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DISCUSSION PAPER

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Heinrich W. Ursprung

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HWWA DISCUSSION PAPER

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Abstract

Standard spatial models of political competition give rise to equilibria in which the competing political parties or candidates converge to a common position. In this paper I show how political polarization can be generated in models that focus on the nexus between pre-election interest group lobbying and electoral competition.

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1. Introduction

A general problem in the theory of political competition is that of explaining the phenomenon of candidates or political parties taking different policy positions on an issue rather than converging (as in the familiar Hotelling-Downs model) to a common policy position. Since clearly, if two candidates choose policies to maximize their probabilities of election, then when all is said and done, the candidate who realizes that his probability of election is less than that of his opponent has an incentive to duplicate the policy stance that his opponent has taken. Would such duplication of policy positions not result in the candidate who has revised this position having a fifty percent chance of electoral success? The question thus arises as to how, in principle, polarization of policy positions can be explained.

Political polarization is a spatial phenomenon. Within the spatial theory of political competition there are three strands of literature which one can draw on to explain political polarization. These three literatures focus on different groups of political actors. The key groups of actors in any spatial model of political competition are the *candidates* running for public office, the *voters* who vote for the candidates, and the *interest groups* who contribute to the candidates' election campaigns. Since polarization of policy positions is a consequence of the candidates' behavior, modeling the decision calculus of the candidates is an indispensable ingredient of models portraying policy polarization. With respect to the two remaining groups of key actors, the analyst has a choice. One modeling strategy is to focus on the interaction between the competing candidates and the voters, and to neglect the interest group activities. This is the modeling strategy which underlies the *voting theory* of political competition. A second strand of literature focuses more on the interaction between the candidates and the activities of the interest groups. In these models the behavior of the voters is relegated to the background by portraying voting behavior with some kind of contest success function. The models belonging to this strand of literature constitute the traditional *lobbying theory* of political competition. This theory is thus characterized by a certain lack of micro-foundation as far as voting behavior is concerned. An emerging third strand of literature attempts to overcome this shortcoming by incorporating all three groups of key actors in a single model. All of the models belonging to this third group portray in more or less detail how incompletely informed voters can be influenced in an election campaign. The dividing-line between the traditional and the second-generation lobbying models of political competition is, however, not clear-cut and depends on what one accepts as a primitive building block of a micro-foundation. If the black box of the

traditional contest-success function is simply replaced by another black box, for example by an ad hoc specification of an information-transmission technology, not much is gained.

Sophisticated post-Downsian *voting-theory* models which explicitly deal with the polarization issue date back to the contributions by Wittman (1983) and Bernhardt and Ingberman (1985). This strand of literature is nicely surveyed in Fiorina (1999). A more extensive survey of the extensive literature on voting theory of political competition is to be found in Osborne (1995).

The political-polarization model by Austen-Smith (1987) is often regarded to represent a predecessor of the incomplete-information lobbying theory of political competition. The model indeed combines elements of voting and lobbying theory, but the model's structure is not completely consistent. Another early contribution to this literature is Mayer and Li (1994). The bulk of the second-generation literature on lobbying models of political competition is, however, only a few years old and still in the process of initial growth.¹ This is the reason why I focus in this paper on the *traditional* lobbying theory of political competition.

This paper is not meant to represent an exhaustive survey of the literature on the traditional lobbying theory of political competition. The objective is rather to provide a simple tool kit for applied political economists by presenting the modeling strategies used in this literature to portray political polarization. I have, as a consequence, made no attempt to cite all the papers that employ the presented modeling strategies. Since the surveyed modeling strategies have been applied to a large number of economic policy fields, such an attempt would, in any case, not have been very illuminating.

¹ Papers which belong to this second-generation literature include Besley and Coate (2000a), Besley and Coate (2000b), Coate (2001), Felli and Merlo (2000), Glazer and Gradstein (2001), Ortuno-Ortin and Schultz (2001), Potters, Sloof and van Winden (1997), Prat (2000), Prat (2001), and Schultz (2002).

2. The Vanilla Model

A model which portrays the pre-election interaction between interest groups and candidates for public office consists essentially of the objective functions of the players and a contest success function specifying the election-campaign technology. The channel through which interest groups influence the election outcome is usually identified with the provision of campaign contributions. The following contest success function which is standard in the rent-seeking literature nicely captures this nexus in a race between two candidates:

$$(1) \quad \pi = \begin{cases} \frac{\beta c_1}{\beta c_1 + c_2}, & \text{if } c_1 + c_2 > 0 \\ \frac{\beta}{1 + \beta}, & \text{if } c_1 = c_2 = 0 \end{cases}$$

In this equation π denotes the probability of the first candidate's winning the election, and c_i ($i=1,2$) the campaign contributions collected by candidate i . The parameter $\beta \geq 1$ measures the relative efficiency of the first candidate's campaign. For the time being, we assume $\beta=1$ and two interest groups j ($j=1,2$). The two interest groups choose campaign contributions to maximize their expected utility specified as

$$(2) \quad V_j = \pi G_j(Q_1) + (1 - \pi) G_j(Q_2) - L_{j1} - L_{j2},$$

where G_j denotes the utility derived by interest group j from the policy $Q_i \in [0,1]$ proposed by candidate i , and L_{ji} denotes interest group j 's contribution to i 's campaign. Throughout the paper it is assumed that the candidates do not steal any of the contributions to increase their personal income: $L_{1i} + L_{2i} = c_i$, for $i=1,2$.

The two competing candidates choose policy platforms Q_i with a view to maximize their expected utility

$$(3) \quad U_i = U_i(Q_1, Q_2, \pi, c_1, c_2)$$

The starting point of our analysis is the standard (vanilla) assumption that the candidates maximize their respective probabilities of winning the election:

$$(3a) \quad U_1 = \pi \text{ and } U_2 = 1 - \pi$$

If the candidates make their policy pronouncements simultaneously, and the interest groups then simultaneously respond to these policy pronouncements by providing utility-maximizing campaign contributions, we are faced with a simple two-stage game that can easily be solved via backward induction to obtain the subgame-perfect Nash equilibrium.

