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Tacit Collusion in Politics

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Abstract

We study competition between political parties in repeated elections with probabilistic voting. This model entails multiple equilibria, and we focus on cases where political collusion occurs. When parties hold different opinions on some policy, they may take different policy positions that do not coincide with the median voter's preferred policy platform. In contrast, when parties have a mutual understanding on a particular policy, their policy positions may converge (on some dimension) but not to the median voter's preferred policy. That is to say, parties can tacitly collude with one another, despite political competition. Collusion may collapse, for instance, after the entry of a new political party. This model rationalizes patterns in survey data from Sweden, where politicians on different sides of the political spectrum take different positions on economic policy but similar positions on refugee intake—diverging from the average voter's position, but only until the entry of a populist party.

Keywords: electoral competition, partisan collusion, probabilistic voting, repeated elections, tacit collusion

JEL: C73, D72, P16

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1 Introduction

At the heart of many normative definitions of democratic systems is the assertion that political parties represent their constituents and advocate for them in the policy-making process (Dahl, 1956).[1] However, this is somewhat at odds with the empirical observation that politicians have vastly different views from their voters (Levitt, 1996; Ansolabehere, Snyder and Stewart, 2001).

We begin this research note with a motivating example that echoes this commonplace remark. We use survey data from Sweden to show large—and time-varying—differences in politicians' and voters' policy positions. This contrast could stem from, for example, elite misperceptions of public opinion (Broockman and Skovron, 2018; Pereira, 2021), differences in the personal characteristics of political elites and masses (Kertzer, 2022), or the nature of political competition (Gerber and Lewis, 2004). The second part of this paper discusses a slightly different rationale that could explain the patterns that we observe in the data: tacit collusion between political parties. We formalize this argument with a simple probabilistic voting model that allows a multidimensional policy space and multiple political parties.

The model entails multiple equilibria, and this paper focuses on two of them:

(i) When parties hold different opinions on some policy, they may take different policy positions that do not coincide with the median voter's preferred policy platform.

(ii) When parties have a mutual understanding of a particular policy, their policy positions may converge (on some dimension) but not to the median voter's preferred policy. Parties may *collude* with one another and take a position that differs from what the median voter prefers, despite political competition.

The latter type of equilibrium is consistent with what our example illustrates. Swedish politicians from the left and right diverge from each other in terms of economic policies,

[1] In the classical work in formal political theory, the policy platforms of two competing parties converge to the median voter's preferred policy position. A prominent example is the economic theory of democracy by Downs (1957) and extensions thereof (see Grofman 2004 for a review).

but on average, they are no different from voters. When it comes to refugee intake, parties' policy positions converge—but not to what the average voter would prefer.

In our model, the collusion equilibria arise naturally without parties actively seeking to form a cartel. This is because, similar to Alesina (1988), we model electoral competition as a repeated game (see also Duggan and Martinelli 2017 for a review).[2] One justification for doing so is the remarkable stability of party systems observed especially in the West. Although parties are organizations that react to changing circumstances, they are also persistent institutions (Aldrich, 1995; Bartolini and Mair, 2007). The first type of equilibria in our model echoes the central result of Alesina (1988). Characterizing the second type of equilibria, the *collusion equilibria*, is the main novelty and contribution of our paper. Although the argument that repeated interactions between political actors facilitate collusion against voters is commonplace in political-science scholarship (see, e.g., Gottlieb 2015), earlier work has not yet formalized the idea that such behavior can emerge also in repeated electoral games.

In the final part of the paper, we use a numerical analysis of our model to exemplify that the collusion equilibria can break down if there is a shock to the location of the median voter or if there are changes in the configuration of the party system. In such cases, convergence towards the median voter's policy position may emerge. This result reconciles many empirical findings that document shifts in politicians' and parties' policy platforms and their causes.[3] For instance, in the Swedish case, we see that parties' stances regarding immigration start aligning with those of voters after the breakthrough of the nationalist and right-wing populist Sweden Democrats (*Sverigedemokraterna*) party.

[2]Our model shares some similarities with the probabilistic spatial voting model of Lin, Enelow and Dorussen (1999), but we deviate from their treatise in two ways. The first deviation is small: Our model allows a continuous rather than a discrete policy space. The second difference is that candidates do not simply attempt to maximize their expected number of votes but also have personal policy preferences. Thus, their utility function balances their personal policy preferences with their expected electoral performance and the influence they expect to gain over policy.

[3]Adams (2012) surveys both theoretical and empirical literature on shifts in parties' policy platforms in multiparty settings.

Our theory also resonates with several other real-world examples. The rise of populist parties in Western Europe and the subsequent response of mainstream parties serves as a timely example. Established political parties have become more moderate along social dimensions of ideology, which has provided new parties with an opportunity to take more extreme policy positions and thereby benefit electorally (e.g., Rydgren 2007). Many researchers have argued and empirically shown that mainstream parties have reacted to the rise of the radical right by adjusting their own policy positions on issues such as immigration and European integration (e.g., Meijers 2017; Abou-Chadi and Krause 2020; Spoon and Klüver 2020).[4] In the United Kingdom, most politicians within both the Conservative and the Labour Party were persistently in favor of remaining in the European Union, but there was a substantial opposition from the voters (see, e.g., Hanretty, Mellon and English 2021 for related discussion). When the popularity of the United Kingdom Independence Party grew and the party became able to threaten important Conservative constituencies, a referendum was held to sort out the question. With a small majority voting in favor of Brexit, the established parties could no longer ignore voters' opinion.[5]

A natural parallel could be drawn between collusion among political parties and the work on tacit collusion between firms (see Ivaldi et al. 2003 for a review).[6] When political parties repeatedly compete with one another, they may form a (tacit) cartel and hold policy positions that are favorable to them but harmful to voter welfare. Similarly, repeated interactions among firms could lead to collusion where firms maintain higher prices, lower quality, or something else that can make consumers worse off. This collusion can be upheld if the parties or the firms tacitly agree that any deviation from the collusive equilibrium would trigger retaliation that would dominate the potential short-term benefits of drifting away

[4]Populists could also be successful in changing the public norms, making it socially acceptable to express views that were previously stigmatized (Bursztyn, Egorov and Fiorin, 2020).

[5]These remarks are in line with the idea of new parties acting as *political entrepreneurs* that offer new policy options to the voters and, by doing so, defy the established party brands (De Vries and Hobolt, 2020).

[6]A classic example of an industrial-organization take on the study of political organizations is Weingast and Marshall (1988). More recently, Seror and Verdier (2018) adopted a similar approach to studying political parties. Their model is closely related to ours and that of Lin, Enelow and Dorussen (1999), but they do not discuss the possibility of political cartels.

from the collusive path. A focal point, for example a price ceiling as in Knittel and Stango (2003), or a shared political view along some policy dimension as in this paper, can make co-operation more viable.

We are not the first to theoretically discuss the idea of collusion in the political arena, although there are some important differences between our model and earlier formal analyses. Palfrey (1984) and Weber (1992) present static models in which two candidates collude to take divergent policy positions in a single-dimensional policy space in response to the threat of an outside entrant.[7] In contrast, we study a setting where multiple parties participate in a sequence of elections.

Prior albeit non-formalized arguments have also been made about more explicit cartels between political parties. Gottlieb (2015) argues that the low level of public goods provision in villages in Mali is a result of collusion between rent-seeking political parties. According to Crisp and Desposato (2004), incumbent representatives collude with one another to use state resources to advance their own electoral careers in Colombia. Similarly, Katz and Mair (1995) discuss collusion between political parties—what they call the "cartel party"—to employ state resources for their political survival. They present examples of such noncompetitive party behavior in a number of established democracies.

Collusion is of course not the only potential explanation for why parties' policy platforms might not converge, as we already noted above. Wittman (1983) and Calvert (1985) showed in their seminal work that if there is uncertainty about the electoral outcome and parties have divergent preferences over policy, divergence can arise if candidates "sacrifice" part of winning probability to adopt policy platform that are more aligned with their preferences. This shows similarities with the behavior of firms that are uncertain of the location and preferences of their customers (Meagher and Zauner, 2004, 2005). When firms face uncertainty of the distribution of customer preferences, they will be have a larger degree of product variety than if they had perfect information of the demand. A greater variety will sometimes results

[7]In a related contribution comparing corrupt behavior of politicians across electoral systems, Myerson (1993) notes the possibility of collusion in two-party systems.

in products being close to the demand of the customers, and sometimes in products that are far from what customers want.

