Electoral Strategy and Economic Policy*

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Abstract

This paper develops an approach to political equilibrium in a two-party setting. The approach characterizes political resource allocation as trading off the utility of core party supporters and swing voters, i.e. those who are not attached to either party. The model has three stages. First parties determine their electoral strategies. Second, an election is held. Third, policy is chosen. To illustrate the model at work, I apply it to two policy settings – the standard spatial model and the distributive politics problem of targeting transfers to groups of voters. The latter application is particularly interesting since the game of electoral strategy that emerges is supermodular. The paper then briefly discusses strategies for making political equilibria credible, how some of the key magnitudes suggested by the theory can be measured and the additional considerations that arise in dynamic models of political competition.

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1 Introduction

The main challenge in political economy is to provide practically useful analysis of economic policy problems where politics is important. A vital part of the tool kit needed to increase the competence of economists in this area is finding a model of political incentives that can be applied to a wide class of relevant policy problems. Progress has been made in achieving this end and this paper develops an approach to one central piece of this – the literature on electoral strategy in two party competition with a majoritarian electoral system.

While two party competition is special for many reasons, it has proven to be a workhorse case for the study of political competition. There is probably more literature on this model than any others, perhaps reflecting an Anglo-American bias in the literature. However, because of its prevalence, it is a good point to take stock of what is useful for the study of economic applications. Understanding whether the insights that come out of this strategic model are general is important.

The paper suggests a unifying approach which generates a number of useful insights about the policy process which should be useful in a wide variety of applications of interest to policy economists. The approach formulates the problem of electoral strategy as a balancing act between rewarding core party supporters and swing voters with weak party ties. This general approach is not new and corresponds to the way that much of the data on voter allegiances is collected around the world. However, the ingredients of the model are assembled somewhat differently here.

An attractive feature of the approach is that it can handle a wide variety of economic environments – including multi-dimensional policy spaces. We also show that the model gives guidance on measurement and gives way naturally to empirical analysis of policy outcomes. Moreover it provides a vehicle for thinking about credibility issues and dynamic aspects of political competition.

This paper is organized as follows. It begins in section two by reviewing some general background issues in modeling electoral competition. Section three lays out the approach that will be developed and discussed in the remainder of the paper. Section four puts the model to work and generates some insights into a class of policy problems that have been studied in the literature. In one of the applications, the model gives rise naturally to strategic complementarities between parties' strategies which facilitates get-

ting useful insights. Section five of the paper reviews some credibility issues and how they might impinge on the insights that can be gained from the model. Section six shows how the approach can serve as a guide to empirical investigation and discusses, in particular, how some of the key empirical magnitudes can be measured. Section seven discusses how the ideas behind the model have implications for dynamic policy settings while section eight concludes.

2 Background Issues

There is a vast literature studying the theory of political competition and its relevance for economic policy choice. This is not the place to survey this in depth.[1] However, it will be useful to place the main ideas used in the model below in context. It will also help to justify the modeling approach that is taken here.

All contributions in the field of political economy owe a debt to Downs (1957). His work is particular relevant to the study of strategic two-party political competition. Downs formulated the problem of policy choice as a problem of strategic behavior between competing parties' intent on winning. He showed how parties that care solely about winning will seek out a Condorcet winner, i.e. a policy that beats all others in pairwise comparisons. As is known from Black (1958), one simple way to generate a Condorcet winner is to work with single-peaked preferences over a single-dimensional policy space. From this follows the well-known observation that political competition will lead to outcomes that serve the median voter.

These ideas have a superficial attractiveness and there may even be cases where the model provides a good description of reality. However, as a theoretical foundation for the study of political competition, they have deficiencies and a great deal of the research in the field of political economy since Downs wrote has responded to these.

If *pure strategies are required*, then the model works only in very restrictive policy environments. In particular, equilibria can not be pinned down in policy environments which are rich enough to encompass many policy debates in public economics or trade policy. This has sometimes lead to policy analyses being dominated by very simple economic models. A good

[1] See Persson and Tabellini (2000) and Roemer (2001) for useful discussion of alternative approaches to electoral competition.

example is the central role given to the median voter model, popularized in this context by Meltzler and Richards (1980). Banks and Duggan (2004) and Myerson (1993) have developed modeling approaches that use mixed strategies to overcome the existence problem.[2] However, it is typically quite involved to compute such equilibria in rich economic models.

The more popular strategy to ease the problem of existence of equilibrium in strategic models of politics is to consider probabilistic voting. This allows for random elements in voting decisions which make the mapping from policy choices into political outcomes difficult for parties to predict when formulating their electoral strategies. This simple analytical device is useful in making concrete progress in studying political strategy. The influential textbook by Persson and Tabellini (2000) makes extensive use of the approach in exploring the policy implications of different economic models.[3] This approach often assumes that there are some fixed and some pliable policy dimensions with competition taking place on the latter. As Duggan (2004) points out, the introduction of probabilistic voting is no panacea for the existence problem in studying electoral strategy. However, in practice, it is often useful in making progress.

A second feature of the Downsian model is its important prediction (which holds quite broadly) of policy convergence. This also tends to be a feature of models with mixed strategies[4] and models with probabilistic voting. Predicting policy divergence in strategic models of politics generally requires parties to care about policy as well as winning. Calvert (1985) and Wittman (1977) have put forward models with probabilistic voting where parties have policy preferences. In general, these models predict divergence in policy platforms.[5] He also develops his own model of competition – the Party Unanimity Nash Equilibrium or PUNE – which studies the role of within party decision making in forming party platforms. He studies the interplay of three factions which he calls reformists, opportunists and militants. There is no general result proving existence of equilibrium in this class of models. However, they have been used fruitfully to study some policy problems. The model put forward has some features in common with these ideas.

[2]Duggan (2004) makes a powerful argument for this approach in general.

[3]Lindbeck and Weibull (1987) is an important early contribution which uses this approach.

[4]In models with mixed strategies this amounts to each party using the same probablility distribution over policy outcomes. Hence, there may not be convergence *ex post*.

[5] Roemer (2000) offers a useful review of these approaches.

Another issue in the Downsian framework (and most of its progeny) is the need to make strong assumptions about the ability of parties to commit to political platforms ahead of an election. This can only be justified under fairly extreme assumptions, for example, that parties have no policy preferences. But that creates a tension in what is being assumed about parties and voters. Even a small amount of party preference would create a credibility problem.

The literature has responded much more to the challenge of existence of equilibrium than it has to discussing credibility. The focus is typically on the pre-election politics of platform formation where politicians can commit. While there are models of post-election politics, notably those in the political agency tradition, these are rarely joined up. The complicating factor is that such models are typically dynamic and there are good reasons to want to limit the analytical complications in generating policy relevant insights. In attempting to study credibility endogenously and overcome those complications two broad approaches have emerged. One class of models developed by Osborne and Slivinski (1986) and Besley and Coate (1997) work with "types" as a source of credibility. A policy is credible only if the politicians elected to implement it regard that policy to be *ex post* optimal. A second class of models, sees credibility as a dynamic problem where deviations from pre-announced platforms lead to punishments by voters as enforcement mechanisms. This approach was pioneered in political economy by Alesina (1988).[6]

Lastly, in the classic strategic model of politics, voters care solely about policy while parties care only about winning. Just as assuming that parties do not care about policy is questionable, so is assuming that voters do not care about winning. Beginning with the work of Berelson, et al (1954), political scientists have developed "identity" based theories of voting in which voters form attachment to particular parties. Campbell, et al (1960) define party identification as an "affective orientation" towards a group. (The analogy between political allegiance and supporting a football team is relevant here.) This has influenced election studies that divide the world into groups of voters who are attached to parties and those that are independent and whose voting is more issue based.[7] Debates about whether party

[6] See also Aragones, Palfrey and Postlewaite (2007).

[7] This can be thought of as a "behavioral" as opposed to "rational" model of voting.

identification is weakening are on-going in political science.[8]

The model that we develop below is heavily influenced by the Michigan voting studies beginning in the 1950s whose ideas continue to shape election surveys to this day. They divide voters into two broad groups. Some voters are loyal to a particular party. In the approach taken here this could be for affective or policy based reasons. Other voters are "swing voters" and vote primarily on the basis of issues. They may also have attachments to parties, but they are weaker. Given the influence of the Michigan project, in the United States and elsewhere, this "model" of voters has the advantage of mapping nicely into data on voters collected in a range of election studies. Thus, it will facilitate mapping some of the key ideas in the model to empirical magnitudes.

To the extent that party loyalty is affective, then loyal voters may choose to support a particular party regardless its stance on policy issues. It is "as if" they care only about a particular party winning. From a modeling point of view, this is not very different from invoking a fixed set of issues which parties have divergent stances on and which lead to some voters to be loyal. This does, however, raise the question of why parties cannot converge on this dimension of policy. Here again, an analysis of credibility may be necessary.

This discussion gives way naturally to thinking of parties as comprising groups of citizens who are also voters. Parties must find ways of aggregating preferences and this will reflect affective loyalties and underlying policy preferences. We would expect, as in Roemer (2000) for parties to have "preferences" that reflect what voters care about. However, there is no reason to expect party activists to be a representative sample of voters at large. In any complete theory of political competition, party membership (and hence party preferences) should be endogenous.

3 The Approach

The approach used throughout the paper builds on many previous contributions. It is an approach which is able to handle a fairly general set of economic environments. For this reason, we can focus in this section on the study of politics and the additional insights that this brings keeping the economics in the background. The applications presented in the next section will then join these two aspects of the model together.

[8] See Green, Palmquist, and Schickler (2004) for an excellent discussion of these issues.

The key feature of the analysis is to think of political competition as a three-stage problem. At stage one, parties compete by deciding how much to favor swing voters versus loyal voters. Stage two sees an election being held. At stage three parties pick policies to determine the best way to deliver on their stage one promises.

3.1 Basics

There are two parties – labelled a and b – which form a political duopoly. Parties are best thought of as comprising a group of citizens who are loyal to some core principles that bind them to the party. The parties run elections in which they control the policy and candidate selection process. They also control policy implementation after the election.

The voting population falls into two broad groups. A fraction σ of voters display weak party attachments and vote for either party based on the policy utility that they are offered from a set of policies which are abstractly labeled as $x \in \mathcal{A}$. They are *swing voters*. Among the swing voters there are j distinct groups labelled $j = 1, ..., \mathcal{J}$ with policy preferences represented by $v^j(x)$. The fraction of citizens in each swing voter group j is denoted by π_j. The remaining fraction of voters $1-\sigma$ are loyal to one of the parties. We will refer to these as *committed* voters. Their utility is denoted by $v^k(x)$ where $k \in \{a, b\}$.[9] A fraction $(1+\lambda)/2$ of the loyal citizens is attached to party a. The parameter $\lambda \in [-1, 1]$ is a measure of party advantage in terms of committed voters.