In the second stage of the game, i.e. in the lobbying sub-game, the policy pronouncements Q_1 and Q_2 are given. Let the first interest group prefer candidate 1 and the second interest group candidate 2: $G_1(Q_1) > G_1(Q_2)$ and $G_2(Q_2) > G_2(Q_1)$. Under these circumstances, interest group 1 obviously supports candidate 1 and interest group 2 supports candidate 2: $L_{11}=c_1$, $L_{12}=L_{21}=0$ and $L_{22}=c_2$. Using this ‘‘campaign contribution specialization theorem’’ [cf. Magee et al. (1989), p. 60] and the contest success function (1), the objective functions (2) of the two interest groups can be written as follows:

$$V_1 = \pi G_1(Q_1) + (1 - \pi)G_1(Q_2) - c_1 = \pi[G_1(Q_1) - G_1(Q_2)] + G_1(Q_2) - c_1 = \frac{c_1}{c_1 + c_2} s_1 + G_1(Q_2) - c_1$$

$$V_2 = \pi G_2(Q_1) + (1 - \pi)G_2(Q_2) - c_2 = -\pi[G_2(Q_2) - G_2(Q_1)] + G_2(Q_2) - c_2 = \frac{-c_1}{c_1 + c_2} s_2 + G_2(Q_2) - c_2$$

where s_1 and s_2 denote the contest stakes of the interest groups: $s_1 = G_1(Q_1) - G_1(Q_2)$ and $s_2 = G_2(Q_2) - G_2(Q_1)$. The reaction functions of the two interest groups

$$\frac{\partial V_1}{\partial c_1} = \frac{c_2}{(c_1 + c_2)^2} s_1 - 1 = 0$$

$$\frac{\partial V_2}{\partial c_2} = \frac{c_1}{(c_1 + c_2)^2} s_2 - 1 = 0$$

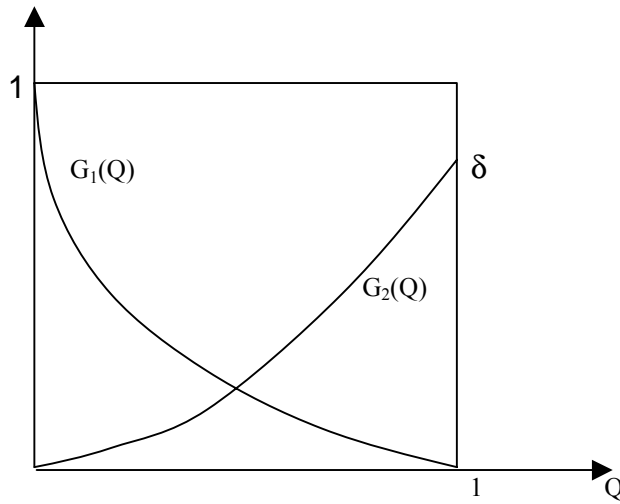
together imply $c_2 = \frac{s_2}{s_1} c_1$. Substituting this result back in either one of the above first-order conditions and in the contest success function (1) immediately yields

$$(4) \quad c_1 = \frac{s_1^2 s_2}{(s_1 + s_2)^2}, \quad c_2 = \frac{s_1 s_2^2}{(s_1 + s_2)^2}, \quad \text{and} \quad \pi = \frac{s_1}{s_1 + s_2}$$

To simplify the exposition, assume now the quadratic utility functions $G_1=(Q-1)^2$ and $G_2=\delta Q^2$ with $\delta>0$ (cf. Figure 1). Substitution of $G_1=(Q-1)^2$ and $G_2=\delta Q^2$ in the expression given for π in equation (4) results in

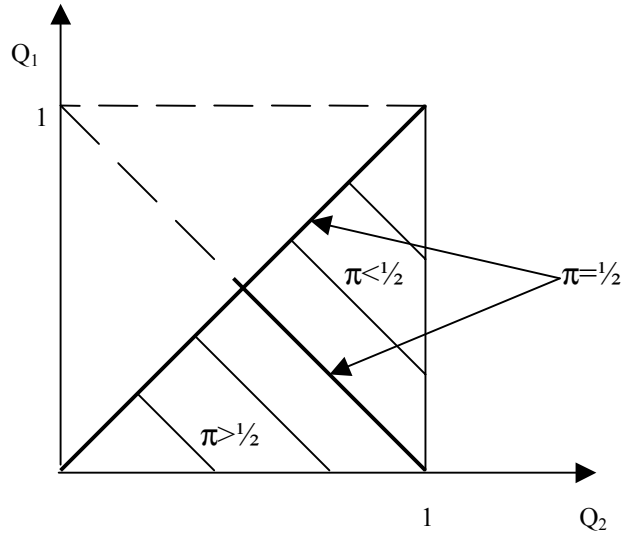
$$(5a) \quad \pi = \frac{Q_1 + Q_2 - 2}{(1 - \delta)(Q_1 + Q_2) - 2}$$

Figure 1



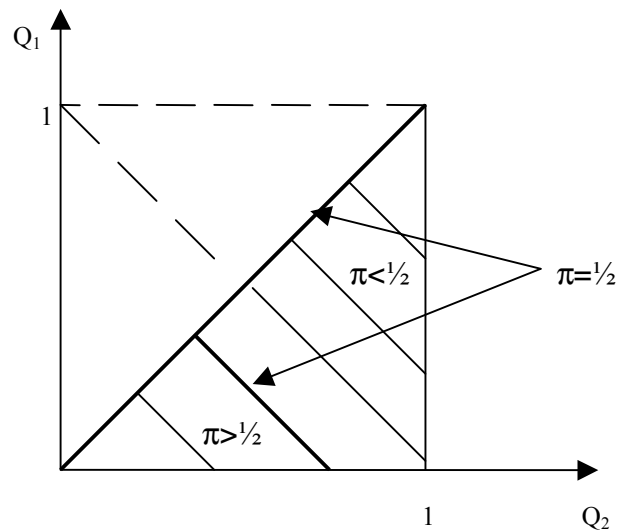
Since Q_1 and Q_2 appear in this expression always in the form Q_1+Q_2 , the iso- π lines have a slope of minus unity in the policy-pronouncement space Q_2/Q_1 (increasing Q_2 by ϵ and decreasing Q_1 also by ϵ leaves π unaltered).

