambiguity originates from the uncertainty over the median voter preference position.



VARIABLES	(1) <i>Amb</i>	(2) <i>Amb</i>
<i>Sd_V</i>	0.275 (0.122)*	0.247 (0.121)*
<i>Bias</i>	0.025 (0.041)	0.016 (0.043)
<i>Opp_Bias</i>	-0.032 (0.043)	-0.040 (0.044)
<i>In</i>	-0.450 (0.150)**	-0.427 (0.152)**
<i>In * Appr_In</i>	0.184 (0.072)*	0.176 (0.073)*
<i>Sd_State_economy</i>	0.275 (0.135)*	
<i>Sd_Nation_economy</i>		0.218 (0.174)
<i>Close</i>	0.289 (0.305)	0.237 (0.264)
<i>Cl * Bias</i>	-0.321 (0.151)*	-0.296 (0.138)*
<i>Cl * Opp_Bias</i>	-0.160 (0.147)	-0.138 (0.131)
Observations	99	99
R-squared	0.36	0.34

Robust standard errors in parentheses  
 \*\* significant at 1%, \* significant at 5%

Table 2: Results with robust standard errors

In the next section we investigate whether this result is robust to the use of a different measure of dispersion of the preferences.

### 3.6.2 Incumbency effects

The second interesting aspect that we can notice is the presence of incumbency effects. Being the incumbent for a seat is correlated with a lower uncertainty of the voters on the ideological positioning of the politician. This is a natural effect, that is due to the fact that the incumbent is better known by the voters, so that his positioning is more clear. This also shows that this measure of ambiguity is problematic; it is clear that we cannot fully disentangle the uncertainty due to the candidate's vagueness during the campaign from the uncertainty due to low visibility. We try to take this into account introducing controls as previous government experience, and the voters' degree of interest in the elections and of information about politics.

More interestingly, we notice that a higher approval rate of the incumbent is correlated with lower levels of ambiguity during the electoral campaign.<sup>27</sup> This is consistent with the prediction by Alesina and Cuckierman (1990); in their model incumbents that are more popular are more prone to be precise in their policies (that in their model implies that they are more prone to implement a policy that is precisely targeting their most preferred outcome, in this way revealing their ideology). As we were discussing in the introduction, however, we do not claim to elicit any causal relation with this analysis, given the absence of an identification strategy. This correlation could therefore be due, for example, to a reverse causation mechanism; it could be that more precise politicians are preferred by the electorate, or even that the electorate exert more effort to acquire information relative to the preferred candidate. In any case, the empirical correlation does not contradict Alesina and Cuckierman's model.

However, the incumbent's approval rate is not the only possible test of this prediction. Alesina and Cuckierman interpret popularity as a greater likelihood of winning the election. Therefore, focusing on those incumbents who face a very tight race, we would in principle look at the behaviour of incumbents that are not popular in the sense described above. It would thus be interesting to look at the coefficients of the interaction term between closeness of the race and the incumbency status. Unfortunately, there are not enough data on incumbents facing a close race to allow us to implement this analysis.

### 3.6.3 Effect of the candidate's ideological bias

Two of the models (Chappell (1994) and Chapter 1 of this thesis) have predictions about the correlation between the candidates' ideological biases and their level of ambiguity. If we look at the direct effect of the biases, we see that no coefficient is

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<sup>27</sup>In interpreting the coefficient, we need to remember that the scale that is used has 1 as the highest level of approval, and 5 as the lowest one.

significantly different from zero. This result is robust across specifications, and across methods of estimation.<sup>28</sup> One possible reason for this is that we merge situations in which candidates have completely different incentives in revealing or not revealing their ideological positioning. An extreme candidate who is sure that he will never win the current race, may have incentive to stress his extreme positions for reasons that are not related to the Senate seat he is running for, and that may be due to his position in the party, for example.