Voting intentions of swing voters are described using a conventional probabilistic voting model.[10] Suppose that v_k^j is the utility that a citizen from group j gets from voting for party k. Then we suppose that she will vote for party a over party b if:

$$\omega + \eta + v_a^j - v_b^j > 0$$

where $\omega$is an idiosyncratic (i.e. voter specific) shock and η is a common shock that affects all voting intentions. For simplicity, let $\boldsymbol{\omega}$ be uniformly

[9] They are modeled as if they are a homogenous group,but the function $v^k(x)$ could easily be thought of as the aggregate of heterogeneous party members.

[10] See, for example, Persson and Tabellini (2000).

distributed on $\boldsymbol{\omega} \in \left[-\frac{1}{2\phi_j}, \frac{1}{2\phi_j}\right]$.[11] Let $\phi = \sum_{j\in\mathcal{J}} \pi_j \phi_j$, then we will talk of:

$$v_k = \sum_{j\in\mathcal{J}} \varphi_j v_k^j.$$

as the "representative" swing voter utility offered by party $k \in \{a, b\}$, where where $\varphi_j = \frac{\phi_j}{\phi}$. This linear aggregation of swing voters is clearly quite special. However, it is useful in the study of political equilibria as well shall see below.

There are a number of different ways of interpreting probabilistic voting. One is that politicians are uncertain about the true distribution of voter preferences. Another is that there are idiosyncratic elements that influence choice and are orthogonal to policies as in the random utility model that is used to model a variety of discrete choices in economics. Third, it could be given a more behavioral interpretation with shocks representing random deviations from rationality. Which of these is taken is unimportant for most of the discussion that follows.

Voters are distributed in a continuum of districts. We assume that the composition of swing voters is the same in each.[12] However, each may contain a different fraction of committed voters. Specifically, let μ be the "advantage" that party a has in a particular district. This variable is distributed on $[-1, 1]$ with mean λ. Let $H(\mu; \lambda)$ be the distribution function of μ. Party a wins a seat if it obtains more than half the votes, i.e.:

$$\sigma 2\phi \left[\eta + v_a - v_b\right] + (1 - \sigma)\mu > 0$$

The party wins the election if it wins in half the districts. This is true if

$$1 - H\left(-\frac{2\sigma\phi}{1-\sigma}\left[\eta + \left[v_a - v_b\right]\right], \lambda\right) > \frac{1}{2}$$

or

$$m_H \equiv H^{-1}\left(\frac{1}{2}, \lambda\right) > -\frac{\sigma 2\phi}{1-\sigma}\left[\eta + \left[v_a - v_b\right]\right] \tag{1}$$

[11] The same basic model can also be used to study multiplicative shocks, i.e. where the voting rule is:

$$\omega + \eta + \log(v_a) - \log(v_b) > 0.$$

[12] The makes the exposition easier. Besley and Preston (2007) generalize the model to allow σ to vary across districts and specify a general joint distribution of σ and μ.

where m_H is the median value of the party advantage μ.

Party a therefore wins if the common shock η exceeds the threshold:

$$\hat{\eta} = -\kappa - [v_a - v_b]$$

where

$$\kappa = \frac{1-\sigma}{\sigma 2\phi} m_H. \tag{2}$$

This threshold depends on two things: (i) the parameter κ which is a measure of the political advantage of party a (ii) any policy advantage which makes party a more attractive than party b measured by $[v_a - v_b]$.

A large κ means that party a needs a smaller aggregate shock to win the election. For the most part, we treat this as an exogenous measure of party a's advantage, although in our discussion of dynamic issues, we return to the possibility that this is manipulated strategically. In the case of **a** single-district such **as** the election of a State Governor, the distribution of the party advantage across districts is irrelevant and $m_H = \lambda$. In this case, it is only the advantage (or disadvantage) in aggregate committed voters that matters. This would also be true if the distribution of committed voter support across districts is not skewed. In the case of a skewed distribution of committed supporters, the party a could have an advantage or disadvantage even if $\lambda = 0$, i.e. there is no bias in the quantity of committed voter support. We will discuss some ways of parametrizing and measuring this advantage below.

Party a's policy advantage, as manifested in $[v_a - v_b]$, is modeled endogenously and is determined by strategic behavior by parties. It is the main focus of our analysis and we turn to this issue now.

3.2 Political Equilibrium

We study political equilibrium in three stages: *Stage I*: Each party decides how much utility to allocate utility to the "representative" swing voter. This could be "backed" by candidate selection. *Stage II*: The election is held and one party wins a majority. *Stage III*: The party that has won picks policies to achieve the utility allocation promised to the swing voters (assuming that this is incentive compatible). We study each stage working backwards.

3.2.1 Policy Choice

Let $x_k^* = \arg\max_{x\in\mathcal{A}} \left\{v^k(x)\right\}$ be party k's preferred outcome and let:

$$\underline{v}_k = \sum_{j\in\mathcal{J}} \varphi_j v^j(x_k^*)$$

be the utility of the swing voters when party **k** implements its preferred policy. This defines a lower bound on the representative swing voter's utility compatible with *ex post* Pareto efficiency. The upper bound is:

$$\bar{v} = \max_{x\in\mathcal{A}} \left\{ \sum_{j\in\mathcal{J}} \varphi_j v^j(x) \right\}$$

which is attained when the policy vector is picked to maximize the representative swing voter's utility.

If party k wins, let its payoff function be defined by the following Pareto efficiency problem for $v \in [\underline{v}_k, \bar{v}]$:

$$W^k(v) = \max_{x\in\mathcal{A}} \left\{v^k(x)\right\}$$

subject to

$$\sum_{j\in\mathcal{J}} \varphi_j v^j(x) \geq v.$$

This describes the best way for a party to reward its core supporters subject to delivering a utility level ν which had been offered to the representative swing voter before the election.[13]

The function $W^k(v)$ could be quite complicated depending on the policy issues being studied. However, it is convenient that the economics behind the policy are bundled into this function which depends on the political outcome only via its dependence on v_k. Thus the structure allows the economics and politics of policy determination to be studied in a separable way**,** while allowing the economics underneath it all to be quite general. For example,

[13] We could easily add an additional additive component reflecting the value of winning the election into the function $W^k(v_k)$. This has a variety of possible interpretations including monetary or ego rents from winning the election.

the policy problem could involve the use of an array of policy instruments as in an optimal tax model.

The function $W^k(v_k)$ is relevant when party k wins. However, when party k loses the election, the utility of its members depends on v_{-k} – the swing voter utility offered by the other party. We denote party k's payoff in this case by $\underline{W}^k(v_{-k})$.

Implicit in this discussion, is an *efficiency principle* which says that in studying policy outcomes in static political economy models, we should expect Pareto efficient policy outcomes.[14] Parties competing for voters have no interest in implementing policy packages that can be a Pareto dominated. Just as in normative accounts of policy, how this shapes up depends on the policy instruments available for achieving this end. Moving from normative to positive studies of policies does not necessarily invalidate the study of Pareto efficient policy making. That is not to say that models cannot be developed that generate inefficiencies in political decision making.[15] However, this needs to come out of the structure of decision making and basic concerns in electoral politics, as modeled here, are not sufficient. Thus saying that resource allocation is political should not be taken as an automatic by-word for inefficiency.

Where the political economy literature has had trouble in the past is by working with models that are typically much simpler than the rich policy models of normative economics. Often it has been necessary to assume a very limited policy space to achieve political equilibrium, thereby suggesting that the political equilibrium is Pareto inefficient. But this has nothing to do with politics as such, more to do with exigencies imposed by modeling. While the approach that we are suggesting here offers no panacea as far as existence of equilibrium goes, the way that we have framed the issues does make clear that one should begin from a model where the government uses its policy instruments efficiently unless there are good reasons for preventing it from doing so.

[14] Hettich and Winer (1999) apply this to positive tax policy with the weights in the Pareto problem determined as here by an underlying probabilistic voting game.

[15] See, the discussions in Wittman (1989), Besley and Coate (1998), Acemoglu (2003) and Besley (2006, chapter 2).

3.2.2 The Election

We focus on a majoritarian electoral system where the party that wins a majority of seats wins the election. Given a pair of promised utility levels to the representative swing voter, then this depends solely on the aggregate shock η. In general, suppose that η is symmetrically distributed on $\left[\underline{\eta}, \bar{\eta}\right]$ with a distribution function $G(\eta)$ with mean zero. Then the probability that party a wins is:

$$P(\kappa + v_a - v_b) = G(\kappa + v_a - v_b).$$

For many applications, including those below, it is useful to work with the case where where η is uniformly distributed on $\left[-\frac{1}{2\xi}, \frac{1}{2\xi}\right]$. In this instance the probability that party a wins is:

$$P(\kappa + v_a - v_b) = \begin{cases} 0 \text{ if } \xi[\kappa + v_a - v_b] \leq -\frac{1}{2} \\ 1 \text{ if } \xi[\kappa + v_a - v_b] \geq \frac{1}{2} \\ \frac{1}{2} + \xi[\kappa + v_a - v_b] \text{ otherwise.} \end{cases} \tag{3}$$

which makes explicit the fact that, if party a has a sufficiently large advantage as measured by κ, then it wins the election for sure.

Using this, it is now straightforward to see that the ex ante payoff of party a when the parties offer $\{v_a, v_b\}$ to swing voters is:

$$P(\kappa + v_a - v_b) W^a(v_a) + [1 - P(\kappa + v_a - v_b)] \underline{W}^a(v_b)$$

and that for party b is:

$$P(\kappa + v_a - v_b) \underline{W}^b(v_a) + [1 - P(\kappa + v_a - v_b)] W^b(v_b).$$

We now have the ingredients that we need to study the electoral equilibrium.

3.2.3 Electoral Strategy

The currency of electoral strategy is the utility level offered to the representative swing voter offered by each party denoted $\{v_a, v_b\}$. We take the standard route of looking for a Nash equilibrium between the parties.

The model of politics that we are studying is primarily about picking allocations from the Pareto frontier between the ideal points of parties and swing voters. We will start by abstracting from the issue of credibility which we have argued should be central to our thinking about political resource

allocation. In the absence of credibility, it would not make sense to allow any policy-motivated party to offer anything other than $\underline{v}_k$ – its ideal point – to the swing voters. This is just as in the citizen-candidate model of Osborne and Slivinski (1996) and Besley and Coate (1997). In this case, the political equilibrium is trivial with both parties simply able to offer their ideal points. The election outcome would then be determined by

$$P\left(\kappa + \underline{v}_a - \underline{v}_b\right).$$

To allow parties to diverge from their ideal point, therefore requires some mechanism for achieving credibility. We will come back to this and discuss some models with credibility constraints are an issue in section 5 below. However, for now we suppose that a party can choose any swing voter utility level in the interval $[\underline{v}_k, \bar{v}]$.

