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Matthias Dahm
Amihai Glazer

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Universitat Rovira i Virgili
Facultat d'Economia i Empresa
Avgda. de la Universitat, 1
43204 Reus
Tel.: +34 977 759 811
Fax: +34 977 300 661
Email: sde@urv.cat

CREIP
www.urv.cat/creip
Universitat Rovira i Virgili
Departament d'Economia
Avgda. de la Universitat, 1
43204 Reus
Tel.: +34 977 558 936
Email: creip@urv.cat

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A Carrot and Stick Approach to Agenda-Setting*

Matthias Dahm† Amihai Glazer‡

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Abstract

This paper models a legislature in which the same agenda setter serves for two periods, showing how he can exploit a legislature (completely) in the first period by promising future benefits to legislators who support him. In equilibrium, a large majority of legislators vote for the first-period proposal because they thereby maintain the chance of belonging to the minimum winning coalition in the future. Legislators may therefore approve policies by large majorities, or even unanimously, that benefit few, or even none, of them. The results are robust; but institutional arrangements (such as entitlements) can reduce the agenda setter's power by reducing his discretion to reward and punish legislators, and rules (such as sequential voting) can increase a legislator's ability to resist exploitation.

Keywords: Legislative bargaining, distributive politics, agenda-setting, proposal power

JEL: C72, D72, D78

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†School of Economics, University of Nottingham, University Park, Nottingham NG7 2RD, United Kingdom. m.dahm@nottingham.ac.uk

‡Department of Economics, University of California, Irvine, CA 92697 USA. aglazer@uci.edu

1 Introduction

Much legislation is usefully viewed as imposing a tax on all legislators (or their constituents) and distributing the benefits among only some individuals or groups. It may therefore appear that proposed legislation can gain majority support only if in a majority of districts the amounts distributed exceed the taxes collected. The existence of large majorities thus suggests wide benefits from a policy. It is therefore puzzling that redistributive legislation can gain strong political support though benefits are concentrated among few districts (as with farm bills).[1] In these cases suspicion falls on special interests with much influence.

We offer a different explanation, allowing current policy proposals and voting outcomes to depend not only on current benefits, but also on past decisions and on expectations of future behavior. These implicit connections between policies was well captured by a study of the Connecticut legislature (Barber 1996) that reports

> But for a considerable number, the relevant patronage is not that which can be offered here and now, but, in effect, all the patronage which the leaders are expected to control in the future. For these members the important thing is to build a favorable record of party service, so that when and if some opportunity is presented, perhaps years hence, they will be among the eligibles... Party allegiance is motivated in part by vague hopes that sometime in the future, should the member want help of some unspecified kind—a job, an administrative decision, a local bill passed—the leadership would remember his yeoman service in the party ranks. As one legislator said, "It isn't what you've been promised, it's what you hope for that helps, that will swing a person into line."

[1] Agricultural policy in the U.S. is periodically renewed. Consider the Food, Conservation, and Energy Act of 2008. It passed in the House (Vote #353) by 306/110 and in the Senate (Vote #144) by 77/15. Moreover, both the House and the Senate overrode a veto by the President with a 2/3 majority (see the Library of Congress at www.loc.gov). The Environmental Working Group, a watchdog, offers detailed data on commodity subsidies from 1995–2010 for 400 congressional districts at www.ewg.org; accessed on June 21, 2012. The 24 districts (6% of all districts listed) that received the largest subsidies obtained 52.8% of the total of $167.3 billion.

The analysis below formalizes this idea, focusing on the ability of an agenda setter to use promises and threats to his advantage, showing how he can induce a majority of legislators to vote for a policy that directly benefits few, or even none, of them: he threatens legislators voting against him in one period that he will exclude them from the winning coalition in a following period. We do not claim that an agenda setter always exploits the legislature; for example, he may be unable to forbid amendments to a policy he proposes. Rather, one contribution of our analysis is to point to conditions which allow for exploitation, and conditions or institutional arrangements which limit it.

A classic example of a legislative leader who long controlled the agenda and used this power, among other powers, to control policy is Joseph Cannon, Speaker of the U.S. House of Representatives from 1903 to 1911, and called at the time the "Tyrant from Illinois." He was reported to punish disloyal members by refusing to schedule their favored legislation, and declining to recognize them to offer amendments or private bills. When chairing the House Rules Committee, he limited amendments that could be made on the floor of the House. Nevertheless, he did not punish all opponents or reward all supporters. Our model can explain how an agenda setter can wield great power even when rewards and punishments are rare or small.

Our analysis is of more than historical interest. Though currently the Speaker has less power than Cannon enjoyed, congressional committees have agenda-setting powers, particularly, when the vote on the floor of the House of Representatives is made under the closed rule.[2] Thus, congressmen with some agenda-setting power enjoy greater pork-barrel spending in their districts. Such congressmen include party leaders (Balla et al. 2002; Hird 1991), committee chairs (Ferejohn 1974), and members of prestige committees, especially the Appropriations Committee (de Figueiredo and Silverman 2006). Members of Congress with proposal power—those sitting on the Transportation Committee—get more spending on transportation projects in their districts than do other congressmen (Knight 2005).[3]

[2]Price (2006) reports that the incidence of completely closed rules that preclude the offering of any amendments whatsoever, including the traditional minority substitute, was 28% in the 108th Congress (2003-2005). Doran (2010) reports that the closed rule is now used for half of the controversial House floor agenda.

[3]Because, however, different committees may have agenda-setting powers over different policy areas, the benefits members of any one committee can gain may be smaller than the

A study of earmarks in senatorial bills finds that the number of earmarks Senate majority leader Harry Reid received was more than one standard deviation above the mean number of earmarks for the Senate (Engstrom and Vanberg 2010). In both the Senate and the House, members of the Appropriations Committees received larger earmarks. In the House, party leaders received more earmarks (Lazarus and Steigerwalt 2009). Similarly, Hardin (1958) argues that farm policy is inefficient, but nevertheless supported in the U.S. Congress, because committee chairmen with agenda power come from farm districts.

Not only legislative leaders have agenda-setting power. Under fast-track legislation in the U.S., the president proposes a treaty that Congress can either accept or reject, but not amend. In the European Union, the Commission has significant agenda-setting power: in some policy domains, only the Commission can propose a policy, and the power of the Council and the Parliament to amend the proposal may be restricted (as by super-majority requirements) depending on the legislative procedure used. Many parliamentary democracies allow the government to propose a policy as a confidence vote, which the legislature can adopt or reject, but not amend. In Germany, Finland, France, Italy, Portugal and Spain, the constitution authorizes the government to make policies questions of confidence. By convention, the government can make the vote on a specific policy a question of confidence in Australia, Canada, the Netherlands, New Zealand, Norway, and the United Kingdom. Other parliaments permit votes of confidence. For example, in 1995 members of the Italian Lower House proposed more than 150 amendments to a budget introduced by the Prime Minister. The Prime Minister eventually invoked a confidence vote procedure on his budget package, which the legislature passed without the amendments.[4]

The agenda setter could more generally be the bureaucracy, as in the seminal work by Romer and Rosenthal (1978). But their model underestimates the agenda setter's power, because it assumes voters must be indifferent between the proposal and the status quo, without looking at the bureaucracy's ability to punish opponents. Niskanen (1971) similarly assumes that the executive branch's power is limited to making take-it-or-leave-it offers.

In our model the agenda setter can credibly punish legislators. Such threats are observed. When Senator James Buckley tried to delete forty-four public

benefits gained by an agenda setter with control over all policy proposals, which we consider.

[4]This discussion of confidence votes is based on Huber (1996).

works projects at the committee stage in the Senate, the members voted down all his amendments, but cut out projects in his home state (as reported by Epple and Riordan 1987). Senator William Proximre was similarly punished for supporting proposals to cut appropriations for the Department of the Interior—a House-Senate Conference Committee deleted the senator's favored project from the Interior appropriations bill (see Ferejohn 1974, p. 114).

The paper is organized as follows. The next section reviews related literature. Section 3 formalizes a benchmark model of agenda-setting in which the proposer controls the agenda: he is the unique proposer, amendments are not possible, and he is certain to stay in power. Sections 5 and 6 consider different institutional arrangements, investigating whether they can balance power between the agenda setter and the legislature. This highlights the importance of, for example, the cohesion of the legislature to sustain tacit collusion against the agenda setter, or the separation of budgetary powers and entitlements. It also yields the surprising finding that a secret ballot alone might not be enough. The last section contains concluding remarks.

2 Literature

2.1 Agenda setting

Studies of agenda setting usually need to refine equilibrium predictions by considering 'simple' strategies which only depend on current payoff relevant variables. This precludes investigating the power of promises and threats on which we focus.

Important early contributions include work by Romer and Rosenthal (1978), Baron and Ferejohn (1989), Baron (1989), and Harrington (1990). They assume that any legislator can make a proposal, with proposals considered in a random order. In proposing and voting on policies, a legislator must thus compare the benefits from the proposal to the status quo, and to a future proposal in which the legislator might be excluded from the minimum winning coalition. The sequence of proposal makers gives an early proposer power to gain more benefits to himself than other members of the majority gain. As we shall see, in our model the agenda setter is yet more powerful.

These models suppose that the amount spent is fixed; because the legislators

cannot abolish a program, the issue is only who gets the money. We instead allow for zero spending: if the majority votes against a proposal taxes are zero. So we can speak of the legislators adopting a proposal that hurts each of them.