There is however a case in which the candidates have the greatest incentives to behave strategically: the case in which the race is very tight. In this case the stake is very high, and the candidates' main focus should really be the maximisation of the probability of being elected, given that it is still possible for both of them to do so. We use polling data that are included in our dataset, and we restrict the analysis to those candidates running in very competitive races. If we look at the interaction term between the close races and the biases of the candidates, we see that the own bias is negatively correlated with the level of ambiguity. This is consistent with Chapter 1, that predicts a negative correlation between the own bias and the level of ambiguity. The finding is not consistent with Chappell's model, as he predicts a positive correlation between own bias and ambiguity. Both the model included in Chapter 1, and Chappell's model predict also a positive correlation between the opponent's bias and the ambiguity level; this correlation, however, cannot be found in the data.

#### **3.6.4 Real world effects**

We try to see whether there is a correlation between the variability of the underlying state of the world and the level of ambiguity in the campaign. To do so we consider the state of the world as being the state of the economy, and we look at the survey questions that investigate the respondent's beliefs about the state of the economy (both at State and Nation levels). We take then the standard deviation of these beliefs as a measure of the uncertainty about the current state of the world. As it can be seen in Table 2, the uncertainty about the economy both at national and local levels seems to be correlated with the ambiguity level of the campaign, even though only at the State level the effect is significantly positive. This is consistent with one of the structural hypothesis of Chapter 1, as the existence of such correlation is crucial for that model of vagueness in the electoral campaigns.

#### **3.6.5 Other effects**

The full analysis (see Table 4) also shows a positive correlation between the level of ambiguity and the voter's level of interest in the campaign, and between ambiguity

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<sup>28</sup>As it can be seen in the appendix, the same result hold if we use OLS, and if we use robust standard errors.

	(1)	(2)
F(3, 78)	0.29	0.49
Prob > F	0.8331	0.6891

Ho: model has no omitted variables

Table 3: Ramsey RESET test

and  $Cl*P$ , implying that in close elections the democrats tend to be more ambiguous. This last effect, however, cannot be identified uniquely as the effect of the party; in those election that are classified as close, there are no incumbents coming from the Democratic Party, while there are several Republican incumbents. Therefore this could simply be an effect of the fact that incumbents are in general better known than challengers.

The effect of the voter's level of interest, instead, seems to be a relevant one, even though it is not included in any of the analysed models.

### 3.7 Robustness checks

This section provides few robustness checks and discusses the choice of the estimation method, and the problems that may arise.

#### 3.7.1 Estimation method

As mentioned above, the regressions we consider may have endogeneity problems. In particular, the variables that may create problems are the following:

- $In$  and  $In*Appr\_In$ : the level of ambiguity of the incumbent may affect his approval rate, and therefore the likelihood of running for the considered election (and therefore his status of incumbent);
- $close$ : the level of the ambiguity of the candidates may affect the likelihood that the race is perceived as being tight; we try to prevent this by considering an early measure of closeness, but we cannot completely rule out this possibility. When we use  $Close\_Late$  to conduct a robustness check (see section 3.6.2) this is an even stronger concern;
- $Bias$ : given that we use the voter's perception of the candidate's positioning to compute the candidate's bias, it might be that the level of ambiguity affects the perception of the positioning in a way that makes  $Bias$  an endogenous variable.

As for the specification, even though we cannot rule out the possibility that there are omitted variables that affect the result, we performed the RESET specification test and we cannot reject the null hypothesis that there are no omitted variables.

### 3.7.2 Variables

In the above analysis we made some choices on the measure of some of the explanatory variables. In this section we investigate how the results would change if we change the explanatory variables that are used.

**Election outcome** Let's start considering the election outcome variable. In the main analysis we used as a measure of the tightness of the political race the early Cook report projection of the likelihood of the different electoral outcomes. The dataset also includes a later measurement of the same variable. The effect of the early variable should be more relevant, because it describes the situation at the stage in which the politicians are planning their strategies. The late polling variable, instead, is more endogenous, in the sense that it also includes the effects of the electoral campaign. Therefore it should have a lower impact on the analysis of the candidates' behaviour. Table 5, in the Appendix, shows the results of the regressions when we use the late measure of race tightness. It is possible to notice that the coefficients of the interaction terms that include *Close.Late*, the late measure of closeness, are no longer significant.