Figure 2



Inspection of equation (5a) reveals that close to the point $(0,0)$ the probability π of the first candidate's winning the election is almost one, whereas close to point $(1,1)$ it is almost zero. Moving through the policy-pronouncement space Q_2/Q_1 in a north-easterly direction thus reduces π . For $\delta=1$, the negatively sloped $\pi=1/2$ -line passes through the point of complete polarization $(Q_1, Q_2)=(0,1)$ as depicted in Figure 2. If, however, $\delta \neq 1$, then complete polarization does not result in an equal chance of electoral success. In Figure 3, which is based on the assumption $\delta > 1$, candidate 1 has a smaller chance of winning at the platform combination $(0,1)$ than candidate 2, i.e. $\pi(0,1) < 1/2$.

Figure 3



Consider first the case $\delta=1$ (cf. Figure 2). There are three Nash equilibria: $(Q_1, Q_2)=(0,0)$, $(0,1)$, and $(1,1)$. All these platform combinations lie on the $\pi=1/2$ -locus; in each of these equilibria the two candidates thus have a 50% chance of winning the election. The figure nicely illustrates that neither candidate can increase his probability of winning by choosing another policy platform as long as the opponent remains at the respective equilibrium position. Moving away from $Q_2=0$ does, for example, not pay for candidate 2: between 0 and 1 his probability of winning $1-\pi$ is smaller than one half, and at $Q_2=1$ it does not exceed one half.

Notice, that in the case $\delta>1$ (cf. Figure 3), the point $(0,0)$ is not a Nash equilibrium anymore, since candidate 2 can announce the policy $Q_2=1$ which, combined with $Q_1=0$, increases his probability of election $1-\pi$: $1-\pi(0,0)=1/2 < 1-\pi(0,1)$. The point $(0,1)$, however, is not a Nash equilibrium either, since candidate 1 can now duplicate the policy of his opponent to obtain a 50% chance of winning: $\pi(1,1)=1/2 > \pi(0,1)$. The only global Nash equilibrium is the point $(1,1)$.²

We thus arrive at the conclusion that political polarization as an equilibrium phenomenon emerges only if $\delta=1$. The political-polarization equilibrium is thus structurally unstable and we are led to conclude that the “vanilla” model does not allow for political polarization. To generate polarized equilibria that resemble the political cleavages observed in the real world, one needs to throw some sand into the well-oiled political mechanism portrayed in this model. The requisite changes that have been proposed in the literature refer, technically speaking, to the *equilibrium concept*, the *strategy set*, the *payoffs*, and the *rules of the game*. We will discuss these changes one after the other.

² For symmetry reasons, $(0,0)$ is the unique Nash equilibrium in the case $\delta<0$.

3. The Equilibrium Concept

To allow for political polarization, an equilibrium concept has been proposed that takes history into account [cf. Hillman and Ursprung (1988)]. The basic idea is the following. Assume that candidates belong to established political parties and thus cannot choose freely any platform they may want to adopt. They rather need to take the established party line into account and can, in their attempt to maximize or minimize π , deviate from the inherited party-line only in small steps. Under these circumstances the candidates' behavior can be portrayed with a so-called "gradient system": the candidates move in the policy-pronouncement space in that direction which maximizes π or $1-\pi$, as the case may be. Formally:

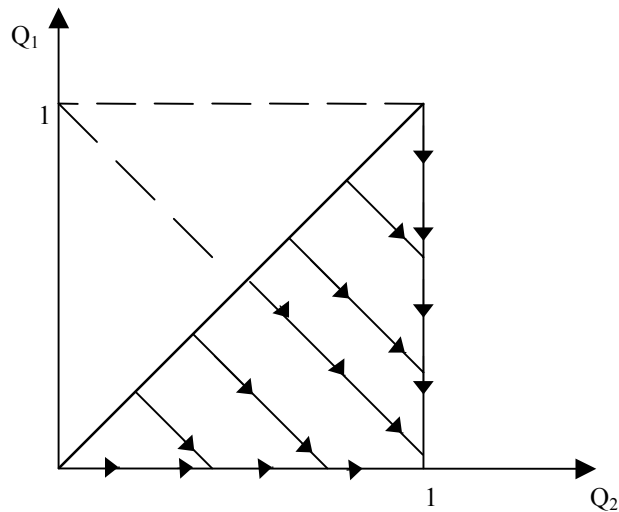
$$\dot{Q}_1 \equiv \frac{dQ_1}{dt} = \kappa \frac{\partial \pi}{\partial Q_1} \quad \text{and} \quad \dot{Q}_2 \equiv \frac{dQ_2}{dt} = \kappa \frac{\partial(1-\pi)}{\partial Q_2} = -\kappa \frac{\partial \pi}{\partial Q_2},$$

where dQ_i/dt denotes the change over time t , and the positive parameter κ measures the speed with which the candidates can adopt changes in established policy stances. Since the partial derivatives of π with respect to Q_1 and Q_2 are both equal to

$$\frac{\partial \pi}{\partial Q_i} = \frac{-4}{(2 - Q_1 - Q_2)^2} < 0 \quad (i=1,2)$$

(cf. equation 5 with $\delta=1$), we have $\dot{Q}_1 = -\dot{Q}_2 < 0$. While the first candidate marginally adjusts her platform by reducing Q_1 (i.e. by moving down in the policy-pronouncement space depicted in Figure 4), candidate 2 increases Q_2 by exactly the same amount (i.e. he moves to the right). Starting out from any platform combination (Q_1, Q_2) except $(0,0)$ and $(1,1)$ [where the partial derivatives of $\pi(Q_1, Q_2)$ are not defined, but unilateral marginal deviations do not pay] small policy adjustments will eventually bring about a complete polarization in policy pronouncements as indicated by the arrows in Figure 4.