Recent contributions consider endogenously evolving default policies, and yield exploitation results closer to ours. How legislators can obtain local benefits is discussed by Bernheim, Rangel, and Rayo (2006), who consider the default policy changing from period to period, a single policy implemented in the final period, and the agenda setter in each period offering a policy which depends on the policy that was most recently adopted. The authors show that a majority may support a pork-barrel policy which hurts almost every legislator. Anesi and Seidmann (2013) show in a related model that even a non-proposer may obtain all of the surplus. Other papers consider a sequence of policies. Kalandrakis (2004) models a legislature in which a player is selected at random to make a proposal in each round. The proposal is pitted against the status quo, with the winning alternative becoming the status quo in the next round of bargaining. The equilibrium has the proposer eventually extract all benefits for himself in all periods. If, however, a policy can be reconsidered, then legislators have an incentive to protect each other and limit the power of the agenda setter (see Diermeier and Fong 2011).

2.2 Size of winning coalitions

The literature looks at two extreme forms of winning coalitions. One approach, introduced by Riker (1962), predicts the existence of minimum winning coalitions—why should the agenda setter, or for that matter any member of the majority, offer anything to the minority. The agenda-setting models described above also predict minimum winning coalitions.

The other extreme examines conditions under which policies will be passed by very large majorities, with benefits going to almost all legislators. Legislators operating under a "veil of ignorance" (they do not know which coalitions will form in the future) will adopt a norm of universalism that calls for all legislators to benefit from pork barrel projects (Weingast 1979, Shepsle and Weingast 1981, and Grofman 1984). Costs of drafting policy can affect the policies a legislator proposes, by inducing him to propose policies which are supported by a large majority of legislators (Glazer and McMillan 1992), or by proposing policies which other legislators would later not want to amend (Glazer and McMillan

1990). An extension of the Baron and Ferejohn model to consider incomplete information is given by Tsai and Yang (2010), showing that oversized coalitions may appear. Relatedly, the Baron-Ferejohn model with sequential voting is examined by Norman (2002), who shows that any allocation of benefits can constitute an equilibrium. But in their setting no one suffers from adoption of a policy; in our model all legislators prefer that the agenda setter's proposal be rejected.

2.3 Punishing opponents and rewarding supporters

The idea that a political leader can exercise power by rewarding supporters and punishing opponents is of course not novel. The Introduction mentioned how Joseph Cannon, as Speaker of the House of Representatives, used such tools. The previous papers discussed had an agenda setter ignore how legislators voted in the past in deciding what proposal to make. When such history is considered, punishment strategies can arise, giving an agenda setter much power.

Dal Bó (2007) analyzes how an outside party can use bribes that are conditional on the realized voting profile to influence committee decisions. He shows that a special interest group can generate unanimous approval, although in equilibrium payments are very small. His key insight is that "pivotal bribes," in which a legislator is paid if and only if he casts a decisive vote for the policy, render the voting game a multilateral prisoners' dilemma.[5] Though the analysis below relies on these insights, the influence mechanism differs from his—we allow compensations to be conditioned only on a legislator's vote, which under his model does not allow for costless capture. Moreover, in Dal Bó the special interest is assumed to commit to payments it will make after votes are realized, whereas in our setting compensations are costless for the agenda setter and thus credible. Lastly, whereas Dal Bó allows for cash payments, in much of our analysis the agenda setter is restricted to excluding or including legislators in a minimum winning coalition in a future period. That limitation may appear to limit greatly an agenda-setter's power in earlier periods; we show when it does not.

An agenda setter who can exclude from the majority coalition legislators

[5]The model is extended by Console-Battilana and Shepsle (2009), who consider payments that either the president or lobbying groups can make to induce legislators to confirm the appointment of a supreme court justice.

who had voted against him can capture a large share of the budget (Baron and Ferejohn 1989, Cotton 2010, and Fan, Ali, and Bernheim 2010). Our results are even stronger: the agenda setter can have much power even under a finite horizon, and in equilibrium the majority in some periods are made strictly worse off by the policy they pass.

An incumbent, even one who pursues policies that most oppose, can stay in power if members of the incumbent's winning coalition are more likely to become members of the winning coalition in the future than are members of the challenger's coalition (Bueno de Mesquita et al. 2002). The PRI party in Mexico maintained power by threatening districts that did not support it that they will be denied private benefits from the central government which the PRI controlled (see Diaz-Cayeros, Magaloni, and Weingast 2003). Relatedly, a group's fear of later falling under an inefficient and venal ruler that favors another group can suffice to discipline supporters (Padró i Miquel 2007). And in discussing governance, Dixit (2009) argues that private order can be sustained by the threat of expulsion. Punishment strategies can be more effective if the principal has some discretion, as we show below in considering entitlements. The importance of discretion in allowing punishment is analyzed by Bernheim and Whinston (1998), who show that when some outcomes cannot be verified, efficiency can be enhanced when the obligations of contracting parties are left vague or unspecified.

The power of an agenda setter to punish opponents is considered by Epple and Riordan (1987), who examine repeated interactions, with different individuals having the right to propose policies in different periods, showing that a wide range of allocations can be sustained as equilibria by the threat of political banishment. Like them, we suppose that the punishment for defection is exclusion, which in equilibrium is not invoked. Their result on plutocracy resembles our result about the agenda setter exploiting others. But whereas they consider punishment by multiple legislators, we consider punishment by the agenda setter. They consider an infinite horizon whereas we have a finite horizon. And whereas they consider complicated strategies, ours is simple. Moreover, we extend the analysis in several ways, including sequential voting, tacit collusion, and the agenda setter's decision of whether to privilege the status quo.

3 Assumptions

We start the analysis with a simple benchmark model. Most assumptions are generalized in later sections.

There are four players. One person, say the President, or the Speaker of the House, or the majority of a legislative committee, is the agenda setter in each of two periods.[6] He, and only he, can propose a policy. The legislature consists of three members. The agenda setter's proposal is adopted if a majority of legislators vote for it. Votes are public and simultaneous. The agenda setter does not vote. This is consistent with an interpretation of the agenda setter as the U.S. President who is not a member of Congress, or the European Commission that submits a proposal to the European Parliament and the Council of Ministers.[7]

In each of two periods the agenda setter proposes a policy that costs a dollar, and that divides that dollar among the three legislators and himself. The cost of any policy is divided equally among the three legislators.[8] No costs arise in a given period when the proposal is rejected.

In period 2 the agenda setter can propose any distribution of the dollar. In period 1, however, he must treat each legislator equally; he cannot target a subset of legislators or make the payments conditional on votes. We offer two justifications. First, as we show in the context of Proposition 1 below, sometimes the agenda setter can obtain the whole surplus in period 1 and thus prefers not to build a minimum winning coalition in both periods. In this case our assumption is innocuous and simplifies the exposition. Second, as we will see in the context of Proposition 2 below, sometimes the agenda setter would

[6] Consistent with our assumptions, Primo (2002) notes that most political bargaining in the U.S. Congress has only one actor make a formal proposal. Also, consistent with our assumption that the agenda setter remains in power, Cotton (2010) reports that agenda-setting authority in the U.S. Congress rarely changes hands. Since the first U.S. Congress in 1789, for example, there have been only 59 changes in the Speaker of the House, of which no more than 24 can be attributed to the speaker losing support amongst his party. Diermeier and Fong (2011) give further examples of institutions, among them central banks, in which an agenda setter persistently controls proposals.

[7] Were the agenda setter a voting member of the legislature, he would find it easier to win approval for his proposal—he would need the support of fewer legislators (just one other legislator is needed as opposed to two in our setting, in which the agenda setter has no vote).

[8] An alternative version of our model considers a legislature composed of three legislators, who each pay taxes and vote, with one of them the agenda setter. This would not change our qualitative results; details are available upon request (and for the convenience of the referees included in Appendix B.1, which is not intended for publication).

do better without this restriction. In this case our assumption makes it more difficult to explain support for the period 1 proposal, and so makes our results more striking.[9]

The agenda setter maximizes his benefits, subject to the constraint that his proposal is approved only if a majority of legislators vote for it. We describe the agenda setter's possibilities in period 1 as follows. He proposes to impose a tax of 1/3 on each legislator, to give $s \leq 1/3$ to each legislator, and to give the remainder of the budget to himself. Optimization by the agenda setter requires minimizing the side payments s; we will investigate how s depends on the institutional constraints.

Each legislator cares only about the net benefits he gets, and votes for a proposal if the present discounted value of voting for the proposal exceeds the present discounted value of voting against.

We look at sub-game perfect, or time-consistent, solutions. Collusion in a two-period model is therefore impossible. Denote the intertemporal discount factor by $\delta > 0$. The time line is as follows

1. The agenda setter proposes a policy
2. The agenda setter's proposal is adopted if a majority of legislators vote for it
3. Payoffs are realized
4. The agenda setter again proposes a policy
5. The agenda setter's proposal is adopted if a majority of legislators vote for it
6. Payoffs are realized

4 Benchmark result

Let the agenda setter use the following strategy. In period 1 he threatens that any legislator who votes against the proposal will be politically banished, in

[9]For example, in the context of Proposition 2 below, without this restriction the agenda setter could secure approval of his proposal in period 1 at lower cost to himself by offering a share of the dollar to only two legislators.

the sense that his chance of becoming a member of a future minimum winning coalition is smaller than that of a legislator who voted for the proposal. In period 2, the agenda setter proposes to split a dollar equally with the members of a minimum winning coalition. Any legislator who supported him in period 1 has an equal chance of belonging to the minimum winning coalition in period 2.[10] If a minimum winning coalition requires more members than the number of legislators who supported the proposal in period 1, then the remaining members are chosen with equal probability among the legislators who opposed the agenda setter in period 1. Call this the exclusion strategy.

