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Farquharson and Fenno: Sophisticated Voting and Home Style

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This article is aimed at integrating two kinds of analysis of legislators' calculations of advantage. We assume that legislators operate in two arenas, in the legislative arena itself, where their calculations of advantage concern simply their effectiveness in voting (Farquharson), and in the electoral arena, where their calculations concern the rewards for their position-taking as well as their effectiveness (Fenno). Our analysis is introduced by an interpretation of voting on the Powell amendment, 1956, when some legislators apparently voted strategically and others, equally able to do so, still did not. We then develop an expected utility model of voting that accounts for such divergent choices in terms of legislators' individual beliefs about the distribution of opinions in the legislature (Farquharson) and in their constituencies (Fenno). We conclude with an analysis of the Nash equilibria of choices to vote strategically or nonstrategically.

For the past 30 years students of positive political theory have been preoccupied with problems of collective choice. Although it was intended as a critique of and an advance upon the then-prevalent views in welfare economics, Arrow's (1951) seminal contribution, *Social Choice and Individual Values* has spawned both a large technical literature in social choice (Kelly, 1978; Sen, 1970) and a growing body of research on political choice and political institutions (Riker, 1982). Samuelson (1967) doubted "Arrow's mathematical politics" was a contribution to economics, but held it in high esteem as a benchmark study of political choice:

If the Muse of history has its wits about it and succeeds in doing justice—two hypotheses of a somewhat romantic nature—I believe that Kenneth Arrow's name will long be remembered for a new and important insight into the permanent problem of the nature of democracy. . . . [T]he

Arrow result is much more a contribution to the infant discipline of mathematical politics than to the traditional mathematical theory of welfare economics. (pp. 41-42)

Some 30 years later, rational actor models of political processes have become a staple of political analysis. It is no longer odd or controversial to stipulate motives for political agents and then to trace their implications for agent behavior and social choices. As a consequence, market and nonmarket phenomena are unified in a common framework which, in turn, serves as a promising basis for a more comprehensive social science. This promise, however, has been frustrated by the profound indeterminism in rational actor models of collective choice identified by Arrow. If tastes or values in a society display even a modest amount of diversity, then the social choices that emerge from aggregating these tastes or values through voting will not in general possess equilibrium properties; rather, any choice that emerges is inherently unstable. In the context of voting models, the characterization of this instability has reached its fullest generality in the so-called chaos theorems of McKelvey (1976, 1979), Schofield (1978), Cohen (1979), and Matthews (1980).

That majority rule is badly behaved in principle is now widely appreciated and need not be documented in detail here. What does require further examination and analysis are the rather stark premises and implicit commitments upon which this conclusion rests. The task of scrutinizing, relaxing, and refining these implicit commitments

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is one of substantial magnitude, constituting in itself a research program of major proportions. In the first part of this article we note in passing some of the work that has begun this enterprise. The main purpose of this article, however, is both less ambitious and more substantive.

We are interested in some aspects of political institutions and how they structure political choices. We are specifically interested in the political context in which such institutions and their members are embedded. In thinking about institutions in general, and legislatures in particular, we have been struck by how much in isolation they tend to be treated. For some purposes this is perfectly appropriate. Each of us knows congressional scholars who have never felt the urge to venture beyond the city limits of Washington. But Mayhew (1974) and Fiorina (1974) reminded us a decade ago that, although congressmen choose and behave in Washington, they have an eye on the folks back home. They vote, attend committee meetings, make speeches, draft bills, and do casework in the legislative arena; but they secure political support, campaign resources, and electoral rewards in the constituency arena.

Recently, Fenno (1978) elaborated the "two arenas" hypothesis in impressive fashion. In *Home Style*, he sought to escape the strictures of Washington (much as congressmen themselves do) in order to answer "one question central to the representative-constituency relationship [which] remains underdeveloped. It is: What does an elected representative see when he or she sees a constituency? And, as a natural follow-up, What consequences do these perceptions have for his or her behavior?" (Fenno, 1978, p. xiii).

We join Fenno in taking the two-arenas hypothesis seriously. As distinct from Fenno's more empirical exploration outside Washington, however, ours is explicitly more analytical. We believe that legislators are calculators of advantage in the institutional arena, but that they understand, as Fenno does, where the rewards are. Their behavior in Washington, then, is in part instrumental; it is aimed at the external, constituency arena. In turn, constituents and other interests monitor legislator performance. They ask the question attributed to Alben Barkley's farmer-constituent with two different emphases. They ask not only "*What* have you done for me lately?" but also "*What* have *you* done for me lately?" That is, constituents care both about legislative results and about legislator behavior.

Some years ago, an influential monograph by Robin Farquharson provided considerable insight into the idea of strategic calculation in committee and legislative voting situations. In *Theory of Voting*, Farquharson (1969) developed the idea of sophisticated voting in sequenced binary voting

processes like those observed in legislatures. According to this idea, result- or outcome-oriented legislators should regard the alternatives on the floor at any stage of the voting process (but the last) not as objects of choice per se, but rather as vehicles that carry the process into the next stage of the sequence. Their behavior in any penultimate or antepenultimate stage of the sequence, therefore, is taken less as an opportunity to demonstrate preferences over the nominal alternatives before them than as an occasion to choose instrumentally with an eye to what will survive to the ultimate vote.

Herein lies the tension! In the context of the two-arenas hypothesis, in which both results and behavior are monitored and evaluated by constituents, result-oriented strategic calculation and sophisticated behavior in the legislative arena may require actions that run contrary to the nominal preferences of important constituents. Although helpful in producing a final result desired by constituents, a strategic vote, for example on some particular amendment, may nevertheless entail behaving in a manner that directly conflicts with the wishes of constituents on the amendment in question. Such actions will need to be explained by the legislator. But can he explain those actions? Fenno regards the task of "explaining Washington behavior" as one of the core components of a legislator's home style. Surely in contemplating a sophisticated move in the legislative arena, a legislator will give prior considerations to how it will play back home—and to whether or not he can explain it satisfactorily to his supporters in order to reduce the prospects that it will become a damaging campaign issue. In short, the two-arenas hypothesis induces legislators to calculate about being sophisticated.