In a Nash equilibrium:

$$v_a^* = \arg \max_{v \in [\underline{v}_a, \bar{v}]} P\left(\kappa + v - v_b\right) W^a\left(v\right) + \left[1 - P\left(\kappa + v - v_b\right)\right] \underline{W}^a\left(v_b\right)$$

$$v_b^* = \arg \max_{v \in [\underline{v}_b, \bar{v}]} \left[1 - P\left(\kappa + v_a - v\right)\right] W^b\left(v\right) + P\left(\kappa + v_a - v\right) \underline{W}^b\left(v_a\right).$$

Each party's maximization problem embodies a standard and natural trade-off. To see this clearly observe that the reaction function, $\rho^a\left(v_b\right)$ for party a, assuming an interior solution, can be derived from the first order condition:[16]

$$\frac{\partial P\left(\kappa + \rho^a\left(v_b\right) - v_b\right)}{\partial v} \left[W^a\left(\rho^a\left(v_b\right)\right) - \underline{W}^a\left(v_b\right)\right] + P\left(\kappa + \rho^a\left(v_b\right) - v_b\right) \frac{\partial W^a\left(\rho^a\left(v_b\right)\right)}{\partial v} = 0 \tag{4}$$

The first term reflects the fact that increasing v_a enhances the probability that party a wins. The second term in (4) reflects the cost to party a of moving policy towards the preferences of the representative swing voter. Absent electoral concerns a party would pick $v_k^* = \underline{v}_k$. A necessary condition for an interior solution is $\frac{\partial W^a(\rho^a(v_b))}{\partial v} < 0$, i.e. it must be costly (on the margin) for the party to allocate more utility to the representative swing voter.

Note that an equilibrium might not exist and even if it does, there is no guarantee that it will be in the interior of the set of feasible utility allocations for the swing voters. In fact, the model displays four possible types of equilibria. First, there are equilibria where $v_a = v_b = \bar{v}$: in effect the parties are

[16] There is a symmetric expression for party b.

maximizing the probability of winning and giving as much as they can to the swing voters. In many applications this is like the traditional Downsian median voter outcome. Second, there are equilibria where $v_a = \underline{v}_a$ and $v_b = \underline{v}_b$ and parties are content to reward only their loyal supporters. This would be the outcome predicted by the citizen-candidate model. Third, there are equilibria where v_a and v_b are both interior. Finally, there are mixed cases where one party is at one of the extremes and the other in the interior or at the other extreme.

The model identifies the key primitives that can affect policy outcomes. First, there is the identity and preferences of swing voters. Second, there are policies and motivations of party members (the political elites who control policy). These enter the payoff functions $W^k(\cdot)$ and $\underline{W}^k(\cdot)$.[17] Third, there is the state of political competition as embodied in the parameter κ. As we saw above, this represents how core support varies between the two parties in a way that gives one party an advantage.

It should be clear to readers that know the political economy literature well that the model developed here has much in common with the Calvert-Roemer-Wittman models of party competition referred to above. These authors emphasize that equilibrium will involve policy divergence. One important lesson of our two-stage formulation is that we should differentiate between two distinct notions of convergence – convergence in the utility offered to swing voters and convergence in policy. Parties could converge by offering the same utility level to attract swing voters. However, this could be supported by divergent policy strategies reflecting the policy preferences of the parties. What matters is that each party will choose its own (Pareto efficient) policy mix to please swing voters which depends on the costs and benefits from making particular policy pledges.

In spite its simple and appealing structure, there is no guarantee that an equilibrium exists in this model. The analysis of Duggan (2004) is relevant here and it might be necessary resort to mixed strategies in some cases. However, this is best assessed in specific policy applications. Below, we will consider two cases where existence of equilibrium is not an issue. One particularly interesting case is where the party reaction functions are upward sloping. We can then use the useful apparatus of super-modular games to

[17] It is clear that a more complete treatment of political influence would have to make these endogenous. Roemer [2001] provides a fruitful effort in this direction. Levy [2004] studies endogenous parties in a citizen-candidate setting.

study political equilibria. This apparatus has been widely used in industrial organization as reviewed by Vives (2005), but seems to have had less impact in the study of political competition.

4 The Model at Work

One test of the usefulness of a model is how well it can serve as a workhorse to generate insights for interesting applications. This section will develop two main examples to illustrate the model at work. The first is a simple spatial politics model and the second is the distributive politics model.[18]

4.1 Spatial Politics

It is interesting to see how the model works in the context of the classic one-dimensional spatial model of politics. This has received a huge amount of attention in the literature even though it does not always represent economically relevant applications.

Suppose [[then]] that the political issue to be determined is the level of public spending $y \in [0,1]$. Denote the policies adopted by the parties as $\{y_a, y_b\}$. Suppose also that there is a single group of swing voters with preferred public spending equal 1/2. In particular let $v_a = -\left\|y_a - \frac{1}{2}\right\|$ and $v_b = -\left\|y_b - \frac{1}{2}\right\|$. Parties care about winning as well as the spending policy. The spending preference of party a is assumed to be $y = 1$ while that of b is $y = 0$. In this case, the party preference for a is $\Omega_a - \|y - 1\|$ and for b it is $\Omega_b - \|y\|$ where $\{\Omega_a, \Omega_b\}$ represent the utility that each party gets from winning. We look for an equilibrium where $1 \geq y_a \geq 1/2 \geq y_b \geq 0$ – anything else would be Pareto dominated. It is now easy to see that:

$$W^a(v_a) = \Omega_a - \left(\frac{1}{2} + v_a\right) \text{ and } \underline{W}^a(v_b) = v_b - \frac{1}{2}$$

with corresponding expressions for party b. Observe that the payoff to party a when it offers v_a to the swing voter and [[and]] party b offers v_b considering only cases with non-trivial probability is:

$$\left(\frac{1}{2} + \xi\left[\kappa + v_a - v_b\right]\right)(\Omega_a - v_a) + \left(\frac{1}{2} - \xi\left[\kappa + v_a - v_b\right]\right)v_b - 1$$

[18] Besley, Persson and Sturm (2007) develop an application where the problem is distributing a rent between a ruling group and the swing voters.

and the corresponding expression for party b is:

$$\left(\frac{1}{2}+\xi\left[\kappa+v_a-v_b\right]\right)v_a+\left(\frac{1}{2}-\xi\left[\kappa+v_a-v_b\right]\right)(\Omega_b-v_b)-1.$$

It is now straightforward to compute the Nash equilibrium $\{v_a, v_b\}$ and the implied policies.[19] This task **is** easy in this application since the reaction functions turn out to be horizontal/vertical. Define $\zeta_k = \frac{1}{2\xi} - \Omega_k$. An interior solution, this yields reaction functions:

$$v_a = \frac{1}{2}\left[-\zeta_a - \kappa\right] \text{ and } v_b = \frac{1}{2}\left[\kappa - \zeta_b\right]$$

from which policy choices can be inferred.

It is not easy to see that if $\zeta_a + \kappa \leq 0$ and $\kappa - \zeta_b \geq 0$, then there is convergence to a median voter outcome where $y_a = y_b = \frac{1}{2}$. This will happen if Ω_k is large enough. This logic is reminiscent of Downs (1957) and makes sense in a world where the desire to win by each party is the overwhelming force driving political competition.

Now consider the opposite extreme where κ is very large. In this case party a picks its ideal point as it will win anyway.[20] More generally, if $\kappa \geq 1 - \zeta_a$ then the optimal strategy of party a is always to set $y_a = 1$. The corresponding strategy of party b is then:

$$y_b = \min\left\{\max\left\{0, \frac{1}{2}\left(1-\zeta_b+\kappa\right)\right\}, \frac{1}{2}\right\}.$$

This reflects the fact that party b would never pick a policy above $y_b = 1/2$ since it would increase both its chances of winning and the value of winning by lowering y_b.

For an interior solution for both parties, we require that[21]

$$0 \leq \zeta_a + \kappa \leq 1 \text{ and } -1 \leq \kappa - \zeta_b \leq 0.$$

In this case:

$$y_a = \frac{1}{2}\left(1+\zeta_a+\kappa\right) \tag{5}$$

[19] An equilibrium always exists in this example.

[20] A symmetric argument applies to party b as κ becomes very negative.

[21] It is also possible to have a solution where one of the parties picks it ideal point.

and

$$y_b = \frac{1}{2}\left(1 - \zeta_b + \kappa\right). \tag{6}$$

If $\Omega_a = \Omega_b = 0$ (no direct desire to win), then the equilibrium outcome is centred around the policy $\frac{1+\kappa}{2}$ with one party above and one below this value. In this case, if $\kappa = 0$, the parties are located around the median with distance depending their preferences for winning. Further, if a party a enjoys an advantage then party b will tend to move its policy in the direction of party a's preferred point. More generally, a change in κ will move *both* parties policies in the same direction.[22]

However, at an interior solution, the entire impact of electoral advantage is on policy choices rather than the chances of winning. At an interior solution, the winning probability of each party is independent of κ and determined solely by desire to win of each party. To see this, observe that:

$$v_a - v_b = 1 - (y_a + y_b) = \frac{(\Omega_a - \Omega_b)}{2} - \kappa.$$

So party b neutralizes party a's winning advantage by moving policy in party a's preferred direction. The effect of κ is felt purely in the policy stance taken by the parties. In other words, party strategies collectively react so as to exactly undo the effect of the increasing electoral advantage of the other party. However, if κ increases to a point where party a picks its ideal point and party b picks $y_b = 1/2$, then an increase in κ affects the probability that party a wins.

Policy choice is also determined by the parameters (ζ_a, ζ_b). Hence the parameter ξ also turns out to be important as ξ leads to create convergence and can be interpreted as greater sensitivity of swing voters to policy (a lower variance in the aggregate shock η). Again, this leads voters to behave more in the way that is posited in the standard Downsian framework.

While simple, this example lays bare the key forces that shape the political equilibrium. The key parameters are $\kappa, \xi, \Omega_a, \Omega_b$ and the ideal points of the two parties.

[22] Besley and Preston (2007) find evidence that changes in κ have this effect in U.K. local government data.

4.2 Distributive Politics

The distributive politics problem is a classic study in political economy with a long history. Suppose that a government has a revenue to distribute across groups of voters. There are two main questions of interest. First, how will transfers be allocated across these groups? Second, how big will be the budget devoted to swing versus loyal supporters? We will also see what happens when we add in a general interest policy (a public good), in particular whether more intensive political competition crowds out spending on public goods. Even though the policy choices are Pareto efficient, the question of how electoral strategy affects who gets what is interesting and central to understanding how politics affects public resource allocation.