Figure 4



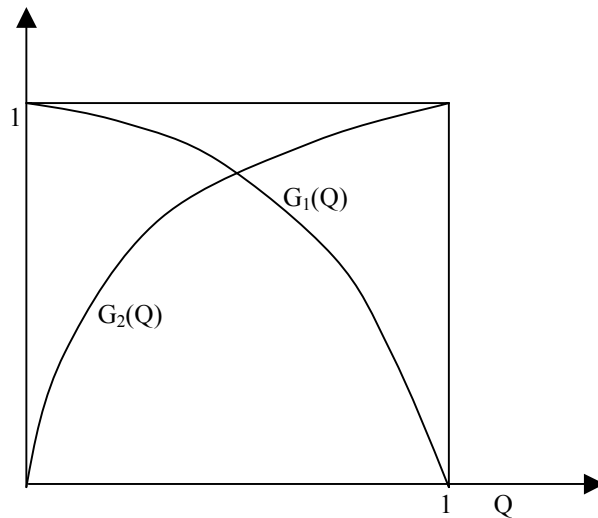
The platform combination $(Q_1, Q_2) = (0, 1)$ is thus a *local Nash equilibrium embedded in a basin of attraction* of the underlying dynamic (gradient) system. Notice, that at $Q_1 = 0$ ($Q_2 = 1$) candidate 1 (candidate 2) cannot improve her probability of election anymore by making policy adjustments and thus leaves her platform unaltered. Moreover, notice that the point $(0, 1)$ is the only (local) Nash equilibrium which is embedded in a basin of attraction. To be sure, complete policy convergence at $(1, 1)$ continues to represent a global Nash equilibrium, but this Nash equilibrium lacks dynamic stability if the candidates behave the way we assumed.

As mentioned above, the economic justification for this choice of equilibrium concept is that a political party cannot choose its election platform without regard to its traditional political stance, and a candidate running for public office is, to some extent, tied to the traditional policy stance of the party which supports her. There exist at least two reasons for these constraints. First, the party machine needs to be persuaded of major policy adjustments. This will take time and effort since information is filtered through ideological convictions. Second, the clientele interest groups need to be informed and their confidence needs to be gained, which - for credibility and reputational reasons - may be difficult if not impossible if the proposed policy change is substantial.³ For these reasons the inherited party stance is usually changed only marginally, implying that the outcome will (almost always) converge towards complete political polarization in the above setup.

³ Mayer (1998), in a standard probabilistic voting model, also employs reputation effects to generate political polarization.

The behavior of the model analyzed above crucially depends on the convexity of the interest groups' utility functions. Using, for example, the concave functions $G_1=1-Q^2$ and $G_2=1-(1-Q)^2$ (cf. Figure 5) yields a strikingly different result.

Figure 5

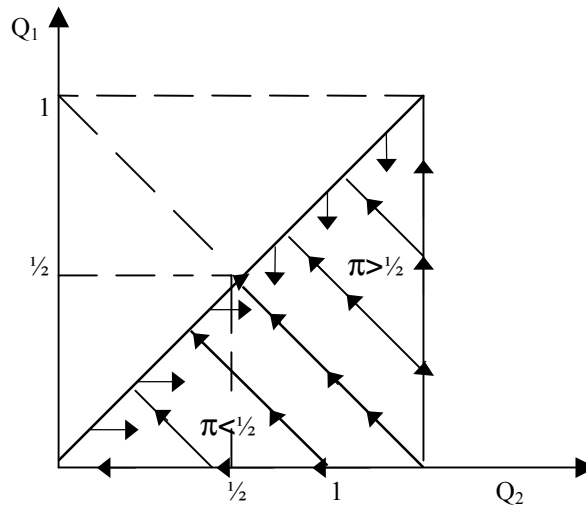


If we substitute these utility functions in the expression given for π in equation 4, we obtain

$$(5b) \quad \pi = \frac{Q_1 + Q_2}{2}$$

Even though this specification does not change the shape of the iso- π lines as compared to the scenario with the convex utility functions, platform combinations in a neighborhood of (0,0) are now associated with a probability π close to zero and platform combinations in a neighborhood of (1,1) with a probability π close to unity. Moving in the policy pronouncement space Q_2/Q_1 in a north-easterly direction, π now increases! As a consequence, the direction of the small adjustments in policy pronouncements is reversed, and Figure 6 reveals that the outcome is now complete political convergence at $(Q_1, Q_2) = (\frac{1}{2}, \frac{1}{2})$. Notice that this outcome, in contrast to the complete-polarization equilibrium derived for convex utility functions, is a “straight” Nash equilibrium.

