

### 3 Electoral Competition

We now turn to a discussion of two-party electoral competition in representative democracy. The underlying policy question addressed in this chapter, as well as the remaining chapters of this part, is what determines the size of government spending. To make things as transparent as possible, we abstain from the difficulties caused by multidimensional policy conflict discussed in chapter 2. Instead, we deal with a very simple policy example, where conflict among the voters is unidimensional. The policy to be determined concerns the size of a program, supplying a publicly provided good, that benefits all the voters alike and is financed by proportional income taxes, income being the only dimension of heterogeneity among the voters. The same economic model is used in all the remaining chapters of part 1, with slight variations only.

Throughout the chapter we retain two key assumptions. First, political candidates are opportunistic. More precisely, their only motivation is to hold office. Candidates thus do not care what policy is implemented: they do not have partisan preferences, and they do not benefit directly from the policy because the rents from holding office are exogenously given and independent of policy. Alternative assumptions about candidate motivation are discussed in the next two chapters, in which we deal with agency problems and with partisan policy preferences, respectively. Second, throughout the chapter we assume that candidates commit to a well-defined policy ahead of the elections, sticking to the realm of preelection politics. Thus, electoral competition is viewed as a choice of location by two competing parties. The parties announce a policy platform, so as to maximize the probability of victory, and voters select the preferred policy. The policy announced by the winning candidate gets implemented.

This model of preelection politics with opportunistic politicians is widely used in the literature. It naturally directs the attention to the conflict among voters over alternative policies and to the question of which groups of voters are more influential. As we shall see, equilibrium policy here reflects features of the voters themselves, such as the distribution of their policy preferences, the ability of different groups to organize as a lobby, or the likelihood that different groups reward policy favors with a vote. Even under the maintained assumptions of this chapter, however, there is not a single model of electoral competition. On the contrary, depending on the specific assumptions about the likelihood that voters reward policy favors with a vote, different forces influence electoral competition and the resulting equilibrium policy.

In section 3.1, we formulate the underlying policy problem. Sections 3.2 and 3.3 discuss the simplest possible model of electoral competition, due to Downs's (1957) classical study, in which the competing parties are identical in all respects and voters care only about economic policy. Here, both parties converge to the median voter optimum. Section 3.4 illustrates the equilibrium under probabilistic voting, while section 3.5 adds lobbying. In these sections different political forces are at play and policy diverges from the median voter's bliss point.

### 3.1 A Simple Model of Public Finance

Consider a society inhabited by a large number (formally a continuum) of citizens, where we normalize the size (mass) of the population to unity. These citizens are of different types indexed by  $i$ . Each type  $i$  has the same basic and quasi-linear preferences over private consumption  $c$  and publicly provided goods  $g$ , which is given by

$$w^i = c^i + H(g), \quad (3.1)$$

where  $H(\cdot)$  is a concave and increasing function. Implicit in (3.1) is also the (unrealistic) assumption that government spending cannot be targeted to specific groups but instead must be provided in the same, nonnegative, amount to everyone:  $g^i = g \geq 0$ . We can interpret  $g$  in different ways, as publicly provided private goods, or traditional public goods. In either case, we let  $g$  measure spending per capita. Nor can taxes be targeted, so government spending is financed by taxing the income of every individual at a common rate  $\tau$ , bounded by  $0 \leq \tau \leq 1$ .

Income differs across individuals, however, implying that their consumption differs according to

$$c^i = (1 - \tau)y^i. \quad (3.2)$$

We assume that  $y^i$  is distributed in the population according to a cumulative distribution function (c.d.f.)  $F(\cdot)$ . The expected (average) value of a variable, such as  $y^i$  is always denoted by a symbol without superscript, that is,  $E(y^i) = y$ , where  $E$  denotes an expected value. Finally, the median value of  $y^i$ , labeled  $y^m$ , is implicitly defined by  $F(y^m) = \frac{1}{2}$ . We assume that  $y^m \leq y$ , so that the income distribution is skewed to the right, in accordance with evidence from virtually every country. The government budget constraint is then simply

$$\tau y = g.$$

Given these preliminaries, we can easily write down the policy preferences of citizen  $i$

$$W^i(g) = (y - g)\frac{y^i}{y} + H(g). \quad (3.3)$$

These preferences are concave in policy, implying that every citizen has a uniquely preferred policy. It is easy to see that this policy satisfies

$$g^i = H_g^{-1}(y^i/y). \quad (3.4)$$

Clearly, the policy conflict between different citizens is quite smooth in this model. This smoothness, of course, reflects the restrictive assumptions about the policy space, namely

that neither government spending nor taxes can be targeted to specific voters or groups of voters and that politicians cannot appropriate tax revenues as rents for themselves. Policy preferences therefore become monotonic in the one parameter that distinguishes individuals, namely their relative income,  $y^i/y$ . Richer individuals want a smaller government because, with taxes proportional to income, they pay a larger share of the tax burden. By concavity of  $H(\cdot)$ , (3.4) implies that  $g^i$  is decreasing in  $y^i$ .

