Bribing Voters

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We present a model of influence over collective decisions made through voting. We show how an outside party offering incentives to a committee can manipulate the committee's decisions at no cost and induce inefficient outcomes. A key condition is that the outsider be able to reward decisive votes differently. Inefficiency results from voting externalities. We relax all initial assumptions to investigate how to insulate committees. We study different information settings, credibility assumptions, payoff structures (voters caring about the collective decision and about their own votes), and incentive schemes (offers contingent on pivotal votes, individual votes, vote shares, and the collective decision). We analyze when voting should be made secret; we elucidate the role of individual accountability and various political institutions in preventing vote buying. We discuss implications for lobbying, for clientelism, for decisions in legislatures, boards, and central banks, and for the efficiency of democracy.

This article studies influence over collective decisions made through voting. For a long time, engineering good governance has involved questions about the pros and cons of collective bodies: "*Some things cannot be done except by bodies; other things cannot be well done by them . . . it is necessary to consider what kinds of business a numerous body is competent to perform properly*" (Mill [1861] 1998, 271). A vast literature has analyzed the advantages of decision making by committee, although abstracting away from the possibility that the committee might be under influence.[1]

The behavior of groups placed under influence is not well understood. To study this topic, we propose a very simple framework where members of a committee are to vote on an issue, and an outside party (the principal) seeks to influence their decision by offering payments. One contribution of our setup is simply to show how a number of factors affect the vulnerability of groups. These factors include whether voting is secret or public, whether voters care about how they vote per se or about the collective decision, whether the offers of the principal are budget constrained, whether those offers are secret, and whether offers are contingent on the collective decision, on individual votes, on the vote share, or on more subtle realizations. We also consider whether the principal knows the preferences of voters, and whether voters can coordinate their actions, or attain stronger forms of cooperation. These factors operate in subtle ways, and the formal model developed here helps to understand them.

The problem of the independence of the vote is highly relevant because important decisions throughout society rely on voting. In democratic societies, citizens select and discipline government officials through elections. Two of the three branches of government in a republic (the legislature and the judiciary) are collective bodies in which members vote. Many central banks around the world are run by boards that vote on monetary policy. Thus, if the executive found it easy to influence voting decisions, the independence of central banks, the separation of powers, and electoral discipline could be seriously curtailed.[2] This problem also affects the politics of the firm. Jensen analyzes the failure of corporate boards to serve as internal

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[1]Most modern research on committees relates to Condorcet's Jury Theorems and studies information aggregation. See, inter alia, Grofman, Owen, and Feld (1983), Young (1988), Austen-Smith and Banks (1996), and Feddersen and Pesendorfer (1997). See Cai (2002) and Persico (2004) on endogenous information. For an experimental study of group decisions, see Blinder and Morgan (2005).

[2]Other instances of collective decisions under influence involve unions deciding whether to go on strike, zoning boards deciding on building permits, shareholders voting on corporate matters, and citizens voting under clientelistic pressures. Although we emphasize bribery applications, the model also applies to situations where vote buying is not illegal nor deemed inappropriate.

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control mechanisms. He argues that "by rewarding consent . . . CEOs have the power to control the board" (1993, 863).

We begin by presenting conditions under which influencing a single individual would be costly but that, nevertheless, allow for a surprising outcome: an outside party can manipulate the decisions of a committee without incurring any costs, even when committee members have strong preferences about the outcome. The key condition is that the outsider be able to reward differently votes that are decisive. Under a wider set of circumstances influence over committees may yield inefficient outcomes, in the sense that decisions do not maximize the sum of utilities accruing to committee members and the outside party.

How can we insulate collective decisions? We relax the assumptions of our benchmark model to understand the operation of real-life factors that could protect collective decisions. Examples of such defensive devices in Congress include political parties and legislative committees. A literature in political science has studied parties and committees as elements that facilitate trade among legislators (see, for instance, Cox and McCubbins 1993 and Weingast and Marshall 1988). Our model sheds new light on such institutions: their trade-facilitating effects could help legislators collude and resist capture. We also show when groups will be protected by the ability to table a project and by promoting individual accountability.

The study of when to make votes secret is perhaps the most important application of our model. According to John Stuart Mill, "*The question of greatest moment in regard to modes of voting, is that of secrecy or publicity*" (1861, 353; Chap. X). Our model allows a systematic formal analysis of the effects of the secrecy of voting when there is a danger of vote buying. One fundamental distinction made in the article is between different types of costs facing a voter when casting a "corrupt" vote. One type of cost accrues when the vote is decisive and causes the approval of a bad decision ("outcome-related" costs). The other type of cost is strictly "vote related" and accrues to an individual casting the "wrong" vote regardless of the collective decision (as when reelection is denied to a representative who supported a bad law). The model predicts that secrecy is undesirable when outcome-related costs are relatively small compared to vote-related costs. Public votes allow the principal more influence, but they also introduce individual accountability pressures. When the latter are strong enough, secrecy is unnecessary. This helps explain why voting should always be kept secret in elections (voters are not accountable to others), while it may be beneficial to keep it public in legislatures (legislators are accountable to constituents).

Our results rationalize the different transparency choices of some major central banks, and therefore inform the debate on transparency in monetary policy (Issing 1999). This is important because political business cycles may be largely driven by fiscal decisions that the monetary authority is compelled to accommodate (see Drazen 2000 for a review of the evidence and for an explanation emphasizing political pressure from the executive).

The result of costless capture provides a possible explanation for the so-called "Tullock paradox," or the observation that certain groups of society obtain political favors that are worth disproportionately more than what those groups invested to secure them.[3] In addition, the finding that collective decisions under influence can be inefficient contributes to the debate on whether democracies produce efficient results. Wittman (1989) holds that because the market for policies operates as well as the markets for goods and the latter are efficient, democracies will generate efficient results. In our view, the market for policies involves collective decisions under external influence to a larger degree than the markets for goods do. Therefore the market for policies may fail more often than the markets for goods.

In this article we consider a single principal. Our model (as many others focusing on a single principal) has value because there are many real-life situations in which there is only one party in a position to exert influence.[4] Other interested parties may be uninformed or disorganized because of the well-known free-rider problem. A regulated firm, for instance, is more likely to be able to lobby the regulator than consumers; the executive, at times, may be in a far better position to lobby the legislature or the central bank than normal citizens or interest groups. Drafters of legislation can embed compensation to supportive legislators in the distribution of benefits generated by a bill. These compensations may depend on subtleties of the bill and not elicit countervailing pressures. Lastly, the incumbent CEO of a firm has unrivalled power to influence the board of directors (see Jensen 1993). Our model of influence over committees offers a better approach than typical principal-agent models to understanding these empirically relevant situations.

[3]See Tullock (1997). Ramseyer and Rasmusen (1992) report examples of cheap capture involving American legislators. Ansolabehere, de Figueiredo, and Snyder (2003) report U.S. data concerning the value of political benefits and expenditures for certain interest groups. The (weighted average) ratio of benefits to expenditures across groups ranges around 10,000. See also Helpman and Persson (2001).