Figure 6



4. The Strategy Set

Policy reversals are costly in terms of party-internal persuasion and external credibility and reputation. These costs can, in principle, also be modeled by restricting the strategy set of the politicians. This is the approach taken by Magee et al. (1989, chapter 9) who assume in their endogenous trade-policy model that one candidate caters for the import-competing interests and thus has to propose an import tariff, and the other candidate caters for the export-industry interests and thus needs to announce an export subsidy.⁴ Somewhat less restrictive is the approach taken in Hillman and Ursprung (1993a) where it is assumed that a candidate with a protectionist background cannot propose free trade and a candidate with a liberal trade policy background cannot announce autarky. In the situation depicted in Figure 3 this means that the candidates' strategy sets are restricted to $[0,1)$ and $(0,1]$, respectively, implying that the feasible policy-pronouncement space Q_2/Q_1 consists of the whole triangle with the exception of the corners at $(0,0)$ and $(1,1)$.

Needless to say, one could just as well change the contest success function in such a way that convergence at the extremes does not pay for the politician whose party background is not in line with the respective policy, i.e. one could define $\pi(0,0)=1$ and $\pi(1,1)=0$. However, we prefer to associate changes in the payoffs with candidate objectives which transcend the maximization of electoral success.

⁴ To obtain reasonable upper bounds for the proposed policies, these authors employ a somewhat more complex contest success function in which the probability of election depends not only on the campaign expenditures but also on the candidates' policy pronouncements.

5. Payoffs I: Income Maximization

The concave utility functions depicted in Figure 5 give rise to political concordance (cf. Figure 6), implying that the interest groups have no reason to provide campaign contributions. The lobbying equilibrium is thus characterized by a platform combination which does not induce any lobbying. This is clearly an unsatisfactory state of affairs and we are again confronted with the problem of driving some kind of wedge between the policy pronouncements.⁵ One way of doing so is by assuming that the candidates do not maximize the probability of being elected to public office but rather their personal income. This is the approach taken in Ursprung (1990) where the first candidate's expected utility is specified as

$$(3b) \quad U_1 = \pi Y_p + (1 - \pi) Y_a + \pi \alpha c_1 = \pi(\Delta Y + \alpha c_1) + Y_a$$

Y_p denotes the salary associated with elected office and Y_a the candidate's income in her best alternative occupation. In addition to the income Y_p , the successful candidate is able to appropriate a rent which varies positively with the elected official's political support as measured by the contributions c_1 to her campaign. Political support is thus not only valued for electoral reasons but also since it can potentially be converted into income.⁶ Notice, that this specification does not imply that the candidate directly appropriates funds from his war chest;⁷ we rather use the size c_1 of the war chest as an indicator of the first candidate's income-relevant political support. The second candidate's utility U_2 is specified analogously.

Using the *concave* utility functions $G_1=1-Q^2$ and $G_2=1-(1-Q)^2$ introduced in the previous section, the campaign contributions collected by candidate 1 amount to (cf. equation 4)

$$c_1 = \frac{1}{4}(Q_1 + Q_2)^2(Q_2 - Q_1)(2 - Q_1 - Q_2)$$

Substituting this expression and the result $\pi=(Q_1+Q_2)/2$ obtained for the second (lobbying) stage of the game (cf. equation 5b) into the objective function (3b), we arrive at

⁵ Poole and Romer (1985) already observed that modeling policy-induced campaign contributions is not a trivial task.

⁶ This kind of utility function has first been used by Appelbaum and Katz (1987) in a lobbying model which does, however, not focus on electoral competition.

⁷ Glazer and Gradstein (2001) assume that the candidates steal from their war chests and Pan and Shieh (2002) assume that service-induced contributions are completely appropriated by the candidates.

$$U_1 = \frac{Q_1 + Q_2}{2} \left\{ \Delta Y + \frac{\alpha}{4} (Q_1 + Q_2)^2 (Q_2 - Q_1) (2 - Q_1 - Q_2) \right\} + Y_a$$

Differentiating the first candidate's utility function with respect to her instrument variable, i.e. the policy pronouncement Q_1 , yields her reaction function:

$$\frac{\partial U_1}{\partial Q_1} = \frac{1}{2} \left\{ \Delta Y + \frac{\alpha}{4} (Q_2 - Q_1) \right\} + \frac{\alpha (Q_1 + Q_2)^2}{4} [(Q_2 - 1)(2 - Q_1 - Q_2) + (Q_1 - 1)(Q_1 + Q_2)] = 0$$

Since our model is perfectly symmetric, we need not derive the reaction function of candidate 2; we rather use the fact that in a symmetric equilibrium, the distance between a candidate's policy pronouncement Q_i and the bliss point of his or her constituency (0 or 1, as the case may be) is the same for each candidate: $Q_2 = 1 - Q_1$. Using this symmetry condition in the reaction function above immediately yields $Q_1 = \frac{1}{4} + \frac{\Delta Y}{\alpha}$ and thus $Q_2 = \frac{3}{4} - \frac{\Delta Y}{\alpha}$. The candidates' equilibrium policy pronouncements thus depend on the ratio of the income difference $\Delta Y = Y_p - Y_a$ and the parameter α which measures to what extent political support can be converted in private income. Since Q_1 cannot become negative, Q_2 cannot exceed unity, and $Q_1 \leq Q_2$, we end up with the following equilibrium policy pronouncements:

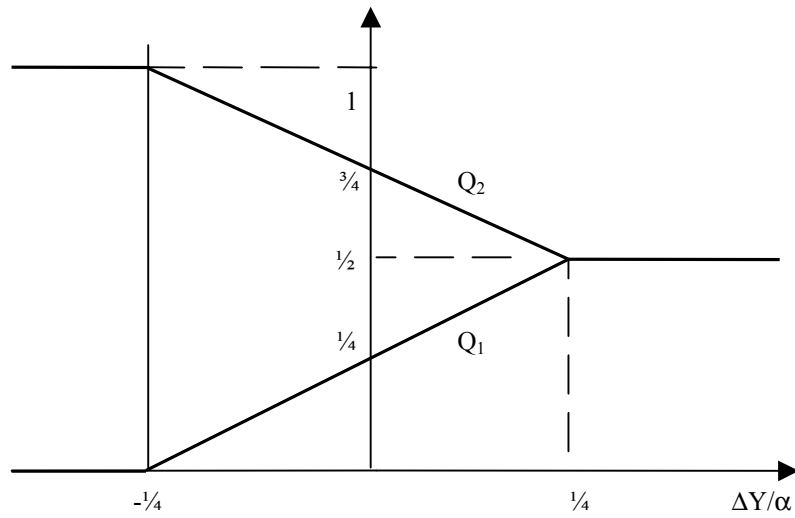
$$Q_1 = \begin{cases} 0 \\ \frac{1}{4} + \frac{\Delta Y}{\alpha} \\ \frac{1}{2} \end{cases} \text{ and } Q_2 = \begin{cases} 1 \\ \frac{3}{4} - \frac{\Delta Y}{\alpha} \\ \frac{1}{2} \end{cases} \Leftrightarrow \begin{cases} \frac{\Delta Y}{\alpha} \leq -\frac{1}{4} \\ -\frac{1}{4} < \frac{\Delta Y}{\alpha} < \frac{1}{4} \\ \frac{\Delta Y}{\alpha} \geq \frac{1}{4} \end{cases}$$

If the salary difference $\Delta Y = Y_p - Y_a$ is sufficiently high or, alternatively, if the appropriation parameter α is sufficiently low, political concordance ($Q_1 = Q_2 = \frac{1}{2}$) is maintained despite the change in candidate preferences (cf. Figure 7). If, however, public office is relatively unattractive as far as the salary (including ego-rent) is concerned, or the conversion of political support into personal income is relatively easy, political polarization will occur ($Q_1 < \frac{1}{2}$, $Q_2 > \frac{1}{2}$).

Conversion of political support into personal gain can be accomplished in a perfectly legal manner. After all, the candidates commit to their policy platforms without any preceding arrangements with their clientele interest groups. Since, however, a politician

who indulges in the requisite activities deserts his voters and his party by trading off election prospects for personal gain, one may well speak of *personal corruption*.

Figure 7



6. Payoffs II: Ideological Objectives

Personal gain can induce politicians to deviate from a strategy of maximizing electoral success. In this section it is shown that following ideological objectives can have the same effect. Consider the following objective function U_1 of candidate 1 and let U_2 be specified analogously:

$$(3c) \quad U_1 = \delta[\pi W_1(Q_1) + \gamma(1-\pi)W_1(Q_2)] + (1-\delta)\pi$$

$W_i(Q)$ denotes the ideological utility that candidate i derives from the implemented policy Q . Furthermore, assume - for simplicity - that the first candidate has the same utility function as the first interest group, i.e. $W_1(Q)=G_1(Q)=1-Q^2$ and, analogously, $W_2(Q)=G_2(Q)=1-(1-Q)^2$. We have already solved the second-stage game played by the interest groups, i.e. we know that $\pi=(Q_1+Q_2)/2$ (cf. equation 5b). Anticipating the interest groups' reaction, the first candidate thus maximizes

$$U_1 = \delta \left[\frac{Q_1+Q_2}{2} W_1(Q_1) + \gamma \left(1 - \frac{Q_1+Q_2}{2} \right) W_1(Q_2) \right] + (1-\delta) \frac{Q_1+Q_2}{2}$$

Her reaction function has the following appearance:

$$\frac{\partial U_1}{\partial Q_1} = \frac{\delta}{2} [1 - Q_1^2 - 2Q_1(Q_1 + Q_2) - \gamma(1 - Q_2^2)] + \frac{1-\delta}{2} = 0$$

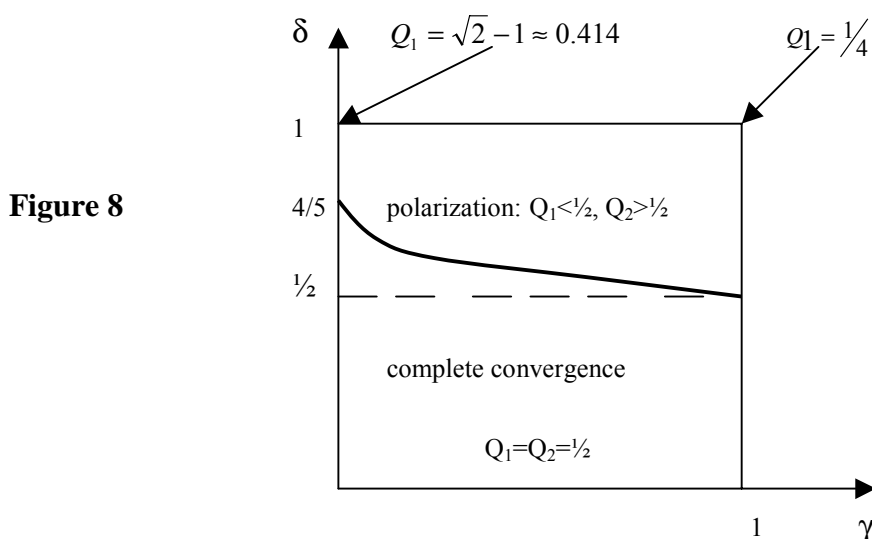
Again we use the symmetry condition to compute the equilibria. Substituting $Q_2=1-Q_1$ in the above equation and solving for Q_1 yields

$$(6) \quad Q_1 = \frac{1}{2(1-\gamma)} \left[-2(1+\gamma) + \sqrt{4(1+\gamma)^2 + \frac{4(1-\gamma)}{\delta}} \right]$$

For which parameter combinations (γ, δ) will the two policy pronouncements converge at $Q_1=Q_2=1/2$? Setting the expression on the right hand side of the above equation equal to $1/2$, we obtain after some standard manipulations

$$\delta = \frac{4(1-\gamma)}{5-2\gamma-3\gamma^2}$$

The $Q_1=Q_2=\frac{1}{2}$ line defined by this equation is depicted in Figure 8.⁸ For $\delta=0$ we have $U_1=\pi$ and we are back to the “vanilla” model discussed in section 1 (cf. equation 3c). Since we used the concave utility functions depicted in Figure 5, we know from section 2 that the equilibrium is characterized by a complete convergence of the two platforms in the sense of Hotelling and Downs. Below the $Q_1=Q_2=\frac{1}{2}$ line we thus have complete political convergence.