If voters also care about factors that are independent of policy positions—such as different valence characteristics (Stokes, 1963)—divergence may arise if some candidates wish to avoid competition with more qualified candidates in a crowded policy space or if some candidates use their quality advantage to deviate from the median voter's preferred policies (Ansolabehere and Snyder, 2000; Groseclose, 2001; Ashworth and Bueno de Mesquita, 2009). Furthermore, if candidates (or parties) have some personal policy preferences that are different from those of the median voter, and they cannot credibly commit to deviating from them, we would observe divergent policy platforms (Alesina, 1988; Osborne and Slivinski, 1996; Besley and Coate, 1997).

The remaining parts of our paper are structured as follows. The next section discusses a motivating example drawing survey data from Sweden. In the third section, we lay out our model. The fourth section presents a numerical illustration of the collusion equilibria. The final section concludes our study.

2 A Motivating Example

We begin by documenting patterns in survey data on Swedish politicians and voters. Swedish politicians tend to have, on average, similar economic policy preferences as voters, but there is a large "preference gap" in the case of preferences for refugee intake.

2.1 Data

We combine two different surveys on voters and politicians elected to the Swedish Parliament (*Riksdagen*). For the voters, we use a survey by the SOM Institute that has been conducted since 1986 (University of Gothenburg, 2019). This survey is a yearly repeated cross-section, with some questions being asked every year and some questions being replaced. We use a similar survey for the politicians, the Riksdag Survey, that has been conducted by the Department of Political Science at the University of Gothenburg.[8] See Ågren, Dahlberg and Mörk (2007) and Pereira (2021) for examples of other studies using these data.

Both surveys are composed of a number of claims. We focus on two claims that concern salient policy issues that overlap between the voter and politician surveys and have been asked continuously over time. The first of these reflects economic left-right ideology, namely "Reduce the public sector". The other claim is "Accept fewer refugees" which could be associated with a non-economic dimension of ideology.[9] We observe these two claims for all years 1994-2018 for both voters and politicians. Voters and politicians both indicate their opinions on each claim on a 1-5 scale, where 1 implies strong agreement and 5 implies strong disagreement.[10]

2.2 Policy Preferences of Swedish Politicians and Voters

Figure 1 provides a first glance at the differences between voters' and politicians' average opinions. We divide politicians into three different groups: the left bloc (the Social Democrats, the Left Party, and the Green Party), the right bloc (the Center Party, the Liberal Party, the Moderate Party, and the Christian Democrats), and Sweden Democrats. This division reflects the stark division between socialist and non-socialist parties that has resulted into a stable two-bloc system (Alesina, Roubini and Cohen, 1997; Pettersson-Lidbom, 2008). We see that there is a relatively stable and small gap between voters and politicians in terms of their preferences for economic policies—reducing the size of the public sector. As expected, the right-wing block is more positive towards reducing the public sector and the left-wing block is more negative towards reductions. However, when we consider attitudes towards

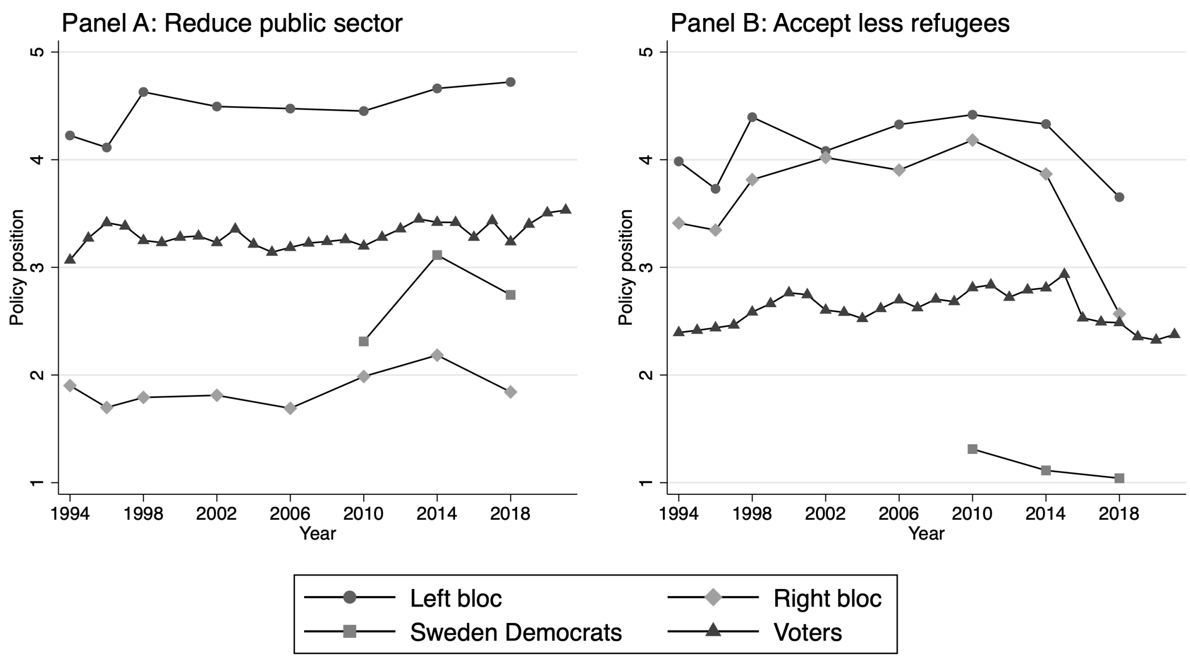
[8]The politician survey has had a relatively high response rate varying from 80% to 95%.

[9]This dimension of ideology is commonly labeled as the GAL-TAN axis, where GAL stands for green-alternative-liberal and TAN stands for traditionalist-authoritarian-nationalist.

[10]Appendix Table OA1 reports the summary statistics on these variables. We show the full distribution of the survey responses in Figure OA4. The Kolmogorov–Smirnov test suggests that the distributions of the responses by voters and politicians are statistically significantly different from each other (with $p < 0.01$). Lastly, Appendix Figures OA1 and OA2 plot the evolution of policy positions over time.

reducing immigration, the difference is striking. Until more recent years, when politicians' policy positions begin to move towards those of voters, both the right- and the left-wing block had a much more negative view of accepting fewer refugees compared to the average voter.

Figure 1. Voter and politician preferences over time.



Notes: The left bloc parties are the Social Democrats, the Left Party, and the Green Party. The right bloc parties are the Center Party, the Liberal Party, the Moderate Party, and the Christian Democrats; 1 indicates a strong agreement with a statement and 5 indicates a strong disagreement with a statement.

To quantify the average preference gap between voters and politicians, we regress the policy position on an indicator for being a politician and a set of control variables. We hold fixed survey wave specific effects, and in some specifications we also net out region fixed effects and various background characteristics to control for potential selection effects. OLS and ordered logit results are reported in Panels A and B, respectively, of Table 1. We see no statistically significant difference between politicians and voters regarding the size of the public sector (columns 1 and 2). Striking differences arise when we examine attitudes towards reducing immigration (columns 3 and 4). On average, the opinions of voters and politicians differ by nearly one point.[11] We also run separate regressions using each annual cross section and plot the results in Figure 2. Resonating with Figure 1, Panel A suggests that, on average, there are no major differences between politicians and voters in their opinions on reducing the public sector. A vastly different observation arises from Panel B. The average difference between politicians' and voters' opinions on reducing immigration is large, but it starts to diminish after 2010 and becomes nonexistent in 2018.

What could explain the changing pattern we see over time in these policy dimensions? In what follows, we formalize one plausible explanation: Politicians collude along some policy dimensions and taking policy positions that do not accord with voters' interests. This collusion could be upset by entry of a new party, eventually leading to (average) convergence of politician and voter opinions. Here, the gap in opinions regarding immigration starts to diminish after the right-wing populist party, the Sweden Democrats, entered the parliament. The party holds considerably more critical views towards immigration than the established parties.[12]

[11]Note that in all specifications, including the additional covariates barely changes the regression coefficients. Appendix Table OA2 reports the regression coefficients of the control variables. We also obtain similar results if we do not control for the year and region fixed effects.