Consider period 2. No member of the minimum winning coalition gains by rejecting the proposal, and the proposal is supported by a majority. In fact, in any sub-game perfect equilibrium, in period 2 the agenda setter offers zero net benefits to a minimum winning coalition and its members vote surely for this proposal.[11]

Turn now to period 1. Given that all legislators face the same situation, we focus on a symmetric equilibrium in pure voting strategies. Consider a given legislator who expects all other legislators to vote for the proposal. Notice that a single vote does not change the outcome of the collective decision which approves the proposal. A legislator who votes for the proposal has a 2/3 chance of belonging to the minimum winning coalition in period 2, in which case his benefit is 1/3. So, considering the taxes he will pay, his expected net benefit when he votes for the proposal is $-1/3(1+\delta)+s+\delta 2/9$. A legislator who votes against the proposal will be excluded from the minimum winning coalition in period 2; his payoff is only $-1/3(1+\delta)+s$. Thus, for any s a legislator strictly prefers to support the agenda setter's proposal in period 1. It is an equilibrium

[10] Norman (2002) makes a similar assumption. But we make the assumption of equal chances for simplicity; the results hold under weaker assumptions (see the discussion after Proposition 1).

[11] To see why, suppose the agenda setter has offered zero net benefits to a minimum winning coalition. Assume there is a sub-game perfect equilibrium in which the members of the minimum winning coalition are not sure to vote for the proposal. Then with some probability, say p, the agenda setter obtains zero benefits and forgoes $p/3$ benefits. He would be better off offering a small benefit, say $b < p/3$, to the members of the minimum winning coalition. Suppose $b > 0$ is the optimal choice. The fact that $b/2$ also assures approval of the proposal at lower costs implies that b cannot be optimal and that the agenda setter has no best response proposal. By definition equilibrium decisions must be mutually best responses. Thus the only such combination is for the agenda setter to offer zero net benefits to the minimum winning coalition and for its members to vote surely for this proposal.

for each legislator to vote for that proposal.[12]

The agenda setter maximizes his surplus by setting $s = 0$; and because he obtains the largest possible surplus, clearly he has no better strategy. In period 1 he obtains the whole surplus, whereas in period 2 his surplus is maximized subject to the constraint that the proposal be accepted. Further reducing the share given members of the minimum winning coalition in period 2 would yield strictly negative benefits to each member, causing them to reject the proposal. The above strategies thus constitute a sub-game perfect equilibrium.

Moreover, a Nash equilibrium in pure voting strategies cannot have all legislators in period 1 vote against the proposal. Assume they do. Again a single vote does not change the outcome of the collective decision which rejects the proposal. But a legislator who votes for the proposal in period 1 will belong to the minimum winning coalition in period 2. Hence, a legislator who votes for the proposal has zero payoff in period 2. Opposing the proposal reduces the chance of belonging to the minimum winning coalition in period 2, so that total payoffs are $0 + \delta(2/9 - 1/3)$. The difference is $\delta/9 > 0$, which represents the benefit from ensuring membership in the minimum winning coalition in period 2. Thus, a legislator strictly prefers to vote for the proposal in period 1; it is not an equilibrium for all legislators to vote against it.

We summarize with

Proposition 1 *A unique*[13] *symmetric sub-game perfect equilibrium in pure voting strategies exists in which*

- *the agenda setter plays the exclusion strategy with* $s = 0$ *and*
- *in period 1 the legislature unanimously approves the agenda setter's pro-*

[12] We do not have data on whether overwhelming majorities support policies which benefit the agenda setter. But data do show that much legislation is passed with very large majorities. King and Zeckhauser (2003) report that in the 1997-98 session of the U.S. House of Representatives, 324 non-procedural roll-call votes, which constitute 42% of the total, passed with more than 300 votes in a chamber with 435 members. The results are not atypical. Data on the U.S. House of Representatives over the years 1873-1998 show that overwhelming majorities (with ninety percent of those voting on the same side) appear on over forty percent of the roll-call votes in several sessions, and occur on over 25 percent of the roll-call votes in about half of the congressional sessions (Gaines and Sala 2000).

[13] Up to the assumption specifying with which probability legislators are included in the period 2 minimum winning coalition and up to the vote of the non-member of the period 2 minimum winning coalition who does not affect the outcome.

posal; in period 2 a minimum winning coalition approves the proposal the agenda setter makes in that period.

The qualitative results are not a knife-edge; they do not require that in period 2 the agenda setter must be indifferent about the composition of his coalition. First, for emotional reasons, in period 2 the agenda setter may prefer to exclude someone who had voted against him in period 1. Second, it is true that the agenda setter randomizes among the legislators that supported his first period proposal. But his motivation is analogous to the classical argument in favor of mixed-strategies, namely that mixed-strategies produce unpredictable choices that cannot be exploited by the members of the legislature. Third, all that is needed for the results is that a legislator who voted for the proposal in period 1 will more likely belong to the winning coalition in period 2 than a legislator who voted against. The agenda setter's choice would be equally unpredictable if it were common knowledge that if all legislators vote for the proposal in period 1, legislators 1, 2 and 3 will be included in the minimum winning coalition in period 2 with probability 1/3, 2/3 and 1, respectively.[14]

Proposition 1 imposes two restrictions that when relaxed might lead to further equilibria: period 1 voting strategies are symmetric and pure. We explore in the next subsection the existence of asymmetric equilibria. In Appendix A.1 we show that even allowing for mixed voting strategies the equilibrium in Proposition 1 is the unique symmetric equilibrium when the discount factor is sufficiently large (roughly greater than 0.6). For low discount factors, an equilibrium with mixed strategies exists. But it is not surprising that the agenda setter loses power as the future becomes less important, because his power is based on his ability to allocate future benefits. Moreover, even with mixed strategies the legislature approves the period 1 proposal with positive probability, implying that the agenda setter can sometimes exploit the legislature.

[14] We could derive asymmetric probabilities analogously to recent micro-foundations for contest success functions by Corchón and Dahm (2010 and 2011). One possibility assumes that the agenda setter is not indifferent about the identity of the legislators included in the period 2 minimum winning coalition, and legislators are uncertain about the agenda setter's preferences. Details are available upon request (and for the convenience of the referees included in Appendix B.2, which is not intended for publication).

4.1 Eliminating asymmetric equilibria with side payments

Suppose legislators respond to the exclusion strategy (when $s = 0$) by playing asymmetric pure voting strategies in period 1.[15] Then the agenda setter's payoffs in period 1 are zero; he could benefit by increasing s. We therefore ask whether some side payment $s \leq 1/3$ eliminates asymmetric equilibria in period 1, and assures approval of the agenda setter's proposal in period 1. And if such an s exists, we determine its minimum value.

Consider the decision of some legislator in period 1. In an asymmetric pure-strategy equilibrium some legislator, whose vote is decisive, votes against the proposal. In voting for the proposal he obtains $-1/3(1+\delta)+s+\delta/3$; opposing yields $-\delta/3+\delta/6$. A vote in favor is advantageous if and only if $s \geq (2-\delta)/6$. Notice that $(2-\delta)/6$ strictly decreases in δ, and lies in the interval $[1/6, 1/3]$. The more important the future, the more valuable the future benefits of membership in the minimum winning coalition, and the easier it is for the agenda setter to sway the legislator. Moreover, for any $\delta > 0$, some feasible payment yields the agenda setter strictly positive payoffs in period 1, and induces legislators to vote for the proposal. Thus, asymmetric pure-strategy equilibria in period 1 which reject the agenda setter's proposal disappear.

To show that this strategy of the agenda setter and unanimous approval in period 1 are an equilibrium, it remains to consider a given legislator who is not decisive. As the vote does not change the outcome in period 1, but increases the legislator's chances of belonging to the minimum winning coalition in period 2, for any s he strictly prefers to vote in favor.

Thus, it is optimal for the agenda setter to offer $s = (2-\delta)/6$. This value is the smallest payment that in period 1 makes it a (weakly) dominant strategy for each legislator to vote for the proposal.[16] As a result, it overcomes the difficulty that legislators could coordinate on an asymmetric equilibrium in period 1.

The above strategies thus constitute a sub-game perfect equilibrium. We summarize with

[15] This requires identical legislators to behave differently. Coordination of legislators on some particular form of asymmetric behavior must be based on some underlying asymmetry which should be modeled explicitly. A natural explanation would be a sequential voting procedure. This extension is considered in Subsection 4.2.

[16] By analogous reasoning to footnote 11, the only combination of strategies consisting of mutually best responses is to offer $s = (2-\delta)/6$ and legislators to accept the proposal, though they are indifferent.

Proposition 2 *Suppose legislators respond to the exclusion strategy (for low s) by playing asymmetric pure strategies in period 1. Then a sub-game perfect equilibrium exists and in any such equilibrium*

- *the agenda setter plays the exclusion strategy with* $s = (2 - \delta)/6$ *and*
- *in period 1 the legislature unanimously approves the agenda setter's proposal; in period 2 a minimum winning coalition approves the proposal the agenda setter makes in that period.*

4.2 Agenda-setting power when each vote is decisive

The equilibria described in Propositions 1 and 2 base the agenda setter's exclusion strategy on two characteristics. First, in equilibrium no individual legislator is decisive and therefore cannot block the proposal in period 1. Second, the agenda setter can condition future benefits or political exclusion on voting behavior in period 1.[17] To show that what drives our result is the second characteristic, we modify our previous assumptions and suppose that voting is sequential, with voting order 1, 2, 3. As a consequence, under sequential voting in period 1 which approves the proposal, some legislator knows that he is decisive. The individual voting incentives are the same as those in period 1 for legislators who play the asymmetric equilibrium which we analyzed above.