There are many previous contributions looking at the distributive politics problem – too many to survey here. Cox and McCubbins (1986) formulated the problem as granting political favours to core and swing groups. They argue that core supporters will receive more support when parties are risk averse. Lindbeck and Weibull (1987) study a model where two parties with fixed ideological positions compete by offering transfers to different groups. They show that parties will converge on the same transfer policies to all voters. This model is very similar to Dixit and Londregan (1996) who bring out the importance of the factors that shape the likelihood that a particular group of voters will "swing" towards a particular party. The approach has been fruitful in a wide variety of contexts – see Persson and Tabellini (2000) which makes extensive use of it. Myerson (1993) studies a similar underlying problem. He uses mixed strategies rather than probabilistic voting to get the model to work. The existing theoretical literature has focused on the case where parties are intent on winning. This leads parties to adopt symmetric strategies, i.e. all groups of swing voters gaining identical treatment from each party.

The ideas of distributive politics models have also been widely tested with a focus on how far policies are targeted to swing voters. However, as shown in the review of the literature in Larcinese, Snyder and Testa [2006], empirical support for the idea that swing voters are targeted is mixed.[23] In the light of the theoretical analysis presented here this can be reconciled. Our analysis makes clear that there is no clear-cut prediction on this – it

[23] For example, Case (2001) finds evidence of targeting towards loyal voters in Albania while Dahlberg and Johansson (2002) find evidence of targeting towards swing voters in Sweden.

depends upon the profile of swing voter groups and the extent of a party's underlying political advantage.

4.2.1 Basic Model

We assume a fixed revenue to be allocated among the J swing voter groups plus the groups who are loyal to one of the parties – groups a and b. Specifically, consider a world in which the winning party has a pot of resources to allocate to group specific transfers denoted by $(T_a, T_b, T_1, ...T_J)$ with $T_j \geq 0$. The government budget constraint is:

$$(1-\sigma)\left[\left(\frac{1+\lambda}{2}\right)T_a + \frac{1-\lambda}{2}T_b\right] + \sigma\sum_{j\in\mathcal{J}}\pi_j T_j = R \tag{7}$$

Assume within each group, each person has the income Y_j for $j = \{1, 2, ..., \mathbf{J}, a, b\}$.

For concreteness sake, we will study the problem from the perspective of party a. The problem solved by party b is symmetric. As usual we start by solving the third-stage problem. Substituting in the budget constraint (7) into party a's payoff yields the following maximization problem to pick out points on the Pareto frontier:

$$Max_{\{T_i: j\in\mathcal{J}\cup(a,b)\}}\left\{v\left(Y_k + \frac{R - \sigma\sum_{j\in\mathcal{J}}\pi_j T_j - (1-\sigma)\frac{1-\lambda}{2}T_b}{(1-\sigma)\left(\frac{1+\lambda}{2}\right)}\right)\right\}$$

subject to

$$\sum_{j\in\mathcal{J}}\varphi_j v\left(Y_j + T_j\right) \geq v.$$

This yields a vector of transfers $(T_a^*, T_b^*, T_1^*, ...T_J^*)$ ensuring an aggregate utility allocation of v to the swing voters.

To solve for the optimal allocation of transfers, first observe that party a will always set $T_b^* = 0$. Thus the loyal voters of the party in power are residual claimants on government transfers. In general, we can write the solution to this problem as $T_j^* = h^j(v_k)$ for some increasing function $h^j(\cdot)$ which describes how large a transfer group j receives when swing voters as a whole receive utility v_k from party k. Using the government's budget

constraint, we can solve for the transfer received by group k, denoted by $T_k^* = h^k(v_k)$, where $h^k(\cdot)$ is a decreasing function.[24]

To see exactly how this transfer function behaves, suppose that the utility function is iso-elastic, i.e. $v(Y_j + T_j) = \frac{1}{1-\varepsilon}(Y_j + T_j)^{1-\varepsilon}$ and consider the case where $T_j^* > 0$ for all $j \in \mathcal{J}$. In this instance we get the closed form $h^j(v_k) = \tau_j \gamma v_k^{\frac{1}{1-\varepsilon}} - Y_j$ where $\tau_j = \frac{\phi_j^{\frac{1}{\varepsilon}}}{\sum_{j\in\mathcal{J}} \pi_j \phi_j^{\frac{1}{\varepsilon}}}$ is a measure of the extent to which group j "swings" relative to other groups and the average swing $\gamma = \left(\sum_{j\in\mathcal{J}} \pi_j \left(\frac{\phi_j}{\phi}\right)^{1/\varepsilon}\right)^{-\varepsilon}$. In this example: $h^a(v_k) = \frac{\sigma\bar{Y} + R - \sigma\gamma v^{\frac{1}{1-\varepsilon}}}{(1-\sigma)\left(\frac{1+\lambda}{2}\right)}$ where $\bar{Y} = \sum_{j\in\mathcal{J}} \pi_j Y_j$ be the average income among the swing voters. Recall that a large value of ϕ_j says that there is a small variance in the shock to group j and hence that it is more easily persuaded to switch its vote with a policy favour. This result on the allocation of transfers across groups mirrors the classic results on allocation across swing voter groups in Lindbeck and Weibull (1987), Myerson (1993) and Dixit and Londregan (1996). With the constant elasticity form, both parties offer the same *shares* of the total budget to swing voters depending on ϕ_j.

As mentioned above, the empirical literature on distributive politics has focused on the issue of whether parties tend to devote more resources to loyal supporters or swing voters. The existing theoretical literature is poorly suited to addressing this issue as it mostly works with parties who care solely about winning. In the set-up proposed here, where parties represent loyal voters, the trade-off between targeting loyal and swing voters arises naturally.

We now study the game played between the parties where they compete by offering swing voter utility levels. Given transfers are allocated optimally across swing voter groups, party k's payoff is:

$$W^k(v_k) = v\left(Y_k + h^k(v_k)\right) + \Omega_k$$

where, as above, Ω_k is any policy "rent" from other issues that the party cares about. This is a decreasing (concave) function of v_k. If party b wins

[24] Formally:

$$h^k(v_k) = \frac{R - \sigma\sum_{j\in\mathcal{J}} \pi_j h^j(v_k)}{(1-\sigma)\left(\frac{1+\lambda}{2}\right)}$$

then

$$\underline{W}^k\left(v_{-k}\right) = v\left(Y_k\right) = \underline{w}_k,$$

which is independent of v_{-k}.

The game played between the parties is now log super-modular. This follows by observing that $\log P\left(\cdot\right)$ is concave if electoral shocks are uniformly distributed as we assumed in section 3.2.2. This implies that the game has upward sloping reaction functions. Standard arguments in the literature (see, for example Vives (2005)) then guarantee that an equilibrium exists without having to assume that the payoff function is quasi-concave.[25] It is also easy to prove uniqueness of equilibrium adapting the dominant diagonal argument used in Proposition 6 of Caplin and Nalebuff (1991).[26] Putting this together, we have:

Proposition 1 *A Nash equilibrium in the game of electoral strategy exists and is unique.*

This has the further well-known attraction that the Nash equilibrium can be derived by a variety of routes including rationalizability or iterated elimination of dominated strategies (see Milgrom and Roberts (1990)). Moreover, some comparative statics exercises are straightforward to analyze. The following result is a direct consequence of the supermodular structure:

Proposition 2 *An increase in the desire to win by either party, i.e. higher* Ω_k *leads both parties to allocate more transfers to swing voters.*

The model makes it possible to study the role of political advantage, as captured by κ, in shaping the way that resources are allocated to swing voters.

[25] In this case, the parallel with models familiar to industrial organization economists is clear with party a's payoff taking the form:

$$P\left(v_a - v_b + \kappa\right) Q^a\left(v\right) + \underline{w}_a$$

where $Q^a\left(v\right) = W^a\left(v_a\right) - \underline{w}_a + \Omega_a$ can be interpreted just like a "quantity" and $P\left(\cdot\right)$ like an inverse demand function where v_k is thought of as a "log" price. This is ordinally equivalent to maximizing

$$\log P\left(v_a - v_b + \kappa\right) + \log Q^a\left(v\right)$$

where $\log P\left(\cdot\right)$ is concave as long as the distribution of the aggregate shock, $G\left(\eta\right)$, is log-concave.

[26] This builds on an earlier argument in Milgrom and Roberts (1990).

Proposition 3 *Suppose that $W^k(v)$ is concave on v for $k \in \{a, b\}$ and that the equilibrium is interior. Then an increase in a party's political advantage leads it to target less to swing voters and more to its core supporters.*

It is clear that party a will do less for the swing voters when κ is larger – i.e. more positive, less negative. Equally party b will do more. This captures a central intuition about political competition and the responsiveness of politicians.

The model makes clear what factors shape the allocation of transfers *between* different groups of swing voters as well as factors that shape allocations between loyal and swing voters. It is clear that there are some situations in which the equilibrium is conducive to swing voters getting more attention from politicians. It is consistent with the variety of empirical results that have been found in this empirical literature on distributive politics.

This formulation of the distributive politics model gives us a means of thinking about the issue that has been at the heart of most empirical testing – whether there is evidence that parties target loyal supporters or swing voters. Whether a particular group gets a transfer should depend on how easily swing voters switch their allegiance, the state of political competition and parties' desire to win.

4.2.2 Adding a General Public Good

The model is able to generate further insights into the politics of policy choice by incorporating the possibility of financing a general public good alongside targeted transfers. In particular, this allows us to ask whether transfers to swing voters crowd out allocating resources to the general interest good.[27] This kind of political distortion is often claimed to be a "cost" of politicized decision making over policy.

Formally, let the general public good be denoted by B with B_k being the level of general public good being offered by party $k \in \{a, b\}$. For convenience, let preferences between public and private goods be additively separable so that, i.e. $v(Y_j + T_j) + b^j(B)$. We normalize the cost of the general public good to be one. The government budget constraint is now:

$$(1-\sigma)\left[\left(\frac{1+\lambda}{2}\right)T_a + \frac{1-\lambda}{2}T_b\right] + \sigma\sum_{j\in\mathcal{J}}\pi_j T_j + B = R$$

[27] This generates insights similar to those in Lizzeri and Persico (2001) who use the framework of Myerson (1993) to investigate this issue.

Now it is easy to see that:

$$T_j^* = h^j \left(v_k - \sum_{j \in \mathcal{J}} \varphi_j b^j \left(B_k \right) \right)$$

where $h^j(\cdot)$ is defined above. Transfers are exactly as above except that swing voter utility is defined net of the value of the general public good being offered by party k.