It is easy to see that these policy preferences fulfill the Gans-Smart single-crossing condition (2.4), introduced in chapter 2. Here, the corresponding condition is

$$\text{If } g > g' \text{ and } y^{ii'} < y^i, \text{ or } g < g' \text{ and } y^{ii'} > y^i, \text{ then} \\ W^i(g) \geq W^i(g') \Rightarrow W^{ii'}(g) \geq W^{ii'}(g'). \quad (3.5)$$

These properties of policy preferences considerably simplify the analysis to follow.

Let us also formulate a normative benchmark. As a basis for this benchmark, consider a utilitarian social welfare function that simply sums up (integrates over) the welfare of all individual citizens:

$$w = \int_i W^i(g) dF = W(g),$$

where the last term is just the utility of the average individual, namely the individual with average income. The second equality follows from the definition of  $W^i(\cdot)$  and the fact that  $E(y^i) = y$ . Even though a utilitarian objective is often quite restrictive, it is not very restrictive in conjunction with quasi-linear preferences, as these rule out meaningful distributional considerations anyway. According to the utilitarian objective, the socially optimal policy coincides with the policy desired by the average citizen:

$$g^* = H_g^{-1}(1).$$

Problem 2 of this chapter formulates an alternative simple model of public finance, in which agents are heterogeneous in their preferences for public versus private goods, rather than in their income. Problems 2–5 deal with equilibria in this alternative model, under the same assumptions about the political environment as those we will make in sections 3.2–3.5.

### 3.2 Downsian Electoral Competition

Throughout the chapter, we maintain a number of assumptions about the nature of political competition and candidates that are akin to those in Downs's (1957) classical study. Like Downs, we postulate two candidates—or parties, as the two here boil down to the same thing—indexed by  $P = A, B$ . Each of these maximizes the expected value of some exogenous ego rents,  $R$ . These exogenous rents reflect the value attached to winning the elections

and holding office, but they do not appear in the government budget. Candidate  $P$  thus sets his policy so as to maximize  $p_P R$ , where  $p_P$  is the *probability of winning* the election, given the other candidate's policy. If we use  $\pi_P$  to denote the *vote share* of candidate  $P$ , we can write  $p_P = \text{Prob}[\pi_P \geq \frac{1}{2}]$ .

The timing of events is as follows: (1) The two candidates, simultaneously and noncooperatively, announce their electoral platforms:  $g_A, g_B$ . (2) Elections are held, in which voters choose between the two candidates. (3) The elected candidate implements his announced policy platform. The candidates' commitments to their electoral platforms are thus assumed to be binding.

To see how the model works, we start with a very simple case. Assume that the income distribution is degenerate so that every citizen has the same income  $y^i = y$ . Voters thus face a very simple problem, and they just vote for the candidate whose platform gives them the highest utility. If indifferent, a voter tosses a coin to decide for whom to vote.<sup>1</sup> This implies the following probability of winning for candidate  $A$ :

$$p_A = \begin{cases} 0 & \text{if } W(g_A) < W(g_B) \\ \frac{1}{2} & \text{if } W(g_A) = W(g_B) \\ 1 & \text{if } W(g_A) > W(g_B), \end{cases}$$

whereas  $p_B$  is just given by  $1 - p_A$ .

Suppose now that candidate  $A$ 's announcement  $g_A$  is further away, utility-wise, from the unanimously preferred policy  $g^*$  than candidate  $B$ 's announcement  $g_B$ . Obviously,  $A$  can then discontinuously increase his probability of winning by announcing a policy closer to  $g^*$ . As the same holds true for candidate  $B$ , there is a unique subgame-perfect equilibrium  $g_A = g_B = g^*$ .

Both candidates thus converge to the socially optimal policy.