As before, assume that the agenda setter plays the exclusion strategy. Sequential voting does not change the incentives in period 2, and in period 2 a minimum winning coalition will support the proposal.

Suppose the agenda setter sets low payments, say $s = 0$. It is straightforward to see that in period 1 a legislator votes against the proposal if and only if he is decisive. Therefore, legislator 1 votes for the proposal, and free rides on the negative votes of the other two legislators.

On the other hand, Proposition 2 already showed that sufficiently high payments in period 1 make it a (weakly) dominant strategy for each legislator to vote for the proposal in period 1. We thus have the following results:

Corollary 1 *Under sequential voting, a sub-game perfect equilibrium exists and in any such equilibrium*

[17] Under a secret ballot future benefits or political exclusion can in principle not be conditioned on votes cast in period 1. Subsection 6.2 discusses conditions under which Proposition 1 continues to hold.

- *the agenda setter plays the exclusion strategy with* $s = (2-\delta)/6$ *and*
- *in period 1 the legislature unanimously supports the agenda setter's proposal; in period 2 a minimum winning coalition supports the proposal the agenda setter makes in that period.*

Comparing Corollary 1 to Proposition 1 shows that sequential voting benefits legislators, but does not eliminate the agenda setter's power.

4.3 Agenda-setting power and a legislator's pivotal probability

As shown above, under simultaneous voting (Proposition 1) no legislator is decisive; in contrast, some legislator is decisive under sequential voting (Corollary 1). On the other hand, whereas simultaneous voting does not require side payments, sequential voting does and therefore limits agenda-setting power.

To show that side payments are monotonically increasing (and agenda-setting power is monotonically decreasing) in a legislator's pivotal probability, we make a small change to our previous assumptions and suppose that for some legislator a small benefit in the future may not suffice to induce him to vote for the proposal in period 1. He may have "non-consequentialist" motivations, for example, because he wishes to express a preference through the act of voting (see Shayo and Harel 2012 for an overview and experimental evidence for this voting behavior). Assume that with probability p one of the legislators has this attitude and rejects the proposal. The other two legislators are then pivotal, and so p also measures the pivotal probability.[18]

Consider the other two legislators. With probability p they are in the same voting situation as under sequential voting; with probability $1-p$ the situation is similar to simultaneous voting. It is straightforward to see that each of the two legislators prefers to support the agenda setter's proposal in period 1 if and only if

$$s \geq \tilde{s}(p) \equiv \max\left\{\frac{2-\delta}{6} - \frac{1-p}{p}\frac{2\delta}{9}, 0\right\}.$$

The threshold $\tilde{s}(p)$ increases monotonically in the pivotal probability p, until the payments under sequential voting are reached. Notice also that for low values

[18]The alternative assumption that with probability p any of the three legislators has "non-consequentialist" motivations yields qualitatively the same results. The exposition, however, is more complex because p no longer measures the pivotal probability.

of the pivotal probability, $\tilde{s}(p)$ is constant and zero. Therefore the assumption of completely consequentialist voters who are solely motivated by preferences over policy outcomes can be somewhat relaxed without affecting the result in Proposition 1.

4.4 Observations

Several comments are in order.

First, in the above equilibria a legislator's expected benefit is $-1/3(1+\delta)+\tilde{s}(p)+\delta 2/9$. Given the size of the different payments $\tilde{s}(p)$, legislators obtain lower expected payoffs than were both proposals rejected. In period 1 all legislators vote for a policy that hurts all of them.

Second, exploitation is most severe under the conditions of Proposition 1, and exploitation declines with a legislator's pivotal probability. So agenda-setting power is sensitive to the institutions and behavioral conditions under which agenda-setting takes place. Later sections further analyze the sensitivity of our conclusions to variations of our assumptions. The monotonicity of side payments in the pivotal probability suggests that agenda setters are more powerful in large elections, but these issues are not explicitly modeled here.

Third, under simultaneous voting (Proposition 1) no legislator is decisive; in contrast, some legislator is decisive under sequential voting (Corollary 1). Thus, the indifference of a legislator who is not decisive strengthens our result, but is not crucial for unanimous approval in period 1.

Fourth, in the basic model (under the conditions of Proposition 1) legislators do not have a dominant strategy and thus do not find themselves in a multilateral prisoners' dilemma (in which fixing the action of one player, the others are in a prisoners' dilemma). But side payments increase the incentives for defection, thereby allowing the agenda setter to eliminate the asymmetric voting equilibrium.

Fifth, crucial for unanimous approval is the agenda setter's ability in period 2 to reward a legislator who supported the agenda setter's proposal in period 1. A unanimity rule in period 2 breaks this link between the periods because then in period 2 every vote is needed and no legislator can be excluded. On the other hand, any scarce resource controlled by the agenda setter and valued by legislators could establish such a link. In some situations it is reasonable to interpret the president as the agenda setter. Rewards could then consist, for example, of

invitations to the White House, fundraisers, or campaign appearances. In other situations one might think of party leaders as agenda setters, with rewards consisting of committee assignments and money from political action committees to reelection campaigns, which are controlled by party leaders.

Sixth, it is not necessary for the result in Proposition 1 that the agenda setter punish with certainty a legislator who opposed the proposal in period 1. It suffices that in period 2 the agenda setter can exclude a legislator with a small but strictly positive probability. This result can reconcile the view by historians that Joseph Cannon, as Speaker of the US House of Representatives, exercised power by punishing opponents, with the findings by Krehbiel and Wiseman (2001) that in making committee appointments Cannon did not consistently reward supporters or punish opponents. For, as we saw, what matters is that when a legislator is not decisive, the cost to him of voting for a policy he dislikes is small or even zero, so that if he expects even a small gain from membership in the winning coalition in a future period, he will support the agenda setter's policy. Strong loyalty can appear under weak punishments and rewards.

Seventh, the exclusion strategy which allows the agenda setter to exploit the legislators in period 1 can also be used by the agenda setter to stay in power. Suppose that in some period before the last one a motion is made to depose the agenda setter. The incumbent agenda setter can threaten that if he stays in power, then in the terminal period he will give preference for membership in the minimum winning coalition to any legislator who had voted against the motion. Then as in the previous analysis, it is a Nash equilibrium for all legislators to vote to retain the agenda setter, even though he had exploited them and may exploit them in the future.

Eighth, it is not strictly necessary that the agenda setter's proposal cannot be amended in any period. What is critical is that in the terminal period his proposal cannot be amended. For in any non-terminal period, the agenda setter can use the exclusion strategy against any legislator who proposes an amendment, and against any legislator who votes for an amendment. In the terminal period, if the agenda setter's proposal cannot be amended, he can indeed implement the exclusion strategy, punishing legislators who had voted against him.

Ninth, although we spoke of forming a minimum winning coalition in period 2, similar results can appear when in period 2 the agenda setter is very busy,

willing to help legislators with their legislative needs, but giving priority to legislators who had supported him in the past.

Lastly, the benchmark result continues to hold under more general conditions, among them larger legislatures or legislators who value the future differently.[19] We consider further institutions that do not limit the agenda setter's power in Section 6. First, however, we turn to institutions that limit the agenda setter's power.

5 Overcoming the agenda setter's power

5.1 Tacit collusion against the agenda setter

In the two-period model the agenda setter exploits the legislature to some extent. This raises the question whether legislators can somehow agree on rejecting exploitive proposals completely. We show now that if the legislators are expected to punish deviations appropriately, then tacit collusion against the agenda setter might occur. To allow for such an agreement we consider the standard framework of a repeated game with infinite horizon.[20] As usual, this framework admits a multiplicity of equilibria and very different outcomes can be sustained; we will see that when legislators cannot reach an agreement they might be exploited in every period.

Suppose that in each period, the game ends with probability $1 - \delta > 0$, and continues with probability $\delta > 0$. Whether period t is the last one is revealed to all players at the beginning of period t, before a proposal is made. The same agenda setter makes proposals in all periods.

The agenda setter modifies the exclusion strategy in the following way. In all but the last period he proposes to retain the whole budget for himself and threatens that in the last period he will exclude any legislator who had earlier voted against a proposal the agenda setter had made. In the last period, the agenda setter proposes to split the benefits equally with the members of a minimum winning coalition. All legislators who supported him in all periods before

[19] For large legislatures see Subsection 6.3; for heterogeneous legislators details are available upon request (and for the convenience of the referees included in Appendix B.3, which is not intended for publication).

[20] Tacit collusion can also be sustained under a finite horizon of at least three periods. But this requires asymmetric behavior of symmetric legislators, see Appendix A.2.

the last one have an equal chance of belonging to the minimum winning coalition in the last period. If a minimum winning coalition requires more members than the number of legislators who supported all proposals before the last period's proposal, then the remaining members are chosen, taking into account the number of times each legislator had voted for the agenda setter's proposals. That is, the two legislators with the most votes in favor participate with probability 1 (in case of ties, equal probabilities are assigned.)

Consider the following strategy profile for each of the three legislators. In the terminal period each legislator votes for the proposal if and only if he is a member of the minimum winning coalition. Consider non-final periods. In the first period each legislator votes against the agenda setter's proposal. Each legislator continues to vote against proposals in any non-final period t as long as all legislators had voted against in all previous periods. If at least one legislator supported a proposal in the past, then all legislator approve the next K proposals. So punishment requires the approval of K non-final proposals. These are the symmetric pure voting strategies in Proposition 1.

Consider the final period. Again, a minimum winning coalition will approve the proposal the agenda setter makes.