**Previous experience** In the previous analysis we defined the dummy variable *Gov.Exp* as having value 1 when the candidate had previous government experience in either Federal government, or State government or Local government. One may argue that this is a too generous characterisation of the candidate's previous experience. We consider a more restrictive measure of experience *Gov.Exp1* that has value 1 only when the candidate has previous Federal or State government experience. The results of the analysis are substantially equivalent to the main one, and are contained in the Appendix, in Table 6.

## 3.8 Possible extensions

The empirical work contained in this chapter is a first overview on the link between the theoretical models of political ambiguity and the available data. At this stage, there are several possible extensions of this work, both into the direction of using a different dataset, and in the direction of focusing on a specific model and using more advanced econometric techniques to test it. Both possibilities are briefly described below.

**Presidential data** The ANES dataset includes also data on the Presidential elections. These data are more detailed in the sense that they allow the researcher to build measures of candidates' ambiguity on specific issues. However, given the nature of the Presidential elections, there are less datapoints available for use.

**Data on the candidates' true ideology** One of the main aspects that we are not able to analyse properly with the kind of data that are used in this Chapter is the difference between the candidate's true ideological bias and the perception that the voters have of his positioning. This is due to the way in which we measure the candidates' bias, using as raw data the voters' perception of the candidates' bias. Further information is however available in the dataset for those candidates who have been in the office in the form of roll call votes, and on their relative positioning in the liberal conservative scale. The problem with using this information lies exactly in the fact that this objective information has however a relative, and not absolute, nature, and it cannot therefore be considered as a direct proxy of the ideological bias of the candidate; for example, being exactly the average politician can mean different things in terms of being liberal when the Senate is mostly conservative or when the Senate is mostly liberal.

**A different methodological approach** A very interesting extension of this chapter is to repeat the same analysis using the methodology introduced by Bartels (1986). Bartels develops a model of voting under uncertainty, based on the Enelow-Hinich model (Enelow and Hinich, 1981), where he assumes that the voters' perception of the candidates' statements generates some uncertainty on the candidates' positioning. Voter  $i$ 's belief on candidate  $j$ 's positioning on issue  $k$  is a distribution with a mean  $M_{ijk}$  and variance  $V_{ijk}$ . The magnitude of  $V_{ijk}$  is therefore the internal uncertainty of voter  $i$ , and is considered on top of any variability of beliefs that may exist across voters. In this respect, Bartels captures more precisely than Campbell the voter's individual uncertainty. The author develops then a model of survey response under the assumption that the respondent places the candidate if he is sufficiently certain of his position (i.e. if  $V_{ijk}$  is sufficiently low), and that he refuses to position the candidate if the uncertainty level is higher than a certain threshold. His two steps procedure enables him to have a more efficient use of the data that allows him to have an estimate of the individual degree of uncertainty of each respondent, and therefore to focus his analysis only on data from one (Presidential) election. This methodology is complementary to Campbell's one, in the sense that it captures the effects of candidates' ambiguity on the internal uncertainty of the voters, and it leaves out the effects on the point estimates of the candidates' positioning.

### 3.9 Conclusions

In this chapter we considered some of the most relevant papers who analyse the problem of ambiguity in the electoral campaign, and we compared their implications with the empirical correlations between the level of candidate's ambiguity and several explanatory variables. The data come from the National Election Studies on Senate elections from 1988 to 1992.

We found that the following implications are consistent with the empirical correlations that are found in the data:

- Alesina and Cuckierman (1990): incumbents that are more popular are more precise in their policy announcements;
- Glazer (1990): candidates are more ambiguous when voters' preferences are more dispersed;
- Chapter 1: candidates are more ambiguous when the state of the world is more uncertain (where the empirical correlation is found considering the National economy as underlying state of the world);
- Chapter 1: candidates are more ambiguous when they are less biased.

The last implication is confirmed by the data only in settings in which there is a close electoral race, and it contradicts the model included in Chappell (1994)

Moreover we don't find any empirical correlation between the level of ambiguity of the candidate and his opponent's bias, when the election results are very uncertain; both the models that analyse this relation, that is Chappell's model, and the one included in Chapter 1 of this thesis, predict a positive correlation between these variables.