The normative implications are thus consistent with the claim made by the Chicago school: political competition indeed leads to an optimal outcome for society. The positive implications—thinking about variation in the size of government across countries or time—are also straightforward. Observed differences are entirely driven by voters' policy preferences. For example, trendwise growth in government could be consistent with Wagner's law if the marginal benefits of  $g$  are positively correlated with average income  $y$  (Wagner 1893). Similarly, it could be consistent with Baumol's disease if the relative cost of

1. We assume that everyone votes. Even so, individual voters may not vote according to their preferences, given that their votes will almost surely not affect the outcome, given how everyone else votes. Formally, we can eliminate such behavior by ruling out weakly dominated voting strategies, which guarantees sincere voting in two-candidate elections.

government versus private goods had an upward trend, because of an adverse productivity development due to the nature of government production (Baumol 1967). This could be formally shown by adding a parameter capturing the relative cost of public goods to the government budget constraint, as is done in the next chapter.

### 3.3 Median-Voter Equilibria

When voters disagree over the desired fiscal policy, the candidates must decide which voters to please, in order to enhance their chances of winning the election. To study this question, we assume that the income distribution is no longer degenerate and that the c.d.f.  $F(\cdot)$  is indeed a continuous function. The equilibrium we will study in this setting is an application of the median-voter theorem, proposed by Black (1948) for voting in committees and applied to electoral competition by Downs (1957).

Voter  $i$  now votes for candidate  $A$  with certainty only if  $W^i(g_A) > W^i(g_B)$ . Under the other assumptions of the model, we have

$$p_A = \begin{cases} 0 & \text{if } W^m(g_A) < W^m(g_B) \\ \frac{1}{2} & \text{if } W^m(g_A) = W^m(g_B) \\ 1 & \text{if } W^m(g_A) > W^m(g_B) \end{cases} \quad (3.6)$$

The pivotal role played by the voter with median income  $y^m$  is easy to establish. Recall from (3.4) that  $g^i$  is decreasing in  $y^i$ . This fact and the monotonicity of preferences (3.5) imply that whenever the median voter prefers one platform over the other, at least half of the electorate agrees. To see the logic behind this separation argument, suppose, for example, that  $y^m$  considers  $g_B$  too low relative to  $g_A$ . Then so does everyone with  $y^i < y^m$ , as they prefer an even larger government,  $g^i > g^m$ . More than half the electorate would thus vote for  $A$ . Given this, the only situation in which neither of the candidates can increase his probability of winning is when they have both converged to the policy preferred by the median voter:  $g_A = g_B = g^m$ . In the jargon of chapter 2,  $g^m$  is the unique Condorcet winner, that is, a policy capable of beating any alternative policy in a pairwise vote. Individuals with median income become pivotal, and both candidates converge to those individuals' bliss point.

The median-voter equilibrium suggests a new set of determinants to the size of the public sector. By (3.4), the first-order condition describing the equilibrium is

$$g^m = H_g^{-1}(y^m/\gamma). \quad (3.7)$$

Thus as  $y^m$  drops relative to  $\gamma$ ,  $g^m$  rises: a relatively poorer median voter prefers a larger government. Thus (3.7) says that larger governments (a higher  $\tau$  and  $g$ ) are associated with

a more skewed income distribution in the specific sense of a higher percentage gap between median and mean income. Furthermore, what matters for the political equilibrium is median income in the electorate, whereas, by the government budget constraint, average income refers to the population as a whole. An extension of the franchise, extending voting rights to poorer segments of the population, should therefore also raise the equilibrium size of government, since it widens the gap between the median voter's income and that of the average citizen. The normative properties are also simple to state. If the income distribution is symmetric, so that  $y^m = y$ , then electoral competition still implements a socially optimal allocation. But an income distribution skewed to the right implies overspending and overtaxation, at least relative to the utilitarian benchmark. The influential paper by Meltzer and Richard (1981) who, relied on earlier theoretical work by Romer (1975) and Roberts (1977), stressed similar implications. The inequality predictions, in particular, have been studied quite extensively, and we discuss this work in part 2. To summarize very briefly, however, it has been hard to find compelling empirical evidence supporting the predictions.

We rely on these kinds of median-voter equilibria in several parts of the book. Such equilibria are useful, for they are so simple to characterize; as a result, one can add much more structure to the model's economic side. We use them in chapter 6, especially, to discuss the determinants of pensions, unemployment insurance, and regional redistribution. In part 4 we analyze capital taxation and its implications for growth in a median-voter model. But as chapter 2 warned us, and as the following section illustrates, existence of a Condorcet winner does not mean this policy will be implemented.