The level of public good offered by k will follow an appropriate version of the Lindahl-Samuelson rule. This is an example of the efficiency principle at work. Specifically:

$$B^k(v) = \arg\max_{B \geq 0} \left\{ v \left(Y_a + \frac{\sigma \bar{Y} + R - B - \sigma \sum \pi_j h^j \left(v_k - \sum_{j \in \mathcal{J}} \varphi_j b^j(B) \right)}{(1-\sigma)\left(\frac{1+\lambda}{2}\right)} \right) + b^k(B) \right\}.$$

The level of the public good promised by party k will be $B_k = B^k(v_k)$. The political distortion is in terms of the social weights used. Loyal supporters of the other party do not figure in the calculation.[28] The party will use a weighted sum of the marginal rate of substitution of the swing voters and their own committed voters. In the isoelastic utility example discussed above, this becomes:

$$\frac{\sigma\gamma \left(v - \sum_{j \in \mathcal{J}} \varphi_j b^j(B) \right)^{\frac{\varepsilon}{1-\varepsilon}}}{(1-\varepsilon)(1-\sigma)\left(\frac{1+\lambda}{2}\right)} \sum_{j \in \mathcal{J}} \varphi_j \frac{\partial b^j(B)}{\partial B} + \chi_k(v) \frac{\partial b^k(B)}{\partial B} = 1$$

where

$$\chi_k(v) = \left(Y_k + \frac{\sigma \bar{Y} + R - B - \sigma\gamma \left(v - \sum_{j \in \mathcal{J}} \varphi_j b^j(B) \right)^{\frac{1}{1-\varepsilon}}}{(1-\sigma)\left(\frac{1+\lambda}{2}\right)} \right)^{\varepsilon}$$

is the reciprocal of the marginal utility of private income of party k's loyal supporters.[29] The party commits to an allocation of the general public good to weigh up the direct benefit against the cost in the form of different levels of transfers to each group.

[28] Swing voters for whom $T_j^* = 0$ also receive no weight.

[29] As above, this implicitly assumes that $T_j^* > 0$ for all swing voters.

We are interested in how $B^k(v)$ varies with v, i.e. does giving more or less to the swing voters increase or reduce focusing on general public goods. This effect is in general ambiguous as the weights on the public goods valuation of the swing and loyal voters go in different directions. From the point of view of swing voters, transfers and public goods are complements as parties will increase both transfers and public goods to court swing voters. From the point of view of party loyalists, an increase in swing voter utility leads to crowding out of general public goods on account of transfers being greater.

We focus now on the crowding case where:

$$\frac{\partial B^k(v)}{\partial v} < 0$$

for $k \in \{a, b\}$. In this case, more intense efforts to attract swing voters leads to fewer general public goods being provided. In this case,

$$\underline{W}^a(v_b) = v(Y_a) + b^a\left(B^b(v_b)\right)$$

is now decreasing in v_b since fewer general public goods are provided when party b offers more to the swing voters. If we assume that this is the case and assume that the distribution of aggregate shocks to voting outcomes is uniform (see section 3.2.2) then we also have upward sloping reaction functions in the electoral strategy game played between the two parties. We now have an extension to the result in Proposition 2 above:

Proposition 4 *In the distributive politics model with a general public good where* $\frac{\partial B^k(v)}{\partial v} < 0$ *for* $k \in \{a, b\}$*, an increase of the desire to win by either party, as measured by* Ω_k*, leads both parties to allocate less to the general public good.*

This result translates the main insight of Lizerri and Persico (2001) into this framework and shows further how supermodularity can simplify the comparative static properties of the model.

5 Credibility

The discussion so far has ignored what makes policy credible, an issue to which the political economy has paid comparatively little attention. This section illustrates credibility issues focusing on the spatial model of section 4.1.

5.1 Strategic Delegation

The strategic delegation model of candidate selection sees a party as picking a candidate thereby committing the party to a particular policy platform. This phenomenon can be important. In presidential elections in the U.S. parties may pick a pro-life or pro-choice candidate to commit to a policy position after an election. In the U.K., Tony Blair was originally picked as a leader because he is on the right of his party, and hence provided some kind of credible commitment of the Labour to occupy the centre ground. More generally, great significance is typically attached to the process of selecting leaders who reflect particular policy positions as well as attributes like honesty and competence.[30]

The selection approach to credibility lies at the heart of the citizen-candidate models of political competition suggested by Osborne and Slivinski (1996) and Besley and Coate (1997).[31] It parallels the approach taken in much of the literature on central banking (see Rogoff (1985)) where conservative central bankers solve the problem that governments may be prone to generating surprise inflation. In principle, the process of political selection then becomes a game of strategic delegation – picking a party leader or rank-and-file politicians to influence electoral outcomes.

To study this formally, it is necessary to specify the set of candidate types and the delegation game between the parties, in particular how parties pick politicians. In the simple spatial politics model studied in section 4.1 we can suppose that parties pick their leaders using majority rule. Then the winning candidate implements their preferred policy after he or she wins the election. To illustrate this concretely, suppose also that the party positions that we have specified, 1 for party a and 0 for party b, are the positions of a majority of the party members. However, there is a distribution of views within the party with some members having more centrist policy preferences. Thus we allow the party to pick from a continuum of candidates with ideal points $\left[\underline{Y}_a, \bar{Y}_a\right]$ for party a and $\left[\underline{Y}_b, \bar{Y}_b\right]$ for party b where $\underline{Y}_a < 1 \leq \bar{Y}_a$ and $\underline{Y}_b \leq 0 < \bar{Y}_b$. Credibility may become an issue for either party if $\underline{Y}_a > \frac{1}{2} > \bar{Y}_b$, i.e. neither party can select a candidate who will pick the swing voter's ideal policy after the election. In this case, complete convergence in policy platforms is not a possibility.[32] In this case, parties are limited in terms of what they can offer

[30] See Besley (2005) for discussion.

[31] This way of establishing credibility **is** also suggested in Persson and Tabellini (1994).

[32] It is clearly unsatisfactory to treat party membership as purely exogenous. See

to swing voters because of credibility.

To illustrate the consequences of this, we can compute the Nash equilibrium imposing the limits on v_a and v_b due to credibility. For party a, the constraint is that $v_a \in \left[-\left(\underline{Y}_a - \frac{1}{2}\right), -\frac{1}{2}\right]$ and for party b it is $v_b \in \left[-\left(\frac{1}{2} - \bar{Y}_b\right), -\frac{1}{2}\right]$. The payoff functions and probability of winning functions are, however, unchanged. Hence, we can proceed as in section 4.1 and check whether the relevant constraints are binding.

In an unconstrained Nash equilibrium, the outcome is exactly as in section 4.1. Otherwise, one or both parties will not be able to offer the outcome that it would prefer. This will be an issue in cases where the Nash equilibrium has convergence to the swing voters' preferred policy which we observed above will tend to be the case when Ω_k is large for both parties, i.e. there is strong motive to win which is not based on the policy y.

5.2 Reputation in Repeated Elections

Credibility can also be studied using the apparatus of repeated games. This was first suggested in a model of political competition by Alesina (1988) where policy credibility is established by enforcement of reputation in a repeated game.[33] A politician who promises a policy before an election is punished for failing to deliver this policy afterwards by losing credibility with swing voters who thereafter expect the party to pick its ideal point in all future elections.

To be concrete, we again study credibility in an infinitely repeated version of the spatial model of section 4.1. Electoral competition evolves over a series of dates denoted $t = 1, 2, ...$ For simplicity, we consider the case where all parameters of the model are fixed over time. However each period, there is a fresh realization of the shock η_t determining electoral control with such shocks being *iid* over time. Idiosyncratic shocks to swing voters described in 3.1 are also *iid* over time.

The best way to think of the repeated elections model is in terms of parties announcing "campaign promises" in the form of swing voter utility levels $\{\hat{v}_a, \hat{v}_b\}$ to be implemented after the election has been won. The credibility problem arises because party k is tempted, after winning the election,

Roemer (2000) for a model where party membership is endogenous.

[33] See also Aragones, Palfrey and Postlewaite (2007) which is closest in spirit to the treatment here.

to revert its ex post optimal choice where swing voter utility is $v_k = -\frac{1}{2}$. We will look for a stationary sub-game perfect equilibrium of the game where the same policies are announced and implemented (by the winning party) each period and both parties discount the future with common discount factor $\delta \in [0, 1]$. We will examine the case where these announcements are supported by beliefs of the voters that any party that has reneged on its promise in the past will implement its preferred policy ever after. All the action will take place with swing voters since the committed voters continue to support the party even after it has lost credibility with the swing voters. It may also pick up some swing voters by only on the basis of the aggregate and idiosyncratic popularity shocks.

Intuitively, the credibility problem lies in convincing the swing voters that the party will not renege to $v_k = -\frac{1}{2}$. The most that a party will wish to offer swing voters is their preferred outcome in which case $v_k = 0$. If $v_k = 0$ is credible for both parties then any $v_k < 0$ is credible and hence the static Nash equilibrium described in section 4.1 is also a credible equilibrium. Otherwise, credibility will act as a constraint forcing the party to offer less to the swing voters than it would ideally like. So our strategy will be to investigate when this is true and we will provide a sufficient condition for credibility to constrain the set of promises that can be made to swing voters.

The equilibrium that we describe is as follows. Parties offer $\{\hat{v}_a, \hat{v}_b\}$. These define a value of maintaining this swing voter utility to the party which wins. The winning party compares this to deviating to $v_k = -1/2$ for one period and then offering $v_k = -1/2$ is every election thereafter – supported by voter's beliefs that any deviation from $v_k = -1/2$ is not credible. This creates a value from deviating. By comparing these two values, we can establish whether $\hat{v}_k$ is credible.[34] Our next Proposition establishes a condition for such an announcement to be credible in terms of underlying preferences of parties and other parameters influencing the election outcome. For convenience define:

$$\kappa_k = \begin{cases} \kappa & \text{if } k = a \\ -\kappa & \text{if } k = b. \end{cases}$$

This notation reflects the fact that an advantage for party a is a disadvan-

[34]The example that we study here is particularly simple since the spatial model implies that the payoff function of each party is additively separable in their own strategy and that of the other party. This implies that we can hold fixed $\hat{v}_b$ in assessing the credibility condition for a and vice versa for b.

tage for party b. The following result, proved in the appendix, shows that credibility is defined in terms of an upper bound on swing voter utility that can be offered in a sub-game perfect equilibrium under the assumption about voters' beliefs that we made above.