## A Appendix

### A.1 Survey questions

Here's a list of the survey questions that have been used in this analysis:

**vps0031:** Some people don't pay much attention to political campaigns. How about you? Would you say that you were very much interested, somewhat interested, or not much interested?

1. Very Much Interested;
3. Somewhat Interested;
5. Not Much Interested;
8. Don't know.

**vps0035:** How many stories did you read, see or hear regarding the campaign in this state for the U.S. Senate? Would you say you read saw or heard a good many, several, just one or two, or none?

1. None;
3. Just One or Two;
5. Several;
7. A Good Many;
8. Don't know.

**vps0352:** Summary of the approval rate of running senate incumbent (Built from V349, 350, 351)

1. Approve strongly;
2. Approve not strongly;
4. Disapprove not strongly;
5. Disapprove strongly;
8. Don't know.

**vps0542:** (Summary of vps 0539, vps0540, vps0541) Now, thinking about the country as a whole, would you say that over the past year, the nation's economy has gotten better, stayed about the same, or gotten worse?

1. Much better off;
2. Somewhat better off;
3. Same;
4. Somewhat worse off;
5. Much worse off;
8. Don't know.

**vps0546:** (Summary of vps 0543, vps0544, vps0545) What about economic conditions in this state? Would you say that over the past year, economic conditions in this state have gotten better, stayed about the same or gotten worse?

1. Much better off;
2. Somewhat better off;
3. Same;
4. Somewhat worse off;
5. Much worse off;
8. Don't know.

**vps0547:** We hear a lot of talk these days about liberals and conservatives. Think about a ruler for measuring political views that people might hold, from liberal to conservative. On this ruler, which goes from one to seven, a measurement of one means very liberal political views, and a measurement of seven would be very conservative. Just like a regular ruler, it has points in between, at 2, 3, 4, 5 or 6. Where would you place yourself on this ruler, remembering that 1 is very liberal and 7 is very conservative, or haven't you thought much about this?

1. Very Liberal;
- 2.
- 3.
- 4.
- 5.
- 6.
7. Very Conservative;
8. Don't know.



**vps0754:** Where would R place the Democratic candidate on the liberal/conservative scale where one means very liberal and seven means very conservative?

1. Very Liberal;
- 2.
- 3.
- 4.
- 5.
- 6.
7. Very Conservative;
8. Don't know.

**vps0755:** Where would R place the Republican candidate on the liberal/conservative scale where one means very liberal and seven means very conservative?

1. Very Liberal;
- 2.
- 3.
- 4.
- 5.
- 6.
7. Very Conservative;
8. Don't know.

**vps1389:** Early (5-31-88,5-31-90,5-31-92) Cook Report projection of the election outcome:

0. Safe Democratic;
1. Democrat favored;
2. Leaning Democratic;
3. No clear favorite;
4. Leaning Republican;
5. Republican favored;
6. Safe Republican.

**vps1390:** Late (10-28-88/10-28-90/10-28-92) Cook Report projection of the election outcome:

0. Safe Democratic;
1. Democrat favored;
2. Leaning Democratic;
3. No clear favorite;
4. Leaning Republican;
5. Republican favored;
6. Safe Republican.

**vps1473:** Democrat's highest level of education completed:

0. Grade school;
1. Some high school;
2. High school graduate;
3. Some college/technical school;
4. College graduate;
5. Some graduate school;
6. Masters;
7. Ph.D. or other doctoral degree (except M.D., but including veterinarians, dentists);
8. J.D., L.L.B, or equivalent law degree;
9. M.D.

**vps1475:** Democrat's most recent prior employer:

1. Self
2. Other private
3. Federal Government
4. State Government
5. Local Government

**vps1673:** Republican's highest level of education completed:

0. Grade school;
1. Some high school;
2. High school graduate;
3. Some college/technical school;
4. College graduate;
5. Some graduate school;
6. Masters;
7. Ph.D. or other doctoral degree (except M.D., but including veterinarians, dentists);
8. J.D., L.L.B, or equivalent law degree;
9. M.D.