### 3.4 Probabilistic Voting

Up to this point, voters have cared only about the economic policy platforms announced by the two candidates. But candidates, or parties, may also differ in some other dimension unrelated to this policy,  $g$ . We shall refer to this other dimension as "ideology," but it could also involve other attributes such as the personal characteristics of the party leadership. This ideological dimension is a permanent feature in that it cannot credibly be modified as part of the electoral platform.

Furthermore, we assume that voters differ in their evaluation of these features. One way to motivate this assumption is to think about a second policy dimension, orthogonal to fiscal policy, in which candidates cannot make credible commitments but set an optimal policy after the election according to their ideology. Voters' preferences over the alternative policy dimension imply derived preferences over the candidates themselves. Problem 1 of this chapter deals formally with this interpretation of the model.

In this setting, some groups of voters may become more attractive prey for office-seeking politicians, who are willing to modify policy in the direction of the favored groups. To

More generally, many authors have suggested reasons why the size of government might be related to the number and orientation of interest groups. As discussed in the recent survey by Holsey and Borchering (1997), however, empirical work has failed to find robust evidence of a tight link between interest group activity and the size of government.

The model also illustrates a more subtle point. In equilibrium no contributions are being paid, according to (3.16), as the candidates converge to the same policy. Obviously, this feature does not allow us to conclude that lobbying is unimportant for the policy outcome. The common argument that lobbying cannot be very important as observed contributions are so small relative to the policy benefits at stake (see Tullock 1988, for instance) should thus be treated with caution.<sup>5</sup>

We will use lobbying models in some of the coming chapters. They naturally belong in chapter 7 on special-interest politics—arising in areas such as trade policy, regulation, and regional transfers—where the formation of lobby groups are essential for the outcome. In chapter 7 we model additional functions of lobbying; apart from the election outcome, lobbies may attempt to influence either the design of policy proposals, or the voting pattern in the legislature. We also discuss lobbying behavior in chapter 14 on growth, where special interests associated with old technologies attempt to protect their rents by lobbying for policies discriminating against modern growth-promoting technologies.

### 3.6 Discussion

This chapter used a simple policy example to ask a fundamental question in political economics: how does electoral competition shape the economic policies proposed during an electoral campaign? As candidates seek to win the election, they design their campaign promises to win the support of a majority of voters. Hence the policy platforms reflect the features of the electorate and the environment in which electoral competition takes place. We end by summarizing the main lessons from the chapter and use them to look ahead.

All the models in this chapter imply that both candidates converge to the same policy platform. This result reflects the assumption that candidates do not care about the policy *per se*, an assumption that will not be preserved in the next two chapters, especially not in chapter 5, where candidates have partisan preferences.

When voters care only about economic policies, every voter is the same from the point of view of the competing candidates. What matters for them is just how many voters prefer the proposed policies over some alternatives, not how strong these preferences are. In the one-dimensional example we considered, the only equilibrium is then a median-voter

5. Note, however, that a less symmetric model resulting in policy divergence would imply positive equilibrium contributions, increasing in the distance between the policy platforms.



optimum, as this policy splits the electorate exactly in half. In this case, the equilibrium size of government reflects differences between median and average income.

Conclusions differ, however, as soon as we drop the assumption that voters care only about economic policies. If some voters are more likely to reward policy with a vote, these voters become more important than others in the candidates' eyes. They become more influential in the electoral campaign, and both candidates seek to please them, rather than the electorate at large. Intensity of preferences now matters for the equilibrium policy outcome, as voters trade off policy benefits against intrinsic party preferences. Electoral competition caters to all the voters, but with weights reflecting their relative responsiveness.

Voters' responsiveness to policy is not given, however. It reflects the voters' information and candidates' advertising. But money or direct work in the campaign can often buy these additional determinants of the election outcome. Campaign contributions matter because they allow politicians to increase their relative popularity in the electorate at large. Groups organized to provide such contributions become more influential in the electorate campaign and receive policy favors at the expense of the unorganized.