Let us now look at the special case $\delta=1$. In this case the candidates have, at least to some extent, extra-electoral motivations. In the case of $\gamma=1$ - a specification which is similar to the one proposed by Wittman (1983) - the candidates’ objectives are completely dominated by ideological considerations; their utility equals the expected utility of the implemented policy with no consideration whatsoever to who is actually implementing the policy. Under these circumstances political convergence certainly does not represent an equilibrium since deviating from a common platform improves the outcome with a positive probability, while the less favorable outcome corresponds to the certain outcome of the status quo. Substituting $\delta=\gamma=1$ into (6) yields $Q_1=\frac{1}{4}$ and thus $Q_2=\frac{3}{4}$.

In the case of $\gamma=0$, the politicians are, in the first place, interested in being elected to public office; if elected, they do, however, derive utility from pursuing a policy which corresponds to their ideological convictions. Deviating from a back-to-back position in the sense of Hotelling and Downs increases the deviating candidate’s utility in terms of

⁸ Notice that δ converges to $\frac{1}{2}$ if γ approaches unity. This can be seen by applying l’Hôpital’s rule: differentiating numerator and denominator with respect to γ yields $\delta = \frac{-4}{-2-6} = \frac{1}{2}$

ideology, but decreases her utility in terms of popularity. Because of this additional cost of deviation the candidates' platforms are less polarized using this specification due to Edelman (1992) as compared to the situation portrayed by Wittman's specification $\gamma=1$.⁹ Indeed, substituting $\delta=1$ and $\gamma=0$ into (6) yields $Q_1 = \sqrt{2} - 1 \approx 0.414 > 0.25$ and thus $Q_2 = 2 - \sqrt{2} \approx 0.586 < 0.75$.

7. The Rules of the Game: Corruption

As compared to *personal* corruption, *official* corruption implies an agreement between a candidate and an interest group to exchange, in case of the candidate's election, favorable policies for campaign contributions. In contrast to the *policy-induced* contributions analyzed in the previous sections, the contributions analyzed here are *service-induced*. To portray political polarization in an environment of service-induced contributions, i.e. in an environment in which official corruption is prevalent, it suffices to assume one *type* of interest group only [cf. Baron (1989) and Wilson (1990)]. We thus assume that there are n identical interest groups, all of them possessing the utility function $G(Q_j)$, where Q_j denotes a policy targeted at interest group j . A suitable example would be an industry-specific import tariff. If the two candidates are in a strong position vis-à-vis the n interest groups, they can extract from them the expected value of the proposed policy; hence

$$(7) \quad c_{j1} = \pi_j^e G(Q_{j1}) \quad \text{and} \quad c_{j2} = (1 - \pi_j^e) G(Q_{j2})^{10}$$

Consider the following objective functions of the two politicians:

$$(3d) \quad U_1 = \pi W_1 = \pi \left[1 - \left(\frac{1}{n} \sum_{j=1}^n Q_{j1} \right)^2 \right] \quad \text{and} \quad U_2 = (1 - \pi) W_2 = (1 - \pi) \left[1 - \left(\frac{1}{n} \sum_{j=1}^n Q_{j2} \right)^2 \right]$$

⁹ Just as Magee et al. (1989), Edelman uses a contest success function which includes the candidates' policy pronouncements. This allows her, first, to restrict the analysis to only one interest group and, second, to consider a setup in which the interest group contributes before the politicians choose their platforms. Gersbach (1998) analyzes a similar model with many interest groups (donors).

¹⁰ Notice, that the "campaign contribution specialization theorem" does not apply anymore to this modeling setup. The interest groups make contributions to both candidates. Morton and Cameron (1992) point out, however, that the stronger candidate could do better by rewarding only those interest groups who do not contribute also to her opponent. They go on to show that such a restriction has devastating consequences for this modeling approach.

Both candidates are thus assumed to possess the same objective: they want to be elected, but the value W_i of winning the election is assumed to decrease with increasing (average) concessions to the interest groups. From a technical point of view, this objective function is identical to the specification $\gamma=0$ and $\delta=1$ analyzed in the previous section. Since, however, the value function $W_i = \left[1 - \left(\frac{1}{n} \sum_{j=1}^n Q_{ji} \right)^2 \right]$ is the same for both

politicians, it is not supposed to reflect any ideological commitment on the part of the politicians, but rather “the recognition that a higher level of Q lessens *political support from the general interest*, thereby *shortening the expected time in office*; or that a higher Q increases the effort required by the politician to counteract political opposition...” [cf. Wilson (1990), p.244].