[4]There is evidence of one-sided influence by special interests (see Leaver and Makris 2006 for examples and a model), and numerous contributions profitably exploiting single-principal lobbying setups.

Subsequent to our article, a number of interesting studies have revisited some of the distinctions we introduce (e.g., whether offers reward pivotal votes differently, voters care about votes or outcomes, budget constraints are present, etc.). Some of these studies investigate the effects of competition (Dekel, Jackson, and Wolinsky 2004; Grüner and Felgenhauer 2003; Morgan and Vardy 2006). Morgan and Vardy (2006) show that there are situations where costless capture survives even in the presence of competing principals.

The plan for the article is as follows. We first discuss related literature and then present an example that clarifies intuitions behind the initial results. We next present our model of influence over a committee and establish the basic results on costless and inefficient capture; then we consider constraints on the payments the principal can pledge. Later we analyze limitations to the complexity of the principal's offers, and we alter voters' preferences and study individual accountability pressures. We then analyze the question of when voting should be kept secret and consider voter collusion and when a motion to table will protect committees. Finally, we conclude. When a proposition is not implied by immediately preceding text, its proof appears in the appendix.

Related Literature

Our work is related to the literature on vote trading. Authors like Buchanan and Tullock (1962, Chapter 10) and Coleman (1966) saw benefits to vote trading because it could allow for the expression of intensity of preferences. Although lacking an equilibrium foundation, Riker and Brams (1973) argued that voting externalities could make vote trading among voters undesirable.[5] Here we focus on trades between voters and an outside party.

The literature on political influence has largely focused on individual decision makers (see, for instance, Bernheim and Whinston 1986; Dixit, Grossman, and Helpman 1997; Peltzman 1976; and Stigler 1971). This article identifies a key difference that arises when decisions are made by groups: voting externalities may render committees vulnerable to manipulation. Snyder (1991) is perhaps the earliest contribution on the buying of legislators, making predictions on the costs of capture and equilibrium legislation. Groseclose and Snyder (1996) explain the formation of supermajorities when legislators can be bought by competing parties. Their model is further developed by Diermeier and Myerson (1999) to understand the internal organization of legislatures. Neeman (1999) identifies situations (such as vote trading) where the freedom to contract should be limited. Each of these studies emphasizes payments to an agent contingent on that agent's actions, while we consider a wider set of possible offers.[6] Our study emphasizes a "divide and conquer" influence strategy analogous to schemes used in the economics literature on contracting with multiple parties (Aghion and Bolton 1987; Crémer and McLean 1985; Segal 1999; Spiegler 2000). One difference between our article and the contractual literature is that, in our setup, committee members do not sign contracts and may lack commitment power. They simply hear offers and vote—which better captures influence situations.[7]

An Example

Suppose a real estate developer wants to buy a plot of land to build houses. This green space is collectively owned by three neighbors who make decisions as a committee. The developer submits a project to them: she offers to buy the land for a very low price and then build many houses. All three neighbors realize that it would be a terrible deal to sell the green area that they enjoy for such a low price, only to find the neighborhood overcrowded in the future. The deal would trigger a large utility loss of size $\theta > 0$ on each neighbor. The three neighbors are to vote, simultaneously, for or against the developer's project. The criterion is simple majority: if two or more neighbors vote "*yes*," the project is accepted. Otherwise, it is rejected. Given the neighbors' preferences, one can expect them to vote against it.

Now imagine that, before voting takes place, the developer tells each voter: "If you vote '*yes*' together with just one other neighbor, you will receive an amount exceeding

[5]Voting externalities were probably first identified by Downs (1957, 191–92). See Philipson and Snyder (1996) for a less grim picture on the consequences of vote trading.

[6]Lizzeri and Persico (2001) study electoral promises by two candidates that may offer either a uniform public good or individual-specific payments contingent on victory (see also Myerson 1993). In the sixth section we study the difference between payments contingent on the vote and payments contingent on the collective decision.

[7]The lack of voter commitment differentiates our model from Ferejohn (1986, Section 4, where commitment matters off-equilibrium). He analyzes electors promising to support an incumbent in exchange for favors. The Bertrand-like competition for favors pushes the price of votes to zero. In our model voters do not compete and even if they did, absent commitment, any prices they quote will not bind. Under such conditions electoral support will be costly unless the incumbent utilizes a more sophisticated strategy that we uncover.

θ by a penny. If you vote '*yes*' either alone or with the two others, I will pay you a penny. And if you vote 'no' I will give you nothing." We call these "pivotal bribes" because they compensate each voter for the harm the project imposes on him (the amount θ), if and only if his vote happens to be pivotal.[8]

Under these offers every neighbor will reason this way: "If my vote is not pivotal, because my two colleagues vote '*no*,' then I will suffer no loss—no matter what I vote—because the project will be rejected. If, on the other hand, my vote is not pivotal, because my two neighbors are voting '*yes*,' then my loss is θ regardless of my vote, since I cannot prevent the project from being accepted. So whenever I am not pivotal, I prefer to vote '*yes*' to get a penny. If my vote is pivotal instead and results in the project being accepted, I will be more than compensated. It follows that I am always happier voting '*yes*,' so voting this way is a dominant strategy for me." Since every neighbor reasons in the same way, they should all vote "*yes*." In this event no one will provide a pivotal vote. Thus, the developer—honoring her promises—will pay almost nothing, yet will succeed in getting her project approved.

To make this transparent, we display the normal form voting game in Figure 1. We present both the *laissez-faire* (no influence) game and the game under influence from the principal. Voter 1 can be seen choosing rows, voter 2 choosing columns, and voter 3 choosing matrices. The figures in the cells are the three voters' respective payoffs, where the penny is worth an arbitrarily small amount $\varepsilon > 0$. Thus, the cell corresponding to [*no*, *no*, *no*] shows the payoffs of voters when they all vote *no*. In the laissez-faire game there are several Nash equilibria (that is, profiles from which no one can gain by unilaterally deviating). The "strongest" is the profile containing all "*no*" votes as it involves (weakly) dominant strategies. In the game under influence, there is a unique Nash equilibrium (in strictly dominant strategies), and this is the profile that contains all "*yes*" votes. Note that even though a unanimous "*yes*" vote triggers a bad outcome (the approval of the project with virtually no compensation), no player can gain by deviating and voting "*no*" himself.

The pivotal bribes render the voting game a multilateral prisoner's dilemma. By playing dominant strategies, all players end up with an outcome that is undesirable. This example illustrates how collective decisions made through voting can be vulnerable to external influence. We will study the nature and limits of this vulnerability.

[8]With a total of three neighbors, each is providing a pivotal "*yes*" vote whenever he is voting that way together with just one other voter. In these circumstances that voter is pivotal—i.e., changing his vote would alter the collective decision.