These insights will be exploited in several parts of the book. Part 2, in particular, focuses on the determinants of alternative redistributive policies, relying on median-voter models in chapter 6 and on probabilistic voting and lobbying models in chapter 7. In chapters 12 and 14 we draw out the implications of such redistributive programs for the structure of taxation and for economic growth. In these chapters we take the political institutions as given, pretty much as we have done in this chapter. But the standard model of electoral competition also allows us to ask questions of comparative politics: how does the electoral rule shape the equilibrium policies proposed in the course of the electoral campaign? We address this question in chapter 8, contrasting majoritarian and proportional elections.

### 3.7 Notes on the Literature

A penetrating survey of the theoretical literature on electoral competition can be found in Osborne 1995. The textbooks by Ordeshook (1986) and Mueller (1989) also cover most of the political modeling in this chapter. Holsey and Borchering (1997) survey different (economic and political) explanations for the size of government and its growth over time.

Downs (1957) and Hotelling (1929) are the classical studies of two-party electoral competition with deterministic voting, as studied in sections 3.2 and 3.3. Bergstrom and Goodman (1973) pioneered the empirical application of the median-voter model to explain the supply of public goods. Romer (1975) and Roberts (1977) developed a theoretical median-voter model of redistributive taxation akin to the model in the chapter, a model that Meltzer and Richard (1981) extended and popularized.



Chapter 2 includes references to the early literature on electoral competition with probabilistic voting. Ledyard (1984) gives some micropolitical foundations for the probabilistic voting model in a spatial setting. He models the individual voter's decision whether to abstain or take the costly action of voting (for her favored candidate). Candidates are uncertain about the bliss points of individual citizens, and the expected vote changes smoothly with small changes in policy because the costs of voting are assumed to have a well-specified distribution in the electorate. In the model formulated in section 3.4, voters instead have preferences over some policy-independent (and nonpliable) attribute of the candidates, as also assumed by Enelow and Hinich (1982). The relative preferences for the candidates are distributed in the population, with a mean unknown to the candidates at the time they commit to their electoral platforms. This setting is adapted from Lindbeck and Weibull's (1987) model, which dealt with redistributive transfers to different groups of voters out of a given budget.

A rather different model of electoral competition, in which candidates commit to mixed strategies promising lotteries to voters, is due to Myerson (1993b). See also Aragones and Postlewaite 1999.

The classic studies of lobbying and influence activities by interest groups include Olson (1965) and Becker (1983). The specific extension of the probabilistic voting model to include lobbies follows Baron (1994) in letting campaign contributions influence the electoral outcome, given the candidates' platforms. Baron distinguishes between informed and uninformed voters, assuming that the latter can be influenced by campaign spending. The model in section 3.5 instead follows Ben-Ner's (1998) formulation, which assumes that all voters can be influenced. Other functions and models of lobbying are discussed in chapter 7 on special-interest politics.

### 3.8 Problems

#### 1. Noncredible commitments and probabilistic voting

Suppose that agents' preferences over policies  $(q_1, q_2)$  are given by

$$\ln(y - q_1 - q_2) + \alpha^i \ln(q_1) + (1 - \alpha^i) \ln(q_2),$$

with  $y > 4$ ,  $\alpha^i \in (0, 1)$ , and  $q_1 + q_2 < y$ . The timing is as follows. First, two politicians  $P = A, B$  select platforms  $(q_1^P, q_2^P)$ . They can commit to implement policy  $q_1^P$  but not policy  $q_2^P$ . Second, the election is held. Last, the winner implements  $q_1^P$  and selects  $q_2^P$  according to his preferences, that is, he maximizes:

$$\max_{q_2} [\ln(y - q_1^P - q_2) + \alpha^P \ln(q_1^P) + (1 - \alpha^P) \ln(q_2)].$$

We assume that the intrinsic parameters of voters  $\alpha^i$  are drawn from a common knowledge distribution  $F(\cdot)$ . At the date the platforms are offered, voters have beliefs about the politicians' preference parameters,  $\alpha^P$ . They are represented by the probability distributions  $F^P(\cdot)$ .

- a. Determine the policy  $q_2^P$  that the winner selects. Characterize the expected utility of voter  $i$  when politician  $P$  announces  $q_1^P$ . Show that the voters' preferences over politician  $P$ 's policy depend on their beliefs.
- b. Characterize the voter who is indifferent between voting for politician  $A$  and voting for politician  $B$  when  $q_1^A$  and  $q_1^B$  are announced. Characterize the vote share of politician  $A$  for all  $(q_1^A, q_1^B)$ .
- c. Suppose that agents have the same beliefs about politicians, that is,  $F^A = F^B$ . Which platforms guarantee half of the electorate for each politician? What happens if beliefs differ?