Many models of committee and legislative choice assume legislators are either sophisticated, strategic calculators, or, alternatively, are passive revealers of their true preferences. The purpose of this article is to make this assumption a matter to theorize about. After reviewing the abstract model of majority rule (which we call the Political Model) and its limitations, we turn to a well-documented historical example of legislative strategy. This example displays instances of strategic preference revelation and at the same time poses an anomaly. Although some legislators most likely misrevealed their true preferences in strategic fashion, not all did. Stranger still, some of those agents who failed to vote strategically "should" have if they were behaving in a purely instrumental fashion to obtain their preferred outcome. In the third part we seek to explain why they did not. Our argument revolves around the idea that principals (constituents) not only induce preferences in agents (legislators) but also con-

strain their modes of behavior, a point developed about congressmen with impressive skill by Feno. We seek, in short, to wed the insights of Farquharson and Feno, of sophistication and home style.

The Political Model and Its Limitations

We begin by describing the bare bones of what we call the political model. Popularized by Downs (1957) and extensively developed in the voluminous literature on spatial models of electoral competition (Enelow & Hinich, 1984), it was actually developed in the context of nonelectoral institutions even earlier (Black & Newing, 1951). It is given its most extensive mathematical development in the work of McKelvey (1976, 1979) and Schofield (1978).

The Political Model

Let $N = \{1, 2, \dots, n\}$ be a committee or legislature consisting of n agents who must choose, by majority rule, an element of the set X (normally modeled as a multidimensional Euclidean subspace). Assume each agent has well-defined preferences over the points in X satisfying certain technical requirements (typically continuous and strictly convex preferences). Let P_i represent agent i 's preferences (xP_iy means x is preferred by i to y). For two points x and y in X , x is said to be majority-preferred to y (xPy) if and only if

$$|xP_jy| > |yP_jx|$$

(where $|xP_jy|$ means the number of agents in N preferring x to y , and $|yP_jx|$ is defined analogously). For any point $y \in X$, we may describe the points which majority-defeat it:

$$W(y) = \{x \in X | xPy\}.$$

$W(y)$ is called the win set of y ; it is the set of points that are preferred by a majority to y .

It is now well known that the majority preference relation P is badly behaved: in almost all circumstances (that is, for almost any distribution of agent preferences), P has no undominated elements in X . Normally, no element in X is preferred by the majority to all other elements. Taking political agents to be bundles of preferences, and P to describe the result of aggregating these preferences by majority voting, and assuming or specifying no additional mediation by institutional arrangements or practices, the "universal instability" result may be characterized in either of two ways:

- 1) For "almost every" configuration of preferences, $W(y) \neq \emptyset, \forall y \in X$.
- 2) For any two arbitrary points, $x, y \in X$, and "almost every" configuration of preferences, there exists a finite sequence $\{x, z_1, \dots, z_m, y\}$ such that $z_i \in W(x)$, $z_i \in W(z_{i-1})$ for $i=2, \dots, m$, and $y \in W(z_m)$.

The first statement asserts the generic nonemptiness of win sets: no point is invulnerable to defeat in a majority-rule contest. The second statement asserts not only that win sets are nonempty, but also that their content is sufficiently rich to permit any point to be reached, via a finite sequence of majority-rule contests, from any other point. In short, there is no equilibrium of majority tastes and, indeed, no basis for asserting priority of one alternative over another because each can be reached from the other by an appropriately chosen agenda.

The Political Model is elegant, but utterly simple. Tastes are taken as exogenous, individual agents passively reveal their tastes, any two alternatives in X may be pitted against one another and a social choice between them determined, and the victory of one alternative over another is strictly determined by counting heads. Read this list of properties to any student of Congress, and he will inquire curiously about other features of life on your home planet! Consider, specifically, three serious limitations of the Political Model.

Limitation 1. Symmetry among Agents

The Political Model—indeed, most formal models of politics—begins with a set N of participants, variously called by such names as "committee," "society," "electorate." There is a presumed symmetry (or anonymity) among political agents, each coming to the decision setting with preferences and a vote, and no other distinguishing features. What is striking about most political institutions, however, is the absence of precisely this sort of symmetry. Rarely do political institutions operate in a committee-of-the-whole mode with N an undifferentiated collection of political agents. Characteristic of most institutions is differentiation in the form of a division of labor. The U.S. Congress, for example, is characterized by political party organization, a committee system, and various leadership posts. The same is true of most other institutions—bureaucratic agencies, capitalist firms, and universities. All are characterized by structural differentiation and a division of labor.

Limitation 2. Symmetry among Alternatives

Similarly, the political model and the theorems of majority rule take as undifferentiated the set X of alternatives from which choices are made. The elements of X represent, in effect, comprehensive government programs in most applications. Yet in institutional settings we rarely observe choices posed in terms of one platform of programs versus another (indeed, this orientation is a vestigial remain of models of electoral competition (Downs, 1957)). Rather, the set X is typically partitioned into jurisdictions over which special kinds of property rights are assigned to organizational subunits. Thus, the undifferentiated sets N and X of our formal theories of majority rule are, in practice, collections of subsets and bundles of "rights" differentiating the agenda and choice authority of the subsets of N over jurisdictions in X .

Implicit in the undifferentiated set X of alternatives is the notion that any alternative may be pitted against any other alternative. Here, too, there is a presumption of symmetry (or neutrality) among alternatives that is generally not encountered in real-world institutional choice. Procedural rules combine with structural features to organize the process of social comparison and choice. Germaneness rules, the requirement that the status quo ante be voted last (i.e., a vote on final passage), privileged motions, and similar factors, combine with structural features like a jurisdictionally based committee system to destroy any presumed symmetry among alternatives.

Limitation 3. Uniformity in Behavior

Farquharson's (1969) *Theory of Voting* and a decade's worth of work in economics on incentive compatibility stimulated by the pathbreaking contributions of Gibbard (1973), Satterthwaite (1975), and Groves and Ledyard (1977), bifurcated the formal analysis of committees and legislatures. The political model and its predecessors assumed that the legislative agent was a non-strategic revealer of his preferences. Confronted with a choice between x and y , the agent voted for the proposal standing higher in his preferences. Voting was taken to be a method by which preferences were revealed and aggregated. The vote itself was not seen as a strategic resource.

The integration of game-theoretic ideas changed all this. In making the act of voting a strategic affair, Farquharson and others exploited the fact that the process of collective choice in institutions follows a well-defined sequence. In such settings, for a legislator to make voting decisions at any stage solely on the basis of

his preferences over the immediate alternatives of choice before him is an act of folly or self-indulgence. Preliminary decisions, argued Farquharson, are not merely popularity contexts because they determine the alternatives from which a social choice will emerge at the decisive ultimate stage.