Proposition 5 *Suppose for some* $k \in \{a, b\}$

$$\left[-\frac{1}{2} + \xi\left[\Omega_k - \kappa_k + \frac{1}{2}\right]\right] < \frac{1-\delta}{\delta}$$

Then in a stationary sub-game perfect equilibrium with voters' beliefs as described above, there exists $\bar{v}_k < 0$ *such that party* k*'s offer of* v_k *to the swing voters is credible only if* $v_k < \bar{v}_k$*.*

To interpret this condition is made somewhat tricky by the fact that changing the underlying parameters affects the equilibrium strategies employed by the parties as well as whether credibility is an issue. For example, increasing Ω_k makes it less likely that the credibility constraint is binding as winning is valuable in future. However, it also leads party k to desire a policy closer to $v_k = 0$. The reason why an increase in κ reduces credibility in the condition of the Proposition 5 is that a party that wins with high probability has an increased incentive to deviate knowing that the deviation may not significantly reduce its future winning probability.

The right hand side depends only on the discount factor. As $\delta \to 1$, there is no credibility problem. This makes sense for standard reasons – the inter-temporal trade off of a better policy choice today compared to a reduced chance of winning in future is unfavorable. Credibility is a major issue as $\delta \to 0$ since picking $v_k = -1/2$ when only the short-term optimal action is ex post optimal.

The analysis in this section is special in many ways since we have focused on stationary strategies and a very particular model. However, it is useful illustration of how credibility can constrain the set of feasible swing voter promises in elections. This interpretation of how credibility matters seems very natural. But it remains to be seen how general this insight is.

5.3 Credible Equilibrium

If a party has no credibility, then the only level of swing voter utility that it can offer is $\underline{v}_k$, i.e. picking its own most preferred policy ex post. If a party

has unrestricted credibility, then it can offer any swing voter utility level in the range $v_k \in [\underline{v}_k, \bar{v}]$. In general, restrictions on credibility reduce the amount of swing voter utility that a party can credibly offer below $\bar{v}$. Thus, analysis of credibility in the framework being studied here can, therefore, be thought of as establishing an upper bound on the utility that can be offered to the swing voters.

In both examples studied in this section, credibility imposes an upper bound $\bar{v}_k$ which can credibly be offered to swing voters by party k. We have derived this in a very specific model and it remains to be seen whether looking at a credibility as an upper bound on swing voter utility works more generally. However, in cases where it holds, it is quite straightforward to study credibility issues in static political economy models by contracting the size of the choice set from which parties can pick and looking for a Nash equilibrium in this more restrictive space.

6 Empirical Issues

This section illustrates the utility of the model as a basis for measuring changing political advantage. Having obtained estimates of either λ or κ, then the model suggests that these should explain policy outcomes. Thus, the model suggests a way of providing an empirical approach to measuring the effect of the underlying state of political competition on policy outcomes. Having a theoretical framework behind this should hopefully lead clearer interpretation of the findings as well as guiding the measurement of relevant magnitudes.

One of the main challenges in political economy is to build bridges between theoretical and empirical models of policy choices. One of the attractive features of the model is that it highlights, via the parameter κ, the way in which exogenous features of the political environment shape political competition. It highlights the role of party advantage in terms of core support as embodied in λ and the distribution of core support across districts as embodied in $H(\mu; \lambda)$. It also shows that the fraction of swing voters σ and heterogeneity in that group as embodied in ϕ are also important determinants of policy outcomes.

This section discusses the feasibility of measuring these key magnitudes and their influence on policy outcomes. It also discusses the potential pitfalls in using outcome data – either seats or votes data – as a means of measuring

political advantage to explain policy.

All of our policy examples above gave prominence to κ as a measure of exogenous political conditions which will influence the strategies that parties use in setting policy. We shall focus in particular on ways of obtaining information on κ.

6.1 Election Survey Data

We have already emphasized that the way in which the model looks at voting lines up well with existing electoral survey data. Such data are a potentially valuable source of information on the structure of voter loyalty. To illustrate the possibility of measurement, we can look at readily available data from the British General Election survey to gauge the nature of support for the two major parties (Conservative and Labour) in three general elections – 1992, 1997 and 2001. This kind of election survey data tries to discern who are committed and swing voters and hence give measures of λ and σ.

Table 1 illustrates and shows that there has been a marked fall in the proportion of voters who classify themselves as swing voters in the near decade of these data. Equally, there has been a switch in the proportion of voters who deem themselves core supporters of the Conservative party versus Labour. The data suggest a move from a situation where the Conservative party enjoyed an advantage in terms of λ towards one where that advantage resides with Labour. This may call into question whether a model of immutable preference is the right one. However, equally it should be borne in mind that there is a fair amount of sampling error in the data and there is turnover on electoral roles with new voters joining the roles and older ones moving off it. While only illustrative, this example shows how the model of voting used here can correspond to measurable magnitudes. Although much more work would be needed, these data could be used to calibrate a model along the lines studied here

Table 1 about here.

Another illustration along these lines comes from Besley, Preston and Sturm (2007) who more explicitly calibrate κ from the biannual National Election Studies (NES) between 1952 and 2002.[35] Their paper focuses on documenting the dramatic change in political competition comparing the

[35] See http://www.umich.edu/~nes/

U.S. South and non-South over this period. The parameter κ is estimated from the data by taking those who regard themselves as Democrats, Republicans and independent, i.e. swing, voters.[36] The estimate of $\kappa = \frac{(1-\sigma)\lambda}{\sigma\phi}$ is then computed by taking the proportion of Democrats less the proportion of Republicans, i.e., $(1-\sigma)\lambda$, divided by the proportion of swing voters, i.e., σ. There is no direct measure of ϕ. However, this calibrated to be a constant over this period which implies a winning probability of 90% for the Democrats in the South in the year 1952 (absent any policy advantage), i.e.,

$$\frac{1}{2} + \kappa = 0.9 \ .$$

which implicitly normalizes $\xi = 1$. The estimated value of κ is consistent with political competition in the South increased over time in part due to a rise in the share of Southern swing voters (σ) and in part due to a fall in the share of Southern Democrats less Republicans, (λ). The result is illustrated in Figure 1 which shows a dramatic decline in the political advantage of the Democrats in the south over the fifty year period of the data.

Figure 1 about here

The advantage of working with survey data of these kinds is the possibility of measuring voter preferences independently of policy outcomes to the extent that concepts like loyal and swing voters are genuine primitives or at least move slowly over time. At the very least they allow us to identify qualitative trends in the underlying sources of variation which can be used to inform theorizing about changes in political incentives.

6.2 Using Data on Seats and Votes

The above exercises tell us nothing about the distribution of voters over districts. However, the analysis in section 3.1 showed that this can be an

[36] Respondents in the NES are classified as Republican if variable VCF0301 ("Generally speaking, do you usually think of yourself as a Republican, a Democrat, an Independent, or what?") is 6 (weak Republican) or 7 (strong Republican), as Democrat if 1 (strong Democrat) or 2 (weak Democrat), or as swing voters if 3 (independent closer to the Democratic Party), 4 (independent closer to neither party), or 5 (independent closer to the Republican Party). We calculate the proportion of each type in every state and year as the ratio of the number of Republicans/Democrats/swing voters to the total number of respondents (excluding those with a missing value) each year. The sum of the three percentage points is not equal to a hundred as some respondents are categorised as apolitical (their variable VCF0301 is 9).

important source of political advantage. However, to make progress on this requires some way of looking at distribution function $H(\cdot)$ and, in particular, the location of its median value – m_H. Besley and Preston (2007) have a developed a way of thinking about this which gives way to a natural recursive estimation structure.

It is straightforward to tie the theory to two key observables, seat shares and vote shares. According to the analysis in section 3.1, the share of seats for party a is

$$S_a = 1 - H\left(-\frac{2\sigma\phi}{1-\sigma}\left[\eta + [v_a - v_b]\right], \lambda\right) \tag{8}$$

while its vote share is:

$$P_a = \sigma\left[\phi\left[\eta + v_a - v_b\right] + \frac{1}{2}\right] + (1-\sigma)\left(\frac{1+\lambda}{2}\right). \tag{9}$$

These outcomes depend on equilibrium policies and the electoral "shock" denoted by η.

Before seeing how (8) and (9) can be combined to develop a measure of political advantage, we consider how well realized outcomes on votes or seats can serve as a measure of advantage. One popular measure of political advantage that has been used in empirical work in U.S. state level data is the "Ranney" index which basically assigns a greater advantage to party a if it has a larger vote or seat share in a state legislature.[37]

To illustrate, consider a typical panel data set from jurisdictions (such as U.S. states) and suppose that we have data on seat shares S_{aij} and vote shares P_{aij} at various states $i = \{1, ...N\}$ and dates $j \in \{1, ..., J\}$. We may also have data on policy outcomes $\{y_{aij}, y_{bij}\}$ at the same dates. (These could be thought of as averages over an election cycle.) We will suppose that all other variables are time invariant but allowed to vary cross-sectionally, i.e. between jurisdictions.

To illustrate how the vote share varies with policy, consider the spatial model from section 4.1 and suppose that there is an interior political equilibrium. In that case:

$$v_{asj} - v_{bsj} = \frac{1}{2}\left[\Omega_{ai} - \Omega_{bi}\right] - \kappa_i.$$

[37] See Besley and Case (2003) for discussion and some empirical analysis along these lines.

This implies that

$$P_{aij} = \frac{1}{2} + \sigma_i \phi_i \left[\eta_{ij} + \frac{1}{2} \left[\Omega_{ai} - \Omega_{bi} \right] + \kappa_i \left(\frac{\lambda_i - m_{Hi}}{m_{Hi}} \right) \right]$$

using the definition of κ. Using the results in section 4.1, party a's policy choice will be:

$$y_{aij} = \frac{1}{2} \left(1 + \frac{1}{2\xi_i} - \Omega_{ai} + \kappa_i \right).$$

It is now clear what are the possible sources of correlation between the vote share of party a and its policy. First, this can come through party preferences affecting equilibrium policies and hence affecting votes and policy. In this example, this will induce a negative correlation between the distance between party a's policy choice and the swing voters and its vote share. In other words, a greater desire to win leads the party to move closer to swing voters and increase its vote. There will also be a correlation induced by the fact that measures of political advantage enter both vote share and the equilibrium policy. However, in general this will be quite complicated since κ_i depends on m_{Hi} which in turn depends on λ_i. So inferring much from this reduced form correlation is quite difficult.[38]

One way to make progress is to use seats and votes data to get more direct information about κ. Besley and Preston (2007) suggest a procedure based on substituting (9) into (8) to obtain:

$$S_a = 1 - H \left(\lambda - \frac{2P_a - 1}{(1-\sigma)}; \lambda \right)$$

which does not depend on "policy" (embodied in $v_a - v_b$). This opens up the potential for using the empirical relationship between seats-votes to estimate parameters that go into κ.