To introduce a difference between the two competing politicians, assume now that the contest success function (1) is biased in favor of the first politician:

$$(1) \quad \pi = \frac{\beta c_1}{\beta c_1 + c_2} \quad \text{with } \beta > 1 \quad \text{and} \quad c_i = \sum c_{ji}$$

Assuming for simplicity that $G(Q_j) = Q_j$ and $\pi_j^e = \pi^e$ for all j , equation (7) reduces to $c_{j1} = \pi^e Q_{j1}$ and $c_{j2} = (1 - \pi^e) Q_{j2}$. Substitution of these expressions in (1) and the resulting expression for π in the first candidate’s utility function (3d) yields

$$(8) \quad U_1 = \frac{\beta \pi^e \sum Q_{j1}}{\beta \pi^e \sum Q_{j1} + (1 - \pi^e) \sum Q_{j2}} \left[1 - \left(\frac{1}{n} \sum Q_{j1} \right)^2 \right]$$

If n is large, it is reasonable to assume that each interest group takes the expected probability π^e as given. Candidate 1 can thus treat π^e parametrically when she chooses Q_{j1} . The best-response calculus of the first politician thus implies choosing Q_{j1} (for $j=1, \dots, n$) such that U_1 in the above equation is maximized for given values of Q_{j2} and π^e :

$$\frac{\partial U_1}{\partial Q_{j1}} = \frac{\beta \pi^e (1 - \pi^e) \sum Q_{j2}}{(\beta \pi^e \sum Q_{j1} + (1 - \pi^e) \sum Q_{j2})^2} \left[1 - \left(\frac{1}{n} \sum Q_{j1} \right)^2 \right] - \frac{2}{n^2} \sum Q_{j1} \frac{\beta \pi^e \sum Q_{j1}}{\beta \pi^e \sum Q_{j1} + (1 - \pi^e) \sum Q_{j2}} = 0$$

The second candidate solves an analogous maximization problem. For symmetry reasons we have $Q_{ji} = Q_i$ (for all $j=1, \dots, n$ and $i=1,2$). Thus, the above first-order condition reduces to

$$\frac{\beta\pi^e(1-\pi^e)nQ_2}{(\beta\pi^enQ_1+(1-\pi^e)nQ_2)^2}[1-Q_1^2]=\frac{2}{n}Q_1\frac{\beta\pi^enQ_1}{\beta\pi^enQ_1+(1-\pi^e)nQ_2}$$

and then to

$$(8a) \quad \frac{(1-\pi^e)nQ_2}{\beta\pi^enQ_1+(1-\pi^e)nQ_2}=1-\pi=\frac{2Q_1^2}{1-Q_1^2}$$

For symmetry reasons we have

$$(8b) \quad \pi=\frac{2Q_2^2}{1-Q_2^2}$$

In equilibrium, of course, the expected probability π^e needs to equal the actual probability π . Setting $\pi=\pi^e$ in the left part of (8a), we see that the condition is satisfied for $\pi=0$ as well as for $\pi=1$. For $\pi\neq 1$ we can cancel the term $(1-\pi)n$ and obtain

$$\frac{Q_2}{\frac{\beta\pi Q_1}{1-\pi}+Q_2}=1-\pi \Leftrightarrow Q_2=\beta\pi Q_1+(1-\pi)Q_2 \Leftrightarrow \beta Q_1=Q_2$$

Interior solutions of π , i.e. $\pi \in (0,1)$, thus require $Q_2=\beta Q_1$. Since we want to focus on solutions in which the election outcome is *uncertain*, we need to assume that this condition is satisfied. Returning now to equations (8a) and (8b), we obtain by substituting $Q_2=\beta Q_1$

$$\pi=1-\frac{2Q_1^2}{1-Q_1^2}=\frac{2Q_2^2}{1-Q_2^2}=\frac{2\beta^2Q_1^2}{1-\beta^2Q_1^2}$$

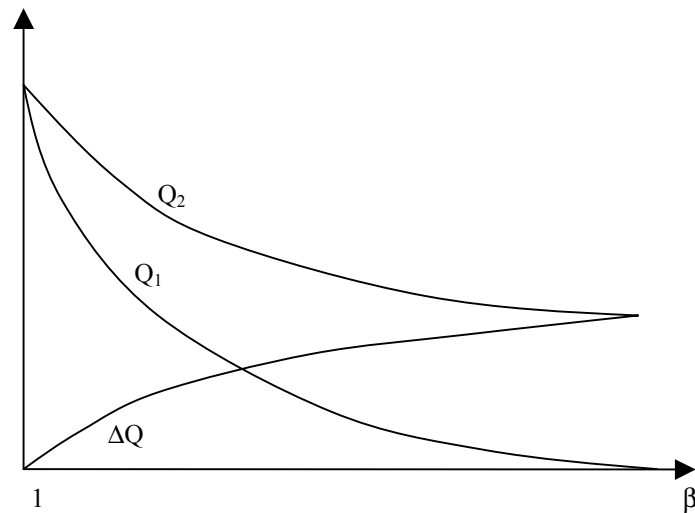
We thus, finally, arrive at the equilibrium policy pronouncement Q_1 as an implicit function $f(Q_1, \beta)=0$ of the parameter β :

$$(9) \quad 1-\frac{2Q_1^2}{1-Q_1^2}-\frac{2\beta^2Q_1^2}{1-\beta^2Q_1^2}=0$$

Plotting $f(Q_1, \beta)=0$ reveals (cf. Figure 9) that Q_1 converges to zero if the asymmetry in election efficiency as measured by the parameter β increases beyond all bounds. Moreover, the plot shows that the extent of political polarization $\Delta Q=Q_2-Q_1$ varies positively with β . If the first candidate's campaign is much more efficient than the campaign of her opponent, she is in such a strong position that she does not need to

compromise her value W_1 of being elected by making illegal deals with the interest groups, whereas the weak second candidate's best option is to corrupt himself and to buy a higher probability of winning, thereby reducing his value W_2 of being elected.¹¹

Figure 9



¹¹ In this model the offer is made by the politician. In the “policy for sale” type of model advocated by Grossman and Helpman (1994, 1996) it is the interest groups which are supposed to approach the politicians. The corruption model designed by Grossman and Helpman is essentially a combination of building blocks taken from the Wilson model and our vanilla model presented in section 2. The difference between our vanilla model and the Grossman/Helpman model is that in the vanilla model the politicians are the Stackelberg leaders whereas in the Grossman/Helpman model the interest groups act as Stackelberg leaders and the politicians are the followers.

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