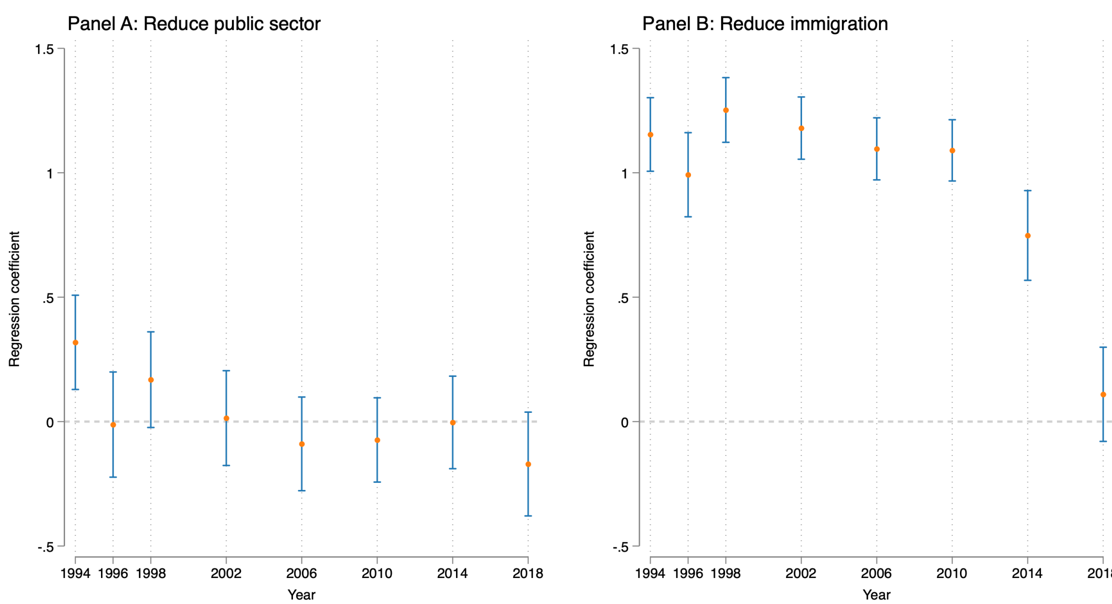
[12]In Appendix Table OA3 and Figure OA3, we re-run our regressions using a sample that excludes politicians from the Sweden Democrats. The results suggests that some difference in terms of attitudes towards refugee intake remains, which implies that politicians have not fully adopted the voters' preferences.

Table 1. Average preference gap between voters and politicians.

	Reduce public sector		Accept less refugees	
	(1)	(2)	(3)	(4)
Panel A: OLS				
Politician	-0.02	-0.01	1.20***	0.97***
	[0.03]	[0.03]	[0.02]	[0.03]
Panel B: Ordered logit				
Politician	0.04	0.05	1.69***	1.47***
	[0.05]	[0.06]	[0.04]	[0.04]
N	23344	21609	29191	27084
Year FE	✓	✓	✓	✓
Additional covariates		✓		✓

Notes: Our estimation sample only includes years when surveys were conducted on both voters and politicians. Additional controls include indicators for gender, educational attainment (primary education, high school, and a university degree), age group (five age brackets), and geographical region (21 regions). Robust standard errors are reported in brackets. *, ** and *** denote statistical significance at 10%, 5% and 1%, respectively

Figure 2. Preference gap between politicians and voters by year.



Notes: We report point estimates from separate regressions that use data from each survey year. We control for indicators for gender, educational attainment, age group, and geographical region. The figure also shows 95% confidence intervals that are constructed using robust standard errors.

3 The Model

In this section, we present a model of electoral competition with probabilistic voting and policy motivated candidates. We start by laying out a continuous version of the model of Lin, Enelow and Dorussen (1999) with (exclusively) office-motivated candidates. We then augment their model by making candidates policy-motivated.

Our goal is to illustrate that policy-motivated candidates will often produce outcomes that do not align with the policy preferences of the median voter. Moreover, when the policy preferences of the candidates as a group differ from those of the voters (on some issue), the candidates have incentives to *tacitly* collude on that issue, while still competing on issues where they disagree.

Our model is designed to be simple yet general, to demonstrate the tension between policy motivated candidates and the median voter when they disagree. It is not designed to produce a unique equilibrium. In this section, we describe the model and discuss some theoretical aspects of it. As is so often the case, fully understanding our model by analytic methods is out of reach. The next section thus describes some numerical results that further illustrate the behavior of the model.

3.1 Electoral Competition with Vote-Seeking Candidates

As mentioned above, we begin by describing a continuous version of the model from Lin, Enelow and Dorussen (1999).[13] Let there be n candidates who compete for the votes of a population of voters in the policy space. For simplicity, we assume that the policy space is 2-dimensional real space $\mathbf{R}^2$.[14] We assume that the voters are distributed in $\mathbf{R}^2$ according to a probability density function g. The candidates choose positions $c_1, \ldots, c_n \in \mathbf{R}^2$, and

[13] Adams (1999) is another example of a model of policy divergence in a multi-candidate probabilistic voting setup. See also Lindbeck and Weibull (1987) for early work on probabilistic voting and Persson and Tabellini (2002) for a textbook treatise.

[14] Given that our main goal is to show that we may have competition on one policy dimension and collusion on another, two dimensions suffice. However, it is straightforward to generalize the model to allow for m policy dimensions (where $m \geq 1$ is an integer) by simply replacing $\mathbf{R}^2$ with $\mathbf{R}^m$ in what follows. In an n-dimensional policy space we may have collusion in any number of dimensions where voters and politicians

they commit to enacting these policies after the election. Let

$$d : \mathbf{R}^2 \times \mathbf{R}^2 \to \mathbf{R}_{\geq 0}$$

denote a distance function on $\mathbf{R}^2$. The policy promised by candidate i yields each voter with position $v \in \mathbf{R}^2$ utility

$$U_v(i) = E_i - d(v, c_i),$$

where E_i is a continuous random variable. The probabilistic element of the model depends on the candidate but *not* on the voters. We assume that E_i are independent with mean 0.

We can now compute the expected vote share of candidate 1 (the expressions for other candidates are entirely analogous). A voter with position v will vote for candidate 1 if $U_v(1) > U_v(i)$ for all $i \geq 2$. This condition is easily rewritten as

$$E_i - E_1 < d(v, c_i) - d(v, c_1).$$

Let us denote $E_{i1} := E_i - E_1$ and $D_{i1}(v) = d(v, c_i) - d(v, c_1)$. Furthermore, let us write $\mathbf{E}_1 := (E_{21}, \ldots, E_{n1})$; this is a multivariate random variable, and we denote its joint cumulative density function by F and its joint probability density function by f. Similarly, we set $\mathbf{D}_1(v) = (D_{21}(v), \ldots, D_{n1}(v))$. The probability that a voter with position v votes for candidate 1 is then

$$P_1(v) := \mathbf{P}\left(\mathbf{E}_1 < \mathbf{D}_1(v)\right) = F(\mathbf{D}_1(v)).$$

Therefore, the expected vote share of candidate 1 is

$$EV_1 := \int_{\mathbf{R}^2} g(v) P_1(v) dv = \int_{\mathbf{R}^2} g(v) F(\mathbf{D}_1(v)) dv.$$

disagree. We also note that Propositions 1 and 4 continue to hold when $\mathbf{R}^2$ is replaced by $\mathbf{R}^m$, with only superficial changes to the proofs.

Lin, Enelow and Dorussen (1999) derive general conditions for the existence of Nash equilibria when candidates attempt to maximize their expected vote share. Nevertheless, any more detailed analysis of their model, such as locating a Nash equilibrium, is generally out of reach without specifying the shape of g, F, and the distance function d. Before proceeding to a version with policy-motivated candidates, let us record a median voter result from this probabilistic spatial voting model under a particular set of (symmetric but otherwise mild) assumptions. It will serve as a contrast to the results and discussion of the next section.

Proposition 1. *Assume that there is a median (and mean) voter, with position* $0 \in \mathbf{R}^2$*,* $n = 2$ *and that* d *is a strictly decreasing positive function of Euclidean distance on* $\mathbf{R}^2$*. Assume further that* $g(v) = h(d(v, 0))$ *for some non-increasing function* $h : \mathbf{R}_{\geq 0} \to \mathbf{R}_{\geq 0}$ *and that* f *is an even function (i.e., symmetric around* 0*;* $f(x) = f(-x)$*). Then,* $EV_1 \geq 1/2$ *if and only if* $d(c_1, 0) \leq d(c_2, 0)$*. If, additionally,* h *is decreasing, then* $EV_1 > 1/2$ *if and only if* $d(c_1, 0) < d(c_2, 0)$*. In particular, there is a unique Nash equilibrium* $c_1 = c_2 = 0$*.*

Proof. See Appendix A. □

3.2 Probabilistic Voting with Policy-Motivated Candidates

We are interested in the case when the candidates will not merely attempt to maximize their expected vote share. Rather than that, they care about the outcome of policy-making. To implement this, we assume that candidates have a preferred policy, and we introduce a utility function for each candidate that measures how satisfied they are with an election outcome (in terms of policy). Candidates attempt to maximize this utility.