FIGURE 1 The Effect of Offers Conditioned on Pivotal Votes (Voter 1 Chooses Rows, Voter 2 Chooses Columns, Voter 3 Chooses Boxes)

Laissez-faire voting game

	no: no	no: yes	yes: no	yes: yes
no	0,0,0	0,0,0	0,0,0	-θ,-θ,-θ
yes	0,0,0	-θ,-θ,-θ	-θ,-θ,-θ	-θ,-θ,-θ

Voting game under influence

	no: no	no: yes	yes: no	yes: yes
no	0,0,0	0, ε ,0	0,0, ε	-θ, ε, ε
yes	ε,0,0	ε, ε,-θ	ε,-θ, ε	ε-θ, ε-θ, ε-θ

The Benchmark Model and Results

A committee comprising $N \geq 2$ members is faced with a vote on a project. The action space for an individual voter is the set $\mathcal{V}=\{yes,no\}$ (the results do not change if we allow for abstention), so each of the $i = 1, 2, \ldots N$ committee members can cast a vote v_i for or against the proposal. The profile of votes cast is denoted $v = \{v_i\}_{i=1,\ldots,N} \in \mathcal{V}^N$. The committee decision $d(v)$ (the "outcome") belongs to the set $\{Yes, No\}$.[9] To simplify exposition, let $d(v)$ take the value 1 when the decision is "*yes*," and the value 0 when it is "*No*." As just written, the decision of the committee is a function of the vote profile v. This function embodies a majority rule: the decision is "*Yes*" if and only if the vote profile contains at least M votes for "*yes*," where $M < N$.

The principal receives revenue $\pi > 0$ when the committee's decision is '*Yes*.' Decision "*No*" yields her a payment of zero.[10] Therefore the principal will try to induce the committee to choose '*Yes*' by offering its members a collection of payments $\{b_i\}_{i=1,\ldots,N}$. An offer b_i is actually a function $b_i(v)$ expressing the bribe that will be paid to voter i depending on the realized voting profile v. We assume, initially, that the principal can observe the entire profile v (decision d is always observable as it impacts the principal's payoff). We will study different offers,

[9]We will always write "*yes*" ("*no*") with lowercase initial when we refer to an individual vote, and with uppercase initial when we refer to the overall committee decision.

[10]For expositional convenience, we will refer throughout to the principal as a female and to the voters as males.

however, that can be of use when the principal does not observe v. Bribes are costly to the principal. Her payoff is then written as

$$d(v)\pi - \sum_{i=1}^{N} b_i(v).$$

We assume the principal cannot tax voters so bribes are always nonnegative. As is standard in the literature, the principal is assumed to be able to commit to her offers.[11] We do not assume any commitment power on the part of the voters: voters hear offers but do not sign contracts; when the time comes, they vote whichever way they find most advantageous. The payoff of voter i is written as

$$-d(v)\theta_i + b_i(v).$$

This expression says that voters care positively about the bribes they receive and negatively about the committee's decision. When the decision is "*No*," voters get zero utility (apart from bribes), but when it is "*Yes*," each committee member i suffers a utility loss of size θ_i. This magnitude is the "type" of voter i. We want to focus on cases where there is a conflict between the committee and the principal. Therefore we assume that all types θ_i are positive, which means all committee members are individually *against* the approval of the project desired by the principal. Assuming that some members of the committee are actually in favor of the principal would just make things easier for the latter. All results in this study would be either strengthened or unchanged. For simplicity of exposition we make all types equal to $\theta > 0$. It may be argued that in a setup where voters' preferences are common knowledge, and identical, a committee is not necessary in the first place. It must be stressed that the similarity of preferences and the certainty features of this setup are for simplicity only. We could embed our analysis in a more complicated environment where voters' valuations are unknown ex ante and, being risk averse, desire to secure median outcomes. When complete, contingent contracts are not feasible; delegating to a single representative may be risky. Hence, appointing a committee could be desirable ex ante in order to aggregate preferences and implement median outcomes, even when (1) preferences are common knowledge ex post, and (2) a principal may appear with positive probability and rig voting.

We now establish six assumptions. The first three simplify the analysis and we later show they can be relaxed without necessarily affecting the costless capture result. The following three are strictly necessary for that result. We relax each assumption later on and discuss its implications. (For reasons of space the analysis of the relaxation of Assumption 3 is omitted here, but the reader is referred to the working paper version; see Dal Bó 2000).

Assumption 1. The principal has deep pockets.

Assumption 2. Offers from the principal are public.

Assumption 3. Voter preferences are public information.

Assumption 4. The action profile v is contractible. The principal can promise payments to a voter contingent not only on how he votes, but also contingent on how others vote. This requires the principal to be able to observe v.

Assumption 5. Committee members care about the collective decision, but not about their individual votes per se.[12]

Assumption 6. Committee members can communicate and coordinate their play through nonbinding agreements, but they cannot bind themselves to vote in any particular way.

Although we allow voters to use mixed strategies, all of our results involve pure strategies. Therefore, in order to save space, we omit expanding the notation to explicitly deal with mixing. All the propositions in this article survive if we specify risk-averse preferences and nonseparable utility functions.

Timing. **First stage:** Nature determines the value of θ and both principal and voters learn it. Then the principal communicates the bribe offers $\{b_i(v)\}_{i=1,\ldots,N}$. **Second stage:** The voters learn the bribe offers of the principal. Then they cast their votes simultaneously and noncooperatively.

Solution concept. We will focus on subgame perfect Nash equilibria (SPNE) of the game. Votes are the committee members' pure strategies. A collection of bribe

[11]This would be natural when a long-lived principal faces a sequence of committees (as a big corporation may do over decades with changing legislatures), and she wants to develop a reputation for honoring promises. Assuming away the credibility problem is standard in the literature on political influence (see, for instance, the common agency models as introduced by Bernheim and Whinston 1986). We follow this convention to keep everything other than the specific difference of our environment in line with the literature on political influence. The specific difference we study is that the decision maker is a group, not an individual. Varying only one thing at a time allows us to relate the origin of our results to that specific difference. As in every model with one-shot interactions, the absence of commitment would significantly damage transactions where the rendering of service and payment are not simultaneous.

[12]If voters face a moral cost of accepting offers of any sort from the principal, things are altered. The acceptance or not of those offers must be modeled explicitly as a decision previous to voting. The treatment is similar to the one in the seventh section, where voters care directly about their vote.

offers $\{b_i(v)\}_{i=1,\ldots,N}$ is a pure strategy for the principal. Voting games typically have multiple Nash equilibria. Given a majority rule M, we will say that the principal can induce or implement a decision "*Yes*" by the committee if and only if, given the principal's offers, there are at least M members for whom voting "*Yes*" is a dominant strategy. Whenever voters have a dominant strategy we assume that they will use it. If an individual voter assigns some probability to the event that some voters may make a mistake when selecting their actions, then even weakly dominant strategies are the safest action for that voter.