Since the publication of Farquharson's monograph, most models make explicit assumptions about the behavioral mode of participants. However, even those models in which the distinction between sincere and strategic behavioral modes is appreciated typically make a blanket assumption to cover all agents, for example, "Assume all legislators engage in strategic voting." To our knowledge, this issue has always been settled by fiat. Conformity is presumed, and no effort is made to make it a matter determined endogenously.

Implications for the Political Model

Each of the three limitations of the Political Model described above involves a presumed uniformity or artificial symmetry. The empirical richness of political institutions, we claim, is found in the myriad ways in which uniformity and symmetry are violated. The Political Model has taken liberties with this richness. However, research is well underway aimed at relaxing some of the implicit premises of the political model. Structural features, especially those providing for the agenda power of committees, have been incorporated into the Political Model by Shepsle (1979, 1983), Shepsle and Weingast (1981), and Denzau and Mackay (1981, 1983). Likewise, procedural features, especially those relating to germaneness, other rules governing amendments, and the privileged status of certain motions, have also been explored by the above authors as well as by Enelow (1982), Enelow and Koehler (1980), Enelow and Hinich (1983, 1984), Blydenburg (1971), and Sullivan (1984). In all of this work, conclusions about pure majority rule drawn from the Political Model require modification or qualification. The chaos characteristic of pure majority rule need not be inherited by structurally and procedurally rich institutions based on majority rule.

The third limitation of the Political Model has not received attention, and this is what we set as our task in this article. This is not to say that a concern with sophisticated behavior has not attracted scholarly interest. Since Farquharson there have been significant contributions to questions of strategy in the context of the Political Model by Kramer (1972), McKelvey (1983), McKelvey and Niemi (1978), Miller (1980), Gretlein (1980), Shepsle and Weingast (1984), and

Banks (1984). Yet in all of these studies uniformity in behavior is presumed. Political agents are endowed with the capacity to behave strategically, but no question is asked about the *wisdom* of such behavior.

This latter question would be of no consequence if collective decision making were insulated from a wider political world. But we know that in the case of the U.S. Congress, legislators' links to external constituencies take on considerable significance (Fenno, 1978; Fiorina, 1974; Mayhew, 1974). Moreover, we know (or at least are prepared to assume here) that a legislator is judged in his constituency not only by the collective choices made by his colleagues and him, but also by the individual actions he has taken (Fiorina, 1983; Fiorina & Noll, 1978). For modeling purposes, this last point suggests that a legislator's behavioral mode—whether to behave strategically or nonstrategically in making motions and casting votes—is determined in part by his link to the constituency arena. Put differently, we can now imagine a reason for legislators to calculate in advance the wisdom of strategic ploys in the legislative arena. This in turn suggests that there may well be times when the wise legislator eschews strategy and votes in a "rationally non-strategic" fashion.

A rational logic of choice about behavioral mode is the subject of the third part of this article. In order to motivate that analysis and to persuade the reader that it is not a theoretical sandcastle, we first present a historical example that lays bare the phenomenon of interest.

An Example and an Anomaly

One would like to describe the voting behavior of legislators in a straightforward way, perhaps with an equation the terms of which capture all its significant elements. Unfortunately, this is not easy, as we will illustrate by means of the incident now to be related. The essential problem of interpreting this event is that although it appears to involve strategic voting, one cannot be absolutely sure. Worse, however, two distinct groups of legislators had the opportunity to vote strategically, but only one apparently did so. How can one distinguish the considerations taken into account by the strategic voters from those taken into account by their nonstrategic counterparts? These are the puzzles we wish to address after we tell the story.

Our example involves a bill for federal aid to education sponsored by the Democratic leadership of the House of Representatives in 1956. The bill authorized the distribution of federal funds to the states for the purpose of building schools. The

motive for this proposal was straightforward: This was ten years into the baby boom of 1946-1962, and schools were being filled up rapidly. Many state and local officials wanted help in building schools, and the Democratic leadership apparently believed it was advantageous to provide the help, or at least to make the gesture in an election year.

Several amendments were proposed on the House floor, but Adam Clayton Powell, a black congressman from Harlem, offered the crucial one. The Powell amendment provided that grants could be given only to states with schools "open to all children without regard to race in conformity with the requirements of the United States Supreme Court decisions."

The Powell amendment posed dilemmas for two kinds of Democrats. For southern Democrats, the unamended bill was attractive because it would doubtless bring more money into their districts than it would take out in taxes. But, if amended, the bill would deny aid, tax their districts for northern benefits, and threaten their institutions of racial segregation. For urban northern Democrats and Republicans with substantial numbers of black voters in their districts, the bill as amended by the Powell amendment was attractive as a symbol and as a method of diverting federal largesse to northern metropolitan areas. But, if amended, the bill promised to repel southern Democrats, whose defection would probably defeat it. In sum, northern urban representatives favored the bill a great deal if amended, and less so if not amended, while Southern Democrats liked it only if not amended. All this would have made no difference if the bill could have passed easily. But this was not the case. Many Republicans opposed the bill, not only because it increased the federal budget, but also and perhaps mainly because it increased the federal presence in local government. Consequently, the Democratic dilemma had a significant effect on the fate of the bill.

There were two relevant roll calls:

- 1) a vote on adding the Powell amendment, which passed, and
- 2) a vote on the passage of the amended bill, which failed.

The totals (including live pairs) on the two roll calls intersect as shown in Table 1. Table 1 generates four groups based on voting records (yea/yea, yea/nay, nay/yea, nay/nay), which correspond closely with identifiable natural groups based on shared political attitudes.

To interpret these attitudes, we can construct individual (and group) preference orders out of the alternatives before the House. These alter-

Table 1

Powell Amendment	Final Passage		
	Yea	Nay	Total
Yea	132	97	229
Nay	67	130	197
Total	199	227	426

natives, the set $C = \{x, y, z\}$ of components of possible outcomes, were:

- x : the bill with the Powell amendment
- y : the original, unamended bill
- z : the status quo, that is, no action

These alternatives can be arranged in six possible orders (xyz , xzy , yxz , . . . , zxy), five of which were the preference orders of natural political groups.