Let each candidate i have a preferred policy $\tilde{c}_i \in \mathbf{R}^2$. Candidate i derives utility

$$\tilde{U}_i(c_1, \ldots, c_n) = \sum_{j=1}^{n} EV_j \cdot W(d(c_j, \tilde{c}_i)) \tag{1}$$

from the announced policies $c_1, \ldots, c_n$, where $W : \mathbb{R}_{\geq 0} \to \mathbb{R}$ is a strictly decreasing function. Let us unpack the expression (1). In general, $W(d(x, \tilde{c}_i))$ measures how much much utility candidate i derives from policy x. As W is strictly decreasing, this utility decreases as x gets further away from the preferred policy $\tilde{c}_i$ of candidate i. The manner in which the utility decreases depends on the shape of W. For example, a very sharply decreasing W means that candidate i is not interested in compromising on their policy position (an idealist position), while a slowly decreasing W suggests the opposite. We have assumed, for simplicity, that the utility function of all candidates has the same W, meaning that they are equally willing to compromise. The utility function (1) for candidate i of the policies $c_1, \ldots, c_n$ is then a sum over all candidates j of the utility $W(d(c_j, \tilde{c}_i))$ that candidate i derives from policy c_j, weighted by how large the influence of candidate j is expected to be. We quantify this influence by the expected vote share EV_j.

While candidate i *will* commit to policy c_i after the election in our model, we do *not* assume that the winner of the election alone sets the policy. As it is formulated, the model describes a *consensual democracy* where the opposition can exert some influence over policy. In situations where $n > 2$, it is also reasonable to expect that no single party will have a majority and that even smaller parties will influence the policy outcomes.[15]

Our main focus is on the emergence of tacit collusion between political parties, with an uncertain time horizon. Therefore, we are primarily interested in the repeated game rather than the one-shot game (c.f. Alesina 1988). We model the uncertain time horizon as an infinite time horizon, with the payoff function

$$\sum_{k=0}^{\infty} \lambda^k \tilde{U}_i(c_1^{(k)}, \ldots, c_n^{(k)}),$$

for candidate i. Here, $c_i^{(k)}$ denotes the selected policy of candidate i at time k, and $0 < \lambda < 1$ is a discounting factor. If λ is "large enough", candidates will participate for the foreseeable future.

[15]See, for instance, Folke (2014) for empirical evidence supporting this claim.

Let us make one further remark regarding the utility function. One could also use a more general utility function of candidate i, with the following shape:

$$\tilde{U}_i(c_1, \ldots, c_n) = \sum_{j=1}^{n} I_{ij}(EV_1, \ldots, EV_n) W_{ij}(c_j, \tilde{c}_i).$$

This utility function is again a weighted sum. The expression $I_{ij}(EV_1, \ldots, EV_n)$ quantifies the perceived influence of candidate j under election outcome $(EV_1, \ldots, EV_n)$ in the eyes of candidate i. The expression $W_{ij}(c_j, \tilde{c}_i)$ quantifies how candidate i values policy c_j when enacted by candidate j. The simple model that we present here corresponds to setting $I_{ij}(EV_1, \ldots, EV_n) = EV_j$ and $W_{ij}(c_j, \tilde{c}_i) = W(d(c_j, \tilde{c}_i))$ for all i and j.[16] Finally, we could allow candidates to value a policy differently depending on which candidate enacts it. One could interpret this as the possibility of engaging in partisan collusion fundamentally depending on the relationship between two or more political parties—for instance, parties with shared socialist origins might be more likely to coalesce with each other than a socialist party and a conservative party. However, we do not pursue such generalizations here.

Although we are primarily interested in the repeated game, let us finish this subsection by briefly discussing the one-shot game, since it is both interesting in itself and relevant for the repeated game (cf. the discussion around Proposition 3 below). In the one-shot game it turns out that Nash equilibria, if they exist, are typically not convergent[17]. Intuitively this makes sense: Since candidates only care about the policy outcome, it does not matter to them which candidate proposes a specific policy. Therefore, in a convergent situation, they would be better off by adjusting their policy towards their preferred policy. This is because any influence (i.e. votes) the candidate loses on this change does not lower the utility (since that influence will be used by the others to promote the convergent position anyway) and

[16] The additional generality allows for more subtle weighting of election outcomes and policies. For example, candidates may place greater (or lesser) emphasis on their expected vote share depending on what kind of motivations are driving them (Callander, 2008). A candidate could also value one policy dimension more than another, which echoes issue ownership or party-level salience of certain policy issues (van der Brug, 2004). However, note that in our model, voters do not have the option of placing different weights on different policies. Incorporating this would require more fundamental changes to our spatial voting model.

[17] We recall that a convergent Nash equilibrium is one where all players play the same position.

instead the candidate can use their influence to promote a policy that is closer to their preferred policy. Numerical examples of (approximate) equilibria for the one-shot game are given in Sections 4.2 and 4.3. In the situations discussed there (which have $n = 2$ with symmetric conditions for the two candidates), the equilibrium policies may be described as compromises between the candidates preferred policy and that of the median voter. They are symmetric, but not convergent.

3.3 Collusion Equilibria

We now turn to discuss collusion equilibria in the game with repeated elections. The exact dynamics will depend on g, F, W and $\tilde{c}_i$. Even after specifying them, numerical computation is required to analyze the model. Before examining some numerical results, we discuss in general terms how collusion can appear in our model.

A repeated game provides us with an opportunity to find equilibria through the mechanism behind the folk theorem, which we now briefly recall. In a repeated game like ours, the *threat vector* is the vector $(Th_1, \dots, Th_n)$ of payoffs with first coordinate

$$Th_1 = \min_{(c_2,\dots,c_n)} \max_{c_1} \tilde{U}_1(c_1^{(k)}, \dots, c_n^{(k)}),$$

and the other coordinates $Th_2, \dots, Th_n$ similarly defined. Any set of plays $c_1, \dots, c_n$ satisfying $\tilde{U}_i(c_1, \dots, c_n) > Th_i$ for all i gives rise to a Nash equilibrium (for sufficiently large λ) by candidate i playing c_i until someone, say candidate j, defects, and then everyone else reverts to playing the policies that min-max candidate j.

This is an example of a *grim trigger strategy.* Players cooperate, playing the same position over and over again, until someone defects and plays a different position. When this happens, all other players immediately defect as well, in this case playing a strategy that minimizes the possible utility for the defecting player. These equilibria are very rigid and may seem unrealistic, in that even the smallest deviation from a predetermined status quo is punished immediately, possibly to the detriment of all candidates. For us, they are inadequate, since they require sticking to predetermined policies in *all* policy dimension, whereas our intention is to demonstrate the possibility of collusion in one dimension and competition in the other. Nevertheless, these equilibria are very illustrative, and there are various ways to modify the strategy so that it allows some flexibility for the candidates while cooperating, or allows a less severe response to defection (for example, one that provides a better outcome for the candidates responding to the defection). One option is to use a different game-theoretic notion of equilibrium. To allow the players more flexibility, one might consider approximate Nash equilibria to allow small policy movements near the status quo, or consider correlated equilibria to allow movement between different sets of policies that are Pareto improvements of the threat vector. It is also natural to consider what happens when candidates respond to defection by moving to a Nash equilibrium for the one shot game, or any type of position that is an improvement on the threat.[18]

We will consider a more flexible way of using the threat vector to create equilibria where collusion occurs, which allows for competition in one dimension and collusion in the other. We will build the discussion in two steps: First, we will address the issue of flexibility while cooperating, and then the issue of playing other positions than the threat as a response to defection. Let us call a collection $X_1, \ldots, X_n \subseteq \mathbf{R}^2$ of regions a set of *collusion regions* if, for any set of plays $(c_1, \ldots, c_n) \in X_1 \times \cdots \times X_n$,

$$\tilde{U}_i(c_1, \ldots, c_n) > Th_i$$

for all i.[19] We may then consider a restricted game where candidate i is only allowed to play policies from the region X_i. The following proposition is then immediate.

[18] Candidates moving to a Nash equilibrium for the one shot game is what happens when cooperating in the Prisoner's Dilemma, which is the most famous example of a grim trigger strategy.

[19] For some similar ideas in a context of a model with a dynamic oligopoly, see Fershtman and Pakes (2000).