Equilibrium. Consider first the voting game under no influence—the *laissez-faire* voting game. This game has multiple Nash equilibria (NE): any profile containing either more or less than M "*yes*" votes is an equilibrium. The reason is that whenever a voter is not pivotal he is indifferent between voting one way or another. However, when a voter is pivotal, voting "*yes*" is the strictly worse alternative because it triggers the undesirable collective decision. Hence, "*no*" is the (weakly) dominant strategy for every voter, and the profile containing only "*no*" votes is the NE in (weakly) dominant strategies. Therefore, under laissez-faire, a unanimous "*no*" vote against the principal is the expected play. The principal must intervene in order to induce the outcome "*Yes.*"

Now suppose the principal offers what we call pivotal bribes to all voters. These promise a payment $\theta + \varepsilon$ in exchange for a pivotal "*yes*" vote and just ε for a nonpivotal "*yes*" vote. The amount ε can be assumed to be arbitrarily small throughout and to avoid open set problems we assume there is a minimum currency unit $\varepsilon > 0$ of negligible value. These offers completely change the incentives facing voters. Every voter will again see two potential situations, namely when his vote is pivotal and when it is not. When his vote is not pivotal because less than $M - 1$ others vote "*yes*," this particular voter can collect ε instead of zero by voting "*yes.*" If his vote is not pivotal because more than M others vote "*yes*," he can collect $\varepsilon - \theta$ instead of $-\theta$ by voting "*yes.*" Therefore, voting "*yes*" is strictly better for a nonpivotal voter. And voting "*yes*" is also best when his vote is pivotal: voting "*no*" prevents the bad collective outcome and yields a payoff of zero; in contrast, casting a pivotal "*yes*" vote triggers full compensation for the cost θ plus the small payment ε. As a result, pivotal bribes make voting "*yes*" a strictly dominant strategy, and a unanimous "*yes*" vote is the unique NE of the voting game under influence. The outcome is a favorable decision for the principal. Offering pivotal bribes to any number of members higher than M will trigger a nonpivotal majority of "*yes*" votes (the voters receiving no offers have "*no*" as a weakly dominant strategy). The pivotal offers may seem unrealistic or too contrived. What they do is simply to offer a different reward for a vote that is decisive. Differential rewards are common, for instance, in the Congress of the United States when the Speaker obtains "if you need me" pledges from majority legislators who agree to vote the party line if necessary (see King and Zeckhauser 2003).

The pivotal offers described specify virtually zero payments if more than M members vote "*yes.*" Thus, the pivotal bribes induce the approval of the principal's project at virtually zero cost. Having ruled out negative payments, this is the maximum payoff the principal could attain—strictly speaking, the maximum is attained by offering pivotal bribes to just $M + 1$ voters. Hence, offering these bribes must be an equilibrium for the principal. The preceding discussion implies the more formal statement:

Proposition 1: *Under Assumptions 1–6, the principal will offer pivotal bribes to $M + 1$ voters and induce the committee to decide "Yes" at virtually no cost.*

Several remarks concerning this equilibrium follow.

Strictly costless influence and multiple equilibria. Other bribe schemes yield essentially the same outcome. For instance, the principal can offer all voters a sum $\theta + \varepsilon$ in exchange for a pivotal "*yes*" vote and nothing otherwise. Although not the unique NE, the profile where all vote "*yes*" is an equilibrium in weakly dominant strategies, and hence the strongest prediction for the game. In such case, the principal can capture the committee at strictly zero cost. Moreover, she will be exactly indifferent between making this offer to any number of members k, where $k \in (M, N]$, while offering no payments to the remaining $N - k$ voters. Because all voters play dominant strategies, we will have a corresponding voting equilibrium with k votes for "*yes*" and $N - k$ votes for "*no.*" As k is greater than M, no voter is ever pivotal, and all such equilibria will yield decision "*Yes*" at no cost for the principal. Thus, in the remainder of the article we always assume that the principal is indifferent between offering pivotal bribes to any number of voters larger than M. In summary, the next corollary indicates that the same committee and lobbying situation can generate very different voting patterns.[13]

[13]This is of interest in light of the political science literature trying to explain voting patterns in legislatures. Riker (1962) predicted the formation of minimum-winning coalitions. Groseclose and Snyder (1996) explain the formation of supermajorities as a result of sequential bribing. Weingast (1979) and Niou and Ordeshook (1985) provide explanations for why legislatures would display unanimous voting patterns instead. Shepsle and Weingast (1981) account for universalist tendencies in a model of pork barrel expenditures.

Corollary 1: *Voting patterns that are very close to a minimum-winning coalition (i.e., a minimum-winning coalition plus one vote), supermajorities of any size, and unanimous outcomes are all equilibria of the voting game under influence.*

Talk does not help voters. In games with multiple NE, players may attempt to coordinate their play through nonbinding communication. But in our game the principal can thwart any such attempt by offering pivotal bribes to all voters, thus making "*yes*" a strictly dominant strategy for all. This yields a unanimous "*Yes*" as the unique NE. Therefore players cannot rely on communication to help them coordinate a move to any other profile. Stronger means of cooperation are required (analyzed in a later section).

Efficiency. Let us define an efficient decision as one that maximizes the sum of utilities of all $N + 1$ players in the game. Since, as shown before, the principal can attain a "*Yes*" decision at no cost, any other equilibria of the overall game will involve bribes achieving that same outcome—otherwise they will not be equilibria. Hence, all equilibria of the voting game under influence will always involve the outcome "*Yes*," no matter how small the principal's gain π is, and irrespective of the size of the committee members' aggregate utility loss $N\theta$. Then whenever $\pi < N\theta$ the collective decision does not maximize the sum of all players' utilities. It follows that,

Proposition 2: If $\pi < N\theta$, *the equilibria of the voting game under influence are inefficient.*

The reason for this inefficiency is that when a party is buying votes from a group, the link is broken between the cost and the price of a decision.

Unanimity. M has been defined as any majority requirement short of unanimity. Under unanimity rule, every voter becomes pivotal to the decision "*Yes*," and both costless and inefficient capture are impossible.

Sequential voting. The power of the principal is not affected when voting takes place sequentially. By offering pivotal bribes to a majority, she ensures that voting "*yes*" is a strictly dominant strategy for that majority, guaranteeing enough "*yes*" votes in a SPNE in dominant strategies.

The results in this section emerge because each committee member has limited control over the committee's final decision and therefore over his own payoff. Under a nonunanimous decision rule, no player is a priori pivotal to the collective decision, so a player's payoff can be altered without his agreement (no voter has a veto). This allows the outside party to make a committee do things for a price that none of its members would accept individually. The remainder of the article relaxes the assumptions that shape our baseline model and studies how to insulate collective decisions from influence.

Offers under Budget and Secrecy Constraints

In this section we show that relaxing Assumption 1 (on deep pockets) and Assumption 2 (on public offers) does not necessarily protect committees.

Budget constraints. A way to analyze the effects of a budget constraint on the principal's offer is to suppose that any offers that violate the constraint are ignored by recipients and hence do not work. This is clearly important when off-equilibrium offers shape equilibrium outcomes, as is the case with pivotal bribes. A natural constraint to study is given by what the principal stands to gain from a decision favorable to her, namely π. We then assume that public offers are only taken seriously if for every v, they satisfy $\sum_{i=1}^{N} b_i(v) \leq \pi$.[14] Note that under such constraint, costless and inefficient capture is still possible. Whenever $M\theta < \pi < N\theta$, pivotal bribes are affordable and hence believable, but capture is inefficient as the principal gains less than what voters lose. Of course, severe enough budget constraints will prevent the principal from being able to promise full compensation to M voters in the event that they provide pivotal votes, eliminating the possibility of costless capture.[15]

Secret offers. When the offers of the principal are of a corrupt nature, public offers could be inconvenient. Typically, each offer will be communicated privately to its recipient. Under secret offers, the voting game is not a game of complete information, so SPNE is not the right solution concept. We could look for sequential equilibria instead. Because pivotal bribes make "*yes*" a dominant strategy, it is trivial to show that there will be no difference as to the predicted outcome: all voters will support the principal. Given the conservative implementation criterion we

[14]Under less conservative implementation criteria (which may bring mixing into the picture), cheap capture can occur even under more severe budget constraints.