Consider those who voted YY . On the second roll call (where strategic voting was impossible), they voted for x over z . This limited their possible preference orders to xyz , xzy , and yxz . On the first roll call they voted for x over y . If they voted nonstrategically, then yxz is also impossible. So we eliminate yxz for this group, leaving xzy or xyz . We think xzy is highly unlikely for the Democrats. To have held xzy one would have wanted school aid only if the Powell amendment were adopted, that is, only if the South were deprived of aid. Considering the intensity of the Democratic leadership's commitment to the bill and the cultural norm of getting along by going along, it seems unlikely that any Democrat, except, perhaps, Powell himself, had this dog-in-the-manger preference order. Of course, some Republicans might have wanted school aid confined to the North, but even if the preferences of all of the 54 YY Republicans are reversed from xyz to xzy it makes no difference in this case to the outcome between y and z . For convenience, we can therefore say that all the YY voters had xyz as their ordering.

This was a natural political group, mostly northern urban, and fairly closely divided (60-40) between Democrats and Republicans. Of the 78 YY Democrats, 66% were from New England and the big cities of the Midwest and Middle Atlantic states (only 38% of the 227 Democrats voting on these roll calls were from these areas). Similarly, 65% of the 54 YY Republicans were from New England, New York, New Jersey, and Pennsylvania (whereas only 32% of the 199 Republicans voting on these roll calls were from the same states). It seems clear that the YY voters mainly

represented northern urban districts. Presumably, Democrats and Republicans from this region were vying with each other for identification with the interests of blacks, as interpreted by Adam Clayton Powell. We will call this group the Powellians.

Those who voted NY clearly preferred x to z on the second roll call, where voting shows non-strategic preferences; so, like the Powellians, they might have xyz , xzy , or yxz . Because we have eliminated xzy and attributed xyz to the Powellians, this leaves only yxz for the NY voters, if they voted nonstrategically. They also are a natural political group, the people who preferred school aid to anything else. The 42 NY Democrats (only 19% of the Democrats voting) are the regulars, who followed the party leadership. The 25 NY Republicans were presumably those (from states like Maine, Washington, and Colorado) who preferred school aid to a gesture for blacks, although they were not adamantly opposed to the gesture and preferred it to no action. We will call this group the school-aiders. Some of the school-aiders may have been "strategic Powellians"; that is, they may have shared with the Powellians the preference ordering xyz , but voted for y over x out of fear that the Powell Amendment would sink school aid (as indeed it did). Their strategizing (if there was any) came to naught, however, as the Powell amendment had sufficient votes without them, so it will do no harm to our analysis to include them with the genuine school-aiders.

Those who voted NN (107 Democrats and 23 Republicans) are clearly identifiable. They were all the southern and most of the border Democrats and Republicans, with a small scattering of northern Democrats and Republicans. Because the NN voters clearly preferred z to x (because they so voted on the final division, where strategic voting is impossible), it follows that their only possible preference orders were zxy , zyx , or yzx . Consider, first, zxy : If this were the true preference order of NN voters, then their nonstrategic votes would be YN (i.e., yea on attaching x to y). Conceivably, however, they voted NN strategically, while holding zxy . But this does not make sense for people who, as indicated by their placing z first, want most of all to defeat federal aid. To vote N on attaching the Powell amendment (i.e., for y against x) is to increase the chance of the bill ultimately passing. Surely people who place z first do not want to do that. So the preference order zxy is not possible for NN voters. At most, NN voters could have held zyx or yzx , both of which are compatible with nonstrategic NN votes. For the 116 NN southerners (105 Democrats and 11 Republicans), their true preferences were probably yzx , that is, they preferred the unamended bill (y) to the status quo (z), even though they

were ultimately constrained to vote nay on final passage because the bill had been amended (x). A sentiment for y over z was attributed to southerners both by the House Democratic leadership and the Republicans against school aid. If the attribution was correct, then the 116 Southern NN voters must have had yzx . As for the 14 NV northerners (2 Democrats and 12 Republicans), they may have held either yzx (like the southerners) or zyx . If the NV Northerners held zyx , then they simply wished to oppose the Powell amendment and the bill itself, whether amended or not. If these were their opinions, it might make more sense to vote strategically (YN) to attach the Powell amendment, and thus make the bill more vulnerable. Still, a few persons may have found the Powell amendment so distasteful that they voted against it even though that action presumably conflicted with the most efficient attainment of their larger purpose. (Indeed, NN voters with zyx preferences were, if they existed, the exact opposite of the Powellians, who were YY voters with xyz preferences.) We think it likely that all NN voters, north and south, held yzx ; but even if some northerners did not, the numbers are so small that they make no difference in this case. We will, therefore, refer to NV voters as southerners.

The 97 YN voters were all Republicans and were thus clearly identifiable with a natural political group, namely Republicans against school aid. Their preference orders may have been either of the remaining unassigned, zxy or zyx . Clearly, their first preference was to defeat the bill, but they might have had either xy or yx in the second and third places. If they had zxy , which means they wanted the symbolism of equal treatment for blacks but still preferred no school aid to anything else, then they voted directly in accord with their preference orderings. If, on the other hand, they had zyx , which means they found the symbolism of the Powell amendment less attractive than the unamended aid bill, then they voted strategically, that is, in favor of a less preferred alternative (x) against a more preferred alternative (y) at the first division in order to attain the best attainable outcome (z) at the final division.

It is difficult to decide between these possibilities. The issue really turns on whether or not these Republicans wanted to support desegregation symbolically. Certainly, some were, like the New England and New York Republicans, attached to traditional Republican values of sympathy with black aspirations. On the other hand, most northern blacks had by 1956 become Democrats and hence, outside the New York and New England area, very few Republicans felt obligated to black voters. Representative Bolling, a Democratic whip, put forward Harry Truman to argue the cause of the Democratic leadership. He clearly

implied that he believed the Republicans were behaving strategically, which means he believed they ordered zyx . Of course, intensely partisan Democrats like Truman and Bolling are hardly good judges of Republican preferences. Still, no Republican troubled to deny Truman's rather maliciously stated allegations. Furthermore, some of those Republicans who voted for the Powell amendment nevertheless voted later in the session against other civil rights measures, which implies an ordering of zyx in this case. Without being able to prove anything numerically, we believe it is reasonable to divide the Republicans in the yeas/nay category in half, 49 with zxy and 48 with zyx . Summarizing, we have