Proposition 2. *With notation as above, any Nash equilibrium of the one-shot restricted game where candidate i is only allowed to play policies from the region X_i gives rise to a Nash equilibrium of the (unrestricted) repeated game (for any sufficiently large λ).*

When the X_i are singletons, this returns the previous "rigid" collusion equilibria obtained from the folk theorem. In words, the proposition says that a set of collusion regions may be viewed as bounds in which competition is both allowed and profitable for the candidates, and the equilibrium strategy is for each candidate to optimize their utility *within* these bounds, until someone defects. We may interpret the collusion region as representing the policies that are "acceptable" to the establishment at that time. We note that, just like the situation for most types of Nash equilibria, we have no algorithms for finding collusion regions, and they need not be unique. Instead, we will have to find them by inspection. Fortunately, in the situations we will consider, it is easy to locate appropriate collusion regions.

We now turn to the question of responding to defection by playing other positions than the threat. In practice, finding the threat might be impractical, or very difficult computationally. For Proposition 2, it is not necessary to locate *the* threat. Indeed, *a* threat suffices. Let us explain this in the situation of $n = 2$, since this simplifies the discussion and is essentially the only case we will consider. Given a set of collusion regions X_1, X_2, a play $\bar{c}_1$ for candidate 1 is a threat for candidate 2 if

$$\tilde{U}_2(c_1, c_2) > \max_{\bar{c}_2} \tilde{U}_2(\bar{c}_1, \bar{c}_2)$$

for any $(c_1, c_2) \in X_1 \times X_2$. In words, by playing $\bar{c}_1$ candidate 1 ensures that the utility for candidate 2 will be lower than for any possible plays within the collusion regions. A threat for candidate 1 is defined in the same way, and we will simply refer to a pair of plays $(\bar{c}_1, \bar{c}_2)$ where $\bar{c}_1$ is a threat for candidate 2 and $\bar{c}_2$ is a threat for candidate 1 as a threat. Such general threats can be located by guessing, and may be much more plausible plays than *the* threat. In the next section which presents our numerical results, we will exclusively focus on threats in the above sense. It is particularly interesting to investigate whether there is a Nash equilibrium for the one-shot game which also serves as a threat to a collusion based on collusion regions X_1 and X_2. This is in a sense the most realistic type of collusion. Candidates tacitly collude for increased utility. If someone defects, they respond by playing the game for themselves. Let us record this observation explicitly.

Proposition 3. *Let $n = 2$ and assume that $X_1, X_2 \subseteq \mathbf{R}^2$ are two regions. Assume that $(c_1, c_2) \in X_1 \times X_2$ is a Nash equilibrium for the one-shot restricted game where candidate i can only play policies from X_i, and that $(\bar{c}_1, \bar{c}_2) \in \mathbf{R}^2 \times \mathbf{R}^2$ is a Nash equilibrium for the one-shot (unrestricted) game. If $\tilde{U}_i(c_1, c_2) > \tilde{U}_i(\bar{c}_1, \bar{c}_2)$ for $i = 1, 2$, then the strategy where candidate i plays policy c_i until defection occurs, and then plays $\bar{c}_i$, is a Nash equilibrium of the repeated game (for a sufficiently high λ).*

To finish our theoretical discussion, let us provide a stylized example of a situation where we have collusion regions when the assumptions of Proposition 2 are met.

Proposition 4. *We make the same assumptions as in Proposition 1. Assume further that $d(0, \tilde{c}_1) = d(0, \tilde{c}_2)$. Let $X \subseteq \mathbf{R}^2$ be the line segment between $\tilde{c}_1$ and $\tilde{c}_2$. If*

$$\frac{W(0) + W(d(0, \tilde{c}_i))}{2} < \min_{v \in X} W(d(v, \tilde{c}_i))$$

for $i = 1, 2$, then $X_1 = X_2 = X$ is a set of collusion regions.

Proof. See Appendix A. □

4 Numerical Results

Numerical computation is the best tool to further illustrate our model and the collusion equilibria. In this section, we present two numerical examples: one with two political parties and one where a third party enters.[20] We stress that these are examples chosen to illustrate the broad features of our model and that they involve specifying the parameters of the model. Other choices for these parameters would of course produce quantitatively different results, but with reasonable choices we would expect the qualitative aspects to remain unchanged.

4.1 Preliminaries

As mentioned above, one needs to specify the parameters n, d, g, the E_i, and W in order to be able to make computations. We will consider the cases of $n = 2$ and $n = 3$. It seems natural to assume that the voters are distributed according to independent mean 0 and variance 1 normal distributions in both policy directions, which gives us g. In the examples here, our choices for d, E_i and W are as follows:

- We choose the E_i to be identically distributed according to a Laplace distribution with density function $e^{-|t|}/2$.
- We use Euclidean distance *squared* as the distance function.
- We set $W(x) = e^{-x^2/2}$.

With these choices, $0 \leq \tilde{U}_i \leq 1$ for all i and all choices of policies $c_1, \dots, c_n$. $\tilde{U}_i = 1$ means that 100% of the votes go to candidates playing policy $\tilde{c}_i$. In this way, utility can conveniently be interpreted as how satisfied politicians are with the (expected) election outcome, on a scale from 0% to 100%.

Our choices of E_i and W are a compromise between qualitative properties and computational efficiency. The shape of the weight function $W(x) = e^{-x^2/2}$ indicates that candidates will be positive towards policies reasonably close to their preferred one, but eventually the utility they gain from policies far away from their preferred one decreases rapidly. The E_i, which are the probabilistic element in our model, can reasonably be assumed

[20] Our model does not endogenize the entry and exist of new parties, in contrast to the citizen-candidate models (Besley and Coate, 1997; Osborne and Slivinski, 1996). Moreover, some spatial models allow entry. See Palfrey (1984) for one important example.

to be symmetric and have most of its mass concentrated near 0, with relatively rapid decay. Intuitively, this means that a voter votes for the candidate who promises the policy closest to the preferred policy of the voter with a high probability. The normal distribution would again be a natural choice for the E_i, but this turns out to be slow to compute. For our purposes, the Laplace distribution offers the same broad qualitative properties while at the same time being computationally efficient.[21]

With this set-up, we are able to compute the best response for a candidate with respect to a given position of the other candidate (or candidates, when $n = 3$) in a short period of time (less than a minute on a standard personal computer, with implementation in R). This is highly desirable, since we wanted to be able to perform many such computations. Our main technique for finding approximate Nash equilibria numerically is by iteratively computing best responses for the different candidates (in turn) until the position of both candidates appear to converge. This is a standard approach to finding fixed points in general (and hence Nash equilibria), and it works rather well for our model. It is also a very natural way for players to behave in a repeated game. In the discussion below, we will refer to this way of finding approximate Nash equilibria as "best response analysis".

4.2 An Example with Two Parties

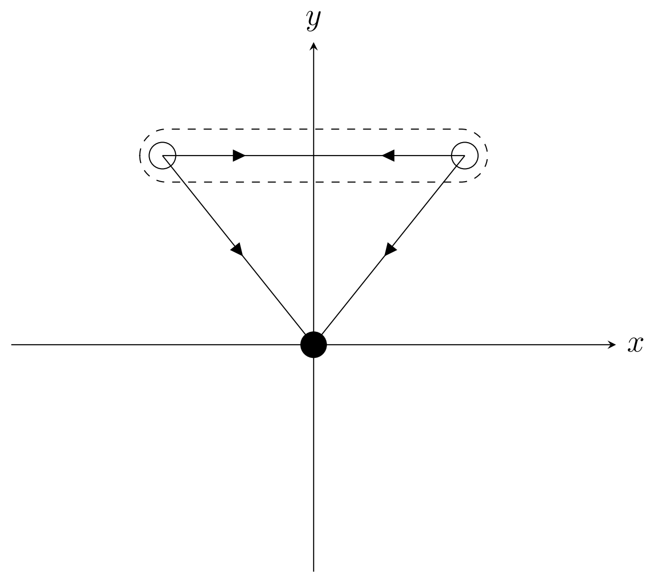
We start with a case with two political candidates (or parties). Figure 3 graphically illustrates the scenario that we have in mind. We assume that the candidates (the hollow circles) have symmetrical but opposite preferred positions on the x-axis but identical preferred positions on the y-axis. Concretely, we set

$$\tilde{c}_1 = (-0.5, 1), \quad \tilde{c}_2 = (0.5, 1).$$

[21] Computing our utility functions is demanding, since they are double integrals that need to evaluated numerically. The situation is further complicated by the fact that the integrand includes F, which is a joint cumulative distribution function and, hence, typically taxing to compute. With the E_i distributed according to a Laplace distribution, it turns out that F has a closed formula that can be explicitly computed by hand and is inexpensive to compute.