[15]Note that when the credibility of the principal's offers depends on her prospective gains π, a perception by voters that π is high benefits the principal. Such beliefs make large off-equilibrium bribes credible, in turn making costless capture possible. This is paradoxical. In normal trading situations the buyer is interested in downplaying her valuation. The reason for this contrast is that the power of the principal depends on the credibility of her off-equilibrium offers, which in turn are relevant because of the voting externalities induced by the committee structure.

have selected, secret offers have no effect on the predicted outcome.

Coarser Offers

In this section we relax Assumption 4. Suppose that offers to member i are constrained to be of the form: "I will pay you a bribe b_i if you vote '*yes*,' and zero otherwise." We call these vote-contingent bribes. This is the type of offers mostly used in previous literature. Another possibility arises when the principal cannot observe the realized voting profile—say because votes are secret. Now she cannot condition payments on the way each individual votes; but if she observes the number of people voting each way, she can make promises of the form: "I will pay you a bribe $b_i(k)$ if k members vote *yes*,' and zero otherwise," where $b_i(k)$ is a function of the number of other people voting "*yes*." We say these offers are contingent on the vote share. Lastly, if the principal observes nothing but the committee decision, bribes to voter i must be of the form: "I will pay you a bribe b_i if the committee chooses '*Yes*,' and zero otherwise." We now have,

Proposition 3: *If the principal wants to induce the collective decision "Yes" through either offers contingent on the individual vote, offers contingent on the vote share, or offers contingent on the collective decision, she must spend an amount arbitrarily close to* $M\theta$.

Limiting the flexibility of the offers the principal can pledge affects the cost of capture. With bribes contingent on the individual vote, the vote share, and the collective decision, the principal must fully compensate M committee members to get her way.[16] Clearly, outcomes will still be inefficient whenever $\pi \in (M\theta, N\theta)$: the principal can afford capture but her gains are smaller than voters' added losses.

Note that in a world where offers take simple forms, committees make corruption more costly than an individual. Moreover, given a particular majority rule such as, say, simple majority, the cost of capture $M\theta = \frac{N+1}{2}\theta$ will increase with committee size, so larger committees will be harder to influence than smaller ones. And given a committee size, a more demanding majority rule (a higher M) will also raise the cost of capture. This suggests an explanation for why we may want to impose supermajority rules on particularly important decisions (such as constitutional reforms): it makes their purchase more expensive.

[16]Note that, when offering bribes contingent on individual actions, the principal commits to pay nontrivial amounts for profiles that yield decision "*No*." So these offers are only possible when the principal has enough initial wealth.

Vote-contingent bribes and payments contingent on the collective decision yield the same costs of capture. Therefore, preventing the principal from making offers contingent on individual votes (for instance, by making votes secret) will not damage the influence power of the principal unless she was planning to use more sophisticated payment schemes. We deal with the issue of secrecy more fully later. However, we can already infer from the last proposition that the importance of the observability of the vote hinges on the possibility of using sophisticated payment schemes, such as pivotal bribes. The literature on clientelism (see Kitschelt and Wilkinson 2006 for an overview and case studies) has debated the issue of whether individual votes can be monitored. Our model suggests that the observability distinction becomes irrelevant unless vote buyers use sophisticated schemes.

The contrast between Propositions 1 and 3 illuminates the role of restrictive assumptions on the behavior of political actors. An important literature on the internal organization of legislatures and parliamentary democracies relies on the figure of a formateur or a proposer of legislation (see, inter alia, Baron 1993; Baron and Ferejohn 1989; Huber 1996; and Shepsle 1979). This proposer can embed "compensations" to potential supporters in the characteristics of the bill or the privileges granted in a government coalition. These compensations are contingent on the success of the proposed legislation (or government formation plan), but not on the various voting profiles supporting it. This restriction is crucial in rendering legislative support costly. Predicted outcomes would be very different if the proposer could offer side payments to legislators that are contingent on the way in which the proposal passes: the cost of legislative support could drop to zero in the absence of constraints on the form of compensations that are deemed "fair game." In short, the previous literature features costly legislative support because it restricts the set of possible bribing strategies. This may be realistic (see Evans 1994). The following section presents conditions under which the optimal bribing strategy coincides with the coarse vote-contingent bribes, resulting in costly legislative support.

Changing Voters' Preferences: Vote-Related Costs and the Impact of Individual Accountability

Now we relax Assumption 5. Assume voters care about how they vote per se in addition to caring about bribes and the final decision. Assume that, on top of losing θ if the project is approved, every committee member suffers a loss $\eta > 0$ when voting "*yes*." This value η may reflect moral concerns, the fact that voters attach an expressive value to the act of voting,[17] or the fact that committee members act under some form of external monitoring. For example, a legislator voting for a project damaging his constituency may face lower chances of reelection. The payoff to voter i is now

$$-d(v)\theta - I(v_i)\eta + b_i(v),$$

where $I(v_i)$ is an indicator function taking the value 1 when $v_i =$ "*yes*" and the value 0 otherwise.

When vote-related costs η are zero, voters' preferences are as in the baseline game: "*no*" is a weakly dominant strategy as long as the principal does not intervene. Thus, for any $\eta > 0$ the strategy "*no*" becomes a strictly dominant strategy in the absence of intervention by the principal, and a unanimous "*no*" vote is the unique NE of the voting game. We now have,

Proposition 4: *If the principal wants to induce decision "Yes," she needs to spend at least min* $\{M(\eta + \theta), (M + 1)\eta\}$.

The trade-off facing the principal depends on the size of vote-related costs η relative to outcome-related costs θ. One influence approach is to target a strict majority and offer full compensation for both types of costs contingent on a "*yes*" vote—i.e., using the coarse vote-contingent bribe strategy on a majority of voters. The other approach is to target a slightly larger majority and, using pivotal bribes, avoid compensating them for the outcome costs θ. So, whenever compensating a single extra voter for his vote-related costs η is cheaper than paying for the strict majority's outcome-related losses (i.e., whenever $\eta < M\theta$), the principal will target an $M + 1$-sized majority, spending $(M + 1)\eta$. Capture will be affordable (and hence take place) but inefficient whenever $\pi \in (\eta(M + 1), (M + 1)\eta + N\theta)$. When, on the contrary, vote-related costs are relatively high (i.e., when $\eta > M\theta$), the principal will target a strict majority and spend $M(\eta + \theta)$. In this latter case, whenever $\pi \in (M(\eta + \theta), M(\eta + \theta) + (N - M)\theta)$ capture is costly but possible, and the final decision inefficient (as the voters' total losses amount to $M(\eta + \theta) + (N - M)\theta$). Inefficient capture is precluded only if the intervals $(\eta(M + 1), (M + 1)\eta + N\theta)$ and $(M(\eta + \theta), M(\eta + \theta) + (N - M)\theta)$ collapse into a single point of the real line, so that π has no chance of lying inside. For any vote-related costs η, this only happens when the voting externality θ that a majority voting "*yes*" exerts on those voting "*no*" goes to zero, i.e., when voters do not care about the final decision. *We have thus isolated voting externalities as the origin of inefficiencies.* Note that the unanimity rule eliminates inefficient capture. When $M = N$, only the second bribe strategy works and the interval of possible values of π that allow for inefficient capture collapses. Because under unanimity every voter has a veto on the project, voting externalities are eliminated: no majority can pass the project and impose a negative externality on another voter without this voter's consent.