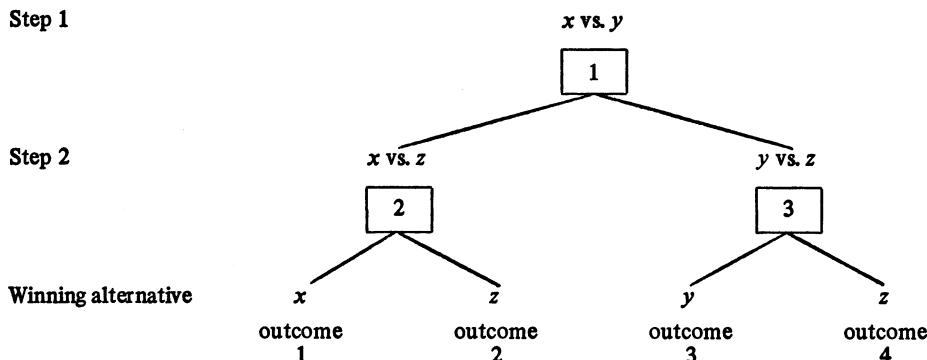
- 132 Powellians (78 Democrats and 54 Republicans), YY, xyz
- 67 school-aiders (42 Democrats and 25 Republicans), NY, yxz
- 130 southerners (107 Democrats and 23 Republicans), NN, zyx
- 49 Republicans against aid, YN, zxy
- 48 Republicans against aid, YN, zyx .

With this summary, it is possible to imagine ourselves into the position of congressmen before these votes were taken. In Figure 1, we present a diagram of the possible events. At step 1, the motion is to amend the bill, y , with the Powell amendment, x . Whichever survives, the amended or unamended bill, at step 2 faces the status quo, z . The three possible winners appear at the bottom of the diagram in four end points of possible histories (or paths).

A congressman looking forward to the vote could have seen that, if everyone voted according to the preferences previously listed (i.e., nonstrategically), then y would win at step 1 (see column (1) of Table 2). Then, at step 2, y would defeat z and the unamended bill would pass (column (2)). It could also have been seen, however, that those Republicans with zyx could defeat the bill by voting strategically (that is, as if they ordered zxy), so long as others continued to vote nonstrategically. This scenario is portrayed in columns (3) and (4) of Table 2. The shift of zyx Republican voters causes x to defeat y only subsequently to lose to z ; that is, assuming everyone else voted nonstrategically, the zyx Republicans could produce victory for z by voting for x (their third choice) against y (their second choice). Historically, this is what happened.

But it need not have been so. From columns (1) and (2), it may be seen that y is a Condorcet winner, and it is well known that sophisticated voting by *all* voters yields the Condorcet winner whenever one exists. Thus, the Powellians could have countered the strategizing by the Republicans by

Figure 1. Possible Courses of Events on School-Aid Bill



voting strategically themselves, as if they had yxz . If they did so, they could guarantee victory for y , their second choice, rather than z , their third choice, no matter how the Republicans against aid voted at step 1. The calculations are given in columns (5) and (6), where it is apparent that no matter how the Republicans against aid voted, the outcome is y .

Because there is a Condorcet alternative, the winning alternative under completely nonstrategic and completely strategic voting is the same. Variations in outcome then occur, as in the case of the Powell amendment, because, for as-yet-inexplicable reasons, *only some voters voted strategically*. Here the status quo, z , won because just the Republicans holding zyx voted strategically (and, possibly some Powellians—some of those who voted NY —but not enough). The Powellians could have obtained their second best, rather than their worst, alternative, if they had also been willing to vote strategically. Most apparently refused to do so, even though the situation was fully explained to them by the Democratic leadership. Representative Bolling, a Democratic whip, obtained ex-President Truman's signature on a

letter outlining the exact parliamentary situation:

The Powell amendment raises some very difficult questions. I have no doubt that it was put forward in good faith to protect the rights of our citizens. However, it has been seized upon by the House Republican leadership, which has always been opposed to Federal aid to education, as a means of defeating Federal aid and gaining political advantage at the same time. I think it would be most unfortunate if the Congress should fall into the trap which the Republican leadership has thus set. That is what would happen if the House were to adopt the Powell amendment. The result would be that no Federal aid legislation would be passed at all, and the losers would be our children of every race and creed in every State in the Union.

Despite the persuasive explanation contained in the letter, only one black Democratic Congressman, William Dawson, the dean of the black delegation, voted with the leadership. All the rest and most northern urban Democrats and Republicans voted nonstrategically and thus obtained their worst outcome.

Table 2. Strategic and Nonstrategic Voting on the Powell Amendment

	Nonstrategic		Strategic by zyx Republicans		Fully Strategic	
	(1) x vs. y	(2) y vs. z	(3) x vs. y	(4) x vs. z	(5) x vs. y	(6) y vs. z
Powellians, xyz	132	132	132	132	132	132
School aiders, yxz	67	67	67	67	67	67
Southerners, yzx	130	130	130	130	130	130
Republicans against aid, zxy or zyx	49	48	97	97	97	97
Total	181	245	329	97	229	197
					199	227
					97	329
						329
						97

This incident sets the terms of our problem. Among those who could do so, why did some vote strategically and some not? One facile, but meaningless explanation is that, for northern urbanites, x was worth more than the cost of z . But that possibility we knew all along to be true, and it does not tell us why they chose in effect to support z over y when, presumably, they valued y more. Why did they implicitly choose to get their worst outcome? This is an extremely difficult question to answer, especially when some similarly placed congressmen had no difficulty at all in voting strategically (some of the Republicans against aid and, perhaps, some of the Powellians). We will try to resolve the problem, however, by constructing some abstract models in which these variations make sense.

Models of Strategic Voting

To begin our analysis of this problem, assume that whenever a legislator makes a vote choice, his calculus is based on the question, "How can a potential electoral challenger use this vote against me?" As in the Powell Amendment votes, suppose a congressman can choose to vote yes (Y) or no (N) on an amendment to a bill and then yes (Y) or no (N) on either the amended or unamended bill. This admits four possible actions on his part:

YY
YN
NY
NN

Without loss of generality; assume that the outcomes are ordered xyz (x : the amended bill; y : the unamended bill; and z : the status quo) by some group in his constituency whom the congressman most wishes to please.