The median voter (the solid dot) is placed in the middle of both the vertical and horizontal axes. Exclusively competing for votes would lead to convergence towards the median voter along both dimensions, by Proposition 1. In our model, however, politicians receive a higher utility from positions closer to their preferred policy, so it would seem that they have incentives to collude on the y-axis, and one might suspect that the two parts of the dashed area on the left and right side of the y-axis are collusion regions. This turns out to be the case, as we will now see.

Figure 3. An example with two parties.



Notes: Parties compete along two policy dimensions, x and y. The solid dot marks the median voter, and the hollow circles are two parties that compete with each other. The dashed area constitutes the collusion region.

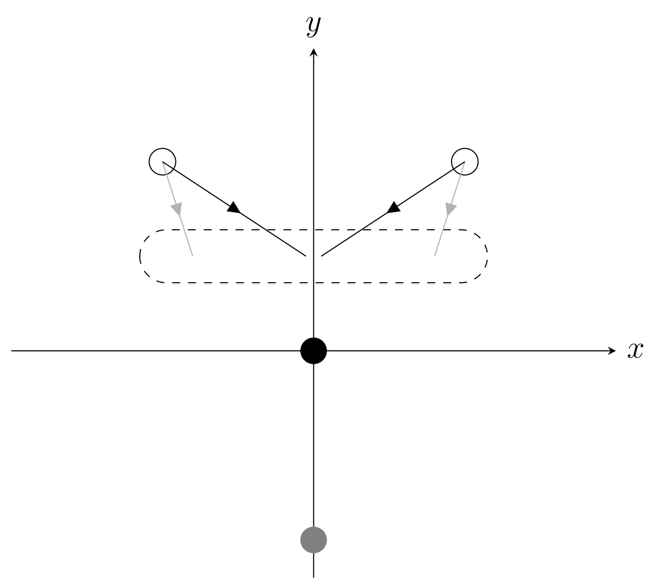
The regions $X_1 = \{(t, 1) \mid -0.5 \leq t \leq 0\}$ and $X_2 = \{(t, 1) \mid 0 \leq t \leq 0.5\}$ in $\mathbb{R}^2$ appear to be good candidates for collusion regions. The minimum utility for each candidate given a play $(c_1, c_2) \in X_1 \times X_2$ is ≈ 0.814. To show that these are collusion regions, we only need to exhibit a suitable threat, in the sense of the discussion in Section 3.2. Here, threats are plentiful—even small movements towards the x-axis lead to lower utility. For example, if $c_2 = (0.5, 0.75)$, then $\tilde{U}_1$ is ≤ 0.807, and this maximum is achieved close to $c_1 = (-0.220, 0.610)$. In particular, we see that a mild deviation serves as a threat. For a more destructive threat, one might take $c_2 = (0.5, 0)$. With this, $\tilde{U}_1 \leq 0.534$. By contrast, best response analysis shows that the one-shot restricted game has an approximate Nash equilibrium close to $c_1 = (-0.233, 1)$, $c_2 = (0.233, 1)$, with utility ≈ 0.93. Summing up, we see there are strong incentives for tacit collusion along the y-axis: Even a small move towards $y = 0$ by one of the candidates will create a substantially worse outcome for both candidate, and if one candidate is truly willing to punish defection then the outcome is drastically worse.

To finish our analysis of this scenario, we look at a repeated game equilibrium of the type considered in Proposition 3 (and the discussion preceding it), using the same collusion regions as in the previous paragraph. As noted above, the (one-shot) restricted game has an approximate Nash equilibrium close to $c_1 = (-0.233, 1)$, $c_2 = (0.233, 1)$ with utility ≈ 0.93. By contrast, best response analysis again shows that there is an approximate Nash equilibrium for the one-shot unrestricted game close to $c_1 = (-0.3, 0.6)$, $c_2 = (0.3, 0.6)$, with utility ≈ 0.85. In particular, we have found an equilibrium of the type discussed in Proposition 3. In this scenario, the candidates will compete rather fiercely along the x-axis if they maintain the collusion on y-axis (but still not converge!), but when they abandon the collusion they will make a significant move towards $y = 0$ while at the same moving closer to their preferred policies along the x-axis. It is a notable (general) feature of our model that equilibria do not tend to be convergent; in a convergent situation, candidates have an incentive to play a policy closer to their preference.

4.3 Dynamics after the Entry of a Third Party

Suppose now that a third candidate enters in the political arena. Tacit collusion theory would suggest that the entry of a candidate with the opposite preference on the y-axis might break the collusion. In Figure 4, we give an idea of the scenario before discussing the numerical results in detail. There, the hollow circles are the two old candidates from the previous subsection, and the black circle is again the median voter. The gray dot illustrates the new candidate. Our results show that the collusion between the two old candidates can in principle be upheld but only at the expense of destructively punishing defection—as we will see below such a scenario is unrealistic. On the other hand, new collusion regions appear. The dashed area marks the most profitable new collusion region. The light gray lines show the movement of the candidates towards an approximate Nash equilibrium in a free competition equilibrium (i.e., the one-shot unrestricted game), whereas the black lines trace the movement towards an approximate Nash equilibrium under collusion in the new collusion regions. In particular, we recognize some of the behavior from Section 4.2: colluding candidates compete more fiercely along the x-axis.

Figure 4. Dynamics after the entry of a third party.



Notes: Parties compete along two policy dimensions, x and y. The solid dot marks the median voter, and the hollow circles are two established parties that compete with each other. The solid gray dot is a new party. The dashed area constitutes the new collusion region. The light gray lines show the movement of the candidates towards an approximate Nash equilibrium in a free competition equilibrium, whereas the black lines trace the movement towards an approximate Nash equilibrium under collusion.

Let us now discuss the precise setup and numerical results. We assume that the new candidate plays the policy

$$c_3 = (0, -1).$$

Although we now have three candidates, we reduce it a two-player game by fixing c_3—but we need the three-candidate model to compute the expected vote shares and utilities. We think of candidate 3 as an idealistic candidate proposing the unrepresented policy in the y-axis while staying close to the median voter in the x-axis.[22]

We keep the notation from Section 4.2. First, we note that X_1 and X_2 still form a set of collusion regions (as indicated above). Indeed, $\tilde{U}_i \geq 0.433$ when $(c_1, c_2) \in X_1 \times X_2$, but if $c_2 = (0.5, 0)$, then $\tilde{U}_1 \leq 0.417$. When $(c_1, c_2) \in X_1 \times X_2$, the maximum utility with symmetric policies around the y-axis is ≈ 0.511, achieved when $c_1 \approx (-0.112, 1)$ and $c_2 \approx (0.112, 1)$. Thus we see that the collusion can be upheld but now it needs a drastic threat, and even this threat does not dramatically decrease the utility. On the other hand, the best response for $c_2 = (0.112, 1)$ is $c_1 \approx (-0.369, 0.419)$, with $\tilde{U}_1 \approx 0.574$, so there is a clear incentive for candidates to defect.[23] Moreover, best response analysis suggests that the one-shot game has a number of approximate Nash equilibria, with one is situated around $c_1 = (-0.413, 0.514)$, $c_2 = (0.413, 0.514)$ with utility ≈ 0.504 (and others with similar values of the x-coordinate). This utility is more or less the same as what can be gained from colluding along the original collusion regions. In conclusion, upholding the conclusion is very unlikely and requires desperate behaviour from both candidates.

Let us now consider the possibility of collusion using new collusion regions, and whether there are plausible Nash equilibria of the form discussed in Proposition 3. Looking at the situation, it seems plausible that candidates 1 and 2 have something to gain from collusion on *different* policy on the y-axis. For example, fixing $y = 0.5$, there is an approximate Nash equilibrium of the one-shot restricted game with utility ≈ 0.555 for both candidates, with c_1

[22] "Populist" parties tend to set up this kind of position. In our model, candidate 3 benefits from having an x-axis position close to the median voter in a stronger way that one would not expect from new and untested "populist" candidate. This is likely due to the fact that, in real life, voters have higher trust in the established candidates ability to handle x-axis policies. This is also what we can observe in Swedish data, as is evident in Figure 1. Incorporating such effects into our model would take us too far afield and make the model more complicated, but it could be an interesting direction for future research.