[17]On the implications of expressive voting, see, for instance, Brennan and Hamlin (1998).

This section tells us that capture is costly when voters care about how they vote per se, say because of moral reasons or because committee members are held individually accountable for their votes. The latter case occurs in legislatures, where roll-call votes are public and legislators face a threat of no reelection when displaying a bad individual voting record.[18] It may seem irrational for voters to condemn legislators for a voting record that is primarily composed of nonpivotal votes, but our treatment can be justified in an expanded model. Snyder and Ting (2005) study constituents' preferred reelection rules in the context of Snyder's (1991) continuous policy setup. Each constituency is seen to prefer conditioning reelection on its legislator's voting record (rather than on the legislature's performance) precisely because it creates vote-related costs and it raises the cost of capture.

When Should Votes Be Kept Secret?

In this section we use our model to obtain lessons on when secret votes will be desirable. We then examine a striking contrast: while ballots are secret in general elections, votes are public in legislatures.

We now assume that each one of the N members of a committee is corruptible (i.e., rational) with probability p. With probability $1 - p$ members are noncorruptible and always vote the right way. To make the problem interesting assume that the effective number of corrupt committee members is larger than the required majority M. Each committee member loses θ if a bad project is passed, and he attaches value $\eta > 0$ to retaining office. We now assume that each committee member represents a constituency so the member's reappointment depends on whether his behavior satisfies his constituency. Suppose now that a bad project is under consideration in the committee. *Under secret voting*, if constituents see that the project is approved, they will know that a majority took bribes, but they will not know who in particular did so. Hence constituents will update their priors on the moral type of all members. Given the prior p, the posterior on

[18]Binder, Maltzman, and Sigelman (1998) present evidence indicating that ideological closeness improves the reputation senators have with constituents. Mayhew (1974) describes the position-taking activities induced by individual electoral accountability.

all members will be greater than p after a bad project is passed, so a randomly selected citizen is more likely to be honest. Constituents play noncooperatively and prefer honest representatives. So, all committee members get replaced by randomly selected challengers. Thus, the game facing corrupt members before bribes are pledged displays a payoff structure analogous to the baseline game in Section 4: legislators sustain a loss whenever a majority votes "*yes*"; the only difference is that when a bad project passes, committee members suffer an additional disutility η from losing office on top of the outcome-related disutility θ. From Proposition 3 we know that under secret voting the cost of capture would be $M(\theta + \eta)$, as the principal can only condition payments on the collective decision (or the vote share when observed).

We now analyze the case of *public votes*. When a committee member is seen to vote for a bad project, constituents update their prior p *only* on that particular representative. The posterior becomes 1. Thus, come reelection day, that individual member is not reappointed. Before bribes are offered, the payoff structure for corrupt members looks exactly like that in the previous section: costs η accrue to a member whenever he votes for the undesirable project, and costs θ accrue whenever the project is approved. From the previous section we know that the cost of capture in that game is given by the expression $\min\{M(\theta + \eta), (M+1)\eta\}$.

From the comparison of the costs of capture under secret and public votes, we see that,

Proposition 5: *When the measure* θ *of concerns for the final outcome is large relative to the accountability measure* η (i.e., when $M(\theta + \eta) > (M + 1)\eta$), *public votes allow for cheaper capture—so secrecy will be best. When, on the contrary, the costs from being held accountable are relatively high (i.e., when* $M(\theta + \eta) > (M + 1)\eta$), *secrecy is unnecessary.*

The intuition behind this proposition is simple. Pivotal bribes—as made possible by public voting—allow the principal to avoid compensating voters for the outcome-related cost θ. When the final outcome is what matters most to voters, pivotal bribes save the principal more money than she has to pay from public votes making voters individually accountable. Things change when vote-related costs are relatively large. In this situation, the costs of capture become $M(\eta + \theta)$ with either secret or public votes.

We can now analyze the cases of voting in elections and legislatures. The voter participating in an election cares about who wins (i.e., $\theta > 0$), but he does not represent anyone but himself (accountability to others is absent, so $\eta = 0$). From the analysis above, the costs of rigging elections with public and secret votes are respectively zero and $M\theta$. Thus, secrecy yields a strictly higher cost of manipulating elections.

Now let us consider legislatures. We said above that when the force of accountability is strong, capture with public votes costs the same as with secret votes. This would seem to suggest that public voting in legislatures can never strictly dominate secret voting.[19] However, under the collective accountability implied by secret voting, the legislature would always tend to have a proportion p of corrupt members, as they are replaced in block. Under individual accountability, only corrupt members supporting bad projects fail to be reelected, while honest representatives remain. So with public voting, the legislature should converge to having a majority of honest legislators. This yields a rationale for public voting in legislatures: when accountability is strong (η is large), public votes do not allow for cheaper capture and do allow for the dynamic purification of the legislature.

The analysis presented here abstracts away from uncertainty and the possibility of expressive voters. But it is possible to show that the explanation is robust to the addition of those ingredients: public votes in legislatures always introduce an extra form of vote-related costs through accountability pressures, and secret ballots tend to make the manipulation of elections more expensive by reducing the set of instruments the principal can utilize.[20]

In the case of monetary policy, it has been indicated that the accountability of board members to territorial constituencies introduces undesirable biases (Issing 1999). Our model indicates that if this type of control is misguided, and it overrides that by other desirable sources (the professional community, say), then voting may have to be kept secret. This principle would apply to central banks where board members represent areas or countries, as it is the case with the Bundesbank and the European Central Bank (where secrecy does hold). On the other hand, votes could be made public in central banks where territorial attachment is not perceived to be a problem, such as in the Bank of England, the Bank of Japan, or the Federal Reserve of the United States (where secrecy is not in place). According to our analysis, the varying transparency standards observed across

[19] Of course if the principal could observe individual votes through a spy under secret voting, making votes public would be strictly better as it would level the field between principal and constituents.

[20] The proof is available on the author's homepage at http://gsbapps.stanford.edu/facultybios/biomain.asp?id=09693169.

major central banks are compatible with good committee design.

To the extent that directors in corporate boards do not face individual accountability pressures, the result in Proposition 5 indicates that board independence would be improved by secrecy. With secret sessions the CEO has less power to affect board members. The desirability of keeping board proceedings secret from the CEO adds an argument in favor of separating the roles of CEO and chairman of the board.