Adopting xyz as his preferences, the legislator will never vote N at the final division, in which either x or y is pitted against z , since z is his least-preferred alternative. This rules out NN and YN as reasonable actions. Consider now YY and NY : 1) If the congressman believes the amendment will help the bill's chance of passage on the final division, then his best action is clear—to vote nonstrategically at both divisions, YY . 2) If, however, he believes the amendment will hurt the bill's chances, he is faced with a more difficult choice: 2a) Suppose he votes nonstrategically YY , the amendment passes, and the bill is defeated (resulting in z , the worst outcome for his favored constituents). A challenger can now attack his vote on the amendment with a plausible counterfactual argument—"If the amendment had been defeated, then the unamended bill would have passed. Your vote on the amendment helped to

defeat the bill." If the challenger can convince voters that the amendment actually did substantially lower the chance of passage of the bill, then the congressman has a lot to explain away. 2b) Suppose, instead, that the congressman votes strategically NY . A challenger can point at the no vote on the amendment and ask embarrassing questions about why the congressman voted contrary to the tastes of constituents who preferred x to y .

It is instructive to look somewhat more generally at the ex ante considerations a congressman may entertain concerning whether or not to cast a strategic vote. These are summarized in Table 3 where we have conjoined the two possible actions by a legislator (a strategic or nonstrategic vote on the amendment) with four possible events (the amendment passes or fails and the final bill passes or fails). In each of these eight situations, we suggest what charge (if any) a challenger might make against the incumbent's vote and what response the incumbent might offer. That is, before choosing an action, the incumbent might wish to think through Feno's "explaining Washington behavior" problem.

What is striking about Table 3, and what sets the tone for the main point of this article, is that an incumbent congressman can get in a good deal of trouble by voting strategically. In the case of nonstrategic voting (events (i)-(iv)), only one event (iii) poses a serious "explanation problem" for the incumbent. In two cases (i) and (ii) there is nothing at all to explain, and in another (iv), the actual events do not substantiate the challenger's charge, and thus can be turned against him. In the case of strategic voting (events (v)-(viii)), on the other hand, every event provides something requiring explanation, and in only one case (vii) does the incumbent have a moderately persuasive response substantiated by the actual outcome. It is true that events like (vi) and (vii) permit the incumbent to demonstrate his comparative information advantage in parliamentary procedure and thereby to denigrate the inexperience and naivete of the challenger. It is also very likely that event (iii) is the worst of all possible worlds for an incumbent—one in which a favored bill goes down to defeat and the incumbent's own actions provide a smoking gun. Still, it is our view, which we believe rings true to most congressional scholars, that congressmen do not like to debate parliamentary counterfactuals with their opponents, and generally seek to avoid votes necessitating complicated explanations. In this light, strategic voting begins to look less compelling.

In the remainder of this section, we depart from previous studies of strategic voting. We explore the premise that legislators *choose* whether to behave strategically or not, and that they calculate

Table 3. Strategic Calculation: Actions, Events, Behavior

Action	Result of Vote		Behavior	
	On Amendment	On Bill	Challenger's Charge	Incumbent's Response
<i>YY</i> (nonstrategic)	(i) passes	passes	none	—
	(ii) fails	passes	none	—
	(iii) passes	fails	You killed the bill.	No, I was behaving responsibly in voting my constituents preferences.
	(iv) fails	fails	weaker version of (iii)	Stronger response than in (iii)
<i>NY</i> (strategic)	(v) passes	passes	You misjudged in thinking amendment would hurt bill.	I was just being prudent.
	(vi) fails	passes	The bill would have passed as amended.	No, it wouldn't have; thank God I voted against the amendment.
	(vii) passes	fails	The bill was dead anyhow. At least you could have contributed a symbolic gesture.	The bill was not dead. The amendment killed it.
	(viii) fails	fails	Stronger version of (vii)	Weaker response than (vii)

about this choice. They consider potential effects both on outcomes in the legislative arena and on the reputational costs of specific action-outcome pairs at home. The costs of different action-outcomes depend in part on whether the challenger can make an effective charge, and in part on whether the actual outcome will substantiate the incumbent's explanation for his behavior (i.e., was it plausible in light of the actual facts?).

We now proceed to some formal models of the legislator's decision about strategy. In the first model we treat the legislator as an expected utility maximizing decision maker. Uncertain about the choices of colleagues, he collapses those choices into "events" (e.g., amendment passes and bill fails or amendment passes and bill passes) and assigns likelihoods to them based on his subjective judgments. Our analysis yields a necessary condition for the legislator to vote strategically, and therefore provides some identification of the circumstances in which there will be a nonuniform response from legislators—some voting strategically, some in a rationally nonstrategic fashion. In the second model, we suppose that our generic legislator knows how each other legislator will vote. Given these presumed actions by others, he

chooses his own optimal action. We seek to identify the behavior that emerges in equilibrium—when beliefs and optimal responses of all legislators are consistent and self-fulfilling. This is the Nash equilibrium. Our final model explores briefly equilibrium behavior when legislators are able to cooperate with one another (i.e., share information, correlate strategies, form coalitions).

Expected Utility Analysis

Let O be the set of possible outcomes,

$$O = \{AB, Ab, aB, ab\},$$

where A represents the passage of an amendment to a bill; a , its failure; B , the passage of the bill itself; and b , its failure. The possible voting choices of a legislator are in the set C :

$$C = \{YY, YN, NY, NN\}.$$

A legislator is thus faced with two separate decisions. First, he must vote on the amendment, before he knows whether the bill, amended or

not, is going to pass. Second, given the division on the amendment, he must vote on the bill.

To simplify our task, we assume away the problem of identifying the group for which the legislator is agent and, without loss of generality, assume that the group he serves ranks the outcomes:

$$\begin{array}{l} AB \\ aB \\ Ab \\ ab \end{array}$$

In terms of the Powell amendment incident, $AB = x$ and $aB = y$. Note that the status quo result (z) is now partitioned into Ab and ab , distinguishing whether the amendment passes or not.

Furthermore, we assume the constituents monitor incumbent behavior as well as legislative outcomes. For any given outcome, they prefer that their representative vote for the amendment:

$$\begin{aligned} U(j, YY) &> U(j, NY) \quad \forall j \in O \\ U(j, YN) &> U(j, NN) \quad \forall j \in O. \end{aligned}$$

That is, when it has no effect on outcomes (i.e., j is the same on each side of both inequalities), a "yes" vote is preferred by constituents to a "no" vote on the amendment. These $U(\cdot)$ functions summarize the legislator's perception of the effect of his own actions and the legislative outcomes on his support constituency. Note that even constituents who understand and want strategic voting would hold these preferences, since the outcome, j , is held fixed across each inequality.