[23] Note that in terms of votes, the situation is even more dire—if we had used an alternative utility function to indicate that candidates 1 and 2 desire a combined vote share of $> 50\%$, then the collusion would likely have broken down completely.

and c_2 close to $(0, 0.5)$, and this appears to be (approximately) the best y-value on which to attempt to collude. Combining this with the Nash equilibrium for the one-shot unrestricted game above we get a Nash equilibrium for the repeated game of the form considered in Proposition 3. Thus we see that there is still something to be gained from collusion, but now along a new policy in the y-axis.

Regardless of whether the candidates attempt to collude, they are very likely to adjust their policy on the y-axis to (very roughly) $y \approx 0.5$. On the other hand, they appear to be exhibiting the opposite behavior on the x-axis depending on whether they collude or not: If they collude, they move towards $x = 0$. If they do not, they move towards their preferred policy in the x-direction. In other words, if they collude, they will compete fiercely along the x-axis to gain voters, but if they do not collude, they need to differentiate themselves more to appeal to their base. In conclusion, the entry of a third candidate supporting the previously unrepresented policy will likely cause the previous collusion to break down, or force the two old candidates to collude along a new y-axis policy, as would be predicted by tacit collusion theory.

5 Concluding Remarks

Several authors have argued that politicians may engage in collusive behavior that goes against the public interest (e.g., Katz and Mair 1995; Crisp and Desposato 2004; Gottlieb 2015). How can we reconcile such behavior in democracies with competitive elections? It has also been shown that established political parties have reacted to the rise of challenger parties by shifting their policy positions along certain dimensions (e.g., Meijers 2017; Abou-Chadi and Krause 2020; Spoon and Klüver 2020).[24] But why does this only happen after a new political party has entered politics?

[24] A recent example would be the rise of populist parties in Western Europe and elsewhere. See Guriev and Papaioannou (2022) for a review on literature on populist parties.

We offer some explanations by studying the behavior of political parties in a model with probabilistic voting and repeated elections. Perhaps the most important feature of our model is that it allows us to characterize the conditions under which political parties form ideological cartels with one another. By colluding, they take policy positions that are beneficial to them but deviate from what the median voter would prefer. We also discuss when this collusion is likely to collapse. In particular, we use numerical examples to illustrate how the entry of new political parties might help break the collusion among established parties.

Although the entry of new parties is not endogenous in our model, existing industrial-organization research on tacit collusion suggests that further studying the entry of new parties would be one interesting avenue for future theoretical work. The number of competitors and barriers to entry can affect the sustainability of collusion in the context of firms, and intuitively, such factors could also be important in the political arena.[25] Such a model could have implications for understanding the rapid rise of populist parties, which could be a result of previous collision among established parties that is broken up due to entry.

In addition to further theoretically studying tacit collusion in politics, our study offers food for thought for empiricists. For instance, it could be interesting to assess whether electoral collusion would arise in the laboratory and under what conditions. Experimentalists have already tested ideas regarding collusion between firms in laboratory settings (see, for example, Holt 1995 for a review). While there already is considerable experimental research on electoral competition, candidate behavior in repeated electoral games warrants further attention.

[25] For instance, electoral thresholds could keep new entrants out of established parties' way. See also Tullock (1965) for a classic discussion of entry barriers in politics.

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Online Appendix A: Proofs

Proposition 1

Proof. If $c_1 = c_2$ then it is clear that $EV_1 = 1/2$. Thus, assume that $c_1 \neq c_2$. Let L denote the line in $\mathbf{R}^2$ that is perpendicular to the line through c_1 and c_2 and goes through $(c_1 + c_2)/2$. Let R be the reflection on $\mathbf{R}^2$ that fixes L, and let H_1 and H_2 be the two closed half-planes with boundary L; we assume $c_i \in H_i$. The situation is symmetric, so assume that $d(c_1, 0) \leq d(c_2, 0)$, i.e., that $0 \in H_1$. Note that $d(v, w) \leq d(R(v), w)$ for all $v, w \in H_1$, and note that $R(c_1) = c_2$. We then compute

$$EV_1 = \int_{\mathbf{R}^2} g(v)F(\mathbf{D}_1(v))dv = \int_{H_1} g(v)F(D_{21}(v)) + g(Rv)F(D_{21}(R(v)))dv =$$

$$= \int_{H_1} g(v)F(D_{21}(v)) + g(Rv)(1 - F(D_{21}(v)))dv.$$

Here, we have used that $D_{21}(R(v)) = -D_{21}(v)$ (which follows from the remarks above) and that, since f is even, $F(-x) = 1 - F(x)$. Similarly, one sees that

$$EV_2 = 1 - EV_1 = \int_{H_1} g(v)(1 - F(D_{21}(v))) + g(Rv)F(D_{21}(v))dv.$$

The proposition now follows by noting that

$$g(v)F(D_{21}(v)) + g(Rv)(1 - F(D_{21}(v))) \geq g(v)(1 - F(D_{21}(v))) + g(Rv)F(D_{21}(v)),$$

since $g(v) \geq g(R(v))$ and $F(D_{21}(v)) \geq 1/2$ when $v \in H_1$. Here, we use the inequality $ac + b(1 - c) \geq a(1 - c) + bc$ when $c \in [1/2, 1]$ and $a \geq b \geq 0$. □

Proposition 4

Proof. By symmetry, it suffices to treat candidate 1. Let $(c_1, c_2) \in X \times X$ be any play. Let $M_i = \min_{v \in X} W(d(v, \tilde{c}_i))$. Then,

$$\tilde{U}_1(c_1, c_2) = EV_1 \cdot W(d(c_1, \tilde{c}_1)) + EV_2 \cdot W(d(c_2, \tilde{c}_1)) \geq M_1 > \frac{W(0) + W(d(0, \tilde{c}_1))}{2}.$$

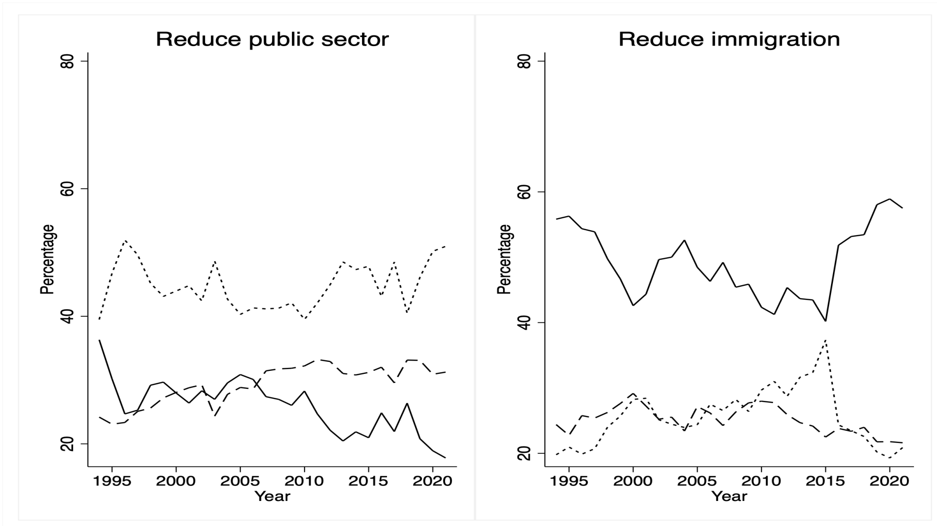
On the other hand we claim that $Th_1 \leq (W(0) + W(d(0, \tilde{c}_1)))/2$. Indeed, if candidate 2 plays policy $c_2 = 0$, we have $EV_1 \leq 1/2$ (by Proposition 1) and $W(d(c_1, \tilde{c}_1)) \leq W(0)$ (since W is decreasing). In particular,

$$Th_1 \leq \tilde{U}_1(c_1, 0) \leq (W(0) + W(d(0, \tilde{c}_1)))/2$$

as desired. This finishes the proof. □

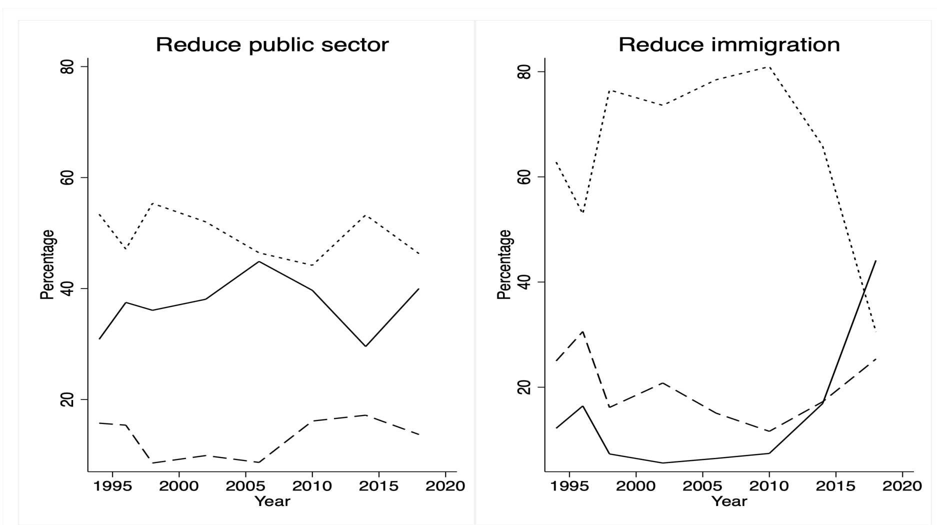
Online Appendix B: Additional Figures and Tables

Figure OA1. Voters' preferences.