**vps1675:** Republican's most recent prior employer:

1. Self
2. Other private
3. Federal Government
4. State Government
5. Local Government

## A.2 Definition of the variables

Here's the list (in alphabetical order) of the variables used, and their definitions.<sup>29</sup>

- *Age*: it's the age of the candidate;
- *Amb*: it's the standard deviation of the candidate's positioning (variables *vps0754* and *vps0755*, fixing the state and the year that identify the candidate);
- *Bias*: it's the absolute variable of the difference between the mean positioning of the candidate (mean of variable *vps0754* or *vps0755* fixing the state and the year) and the median voter's position (median of *vps0547* given the state and the year);
- *Cl \* Bias*: it is the interaction term between the variable *Close* and the variable *Bias*;
- *Cl.L \* Bias*: it is the interaction term between the variable *Close\_Late* and the variable *Bias*;
- *Cl.L \* Opp\_Bias*: it is the interaction term between the variable *Close\_Late* and the variable *Opp\_Bias*;
- *Cl.L \* P*: it is the interaction term between the variable *Close\_Late* and the variable *P*;
- *Cl \* Opp\_Bias*: it is the interaction term between the variable *Close* and the variable *Opp\_Bias*;
- *Close*: it's a dummy variable that takes value 1 if the variable *vps1389* takes value 3 (=No clear favorite);
- *CloseLate*: it's a dummy variable that takes value 1 if the variable *vps1390* takes value 3 (=No clear favorite);
- *Cl \* P*: it is the interaction term between the variable *Close* and the variable *P*;
- *Edu*: it represents the level of education as expressed in variables *vps1473* and *vps1673*;
- *Gov\_Exp*: it is a dummy variable that takes value 1 if the variable *vps1475* or *vps1675* (depending on the candidate) take values 3 (=Federal Government), 4 (=State Government), or 5(=Local Government);
- *Gov\_Exp1*: it is a dummy variable that takes value 1 if the variable *vps1675* or *vps1675* (depending on the candidate) take values 3 (=Federal Government), or 4(=State Government);
- *In*: it is a dummy variable that takes value 1 if the candidate is the incumbent;
- *In \* Appr\_In*: it is an interaction term between the variable *In* and the variable *Appr\_In*, which is the mean of variable *vps0352*;
- *Opp\_Bias*: it's the *Bias* of the opponent's (defined as the candidate of the opposing party competing in the same year and State);
- *P*: it is a dummy variable that takes value 1 if the candidate belongs to the Democratic Party, and 0 if he belongs to the Republican Party;
- *Sd\_Nation\_economy*: it's the standard deviation of the variable *vps0542*;
- *Sd\_State\_economy*: it's the standard deviation of the variable *vps0546*;
- *Sd\_V*: it's the standard deviation of the variable *vps0547*;
- *V\_Info\_Politics*: it's the mean of the variable *vps0035*;
- *V\_Interest*: it's the mean of the variable *vps0031*.

## A.3 Tables

The complete tables of the main regression and of the robustness checks are displayed in the next pages.

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<sup>29</sup>Notice that we considered the answers 'Don't know' and 'Refused' as missing values when we computed means and standard deviations.

VARIABLES	(1) <i>Amb</i>	(2) <i>Amb</i>
<i>Sd_V</i>	0.275 (0.122)*	0.247 (0.121)*
<i>Bias</i>	0.025 (0.041)	0.016 (0.043)
<i>Opp_Bias</i>	-0.032 (0.043)	-0.040 (0.044)
<i>In</i>	-0.450 (0.150)**	-0.427 (0.152)**
<i>In * Appr_In</i>	0.184 (0.072)*	0.176 (0.073)*
<i>Sd_State_economy</i>	0.275 (0.135)*	
<i>Sd_Nation_economy</i>		0.218 (0.174)
<i>Close</i>	0.289 (0.305)	0.237 (0.264)
<i>Cl * Bias</i>	-0.321 (0.151)*	-0.296 (0.138)*
<i>Cl * Opp_Bias</i>	-0.160 (0.147)	-0.138 (0.131)
<i>Age</i>	0.002 (0.003)	0.002 (0.003)
<i>Edu</i>	0.001 (0.001)	0.001 (0.001)
<i>Gov_Exp</i>	-0.070 (0.046)	-0.066 (0.045)
<i>V_Interest</i>	0.197 (0.053)**	0.222 (0.061)**
<i>V_Info_Politics</i>	0.072 (0.057)	0.089 (0.058)
<i>Cl * P</i>	0.239 (0.113)*	0.243 (0.105)*
<i>P</i>	0.046 (0.042)	0.045 (0.042)
Constant	-0.012 (0.426)	-0.061 (0.453)
Observations	99	99
R-squared	0.36	0.34