Consider a non-final period t. Assume the agenda setter has made a proposal. Consider the possibility that in period t all legislators vote against the proposal (that is, they cooperate). Doing so yields zero payoffs in all non-final periods and $-1/9$ in the final period; and because with probability $1-\delta$ period $t+1$ is the final period, with probability $\delta(1-\delta)$ period $t+2$ is the final period , and so on, his expected payoff is

$$-\frac{1}{9}\left((1-\delta)+\delta(1-\delta)+\delta^2(1-\delta)+\ldots\right)=-\frac{1}{9}.$$

Now suppose that one legislator supports the proposal in period t (that is, he defects). Notice that the payoff in period t is still zero, as the proposal is rejected by the majority. Because the consequence is punishment from fellow legislators, in the next K non-final periods the payoff is $-1/3$. The reward is certain membership in the minimum winning coalition yielding zero payoffs in the final period, because the deviator maintains a lead of one yes-vote over the fellow legislators in all subsequent periods. Because with probability δ period $t+1$ is a non-final period, with probability δ^2 period $t+2$ is a non-final period,

and so on, a legislator's expected payoff is

$$-\frac{\delta}{3}\left(1+\delta+\delta^2+\cdots+\delta^{K-1}\right).$$

We see that cooperation is sustainable if and only if

$$3\delta\frac{1-\delta^K}{1-\delta}\geq 1.$$

This holds if the discount factor is large enough because in such a case it is sufficiently unlikely that the game ends soon, and thus the threat of punishment is sufficiently severe. Since the left hand side increases with K, increasing the length of punishment allows to sustain cooperation for lower discount factors.

Notice also that the agenda setter cannot reduce the sustainability of tacit collusion through increased side payments. In the first period a single deviation cannot trigger side payments, as the proposal is still rejected. In later periods the proposal is approved as part of the punishment, and side payments cannot be credibly offered.[21]

Thus, by using a grim trigger strategy legislators can eliminate exploitation completely, when the future is sufficiently important. Other behavior, however, is also possible, including the approval of exploitive proposals in every period but the final one.

5.2 Entitlements

One may think that the agenda setter necessarily gains from committing future policy. But here the opposite occurs. Suppose that whatever policy is adopted in period 1 will also hold in period 2. Roughly speaking, we can think of policies subject to annual appropriations, and of entitlements which remain in force unless explicitly changed. Then in period 1 the agenda setter could no longer threaten to punish in period 2 a legislator who voted against the proposal in period 1. The best the agenda setter could do in period 1 is to propose a policy

[21] A natural extension of the equilibrium with symmetric pure strategies in period 1 has each legislator in the final period vote for the proposal if and only if he is a member of the minimum winning coalition, and in non-final periods each legislator votes for the agenda setter's proposal. So payoffs in non-final periods are $-1/3$, and in the final period $-1/9$. If, however, a legislator deviates and votes against the proposal in any non-final period, he does not affect policy and payoffs in non-final periods, but is punished by the agenda setter in the final period, obtaining only $-1/3$. The difference is $2/9 > 0$, the analogue to the difference in the context of Proposition 1 that now takes into account the infinite horizon.

that gives zero net benefits to members of the minimum winning coalition; that generates lower benefits to the agenda setter than he could obtain if he had power to set the agenda in both periods.

A different question is what happens if the policy adopted in period 1 continues in force in period 2, unless the agenda setter proposes an amendment, which the legislature supports; that is, the default policy in period 2 is the policy adopted in period 1, rather than no spending and no taxes in period 2. If in period 1 the legislature adopted a policy that gives all benefits to the agenda setter, in the next period the agenda setter of period 1 would not want to change the policy. By assumption, only the agenda setter in period 1 can propose a new policy in period 2. Therefore, in period 1 no legislator would support the policy that gives himself negative benefits in period 1, and the agenda setter does best in period 1 by proposing a policy that generates zero net benefits to each member of the minimum winning coalition. Put differently, the agenda setter would prefer annual appropriations over entitlements: the default policy strongly affects the agenda setter's power.

5.3 Separation of budgetary powers

Our results do not require that in each period the decisions on taxation and spending are bundled. But if they are not bundled, they require that funds are already approved.

Let spending in each of the two periods be fixed at one dollar, so that the three legislators vote only on how to allocate the dollar.[22] In any period in which the proposal is rejected, each legislator gets zero benefits. Assume that the agenda setter plays an exclusion strategy in which he offers in period 2 a small benefit $b > 0$ to members of the winning coalition.

In period 2, no member of the minimum winning coalition gains from opposing the proposal, and the legislature passes it. Consider now a given legislator in period 1, with all other legislators voting for the proposal. When the legislator in question votes for the proposal he gets $b\delta 2/3$, whereas in voting against he gets nothing. Thus, a legislator strictly prefers to support the agenda setter's proposal in period 1, and it is an equilibrium for each legislator to vote for that

[22] An analogous result holds if an entitlement program sets benefits to all legislators, but in each period the legislature decides how to allocate taxes among its members.

proposal.[23]

Could a Nash equilibrium in symmetric pure strategies have all legislators in period 1 vote against the proposal? If they do, a legislator who votes for the proposal will belong to the minimum winning coalition in period 2, obtaining $b\delta$. Opposing the proposal reduces the chance of belonging to the minimum winning coalition in period 2, so that total payoffs are $b\delta 2/3$. Thus, a legislator strictly prefers to vote for the proposal in period 1; it is not an equilibrium for all legislators to vote against it.

Put differently, the agenda setter would prefer separation of budgetary powers over combined taxation and spending decisions. But suppose that in period 2 the vote on taxes is held before the vote on spending. We just saw that the agenda setter will offer to give very little of the spending to each member of the minimum winning coalition. So all legislators, anticipating that, vote against the tax. The agenda setter would then be unable to exploit in period 1.

6 Institutions that do not limit the agenda setter's power

Some institutional arrangements, such as secret voting, may at first sight appear to restrict greatly, or even to eliminate, the agenda setter's power. We show, however, that they do not.

6.1 Term limits and turnover

One might expect that term limits and turnover reduce the agenda setter's ability to punish or reward legislators. For that result to hold, however, the end of the legislators' terms must be close and certain.

Suppose that each district might be represented in the second period by a different legislator. That is, each legislator in period 1 continues only with some probability in period 2. It is easy to see that the result in Proposition 1 is robust, because conditional on continuing to serve, a legislator who votes for the proposal in period 1 enjoys higher expected utility over the two periods than he would by voting against.

[23] A technical issue concerns the existence of the optimal amount to offer. That may be solved by making the realistic assumption that a smallest monetary unit exists.

Suppose now that between the two periods the identity of the agenda setter may change. More precisely, assume that the probability with which the agenda setter in period 1 continues is q. With probability $1-q$ in period 2 some other person makes a proposal which is unrelated to voting in period 1, and yields benefits π to the legislator whose voting behavior will be analyzed below.

Let the agenda setter in period 1 use the exclusion strategy. If the agenda setter continues in period 2, his proposal in period 2 will be accepted by a minimum winning coalition.

Consider now a given legislator in period 1, and suppose that all other legislators vote for the proposal. Again, a single vote does not affect the collective decision and the proposal is approved. A legislator who votes for the proposal obtains $-1/3\,(1+\delta)+\delta(q2/9+(1-q)\,\pi)$, whereas voting against yields $-1/3\,(1+\delta)+\delta\,(1-q)\,\pi$. The difference is $\delta q2/9>0$. When $q=1$ the tradeoff discussed in Section 4 applies. But for any strictly positive probability that the agenda setter continues to serve, a legislator strictly prefers to vote for the proposal in period 1.

If in period 1 each legislator expects all others to vote against the proposal, no single vote would change the outcome of the collective decision which rejects the proposal. But by voting for the proposal a legislator can ensure his membership in the minimum winning coalition in period 2 if the agenda setter continues. Thus, each legislator strictly prefers to support the proposal in period 1, and it is not an equilibrium for each legislator to vote against it.

Consider now term limits. Term limits which make a legislator leave before the agenda setter leaves mean that the legislator will not vote for a policy that benefits the agenda setter.[24] Speaking loosely, term limits may weaken the power of the agenda setter. Instead, the agenda setter would have to form a minimum winning coalition of beneficiaries in each period.[25]

A term limit applying to the agenda setter corresponds to $q=0$ in the analysis above.[26] Even in this case, the legislators can be exploited. Suppose the

[24] Actually, the legislator is indifferent and might as well vote in favor. Proposition 1 is therefore robust, in the sense that it is still an equilibrium to approve the first proposal, and a minimum winning coalition approves the proposal in period 2.

[25] Whereas federal congressmen and senators in the U.S. face no term limits, some states do impose term limits for state legislators. Given that these limits are often longer than eight years, they do not seem to restrict the agenda setter's power so much that he must form a minimum winning coalition of beneficiaries in each period.

[26] Office holders may believe that a term limit will not be applied. A recent example of

current agenda setter will never serve again, but that some current member of the legislature serves as the agenda setter in the future. The current agenda setter can still propose a policy that benefits himself greatly, while giving nothing to all but one legislator. Let the current agenda setter propose a policy that gives benefits to himself and to one other legislator, say P, who may become the agenda setter in the next period. Legislator P would then gain from threatening that when he becomes the agenda setter, he will propose no benefits to any legislator who votes against the benefits proposed to P in period 1. It is therefore an equilibrium for all legislators to vote for the proposal in period 1, and it is not an equilibrium for all to vote against.

6.2 Secret ballots

The agenda setter can be powerful even if voting is by secret ballot. Under a secret ballot the agenda setter does not know who voted against him, and so cannot later punish a particular defector. It appears that any one legislator would want to vote no in period 1, and it appears that he would want to do so if with even a small probability he will be decisive. But suppose that each legislator faces a risk of not serving in the next period. The agenda setter can then threaten to give priority to new legislators in the next period if the vote in the current period is not unanimous. That is, in period 2 the minimum winning coalition would include all new legislators, and (if needed) some continuing legislators. Each legislator in period 1 who expects others to vote for the proposal has an incentive to vote for the proposal. Turnover can increase the agenda setter's power.