Notes: The figure shows the share of voters opinion on the respective questions. Data from the SOM-survey. Solid line: Good idea. Dashed line: Neutral idea. Dotted line: Bad idea.

Figure OA2. Politicians' preferences.



Notes: The figure shows the share of politicians opinion on the respective questions. Data from the RDU-survey. Solid line: Good idea. Dashed line: Neutral idea. Dotted line: Bad idea.

Table OA1. Summary statistics.

	Observations	Mean	Median	Std. dev.
Panel A: Voters				
Reduce public sector	80229	3.3	3	1.2
Accept fewer refugees	112360	2.6	3	1.29
Age: 18-24	145711	.079	0	.27
Age: 25-34	145711	.13	0	.341
Age: 25-34	145711	.13	0	.341
Age: 35-49	145711	.22	0	.417
Age: 50-64	145711	.28	0	.447
Age: >65	145711	.29	0	.451
Educ: Basic	147582	.2	0	.398
Educ: High School	147582	.43	0	.495
Educ: College	147582	.37	0	.483
Male	152015	.48	0	.5
Female	152015	.52	1	.5
Panel B: Politicians				
Reduce public sector	2480	3.2	3	1.51
Accept fewer refugees	2488	3.1	3	1.52
Age: 18-24	2754	.013	0	.114
Age: 25-34	2754	.13	0	.335
Age: 35-49	2754	.37	0	.482
Age: 50-64	2754	.46	0	.499
Age: >65	2754	.027	0	.162
Educ:Basic	2379	.054	0	.227
Educ:High School	2379	.25	0	.43
Educ:College	2379	.7	1	.458
Male	2803	.55	1	.497
Female	2803	.45	0	.497

Table OA2. OLS and ordered logit regressions on political preferences.

	Voters and politicians opinions			
	(1)	(2)	(3)	(4)
	Public sector	Refugees	Public sector	Refugees
Politician	-0.01	0.97***	0.05	1.47***
	(0.03)	(0.03)	(0.06)	(0.04)
Female	0.31***	0.16***	0.45***	0.24***
	(0.02)	(0.01)	(0.02)	(0.02)
Age: 25-34	-0.04	-0.12***	-0.03	-0.16***
	(0.03)	(0.03)	(0.05)	(0.05)
Age: 35-49	-0.01	-0.12***	0.02	-0.16***
	(0.03)	(0.03)	(0.04)	(0.05)
Age: 50-64	-0.15***	-0.16***	-0.18***	-0.22***
	(0.03)	(0.03)	(0.04)	(0.05)
Age: >65	-0.40***	-0.20***	-0.54***	-0.25***
	(0.03)	(0.03)	(0.05)	(0.05)
Education: High School	-0.12***	0.18***	-0.17***	0.27***
	(0.02)	(0.02)	(0.03)	(0.03)
Education: College	-0.24***	0.76***	-0.34***	1.11***
	(0.03)	(0.02)	(0.04)	(0.03)
Constant	3.03***	2.28***		
	(0.05)	(0.05)		
Observations	21,609	27,084	21,609	27,084
R-squared	0.04	0.15		

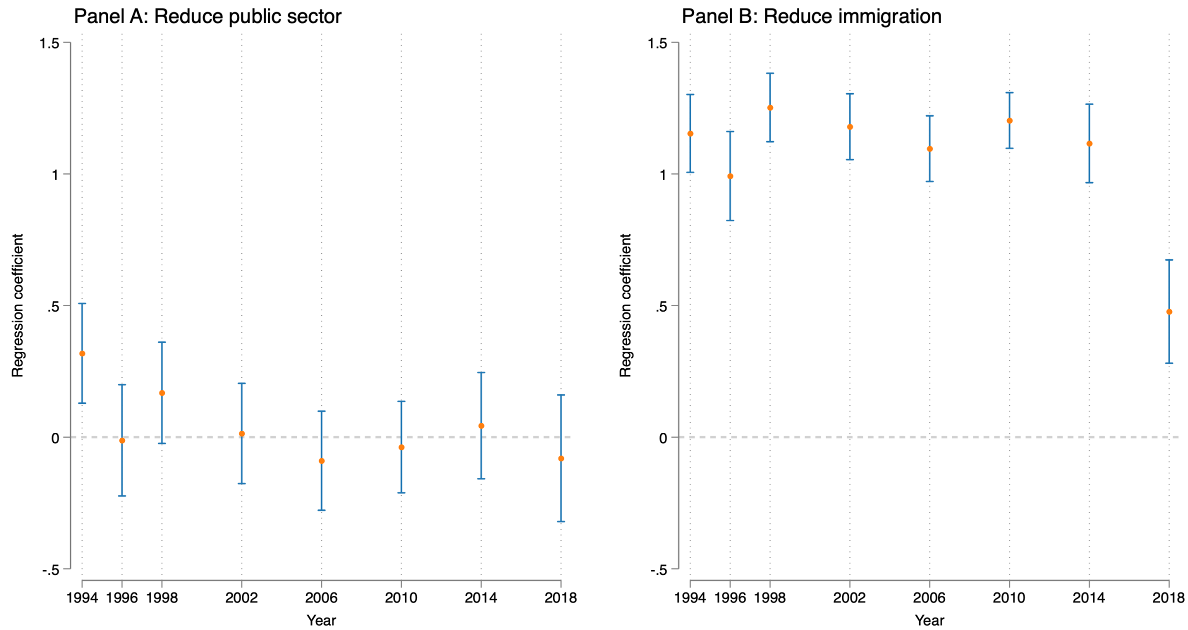
Notes: The specifications in columns (1) and (2) are estimated using OLS, and the specifications in columns (3) and (4) are estimated using ordered logit. The regressions also control for region and time fixed effects. for Robust standard errors are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table OA3. OLS and ordered logit results, Sweden Democrats excluded.

	(1) Public sector	(2) Refugees	(3) Public sector	(4) Refugees
Politician	-0.01	0.98***	0.05	1.46***
	(0.06)	(0.04)	(0.11)	(0.07)
Female	0.21***	0.19***	0.30***	0.29***
	(0.03)	(0.02)	(0.04)	(0.03)
Age: 25-34	0.03	-0.10*	0.05	-0.14*
	(0.06)	(0.05)	(0.08)	(0.08)
Age: 35-49	0.02	-0.19***	0.03	-0.28***
	(0.05)	(0.05)	(0.07)	(0.07)
Age: 50-64	0.01	-0.27***	0.03	-0.40***
	(0.05)	(0.05)	(0.07)	(0.07)
Age: >65	-0.29***	-0.27***	-0.44***	-0.36***
	(0.05)	(0.05)	(0.08)	(0.07)
Education: High School	0.04	0.18***	0.05	0.27***
	(0.04)	(0.03)	(0.06)	(0.05)
Education: College	0.00	0.74***	0.01	1.08***
	(0.04)	(0.03)	(0.06)	(0.05)
Constant	3.06***	2.70***		
	(0.06)	(0.06)		
Observations	8,144	13,302	8,144	13,302
R-squared	0.03	0.14		

Notes: The specifications in columns (1) and (2) are estimated using OLS, and the specifications in columns (3) and (4) are estimated using ordered logit. The regressions also control for region and time fixed effects. for Robust standard errors are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Figure OA3. Preference gap between politicians and voters by year, Sweden Democrat politicians excluded.



Notes: Point estimates and 95% confidence interval. Data on voters from the SOM-survey, data on politicians from the RDU-survey. Politicians from the Swedish democrats excluded from all years. Regional and year fixed effects, robust standard errors.

Figure OA4. Distributions of voter and politician responses.