Robust standard errors in parentheses  
 \*\* significant at 1%, \* significant at 5%

Table 4: Full set of results with robust standard errors

VARIABLES	(1) <i>Amb</i>	(2) <i>Amb</i>
<i>Sd_V</i>	0.286 (0.128)*	0.252 (0.128)
<i>Bias</i>	0.011 (0.044)	0.001 (0.046)
<i>Opp_Bias</i>	-0.032 (0.040)	-0.041 (0.040)
<i>In</i>	-0.345 (0.158)*	-0.326 (0.162)*
<i>In * Appr_In</i>	0.121 (0.074)	0.115 (0.076)
<i>Sd_State_economy</i>	0.278 (0.139)*	
<i>Sd_Nation_economy</i>		0.146 (0.190)
<i>Close_Late</i>	0.072 (0.188)	-0.027 (0.166)
<i>Cl_L * bias</i>	0.034 (0.115)	0.088 (0.108)
<i>Cl_L * Opp_Bias</i>	0.061 (0.122)	0.116 (0.115)
<i>Age</i>	0.002 (0.003)	0.002 (0.003)
<i>Edu</i>	0.001 (0.001)	0.001 (0.001)
<i>Gov_Exp</i>	-0.060 (0.045)	-0.055 (0.044)
<i>V_Interest</i>	0.202 (0.054)**	0.212 (0.060)**
<i>V_Info_Politics</i>	0.076 (0.054)	0.089 (0.056)
<i>Cl_L * P</i>	-0.129 (0.103)	-0.127 (0.099)
<i>P</i>	0.080 (0.041)	0.078 (0.042)
Constant	-0.082 (0.450)	0.005 (0.483)
Observations	99	99
R-squared	0.36	0.34

Robust standard errors in parentheses  
 \*\* significant at 1%, \* significant at 5%

Table 5: Robustness check 1: late measure of closeness

VARIABLES	(1) <i>Amb</i>	(2) <i>Amb</i>
<i>Sd_V</i>	0.271 (0.122)*	0.244 (0.122)*
<i>Bias</i>	0.016 (0.042)	0.008 (0.044)
<i>Opp_Bias</i>	-0.035 (0.043)	-0.042 (0.043)
<i>In</i>	-0.447 (0.154)**	-0.426 (0.157)**
<i>In * Appr_In</i>	0.181 (0.074)*	0.174 (0.074)*
<i>Sd_State_economy</i>	0.278 (0.131)*	
<i>Sd_Nation_economy</i>		0.193 (0.165)
<i>Close</i>	0.254 (0.249)	0.199 (0.217)
<i>Cl * Bias</i>	-0.296 (0.128)*	-0.270 (0.119)*
<i>Cl * Opp_Bias</i>	-0.150 (0.126)	-0.127 (0.113)
<i>Age</i>	0.002 (0.003)	0.002 (0.003)
<i>Edu</i>	0.001 (0.001)	0.001 (0.001)
<i>Gov_Exp1</i>	-0.078 (0.041)	-0.071 (0.040)
<i>V_Interest</i>	0.193 (0.052)**	0.214 (0.058)**
<i>V_Info_Politics</i>	0.083 (0.056)	0.098 (0.057)
<i>CLP</i>	0.230 (0.100)*	0.235 (0.095)*
<i>P</i>	0.048 (0.042)	0.046 (0.042)
Constant	-0.039 (0.420)	-0.052 (0.448)
Observations	99	99
R-squared	0.37	0.35

Robust standard errors in parentheses  
 \*\* significant at 1%, \* significant at 5%

Table 6: Robustness check 2: government experience

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