The following formalizes this idea. Let a legislator continue in period 2 with probability q. As before, in period 2, each member of the minimum winning coalition gains by supporting the agenda setter's proposal, and it will be adopted. The probability that a legislator belongs to the minimum winning coalition in period 2, conditional on his continuing to serve, is $p^C \equiv 2q^2/3 + (1 - q^2)$ when members of the minimum winning coalition are chosen first from continuing legislators, and $p^N \equiv 2q^2/3 + (1-q)q$ when new legislators have priority in becoming members of the minimum winning coalition.

Consider a given legislator in period 1 and suppose that all other legislators

extending term limits is mayor Michael Bloomberg of New York City who won election to a third term.

vote for the proposal. In voting for the proposal he obtains $-(1+\delta q)/3 + q\delta p^C/3$. A legislator who votes against the proposal does not reduce his tax payments, but does cause the agenda setter to give priority to new legislators, yielding the legislator expected benefits of $-(1+\delta q)/3 + q\delta p^N/3$. Given that $p^C > p^N$, the difference is strictly positive; thus, a legislator strictly prefers to support the agenda setter's proposal in period 1.

Could a symmetric Nash equilibrium in pure strategies have all legislators in period 1 vote against the proposal? Denote by x the number of votes against the proposal in period 1. Suppose the agenda setter threatens that in forming the minimum winning coalition in period 2 he will give priority to new legislators with probability $r(x)$. Assume further that $r(x)$ strictly increases with x. The agenda setter is willing to follow such a strategy, because it costs him nothing. Consider period 1 and suppose all legislators vote against the proposal. Again a single vote does not affect the collective decision which rejects the proposal. But a legislator who votes for the proposal increases the chances that a continuing member will belong to the minimum winning coalition. Hence, conditional on continuing to serve, a legislator's expected utility in period 2 is

$$\frac{1}{3}\delta\left(-1+(1-r(x))p^C + r(x)p^N\right).$$

The legislator will have to pay taxes in period 2, and his chances of belonging to the minimum winning coalition decline with $r(x)$. Voting for the proposal makes $x = 2$, whereas opposing the proposal makes $x = 3$. The legislator will strictly prefer to vote in favor if and only if $r(3) > r(2)$. Hence, a legislator strictly prefers to vote for the proposal in period 1; unanimous opposition is not an equilibrium.

6.3 Large legislatures, and partisan benefits

Consider the agenda setter's power when the legislature consists of more than three members. For simplicity let the number of legislators, n, be an odd number.[27] As before, assume simple majority voting, and let the agenda setter play the exclusion strategy. Again, a minimum winning coalition will support his proposal in period 2.

[27] This assumption is to simplify the exposition. Proposition 1 extends to even-sized legislatures with at least four members requiring $n/2+1$ votes for approval. A two-person legislature is special because majority rule effectively becomes a unanimity rule and each legislator is decisive.

Consider period 1. Suppose all legislators vote for the proposal, so that no individual vote is decisive. The expected utility of a legislator who votes for the proposal is $-(1+\delta)/n+\delta(n+1)/(2n^2)$. The first term is the taxes paid in both periods, as both proposals are approved. The second term represents the expected value of obtaining δ/n with probability $(n+1)/(2n)$. Voting against the proposal in period 1 yields $-(1+\delta)/n$. The difference $\delta(n+1)/(2n^2)$ is strictly positive. Again, a legislator will strictly prefer to support the period 1 proposal: it is an equilibrium for each legislator to vote for the proposal in period 1. We see that the agenda setter benefits from larger legislatures, as $(n+1)/(2n)$, the share of the surplus given to the minimum winning coalition in period 2, decreases with n.

As in our previous analysis, in period 1 this is the unique equilibrium with symmetric pure strategies. A legislator who expects all others to vote against the proposal strictly prefers to vote in favor, because his vote does not change the outcome but assures the legislator of belonging to the minimum winning coalition in period 2. Voting against the proposal makes him belong to this coalition with the smaller probability $(n+1)/(2n)$.

Large legislatures allow us to consider super-majority rules. As now approval of the proposal in period 2 requires more legislators, the agenda setter can extract a smaller surplus in period 2.[28] It can be shown, however, that if the majority requirement is less than unanimity, the preceding argument applies, and in period 1 all legislators vote for a policy that hurts all of them.

The results continue to hold when the agenda setter restricts benefits to members of the majority party. Suppose a majority party has n members and a minority party has m members, with $n > m+2$.[29] Minority party members expect to be excluded from a future minimum winning coalition because the agenda setter plays the exclusion strategy but promises future benefits only to members of the majority party.[30] It is straightforward to see that the analysis described at the beginning of this section can be applied, and conclude that the

[28] In the context of Proposition 1, the agenda setter makes no payments in period 1. With more than three legislators the payments in period 1 in the context of Proposition 2 become $1/n-\delta(n-m)/(n(n-m+1))$, where m is the number of votes in favor necessary for approval. These payments increase with m.

[29] For simplicity take n to be an odd number.

[30] Speaker Joseph Cannon, mentioned above, appeared to follow this strategy, in allowing the leader of the minority party to appoint the minority members of committees. See Finocchiaro (2002).

following constitutes a sub-game perfect equilibrium: the agenda setter plays the exclusion strategy restricted to members of the majority party; the proposal in period 1 is approved with the votes of the majority party; the agenda setter's proposal in period 2 is approved by a minimum winning coalition (excluding at least one member of the majority party).

Partisan behavior makes our assumption of a finitely repeated game (rather than of an infinitely repeated game) seem appropriate. An election after period 2 might change the majority party and the agenda setter. In the next term the new agenda setter and legislature might play a similar sub-game perfect equilibrium.

7 Conclusion

It is well known that an agenda setter enjoys power which he can use to his own benefit. But this paper showed much more, suggesting that using promises and threats the agenda setter in the initial period can gain all the benefits from legislation, impose large costs on all legislators, while getting large majorities to support such a selfish policy. An implication for interpreting observed behavior is that wide support for policy need not mean wide benefits from that policy.

Conventional wisdom defines agenda-setting power as "the ability to make proposals that are difficult to amend" (see e.g. Tsebelis and Garret 1996). For most of the paper we made the benchmark assumption that the agenda setter has such absolute power. Not surprisingly, when this formal power is reduced (such as when any one agenda setter serves for a limited time) exploitation is reduced.

The extreme assumption on the *formal* power of the agenda setter allowed us to identify two additional *informal conditions* for exercising power. First, power depends on the ability to reward and punish legislators, requiring discretion or the ability to allocate future benefits. Entitlements remove discretion completely. Exercising power also requires that the agenda setter identify supporters in early periods. Though a secret ballot makes identification impossible, we showed that when terms are staggered and legislators run for re-election at different times (as in the U.S. Senate) the agenda setter's power is restored. Second, power depends on an individual legislators' incentives to resist exploitation. These incentives increase with the likelihood that a vote is decisive, which

likelihood is maximized under sequential voting; and the incentives to resist exploitation can also be sustained through tacit collusion by the legislators, though other behavior is also possible.

Agenda-setting models can also apply to an autocrat in a nondemocratic regime, because even an autocrat needs support for his policies from a part of the society, say the political elite (see e.g. Diermeier and Fong 2011). With such an interpretation our analysis implies that the autocrat might be less constrained in exploiting the elite than commonly thought. Moreover, the autocrat prefers that his future power be restricted. For if he had dictatorial powers in the final period, then he could not credibly promise future rewards and would get little benefits in earlier periods. Paradoxically, the expectation of more formal power endows the proposer with less real power. Put differently, weakness creates strength.

Our model can also apply to special interest politics. Suppose a special interest group promises to give the agenda setter ten thousand dollars if the legislature approves a policy that benefits the special interest, but harms the legislators. The agenda setter uses his exclusion strategy to get the policy passed. This can explain the puzzle of the surprisingly small rent-seeking expenditures by special interest groups, first noted by Tullock (1972).

The qualitative effects of our model can explain some stylized facts. For example, the agenda setter does better for himself, and garners stronger majorities, in earlier periods of power than in his last term. That fits the pattern of a lame duck president losing power. The results can also explain why an agenda setter may not constrain future policy; the ability to change policy in the future is precisely what gives the agenda setter the ability to threaten legislators in earlier periods. And our analysis is consistent with the observation that a legislative district may get more benefits the more closely allied are its representatives with the agenda setter (which can be a political party controlling the central government). Evidence from the United States (see Larcinese, Rizzo and Testa 2006), Spain (see Solé-Ollé and Sorribas-Navarro 2008), Israel (see Rozevitch and Weiss 1993), Brazil (see Brollo and Nannicini 2010), and Japan (see Tamura 2010) show that local governments under the control of the same party as the central government receive higher transfers from the central government.

The results of this paper can be viewed in at least three ways. First, the

results could explain the power that some agenda setters possess, as exemplified by Speaker Cannon discussed in the Introduction. Second, the results can be viewed as predicting that because an agenda setter can exercise so much power, institutions may arise to limit such power. That indeed happened when the House of Representatives changed its internal rules to reduce Speaker Cannon's power. Or, for example, a legislature may constrain an agenda setter by allowing amendments from the floor. Third, the results can suggest that though an agenda setter has the power to induce a legislature to adopt policies which benefit him alone, agenda setters often have goals other than personal benefits. Earlier we had discussed how an agenda setter may favor members of his own party. Or, as Margolis (1984) suggests, political leaders may be altruistic at least in part, aiming to further the public good, or to go down in history as benefactors of the country.