Besley and Preston (2007) shows that if the $H(\cdot; \lambda)$ has the following functional form:

$$H(\mu, \lambda) = \frac{\exp(\alpha) \left[\frac{\frac{1}{1-\sigma} - \mu + \lambda}{\frac{1}{1-\sigma} + \mu - \lambda} \right]^{-\beta}}{1 + \exp(\alpha) \left[\frac{\frac{1}{1-\sigma} - \mu + \lambda}{\frac{1}{1-\sigma} + \mu - \lambda} \right]^{-\beta}}$$

[38] This parallels an argument in Larcinese, Snyder and Testa (2006).

for $\mu \in [\lambda - \frac{1}{1-\sigma}, \lambda + \frac{1}{1-\sigma}] \cap [-1, 1]$, then the seats votes relationship takes the widely-used "log odds" form:

$$\log\left(\frac{S_a}{1-S_a}\right) = \alpha + \beta \log\left(\frac{P_a}{1-P_a}\right). \tag{10}$$

The parameter α denotes districting *bias* since it indicates whether one party has an advantage over another when votes are divided equally. It reflects skewness in the seats-votes relationship. The parameter β denotes *responsiveness* of seats to votes and measures the degree to which the system deviates from proportional representation ($\beta = 1$). In this case, it is easy to show that κ has a closed form measure:

$$\kappa = \frac{(1-\sigma)\,\lambda}{\phi} + \frac{1}{\sigma\phi}\left[\frac{1-\exp\{-(\alpha/\beta)\}}{1+\exp\{-(\alpha/\beta)\}}\right]. \tag{11}$$

This says that the political advantage of party a can be decomposed into two parts: (i) $\frac{(1-\sigma)\lambda}{\phi}$: which depends on the *mean* voting advantage in terms of loyal support towards party a and (ii) $\frac{1}{\sigma\phi}\left[\frac{1-\exp\{\alpha/\beta\}}{1+\exp\{\alpha/\beta\}}\right]$: which embodies the districting advantage. Returning to (10), it is clear that the absence of districting bias is equivalent to the second term in (11) being zero.

Besley and Preston (2007) use estimates of κ derived from estimating (10) to explain policy outcomes in U.K. data. Since there is no direct measure of λ or σ in their data, they treat λ as a random effect and focus on the empirical consequences of districting bias measured by $\frac{1}{\sigma\phi}\left[\frac{1-\exp\{-(\alpha/\beta)\}}{1+\exp\{-(\alpha/\beta)\}}\right]$. They find that the state of political competition as measured in κ is indeed related to policy choices in a way that is consistent with a simple model of electoral strategy.

Besley, Persson and Sturm (2007) look at Gubernatorial elections where there is no issue of districting bias so $m_H = \lambda$. Cognizant of the issues involved in using P_a as a proxy for κ, they suggest two possible ways forward. First, they use data down ballot office elections to measure λ. The data come from Ansolabehere and Snyder (2002), who collected election results for a broad set of directly elected state executive offices, including down ballot officers, such as Lieutenant Governor, Secretary of State, Attorney General, etc. The low name recognition rates for such lower state offices imply that ballots are mainly cast along party lines, which should make this index a good proxy for relative party strength, i.e. λ. It is therefore plausible to argue that votes for these offices should not contain information about $v_a - v_b$. The

data from down-ballot offices mirrors well the general patterns from in the NES data referred to in the last section. Second, they exploit changes in the use of poll taxes and literacy tests to construct instruments for political competition. The argument is that these are correlated with κ without directly affecting policy outcomes. These changes were driven in significant measure by the federal Voting Right Acts of 1965 and 1970 and there is little evidence that the Act was part of a pre-meditated federal strategy. Besley, Persson and Sturm (2007) shows that there is a significant correlation between political competition and economic performance generally in U.S. data and that it is also correlated with policy outcomes.

7 Dynamic Issues

The model that we have studied so far treats parties symmetrically in their policy decisions. But one important source of real world asymmetries comes from the fact that one party is the incumbent. This means that the party has control over current policies and can, in principle, use these policy choices to influence future election outcomes. A complete treatment of dynamic considerations lies beyond the scope of this paper. However, I will study two issues that are germane to the discussion so far. The first concerns *strategic politics* – the possibility that an incumbent can choose policies that have a direct bearing on future political competition such as redistricting. The second concerns *strategic policy* – whether policies are less likely to be second-best Pareto efficient in a dynamic world.

7.1 Strategic Politics

Given the key role played by κ in determining the political equilibrium, an incumbent party will have an incentive to manipulate κ to its political advantage. One obvious way of doing so which has been extensively discussed in the political science literature is via redistricting in a way that better concentrates its core support.

To investigate this schematically, we add a prior stage to the game studied above in which party a is able to choose κ when it is an incumbent. This can be thought of as stage in a wider dynamic game where an opportunity to redistrict arises periodically and a is in power when this happens. However, we will illustrate it in a two-period setting where a single election is to be

held after the redistricting has taken place. We assume that party a is strategic and forward looking in computing the effect of changing κ on its payoff beyond the next election. We assume that redistricting has no effect on the underlying economics.

We consider the marginal benefit to party a of increasing κ. Suppose that there is an interior Nash equilibrium which we can make explicitly dependent on κ by denoting it as: $\{v_a^*(\kappa), v_b^*(\kappa)\}$. (We assume that this is interior.) Then party a's payoff at that equilibrium is:

$$P\left(\kappa + v_a^*(\kappa) - v_b^*(\kappa)\right) W^a\left(v_a^*(\kappa)\right) + \left[1 - P\left(\kappa + v_a^*(\kappa) - v_b^*(\kappa)\right)\right] \underline{W}^a\left(v_b^*(\kappa)\right).$$

Differentiating this expression with respect to κ, and using the envelope theorem, yields:

$$\begin{aligned} &\xi\left[W^a\left(v_a^*(\kappa)\right) - \underline{W}^a\left(v_b^*(\kappa)\right)\right] - \\ &\left[\xi\left[W^a\left(v_a^*(\kappa)\right) - \underline{W}^a\left(v_b^*(\kappa)\right)\right] - \left[1 - P\left(\kappa + v_a^*(\kappa) - v_b^*(\kappa)\right)\right] \frac{\partial \underline{W}^a\left(v_b^*(\kappa)\right)}{\partial v}\right] \frac{\partial v_b^*(\kappa)}{\partial \kappa}. \end{aligned} \tag{12}$$

There are two main effects. The first part of (12) is the *direct* effect whereby increasing κ increases the probability that party a wins again in the future for any given equilibrium policy vector. The second is an *indirect* effect working through changes in electoral strategies employed by the other party. In particular, a rise in v_b decreases party a's chances of winning (first part in brackets) but in improves it's outcome is the case loosing (second part in brackets). In general, the first term is positive while we would expect the second term to be negative. However, further insight into this requires specifying a more concrete policy model.

In the basic distributive politics model of section 4.2, where $\underline{W}^a\left(v_b^*(\kappa)\right) = \underline{w}^a$ independent of $v_b^*(\kappa)$, then the second term in (12) becomes:

$$-\xi\left[W^a\left(v_a^*(\kappa)\right) - \underline{w}^a\right] \frac{\partial v_b^*(\kappa)}{\partial \kappa} < 0$$

using the result in Proposition 3. Thus, there is a clear-cut trade-off between the direct and indirect effects of increasing κ viewed from the perspective of party a.

Given the logic outlined here, we would expect politically motivated redistricting to be important in the absence of institutions that prevent this from happening. The U.S. states which have periodic redistricting are an

interesting source of evidence on this. Besley and Case (2003) looked at the evidence which is reproduced in Table 2. They test the extent to which a unified party control influences party competition through redistricting, by analyzing the legislative composition of the 48 continental US states between 1952 and 1995. They look at the redistricting that takes place after data on the US population have been released by the Census Bureau. They exploit the fact that there is institutional variation in the redistricting process – the detail of which is absent from the current model. In the vast majority of states, redistricting begins with the legislature and the governor. If power is divided, agreement may be difficult to reach and redistricting can end up in the courts. Besley and Case (2003) create an indicator that a party controls redistricting, using information on whether it has unified control of both houses of the legislature and the governor's office in the decennial census year. They then test whether the change in the number of seats held by the Democratic party in the legislature following redistricting (decennial year+2) is significantly correlated with whether the Democrats or Republicans controlled the state's redistricting following the census.

Table 2 shows the result from regressing the change in the fraction of seats held by the Democrats between all years (t) and years ($t-2$) on indicators that the Democratic party held unified control, and this Democratic control indicator interacted with an indicator that this election year is immediately after redistricting.[39] It also includes similar variables for Republican control with mixed control being the omitted category. Controlling for state and

[39] To interpret this coefficient in terms of structural parameters, consider the functional form suggested by Besley and Preston (2007) for the distribution $H(\cdot)$ in section 6.2. Now we can interpret a pure bias increasing redistricting as an increase in α in their notation. The effect of a small increase in bias on seats is then given by:

$$\frac{\partial S_a}{\partial \alpha} = \frac{\exp\{\alpha + \beta z(\alpha)\}}{[1+\exp\{\alpha + \beta z(\alpha)\}]^2} \cdot \left[1 + \beta \frac{\partial z(\alpha)}{\partial \alpha}\right]$$

where

$$\begin{aligned} z(\alpha) &= \log\left(\sigma\left[\phi\left[\eta + v_a^*(\alpha) - v_b^*(\alpha)\right] + \frac{1}{2}\right] + (1-\sigma)\left(\frac{1+\lambda}{2}\right)\right) \\ &\quad - \log\left(1 - \sigma\left[\phi\left[\eta + v_a^*(\alpha) - v_b^*(\alpha)\right] + \frac{1}{2}\right] - (1-\sigma)\left(\frac{1+\lambda}{2}\right)\right) \end{aligned}$$

and the equilibrium choices of swing voter utilities are now explicitly dependent on α rather κ.

year effects and time-varying state-level variables, the results show that when the Democrats controlled redistricting, they protect Democratic seats in the lower house of the legislature following redistricting, and that the opposite is true when Republicans controlled redistricting. The coefficients reported in column 3 of Table 2 imply that if Democrats had unified control in year $t-2$, we would expect them to lose 4 to 5 seats in year t on average. However, if year t is just after a redistricting overseen by the Democrats, that loss is cut by 3 to 4 seats.

Table 2 about here

Take together, these results illustrate the relevance of the strategic redistricting model at work in the data.

The approach suggested here could also be used to study optimal districting. While a complete treatment is beyond the scope of this paper,[40] we can see that the welfare consequences of redistricting (variations in κ) have three components. First, it affects the allocation of rents from winning between groups of loyal voters/party leaders. Second, it can affect equilibrium policies chosen by the parties. Third, it affects the winning probability for a given set of policy choices by parties.