As noted previously, the representative has two decisions—how to vote on the amendment and then how to vote on the bill. The second decision is trivial both because the legislator's constituents unambiguously prefer him to vote for the bill and because his vote can have no strategic value at the final division. Thus, we can safely ignore actions YN and NN and focus solely on his choice of vote on the amendment, using Y and N to represent his alternatives at the first division.

Initially, we assume that he has only partial information about his colleagues but can form subjective probability estimates of how they will vote. Later, we will consider behavioral equilibrium in a richer informational setting.

In the probabilistic version, we assume that each legislator chooses his action to maximize his expected utility, $E[U(\cdot)]$. Thus, the expected utility of Y is:

$$E[U(Y)] = \sum_{j \in O} p(j|Y)U(j, Y) \quad (1)$$

where Y represents voting for the amendment,

$p(j|Y)$ is the probability that outcome j results when action Y is chosen, and $U(j, Y)$ is the legislator's certain evaluation of action Y if outcome j results. We define $E[U(N)]$ in a parallel fashion. The calculus for his choice is then simply whether the expected utility of Y exceeds that for N :

$$\Delta = E[U(Y)] - E[U(N)]. \quad (2)$$

This and other technical terms used below are summarized in Table 3. If $\Delta > 0$, then the legislator will rationally vote nonstrategically; otherwise he will vote strategically. We can expand Δ from equations (1) and (2) to obtain:

$$\Delta = \sum_j [p(j|Y)U(j, Y) - p(j|N)U(j, N)]. \quad (3)$$

This formulation demonstrates that the decision depends on how much $p(j|Y)$ differs from $p(j|N)$, that is, on how likely it is that a single representative's vote will change the outcome by making or breaking a tie. For the typical member in the legislature, this is a relatively unlikely event, especially if he operates noncooperatively, that is, independently of other legislators. On the other hand, if he acts in concert with a group, strategic voting may be more frequently observed (see below).

Deferring for the present a consideration of any possible cooperation, we can further analyze the determinants of strategic choice in this non-cooperative context. To do so, we decompose the probability of each outcome, $p(j|Y)$ into a product of two probabilities for each of the possible outcomes $j \in O$:

$$\begin{aligned} p(Ab|Y) &= p(b|A)p(A|Y) \\ p(Ab|Y) &= p(b|A)p(A|Y) \\ p(ab|Y) &= p(B|a)p(a|Y) \text{ and} \\ p(ab|Y) &= p(b|a)p(a|Y), \end{aligned} \quad (4)$$

where similar relations hold for N . The term $p(B|A)$ means the probability that the bill passes, given that the amendment passes, and the term $p(A|Y)$ means the probability that the amendment passes, given that the legislator votes Y . Note we assume that the conditional probabilities of the passage of the bill are independent of the legislator's vote on the amendment, given the outcome of the overall amendment vote. This rules out the possibility that the vote of a legislator on the bill might be influenced by the vote of another legislator on the amendment.

Note also that the probabilities must add up:

$$\begin{aligned} p(b|A) &= 1 - p(B|A), \\ p(b|a) &= 1 - p(B|a), \\ p(A|Y) &= 1 - p(a|Y), \\ p(A|N) &= 1 - p(a|N). \end{aligned} \quad (5)$$

We may write out Δ , the indicator for voting Y on the amendment, as given in equation (3):

$$\begin{aligned} \Delta = & p(AB|Y) U(AB, Y) - p(AB|N) U(AB, N) \\ & + p(aB|Y) U(aB, Y) - p(aB|N) U(aB, N) \\ & + p(Ab|Y) U(Ab, Y) - p(Ab|N) U(Ab, N) \\ & + p(ab|Y) U(ab, Y) - p(ab|N) U(ab, N). \end{aligned} \quad (6)$$

Substituting the conditional probabilities given in equations (4) and (5) into equation (6), we get

$$\begin{aligned} \Delta = & p(B|A) [p(A|Y)U(AB, Y) - p(A|N)U(AB, N)] \\ & + p(B|a) [p(a|Y)U(aB, Y) - p(a|N)U(aB, N)] \\ & + (1 - p(B|A)) [p(A|Y)U(Ab, Y) \\ & - p(A|N)U(Ab, N)] \\ & + (1 - p(B|a)) [p(a|Y)U(ab, Y) \\ & - p(a|N)U(ab, N)]. \end{aligned} \quad (7)$$

Voting strategically on the basis of this calculus ($\Delta < 0$) entails a tradeoff between a higher probability of one's constituents' more desired *outcome* and the reputational cost of choosing an *action* which is unpopular with constituents. A key element in this calculus is the effect the legislator's vote has on the fate of the amendment, that is, the change in the probability of the amendment passing caused by the representative changing his vote from N to Y :

$$dp = p(A|Y) - p(A|N) \geq 0. \quad (8)$$

We also need a notation for the effect of the legislator's action at the first division (Y or N on the amendment) on his evaluation of the final outcome:

$$e_j = U(j, Y) - U(j, N) \geq 0. \quad (9)$$

Using this notation, we can rewrite Δ by substituting equations (8) and (9) into equation (7):

$$\begin{aligned} \Delta = & p(B|A) [p(A|N) e_{AB} + dp U(AB, Y)] \\ & + p(B|a) [(1 - p(A|N)) e_{aB} - dp U(aB, Y)] \\ & + (1 - p(B|A)) [p(A|N) e_{Ab} + dp U(Ab, Y)] \\ & + (1 - p(B|a)) [(1 - p(A|N)) e_{ab} \\ & - dp U(ab, Y)]. \end{aligned} \quad (10)$$

All individual terms are non-negative; thus, the only terms that can yield a $\Delta < 0$ are the $-dp$ parts of the second and fourth terms of equation (10). If we group together all the dp terms, we can get a better sense of the determinants of sophisticated voting.