Collusion among Voters

Explicit Trade among Voters

Institutions such as political parties and specialized legislative committees have been rationalized in various ways. One view is that parties provide a discipline and legislative committees a currency that facilitate trade among politicians (Alesina and Spear 1988; Cox and McCubbins 1993; Weingast and Marshall 1988; but see also Krehbiel 1991). In this section we show that the "trade facilitating" features of political institutions have an added benefit: they can help collective bodies deal with outside influence.

We relax Assumption 6 and consider cooperation among legislators. Given that pivotal bribes make the voting game a multilateral prisoner's dilemma, application of the standard folk theorem for infinitely repeated games yields that there are equilibria in which legislators cooperate if they interact repeatedly and are patient enough. If the time horizon is not long enough (legislators are, after all, finitely lived) or if legislators are impatient, costless capture may occur. An alternative solution is offered here. Suppose that before the principal makes her offers, an abstract long-lived player called "the party" announces the following transfer scheme: "Every member voting '*no*' will get an amount t from each of his colleagues."[21] We then have,

Proposition 6: *If the party can enforce deals among committee members, then it can choose the transfer t in order to either prevent capture or set an optimal price for it.*

The party can set the transfer t in a way that raises the cost of capture to either exactly π (extracting the principal's valuation), or just above it (preventing capture). In this model, a source of discipline like the party gives the committee bargaining power vis-à-vis external players by enforcing collusion among members. We would then expect parties to directly take over negotiating deals with outside sources and channel funds internally to members. So far we have assumed that political parties are capable of internal discipline. An interesting question is, how is this discipline achieved? Ripley (1964) offers a fascinating study of the origin and functions of party whips in the U.S. House of Representatives. The whip institution involves "a large whip organization" with resources and staff (Schneider 2002, 2). According to Ripley (1964, 573) the most important function of the whip is to guide pressure in order to discipline voting. The party whip may be reconsidered, in light of our model, as another congressional institution that affects the costs of capturing legislation. Alternatively, we may use our model to study what a whip acting unopposed may achieve.

Procedural Substitutes

Committee members may at times fail to enforce exchanges amongst themselves. A simple procedural substitute for explicit collusion is provided by the existence of a motion to table, which proposes not to vote on a project.[22] For example, in the U.S. House of Representatives such motion is authorized under Rule XVI Clause 4 of its manual of procedures (see U.S. Government Printing Office 2003; the motion to table is also used in the Senate, see Den Hartog and Monroe 2006 for an explanation of its use as a source of agenda control). This motion subjects the project to a simple majority vote which, if successful, prevents the project from being put to a vote. This is equivalent to not approving the project (a failure to table does not approve the project; it merely allows the vote on it to take place). The motion to table offers the committee the opportunity of a collective veto before a project is actually considered. The effects of the motion to table are subtle, so we study them formally.

The game now has three stages. In the first, the principal offers bribes. In the second, the "table" stage, a randomly selected committee member introduces the motion to table and the committee votes on it under a majority rule M_t, meaning that the project is tabled if and only if

[21] The party could alternatively announce a punishment on those voting "*yes*." Note that when all members vote "*no*," the transfer scheme is budget balanced: each legislator makes as many payments as he receives. Lastly, the assumption that the party moves first is made for simplicity only. The essence of the argument goes through when the party moves second. Note that the purpose of this section is to show how parties may entail a defensive capability for bodies and not to explain the emergence of parties.

[22] I am grateful to an anonymous referee for pointing out the existence of the motion to table and its potential for protecting committees. A motion with similar consequences, also available in the House and Senate, is the motion to indefinitely postpone the vote. A previous version of the article analyzed a related defense: the committee could vote to make the voting rule more stringent after hearing the principal's offers, offering a variation on Diermeier and Myerson (1999).

at least M_t votes for tabling are cast (in the U.S. Congress, M_t is a simple majority). If the motion passes, the game is over with zero payoffs for all. If the motion does not pass, play proceeds to the third, "project" stage, where the committee votes on the project as in our original game. The complete action profile of votes in the game with a motion to table is $[v^t, v^p] = [\{v_i^t\}_{i=1,\ldots,N}, \{v_i^p\}_{i=1,\ldots,N}]$. The superscripts "$t$" and "$p$" stand for "table" and "project" respectively, to indicate what members are voting on. Bribes can be made contingent on both v^t and v^p if the votes to table are public, or on v^p and the collective decision to table if the votes to table are secret. We now look at the SPNE of this expanded game.

Proposition 7a: *If a motion to table exists and the principal is unaware of it, costless capture is impossible; but if the principal foresees the motion and votes on tabling are public, then costless capture occurs.*

Proposition 7b: *If a motion to table exists, the principal knows it, and votes on tabling are secret, then capture is costly; if $M_t > 1$, inefficient capture is possible.*

The intuition for this result is simple. When the principal is unaware of the motion to table, she attempts to capture the committee costlessly and voters find it in their best interest to table the project. But if the principal knows that the motion to table is feasible she will expand her bribes to cover the table stage. When she can observe individual table votes, she can costlessly buy a majority of those just as she would buy project votes. Only when the votes to table are not observable can the motion to table help the committee.[23] Inefficiency is still possible unless a single vote is enough to table, which amounts to giving everyone a veto, as when unanimity rule is applied to the project. This clearly implies that adding layers of veto players will also increase the costs of capture. In the U.S. Congress, a bill typically must go through several "veto gates" before a final passage vote.

Conclusion

This article presents a model of influence over group decisions. Our model takes seriously the game-theoretic premises of standard principal-agent and voting setups and takes them to their limit. That process yields a novel finding: the presence of externalities in collective decisions makes them vulnerable to influence by outsiders. Such decisions can be swayed at practically no cost and in inefficient directions. The result also provides a valuable benchmark to assess the total value of certain institutional devices. We depart from the baseline case to understand how to protect committees. We show that the vulnerability of committee decisions can be reduced when (*i*) outside parties cannot tailor payments conditional on pivotal actions, when (*ii*) members are held individually accountable for their participation in the decision process, when (*iii*) the size of the promises the principal can credibly pledge is reduced, and when (*iv*) voters can cooperate.

An important feature of our model is that it allows a systematic analysis of when to make votes secret. In particular, it explains why it makes sense to have public votes in legislatures and secret ballots in elections. The model also offers a rigorous basis for analyzing the phenomenon of clientelism, which is partly associated with the practice of vote buying. One implication of the model is that the secrecy of votes will hinder vote buying only if vote buyers would condition payments on pivotal votes. When vote buyers would use simpler strategies, such as offering money contingent on individual votes, identical outcomes could be attained by conditioning payment on the result of the election, making the observability of votes irrelevant. This equivalence may not hold when adding uncertainty.