## 2. Downsian competition in a simple public-good model

Consider the economy described in problem 2 of chapter 2. More precisely, agent  $i$ 's preferences over a publicly provided good  $y$  and a privately provided good  $c^i$  is expressed by

$$w^i = c^i + \alpha^i V(y),$$

where  $V(\cdot)$  is a concave, well-behaved function and  $\alpha^i$  is the intrinsic parameter of agent  $i$  that is drawn from distribution  $F(\cdot)$  with mean  $\alpha$ . Again, all individuals have initial resources only in the private good,  $e^i = 1$  for all  $i$ , and one unit of private good is required to produce one unit of public good. To finance the public-good production, the government raises a tax  $q$  on each individual so that agent  $i$ 's budget constraint is  $c^i \leq 1 - q$ .

- a. Derive the policy preferences of each agent  $W(q; \alpha^i)$  as well as the social optimum in this economy.

Suppose that two politicians  $P = A, B$  select platforms  $q^A$  and  $q^B$ . Assume that each maximizes the expected value of some exogenous rent  $R$ . Call  $\pi_P$  the vote share for politician  $P$ ; then  $P$ 's probability of winning the election is  $p_P = \text{Prob}(\pi_P \geq \frac{1}{2})$  and his expected utility is then  $p_P R$ . First, the two candidates announce their platforms simultaneously and noncooperatively. Then, elections are held. Last, the elected politician implements his announced policy.

- b. Assume that  $\alpha^i = \alpha$ . Determine the candidates' probability of winning. What are the announced platforms and which one is implemented? Discuss.

- c. Determine each candidate's probability of winning when agents are heterogeneous. What are the selected platforms in that case? Which one is implemented?
- d. What are the model's economic predictions? Discuss.

### 3. A simple model of probabilistic voting

Consider the same model as in problem 2, but assume that three factors affect voter  $i$ 's voting strategy: (1) the economic policy implemented  $q$ , (2) his individual ideological bias  $\sigma^i$  toward candidate  $B$ , and (3) the popularity  $\delta$  of politician  $B$ . We assume that  $\sigma^i$  is uniformly distributed on  $[-\frac{1}{2\psi}, \frac{1}{2\psi}]$ . Moreover,  $\delta$  is the same for all voters and is drawn from the uniform distribution on

$$\left[ -\frac{1}{2\psi}, \frac{1}{2\psi} \right].$$

The distributions are common knowledge, but only agent  $i$  observes his own parameter  $\sigma^i$ . Then,  $i$ 's preferences over the policy implemented by  $A$  are summarized by  $W(q^A; \sigma^i)$ , whereas the preferences over the policy implemented by politician  $B$  take the final form

$$W(q^B, \sigma^i) + \sigma^i + \delta.$$

The timing is as follows: first, each voter observes  $\sigma^i$ , and politicians simultaneously and noncooperatively announce platforms  $q^A$  and  $q^B$ . Second,  $\delta$  is realized. Third, elections take place, and last, the announced policy is implemented.

- a. Give an interpretation of  $\sigma^i$ . Characterize the agent who is indifferent between voting for politician  $A$  and voting for politician  $B$  for given policies  $q^A$  and  $q^B$ . Suppose that  $\sigma^i = \alpha$ . Deduce candidate  $A$ 's vote share as well as his probability of winning.
- b. Which platforms do the politicians select? Which one is implemented? Discuss.
- c. Suppose that agents are heterogeneous. What does this imply for the equilibrium?
- d. Discuss your results and compare them with the results obtained in problem 2.

### 4. Probabilistic voting in the presence of groups of voters

Consider a modified version of the previous model. More precisely, we assume that the population consists of three kinds of voters  $J = \{R, M, P\}$  with intrinsic parameters  $\alpha^J$ . The proportion of agents in group  $J$  is denoted by  $\lambda^J$ , and  $\sum_{J=1}^3 \lambda^J = 1$ . Besides,  $\sum_{J=1}^3 \alpha^J \lambda^J = \alpha$ . Once more, the voting strategy of voter  $i$  in group  $J$  is affected by (1) the economic policy that is implemented  $q$ , (2) his individual ideological bias  $\sigma^{iJ}$  toward candidate  $B$ , and (3) the popularity  $\delta$  of politician  $B$ . We assume that  $\sigma^{iJ}$  is uniformly