A Appendix

A.1 Mixed-strategy equilibria in the benchmark

Under majority rule, the equilibrium in period 1 can also have each legislator vote for the proposal with positive probability less than 1. A mixed strategy allows for trading off the increased chance of belonging to the minimum winning coalition in period 2 with the increased probability that an exploitive policy is approved in period 1. This appendix explores, analogously to Proposition 2, the conditions under which a mixed-strategy equilibrium exists, and investigates whether the agenda setter can offer sufficient side payments s to induce the equilibrium in Proposition 1.

Consider a given legislator and suppose the other two legislators vote with probability x for the proposal. If the legislator votes for the proposal, his chances of becoming a member of the minimum winning coalition in period 2 are higher, the more often the realizations of the other legislators' mixed strategies specify a vote against the period 1 proposal. More precisely, expected payoffs are given by

$$x^2\left(-\frac{1}{3}+s+\delta\left(\frac{2}{9}-\frac{1}{3}\right)\right)+2x(1-x)\left(-\frac{1}{3}+s+\delta\left(\frac{1}{3}-\frac{1}{3}\right)\right)+(1-x)^2\delta\left(\frac{1}{3}-\frac{1}{3}\right),$$

which simplifies to

$$-\frac{1}{3}\left(2x-x^2+\frac{x^2\delta}{3}\right)+sx(2-x).$$

On the other hand, a legislator who votes against the proposal has a chance of belonging to the minimum winning coalition in period 2 only when at least one other legislator votes against, in which case the proposal in period 1 is rejected. Expected payoffs are thus

$$x^2\left(-\frac{1}{3}+s-\frac{\delta}{3}\right)+2x(1-x)\delta\left(\frac{1}{6}-\frac{1}{3}\right)+(1-x)^2\delta\left(\frac{2}{9}-\frac{1}{3}\right),$$

which simplifies to

$$-\frac{1}{3}\left(x^2+\frac{\delta}{3}\left(x^2+x+1\right)\right)+sx^2.$$

A legislator is indifferent between voting for and against the proposal if and only if

$$x^2-x\left(1-\frac{\delta}{6}\right)+\frac{\delta}{6}+3x(1-x)s=0.$$

Because this equation is quadratic, there exist two equilibria in mixed strategies. Given the unique symmetric pure-strategy equilibrium described in Proposition 1, in period 1 the number of symmetric equilibria is therefore three.

Figure 1 shows these equilibria for different side payments s and discount factors δ. Given a side payment, say $s = 0$, which indicates the right-most discontinuous curve, for any δ the two mixed-strategy equilibria have very different comparative statics. For the first equilibrium (the lower part of the discontinuous curve), an increase in the discount factor δ increases the probability that a legislator votes for the proposal; in the second equilibrium (the upper part of the discontinuous curve) the opposite holds.[31] As δ increases the mixed-strategy equilibria converge towards each other.

Interestingly, with more legislators and a discount factor smaller than 1, this convergence might be complete: mixed-strategy equilibria appear not to exist for high discount factors. When the future is important enough, the legislator strictly prefers to increase his chances of membership in the minimum winning coalition in period 2 rather than to reduce the probability that an exploitive policy is approved in period 1. For example, with five legislators and an agenda setter, for a mixed-strategy equilibrium to exist the discount factor must be smaller than 0.6.[32]

The right-most discontinuous curve in Figure 1 applies when $s = 0$; curves further to the left are based on higher payments. The most the agenda setter is willing to pay to each legislator in order to induce the equilibrium in Proposition 1 is $t = (1 - x^3 - 3x^2(1 - x))/3$, because $x^3 + 3x^2(1 - x)$ is his expected payoff

[31] One could argue that the first equilibrium is more appealing than the second. First, it is plausible that as the future becomes more important the period 1 proposal is more often approved. Second, as the discount factor approaches zero, the first equilibrium converges to the symmetric pure-strategy equilibrium in which the proposal is unanimously rejected. The second equilibrium converges to unanimous approval. For $\delta = 0$, unanimous approval is only sustained in equilibrium because of a coordination failure. Third, for any discount factor the expected payoffs are strictly higher at the first equilibrium. Lastly, when there is a collective mistake in which everyone mixes with slightly different probability, the first equilibrium is stable, whereas the second equilibrium is unstable.

[32] With five legislators, a mixed strategy allows for trading off the increased chance of membership in the minimum winning coalition in period 2, given by $\delta(1 - x)^4 2/25 + \delta x(1 - x)^3 1/10 + \delta x^2(1 - x)^2 2/15 + \delta x^3(1 - x)3/20 + \delta x^4 3/25$, with the increased probability that an exploitive policy is approved in period 1, $x^2(1 - x)^2/5$. The former is always larger than $\delta(1/2)^4(16/75)$, whereas the latter is at most $(1/2)^4(1/15)$. Equality can therefore not hold for large δ.

in period 1 from the mixed-strategy equilibrium.

The figure shows that when the discount factor is sufficiently large (roughly greater than 0.6), the agenda setter can avoid a mixed-strategy equilibrium by making side payments. For low discount factors, however, the equilibrium in Proposition 1 cannot be induced. When the future is not sufficiently important, a legislator little values membership in the minimum winning coalition in period 2, and strictly prefers to reduce the probability that an exploitive policy is approved in period 1. In these situations playing a mixed strategy can thus protect the legislature from complete exploitation—although it cannot eliminate the exploitation completely.

A.2 Tacit collusion with a finiteley repeated game

Even with only three periods the legislature can avoid payments to the agenda setter in the first period, and reduce exploitation in the second. To do so it requests (in the first two periods) side payments threatening to play the asymmetric equilibrium in the current period. Moreover, in the first period the legislature can increase side payments further to 1/3 by threatening fellow legislators to punish the acceptance of less than 1/3 by playing the unanimous approval equilibrium in the second period. As in the main text, if in period 2 punishment of fellow legislators requires approval, the agenda setter does not offer side payments. This increases the stakes in period 1 and makes it possible to require higher side payments in the earlier period.

Suppose there are three periods and the agenda setter plays the exclusion strategy as explained in the main text, but paying s_1 and s_2 in the first two periods. We show that the legislature can request to set

$$\hat{s}_1 = 1/3, \quad \hat{s}_2 = (2-\delta)/6.$$

We say the second period is a punishment phase if some legislator voted in favor of the first period proposal although side payments were strictly smaller than 1/3. In this case set $\hat{s}_2 = 0$ and notice that the agenda setter has no incentive to pay more than that; he modifies the exclusion strategy accordingly.

Consider the following strategies:

- Legislator 1 approves all proposals, except if the second period is a punishment phase.

- Legislators 2 and 3 approve the last period proposal if and only if they belong to the minimum winning coalition. They approve the first and second proposal if and only if $s \geq \hat{s}_t, t = 1, 2$.

We proceed by backward induction. Consider the last period. As before the proposal is approved by a minimum winning coalition.

Consider period 2. Suppose it is punishment phase. A legislator who does not punish does not change policy but is less likely to belong to the minimum winning coalition in period 3; so all punish. The agenda setter cannot do better. Suppose it is not punishment phase. Legislators 2 and 3 are pivotal and (following the analysis in Subsection 4.1) prefer to vote in favor if and only if $s \geq \hat{s}_2$. Legislator 1 cannot change policy, and so cannot gain from voting against. The agenda setter cannot do better than setting $\hat{s}_2 = (2 - \delta)/6$.

Consider period 1. Suppose $s_1 = 1/3$. A legislator who does not vote in favor does not change policy but is less likely to belong to the minimum winning coalition in period 3; so all vote in favor. Suppose $s_1 < 1/3$. Legislators 2 and 3 are pivotal. Voting in favor makes sure to belong to the winning coalition in period 3 but implies that period 2 is punishment phase, so payoff is

$$-\frac{1}{3}\left(1 + \delta + \delta^2\right) + s_1 + \frac{\delta^2}{3}.$$

Not deviating and voting against foregoes current side payments but assures side payments in period 2 yielding

$$-\frac{1}{3}\left(\delta + \delta^2\right) + \delta\hat{s}_2 + \frac{\delta^2}{6} = -\frac{1}{3}\left(\delta + \delta^2\right) + \delta(2 - \delta)/6 + \frac{\delta^2}{6}.$$

Voting against is beneficial because

$$-\frac{1}{3} + s_1 - \delta(2 - \delta)/6 + \frac{\delta^2}{6} = s_1 - \frac{1}{3} - \delta(1 - \delta)/3 < 0.$$

Legislator 1 cannot change policy, and so cannot gain from voting against. Thus the agenda setter cannot do better than offering $\hat{s}_1 = 1/3$.

Similar to the infinite horizon, the finite horizon can sustain very different behavior in equilibrium. This includes the possibility that multiple periods allow the agenda setter to exploit the legislature in more periods. We remark that exploitation may hold for any finite number of periods.

Consider T periods, denoted by $t = 1, \ldots, T$. A value of $T = 2$ gives the setting of Section 4. Again, the agenda setter modifies the exclusion strategy

as stated in the main text and a minimum winning coalition will approve the proposal the agenda setter makes in the last period.