7.2 Strategic Policy

Above we emphasized the implication of the model that policies are chosen from the Pareto frontier. While, studying a richer process of ex post policy making and a wider array of institutions for political influence can motivate inefficiency in a static model, the most robust way of demonstrating why there can be an inefficiency in policy choices due to electoral politics is to extend the model to a dynamic setting.[41]

The starkest case of a Pareto inferior policy arises in a two period setting where there is a costless opportunity for an incumbent government to increase the income of a particular group of citizens at no cost to itself. To be concrete this could be thought of as lifting a regulation preventing a group from gaining access to a productive opportunity in a small open economy. We label the two time periods $s \in \{1, 2\}$. We will index all relevant variables,

[40] See Coate and Knight (2007) for important work on this issue.

[41] Besley and Coate (1998) defined political failure using the Pareto criterion in a simple dynamic model. Acemoglu (2003) and Besley (2006, chapter 2) discuss wider issues of political failure.

policy and utility levels, by their time period. The timing is as follows. We begin with an incumbent in office who picks a policy vector $x_1 \in \mathcal{A}$. There is then an election along the lines described above after which the winner chooses $x_2 \in \mathcal{A}$. This results in a period two utility allocation. As in the model above, we suppose that the policy vector implemented in period two is that which is announced by the party in period one. In the example that we now study, it will not matter whether the policy is announced before or after the period one election so we will simply study the case where it is picked optimally after the incumbent arrives in office.

Suppose that the period two policy model is the distributive politics model above from section 4.2 and that party a is in office in period one. We give party a a policy $r \in [0,1]$ which costlessly affects the incomes of group b loyal voters at no cost to itself. Formally:

$$Y_{b2} = \hat{Y}_{b2}(r) \text{ with } \frac{\partial \hat{Y}_{b2}(r)}{\partial r} > 0.$$

For any given set of period two transfers, any outcome where $r < 1$ is Pareto inferior. The period two election results in a period two Nash Equilibrium $\{v_{a2}^*(r), v_{b2}^*(r)\}$. This can depend on r since it affects the income of the group b loyal voters. Thus, we write the period two expected payoff of party a as:

$$\underline{w}_k + \left(\frac{1}{2} + \xi\left[\kappa + v_{a2}^*(r) - v_{b2}^*(r)\right]\right)\left[W^k\left(v_{a2}^*(r)\right) - \underline{w}_k\right]. \tag{13}$$

This uses two convenient properties of the distributive politics model. First, since the transfer that party a gives to party b's loyal supporters is zero anyway, its payoff if it wins is not directly dependent on r. Second, since party a gets no transfer from party b if it loses the election, $\underline{w}_k$ does not depend upon r.

Differentiating (13) with respect to r (and using the envelope theorem) yields:

$$-\left[W^a\left(v_a^*(r)\right) - \underline{w}_a\right]\frac{\partial v_{b2}^*(r)}{\partial r}.$$

So the incentive for party a to pick a higher level of r depends solely on how it affects party b's electoral strategy. Party a will not set $r = 1$ if $\frac{\partial v_b^*(r)}{\partial r} > 0$. Determining this comparative static result is now straightforward using the supermodularity of the electoral strategy game that we identified above. All we need to verify is that increasing r increases the marginal benefit of giving

a higher utility level to the representative swing voter. Using the the fact that the game is log-supermodular, this comes down to the observation that:

$$\frac{\partial^2 \log\left(W^b\left(v_b,r\right)-\underline{w}_a\right)}{\partial v_b \partial r}=\left[\frac{v''\left(Y_b\left(r\right)+h^b\left(v_b\right)\right)}{v\left(Y_b\left(r\right)+h^b\left(v_b\right)\right)+\Omega_a-\underline{w}_a}\right.$$
$$\left.-\frac{\left[v'\left(Y_b\left(r\right)+h^b\left(v_b\right)\right)\right]^2}{\left[v\left(Y_b\left(r\right)+h^b\left(v_b\right)\right)+\Omega_a-\underline{w}_a\right]^2}\right]\frac{\partial h^b\left(v_b\right)}{\partial v_b}\cdot\frac{\partial \hat{Y}_{b2}\left(r\right)}{\partial r}>0.$$

It is now straightforward to see that $\frac{\partial v^*_{b2}(r)}{\partial r}>0$ at an interior equilibrium.[42] Thus the optimal period one policy of party a is to pick $r=0$. The failure to adopt a policy that increases b's payoff is an example of political failure in the sense suggested in Besley and Coate (1998) who argue that Pareto inferior policy is the right benchmark as a parallel to the notion of a market failure.

Even though the example is very simple, it illustrates a general point. We would expect a "political cost benefit test" for an intervention to differ from a purely economic cost-benefit test in that it reflects considerations of how the policy intervention will affect the political equilibrium. The analysis here suggest that this will have particular bite when the policy better enables another party to compete for swing voters. In this example, party a would be happy to introduce the policy that raises party b's supporters incomes if it could avoid the negative political consequences of doing so. At work here is the *political replacement effect*. There are now many examples of dynamic models which show how strategic use of policy can affect future policy and/or political equilibria.[43] It is widespread feature of dynamic models of politics and means that the efficiency principle need no longer apply in such settings.

8 Concluding Comments

This paper has laid out an approach to two-party electoral competition. The approach conceptualizes the problem of political competition as competing for swing voters – a notion that squares well with the dominant empirical tradition in political science. We have emphasized that the approach naturally gives way to a three-stage model of political competition. Much of the

[42] The super-modular structure also implies that $\frac{\partial v^*_{a2}(\mathbf{r})}{\partial \mathbf{r}}>0$.

[43] See, for example, Persson and Svensson (1989).

emerging political economy literature is aimed at enriching our understanding of one or more of these stages.

The approach developed here can, in principle, remain somewhat agnostic about the underlying motivations and rationality of voters. Attachments to parties could be either behavioral or rational. We are also agnostic on whether their responsiveness to policy is based on a good understanding of policy. The efficiency principle applies to these "behavioral" preferences and an interesting agenda in behavioral political economy may be to entertain less than full rationality in the policy preferences of swing voters. This would help to unify the traditionally dominant behavioral school in political science of Campbell et al (1960) with the more rational choice approach and the model proposed here provides a natural way of getting into these issues. This is in turn is separable from the issue of how far party strategists are also "rational calculators".

The field of political economy is maturing. This paper is about taking stock and to suggest a framework that is simple, tractable and has features that are useful in studying policy choices. But ultimately, how useful this turns out to be depends how far specific issues that are of interest to economists can be studied using it.

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9 Appendix

Proof of Proposition 3:

Let

$$\kappa_k = \begin{cases} \kappa & \text{if } k = a \\ -\kappa & \text{if } k = b. \end{cases}$$

The first order condition for an interior solution is

$$\left(W^k(v) + \Omega_k - \underline{w}_k\right)\xi + \left[\frac{1}{2} + \xi\left(\kappa_k + v - v_{-k}\right)\right] W_v^k(v) = 0$$

which we can write as:

$$\rho^k(v) = v_{-k} - \kappa_k - \frac{1}{2\xi}$$

where $\rho^k(x) = \left(v + \frac{\left(W^k(v) + \Omega_k - \underline{w}_k\right)}{W_v^k(v)}\right)$. Then the equilibrium is:

$$\rho^k\left(\rho^{-k}(v_{-k}) + \frac{1}{2\xi} + \kappa_{-\mathbf{k}}\right) = v_{-k} - \kappa_k - \frac{1}{2\xi}.$$

Observe that:

$$\frac{\partial \rho^k(x)}{\partial x} = 1 + \frac{\partial\left(\left(W^k(x) + \Omega_k - \underline{w}_k\right)/W_v^k(x)\right)}{\partial x} > 1$$

since:

$$\frac{\partial\left(\left(W^k(x) + \Omega_k - \underline{w}_k\right)/W_v^k(x)\right)}{\partial x} = 1 - \frac{\left(W^k(x) + \Omega_k - \underline{w}_k\right) W_{vv}^k(x)}{\left[W_v^k(x)\right]^2} > 0.$$

It now follows that:

$$\frac{d\rho^k\left(\rho^{-k}(x) + \frac{1}{2\xi} + \boldsymbol{\kappa}_{-\mathbf{k}}\right)}{dx} > 1.$$

Now simple differentiation shows that:

$$\frac{\partial v_a}{\partial \kappa} < 0 \text{ and } \frac{\partial v_b}{\partial \kappa} > 0$$

as claimed where κ is the political advantage of party a. ■

Proof of Proposition 5: Consider a putative choice of swing voter utilities $\{\hat{v}_a, \hat{v}_b\}$. We look at party a's problem (party b's is symmetric). The credibility condition for party a is then that:

$$\frac{\delta}{1-\delta} G^a\left(\hat{v}_a, \hat{v}_b\right) - \hat{v}_a - \frac{1}{2} \geq \frac{\delta}{1-\delta} G^a\left(-\frac{1}{2}, \hat{v}_b\right)$$

where

$$G^a\left(v_a, v_b\right) = \left(\frac{1}{2} + \xi\left[\kappa + v_a - v_b\right]\right)\left(\Omega_a - v_a\right) + \left(\frac{1}{2} - \xi\left[\kappa + v_a - v_b\right]\right) v_b - 1.$$

That we have the same $\hat{v}_b$ uses the fact that reaction function of b is independent of v_a. This implies that party $a's$ announcement is credible if:

$$\left[\left[\frac{1}{2} + \xi\left[\kappa + \hat{v}_a\right]\right]\left(\Omega_a - \hat{v}_a\right) - \left[\frac{1}{2} + \xi\left[\kappa - \frac{1}{2}\right]\right]\left(\Omega_a + \frac{1}{2}\right)\right] \frac{\delta}{1-\delta} \geq \hat{v}_a + \frac{1}{2}$$

When $\hat{v}_a = -\frac{1}{2}$, there is clearly no credibility problem. A credibility problem arises when $\hat{v}_a = 0$ if

$$\left[-\frac{1}{2} + \xi\left[\Omega_k - \kappa_k + \frac{1}{2}\right]\right] < \frac{1-\delta}{\delta}$$

which is the condition given.■

Table 1: Estimates of Loyal Support (Conservative and Labour) and Swing Voters Using British General Election Survey

Election Year	Advantage in core voter support for Conservative party (λ)	Proportion of swing voters (σ)
1992	3%	69%
1997	-14%	39%
2001	-23%	34%

Notes: Source British General Election Survey.

Figure 1: Political Advantage Calibrated from NES Surveys