The grim outcome of collectives being swayed costlessly is relatively easy to avoid. If members have a stake in the decision, making votes secret, for example, will do. The possibility of inefficiencies, however, is more robust. It is only eliminated when voters do not care about the collective decision or when they cooperate. Cooperation must take a strong form. Simple communication among voters will not be enough, as under influence they will find themselves playing a game resembling a prisoner's dilemma. Voters need to enforce cooperation through repeated interactions, or to engage in contracting. Cooperation and contracting may be difficult when voters are opportunistic. The existence of disciplinary devices and of a currency that facilitates trades among members will help committees avoid capture (or set its price). Political parties have been indicated to supply enforcing power, for instance through the labors of party whips, and the pockets of authority created by institutions have been indicated to provide a currency that facilitates trades. Other institutions, such as vetoes, and the existence of motions to table or to postpone voting can also help protect collective decisions.

[23] A motion to table that is voted on secretly has the same effect on the cost of capture as imposing secrecy on the project votes. Because transparency may be desirable for projects on which outside pressure is not suspected, allowing for a less publicized vote on the motion to table may be convenient. A similar defense would be for committees to vote on imposing secrecy of the voting on a project that has triggered bribe offers. Note that congressional rules in the United States allow for secret sessions on cases that may trigger strong outside pressure, such as the impeachment of the president.

Appendix

Proof of Proposition 3. *Vote-contingent bribes*. Offering $\theta + \varepsilon$ to a majority of voters contingent on a "*yes*" vote makes "*yes*" a dominant strategy for a majority at cost $M\theta$. Offering these payments to less people will not induce enough "*yes*" votes, and offering less than θ to any number will fail to make "*yes*" a dominant strategy for them. Higher offers or offers to more players only increase costs.

Bribes contingent on the vote share. Offering $\theta + \varepsilon$ to M voters if there are at least M "*yes*" votes makes "*yes*" a (weakly) dominant strategy for such majority at cost $M\theta$. We now show that spending less will fail to secure the "*Yes*" outcome. Offering the payments above to fewer people will not induce enough "*yes*" votes, and offering less than $\theta + \varepsilon$ can never make "*yes*" a dominant strategy. It remains to be shown that no scheme can work that seeks to avoid paying the compensation $M\theta$ (by, for instance, targeting more voters and avoiding paying for nonpivotal votes). Denote with k the number of voters voting "*yes*" in any given voting profile. For "*yes*" to be a (weakly) dominant strategy for a bribe recipient, no deviation from a profile where $k \geq M$ members (including the recipient) are voting "*yes*" should be profitable. This means, first, that a necessary condition for a recipient to see "*yes*" as his dominant strategy is that he receive full compensation when $k = M$ and he is pivotal. Secondly, it means that his compensation for a profile where $k = M + 1$ should be at least as large; otherwise he would vote "*no*" and, by forcing $k = M$, cash in a larger compensation. Iterating the argument one sees that the voter's compensation should be nondecreasing in k for him to prefer to vote "*yes*" in every instance where $k > M$. Therefore, schemes such as pivotal bribes will fail, and the cheapest alternative for the principal is to target exactly M voters and fully compensate them in case any number $k \geq M$ vote "*yes*."

Bribes contingent on the collective decision. Offering $\theta + \varepsilon$ to a majority of voters contingent on a "*Yes*" decision makes "*yes*" a (weakly) dominant strategy for a majority at cost $M\theta$. Offering these payments to less people will not induce enough "*yes*" votes, and offering less than θ to that majority (or any other) will fail to make "*yes*" a dominant strategy. ■

Proof of Proposition 4. The first question is whether the principal can avoid compensating for outcome-related losses θ. From Proposition 1 we know that the use of pivotal bribes on more than M voters can achieve that. However, making "*yes*" a dominant strategy for such voters will also require fully compensating them for η in any profile where those members are voting "*yes*." The principal wants to minimize the total cost of compensation. Two broad strategies are available to the principal. One is to offer pivotal bribes supplemented with compensation for vote-related costs. In other words, the principal can offer voters a payment of $\theta + \eta + \varepsilon$ if they cast a pivotal "*yes*" vote, and only $\eta + \varepsilon$ if they cast a nonpivotal "*yes*" vote. But because payments η are costly, if adopting this approach the principal will make these offers to the minimum number of people subject to pivotal bribes, allowing her to avoid compensating for costs θ. That number is $M + 1$. This would implement the "*Yes*" decision by making a profile comprising $M + 1$ "*yes*" votes a NE in dominant strategies, at a cost of (almost) $(M + 1)\eta$. The other approach is to fully compensate a minimum-winning majority. This is attained by offering payments of $\theta + \eta + \varepsilon$ conditional on a "*yes*" vote to M members. This implements the "*Yes*" decision by making a profile comprising M "*yes*" votes the NE in dominant strategies. A profile with fewer "*yes*" votes does not implement the "*Yes*" decision. A profile with more "*yes*" votes would be more expensive, except possibly using the first approach. The first approach is chosen whenever $M(\eta + \theta) > (M + 1)\eta$. Otherwise, the second approach is chosen. ■

Proof of Proposition 6. Under the scheme announced by the party, voting "*no*" earns a voter $(N - 1)t$. Therefore, making "*yes*" a dominant strategy for a majority of $M + 1$ (so that no one is pivotal) costs $(M + 1)(N - 1)t$ using pivotal bribes (from Proposition 1; additional off-equilibrium payments of θ to each voter must be promised but do not affect equilibrium payments). On the other hand, implementing a profile where just a majority M sees "*yes*" as the dominant strategy will cost the principal $M(\theta + (N - 1)t)$ (from Proposition 3). Given the parameter values and the party's choice of t, the principal chooses the cheapest option at cost $\underline{c}(t) = \min\{(M + 1)(N - 1)t, M(\theta + (N - 1)t)\}$. The party can avoid capture by setting $\underline{c}(t) > \pi$ and can extract the principal's valuation by setting $\underline{c}(t) = \pi$. ■

Proof of Proposition 7a. The principal, unaware of the chance to table, announces pivotal bribes contingent on v^p. Every profile v^t such that tabling succeeds kills the project and yields voters zero payoffs. Every v^t such that tabling fails leads to the original voting game, to costless capture, and to voter payoffs of $-\theta$. No bribes have been offered contingent on v^t, so the equilibrium in weakly dominant strategies has all voting to table, killing the project. If the principal foresees the motion to table, she announces bribes $[b^t(v^t), b^p(v^p)]$, where $b^t(v^t)$ offers each voter a payment $b = \theta + \varepsilon$ for a pivotal vote against tabling, and just ε for a nonpivotal antitable vote; $b^p(v^p)$ is just the pivotal bribes of the basic model. From Proposition 1, this bribe scheme makes it a dominant strategy for all voters to vote against tabling and subsequently approve the project, again at no cost. ■

Proof of Proposition 7b. The principal can only offer bribes $[b^t(\mathit{table},\ \mathit{no\ table}), b^p(v^p)]$. From the analysis of secret votes, the only way to avoid tabling when bribes are conditioned on the tabling decision is to compensate a majority in the "table" stage for the loss θ the subsequent approval of the project would create. This costs $(N - M_t + 1)\,\theta$. The project then survives, reaching the "project" stage under public votes where, from Proposition 1, the project is approved at no further cost. Whenever $\pi \in ((N - M_t + 1)\,\theta,\ N\theta)$, capture is affordable and, for any $M_t > 1$, inefficient. ■

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