Consider now a given legislator in any period t before the last, with all other legislators voting for the proposal in that period. Because a single vote does not change the outcome of the collective decision which approves the proposal, by voting for the proposal the legislator obtains

$$-\frac{1-\delta^{T-t}}{3(1-\delta)}+\frac{2\delta^{T-t-1}}{9},$$

the discounted value of tax payments in all periods plus the option value of potential membership in the minimum winning coalition in period T. A legislator who votes against the proposal does not reduce his tax, but excludes himself from future benefits, yielding him expected benefits of

$$-\frac{1-\delta^{T-t}}{3(1-\delta)}.$$

Because the difference is strictly positive, a legislator strictly prefers to support the proposals made in periods $t < T$. It follows that there is a sub-game perfect equilibrium in symmetric pure strategies with each legislator voting for the agenda setter's proposal in each period $t < T$, and in the last period a minimum winning coalition approving the agenda setter's proposal.

Thus even under a finite horizon legislators can reduce exploitation considerably. Again, other behavior is also possible, including the approval of exploitive proposals in every period but the final one.

B Not intended for publication

This appendix is for the convenience of the referees and not intended for publication. We substantiate the claims we made in footnotes 8, 14 and 19 of the main text.

B.1 The model with three agents

Consider a legislature composed by three legislators. All pay taxes and vote, and agent 1 is the agenda setter. In this Appendix we show that the results in Section 4 are robust: (i) there are two equilibria in pure voting strategies in which the first proposal is approved; (ii) there is a mixed-strategy equilibrium

for low discount factors; and (iii) side payments are monotonically increasing in a legislator's pivotal probability.

As with four agents, in period 2 the agenda setter offers zero net benefits to one other legislator (paying 1/3) who votes surely for this proposal.

We start with statement (i). Consider period 1. Suppose agent 1 votes for his proposal. The payoffs of agents 2 and 3 are summarized in the following table.

agent 1 votes *yes*

	yes	*no*
yes	$-(1+\delta)/3+s+\delta/6, -(1+\delta)/3+s+\delta/6$	$-1/3+s, -(1+\delta)/3+s$
no	$-(1+\delta)/3+s, -1/3+s$	$-\delta/6, -\delta/6$

Suppose agent 1 votes against his proposal. The payoffs of agents 2 and 3 are summarized in the following table.

agent 1 votes *no*

	yes	*no*
yes	$-(1+\delta)/3+s+\delta/6, -(1+\delta)/3+s+\delta/6$	$0, -\delta/3$
no	$-\delta/3, 0$	$-\delta/6, -\delta/6$

Notice that for any value of s, (yes, yes, yes) is an equilibrium. Moreover, (no, no, no) is not an equilibrium, as agents 2 and 3 strictly benefit from deviating. Thus Proposition 1 is robust.

Without side payments, that is $s = 0$, there is an asymmetric equilibrium: (yes, no, no). If, however, side payments are high enough, that is $s \geq (2-\delta)/6 > 0$, then it is a dominant strategy for agents 2 and 3 to vote in favor. Notice that agents 2 and 3 are now in a prisoners' dilemma. The more important the future, the worse the cooperative outcome, and so the lower the side payment can be that make defection acceptable. Thus Proposition 2 is robust; this implies the robustness of Corollary 1.

Consider statement (ii). Given that the agenda setter votes *yes*, there is also an equilibrium in which agents 2 and 3 use symmetric mixed-strategies. The mixing probabilities are given by

$$x^* = 1 - \frac{\delta}{2(1-3s)}.$$

Notice that these are linear functions of δ that start at $x^* = 1$ for $\delta = 0$ and cut the horizontal axes $x^* = 0$ at $\delta = 2 - 6s \Leftrightarrow s = (2 - \delta)/6$.

Consider statement (iii). Assume that the agenda setter votes *yes*. Suppose legislator 3 votes with probability p *against* the proposal and makes legislator 2 pivotal. It is straightforward to see that legislator 2 prefers to support the agenda setter's proposal in period 1 if and only if

$$s \geq \tilde{s}(p) \equiv \max\left\{\frac{2-\delta}{6} - \frac{1-p}{p}\frac{\delta}{6}, 0\right\}.$$

Again, the threshold $\tilde{s}(p)$ increases monotonically in the pivotal probability p, until the payments under sequential voting are reached. The difference in the functional form comes from the fact that agent 1 is always a member of the period 2 minimum winning coalition, and thus only one slot is left.

B.2 Unpredictable agenda setter

Because in the result in Proposition 1 the agenda setter randomizes among the legislators that supported his first period proposal, it is based on the indifference of the agenda setter among members of the period 2 coalition. We show now that there are other situations in which the choice of the agenda setter is unpredictable for the legislature.[33]

When legislators do not pay the same taxes, the agenda setter prefers to include some districts over others in his period 2 coalition. For simplicity suppose that legislators pay the following taxes $(t_1, t_2, t_3) = (1/3 - \epsilon, 1/3, 1/3 + \epsilon)$.

Assume further that the agenda setter likes some legislators more than others, but that the legislators are uncertain about his preferences. To be precise, suppose that $\Theta = [0, 1]$ is the set of states of the world, and θ is an element, which from the perspective of the legislators is uniformly distributed on Θ. The functions $V_i(\theta)$ with $i = 1, 2, 3$ specify the utility of the agenda setter of including agent i in the period 2 coalition. We assume that $V_1(\theta) = \theta = 1 - V_3(\theta)$ and $V_2(\theta) = 1/2$. Thus all have the same expectations, but the utility of including legislator 2 is certain.

The agenda setter's payoff of including a set of agents T in period 2 is given

[33] The example we give is related to the micro-foundations for contest success functions in Corchón and Dahm (2010 and 2011).

by

$$U_T = aS_T + \sum_{i \in T} V_i(\theta) - \sum_{i \in T} \Pi_i,$$

where S_T is the share of the surplus that the agenda setter can keep to himself, a is a parameter, and Π is an emotional penalty. If legislator i voted against the period 1 proposal, Π_i is a large number and zero otherwise.

Provided all legislators support the period 1 proposal, the expected payoff of the agenda setter from the different period 2 coalitions is

$$\begin{aligned} U_{\{1,2\}} &= a(1/3+\epsilon) + 1/2 + \theta \\ U_{\{1,3\}} &= a/3 + 1 \\ U_{\{2,3\}} &= a(1/3-\epsilon) + 3/2 - \theta \\ U_{\{1,2,3\}} &= 3/2 \end{aligned}$$

We see that (i) the agenda setter is not indifferent among members of the period 2 coalition, and (ii) if the monetary benefits are important enough for the agenda setter (that is $a \geq 3/2$), his choices are unpredictable. For $\theta \leq 1/2 - \epsilon$ he chooses agents 2 and 3, while for larger θ agents 1 and 2 are chosen. Given the uniform distribution, provided legislators support the period 1 proposal they have the following probabilities of belonging to the period 2 coalition: $(1/2 - \epsilon, 1, 1/2 + \epsilon)$. Setting $\epsilon = 1/6$ yields the inclusion probabilities (in the minimum winning coalition in period 2) mentioned in footnote 14 of the main text. We remark that setting $\epsilon = 0$ still yields asymmetric inclusion probabilities.

B.3 Heterogeneous legislators

Legislators might value the future differently because they face different re-election probabilities in the next election, or because some legislators prefer benefits sooner than others (Tsai and Yang 2010). We suppose now that discount factors differ across legislators, but are (strictly) positive and common knowledge. Notice first that this change in assumptions does not affect the benchmark result in Proposition 1, because the agenda setter's strategy relies only on the discount factors being (strictly) positive.

In the context of Proposition 2, however, side payments are strictly positive and depend on the (common) discount factor. Suppose the agenda setter chooses the size of the common side payments such that it becomes a (weakly) dominant

strategy for the two legislators who value the future most to vote for the proposal in period 1. The third legislator will realize that his vote does not affect the outcome in period 1; but he realizes that a positive vote increases his chances to belong to the minimum winning coalition in period 2. The proposal in period 1 is therefore unanimously approved. The agenda setter can do no better because reducing the side payments induces the asymmetric voting equilibrium. The above strategies thus constitute a sub-game perfect equilibrium, showing the robustness of Proposition 2.

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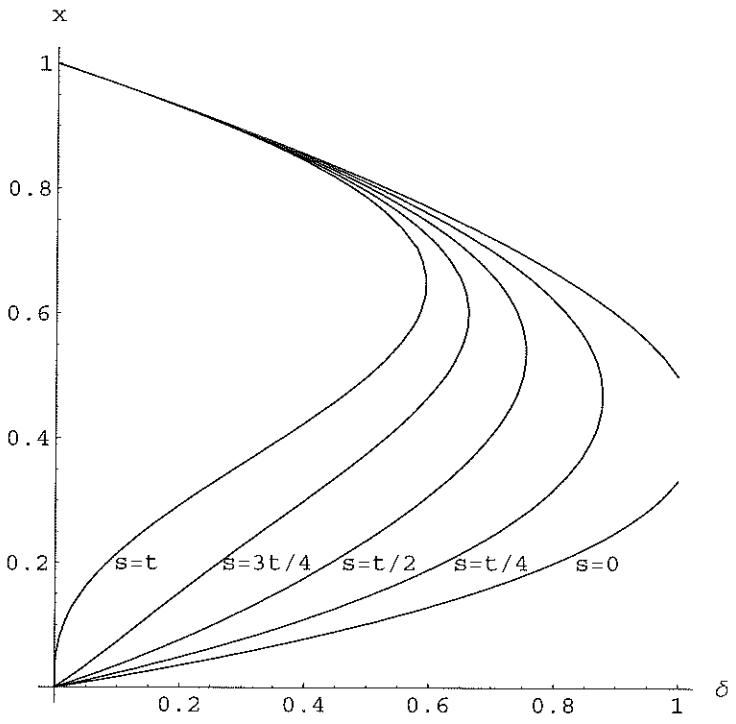

Figure 1: Mixed-strategy equilibria for different values of δ and s.