Let C include all the terms not involving dp :

$$\begin{aligned} C = & p(B|A) p(A|N) e_{AB} \\ & + p(B|a) (1 - p(A|N)) e_{aB} \\ & + (1 - p(B|A)) p(A|N) e_{Ab} \\ & + (1 - p(B|a)) (1 - p(A|N)) e_{ab}. \end{aligned} \quad (11)$$

The term C , containing only the utility difference terms, $e_j = U(j, Y) - U(j, N)$, represents solely the expected benefits and costs of actions alone, independent of the potential effects of strategic behavior on outcomes. The remaining terms, involving dp , represent solely the potential effects of strategy, and must overcome the positive C term if there is to be rationally strategic behavior ($\Delta < 0$). Writing D as the coefficient of dp in the expression for Δ , we have from equations (10) and (11):

$$\begin{aligned} \Delta = & C + dpD \\ = & C + dp[p(B|A) U(AB, Y) - p(B|a) U(aB, Y) \\ & + (1 - p(B|A)) U(Ab, Y) \\ & - (1 - p(B|a)) U(ab, Y)]. \end{aligned} \quad (12)$$

Using some additional notation will further simplify this expression:

$$\beta_Y = U(aB, Y) - U(ab, Y) \quad (13) \quad (\text{value of the unamended bill}),$$

$$\gamma_Y = U(AB, Y) - U(aB, Y) \quad (14) \quad (\text{value of the amendment if the bill passes}),$$

$$\theta_Y = U(Ab, Y) - U(ab, Y). \quad (15) \quad (\text{value of the amendment if the bill fails}).$$

The last term reflects the largely symbolic value of the amendment's passage, since the bill's failure leaves the status quo unchanged.

Finally, we need to specify the effect of the amendment's failure on bill passage. We represent this difference as δ :

$$\delta = p(B|a) - p(B|A). \quad (16)$$

Substituting equations (13) through (16) into equation (12), we can rewrite Δ in its final form:

$$\Delta = C + dp [(1 - p(B|A)) \theta_Y + p(B|A) \gamma_Y \\ - \delta \beta_Y] = C + dpD. \quad (*)$$

Because all individual terms but δ in (*) are necessarily positive, there is only one way in which Δ can be negative, that is, in which a legislator can find it rational to vote strategically on the amendment. A strategic vote is rational only if $\delta > 0$. If the amendment's failure greatly enhances the bill's chance of passage, and the unamended bill is very important to the legislator's constituents relative to the status quo ($\beta_Y > 0$), then he may have an incentive to vote against the amendment. In doing so, he still incurs some cost owing to his vote, but this cost is now overcome by the $-dp\delta\beta_Y$ term.

Notice, however, that although $\delta > 0$ is a not very surprising necessary condition for strategic voting, it is *not* a sufficient condition. It can (and in many plausible circumstances it will) be over-

Table 4. Reader's Guide to Technical Definitions

Term	Definition	Substantive Interpretation
Δ	$E[U(Y)] - E[U(N)]$	Advantage of voting nonstrategically
$p(j Y)$	—	Probability of an event given the legislator votes yes on the amendment
$U(j, Y)$	—	Utility of (outcome, action) pair
dp	$p(A Y) - p(A N)$	Effect of legislator's vote on the fate of the amendment
e_j	$U(j, Y) - U(j, N)$	Evaluation of the effect of legislator's action on the final outcome
C	$p(B A)p(A N)e_{AB} + p(B a)(1-p(A N))e_{aB}$ + $(1-p(B A))p(A N)e_{Ab}$ + $(1-p(B a))(1-p(A N))e_{ab}$	Reputational effects of actions alone, independent of strategic effects
β_Y	$U(ab, Y) - U(ab, Y)$	Value of unamended bill relative to status quo
γ_Y	$U(AB, Y) - U(ab, Y)$	Value of amended bill relative to unamended bill
θ_Y	$U(AB, Y) - U(ab, Y)$	Value of amendment only relative to status quo
δ	$p(B a) - p(B A)$	Effect of amendment's failure on the final bill's prospects

whelmed by the other factors in (*). As a consequence, the decision to vote nonstrategically ($\Delta > 0$) is not an instance of myopia, naivete, or passivity in preference revelation, even though a nonstrategic vote might harm the bill's chances of final passage. It results from an instrumental calculation. Hence, we refer to it as *rationally nonstrategic* behavior.

From (*), we can assess the effect of various factors on the legislator's decision to vote strategically or rationally nonstrategically. First, the major factor in the C term is the effect on his constituents of voting against the amendment. Thus, suppose constituents themselves are so sophisticated in their thinking about the complexities of institutional politics that they care only about outcomes and not about their agent's actions, that is, $e_j = 0$ for all $j \in O$. This implies $C = 0$, so $\Delta = dpD$. But $dp \geq 0$, so $\Delta < 0$ if and only if $D < 0$. From the definition of D in (*), then, $\Delta < 0$ if and only if

$$\delta\beta_Y > p(B|A)\gamma_Y + (1 - P(B|A))\theta_Y.$$

Substituting for δ , β_Y , γ_Y , and θ_Y (see Table 4), the reader can see this entails a kind of expectation calculation which could go either way, depending upon the effect of the amendment on the bill's passage and the constituency's relative strength of preference as between AB , Ab , aB , and ab . Thus, even in those circumstances in which there are no "behavioral tugs" from back home (i.e., voters care only about outcomes, not

agent actions), it is not always prudent for a legislator to vote strategically.

Consider two other conclusions that follow straightforwardly from (*). Suppose our legislator does not anticipate a close vote on the amendment—it will surely pass or surely fail no matter what vote he casts. Then $dp = 0$, and $\Delta = C$. That is, $\Delta > 0$ under the hypothesis, and there is nothing to be gained, and possibly much to be lost (if $e_j > 0$), from strategic voting. Similarly, suppose our legislator does not believe the fate of the bill hinges on whether the amendment passes—it will surely pass or surely fail whether amended or not. Then $\delta = 0$ and

$$\Delta = C + dp[(1 - P(B|A))\theta_Y + P(B|A)\gamma_Y].$$

Again, $\Delta > 0$ under the hypothesis, and rationally nonstrategic behavior is strongly indicated.

Although additional implications of the model, particularly its comparative statics, are not developed here in much detail, the model does provide some useful insights into the problem originally posed. As equation (*) demonstrates, the decision to vote strategically or not is dependent on agent-specific beliefs and constituent-specific preferences. Consequently, we may conclude that, in an environment of probabilistic beliefs, there are circumstances in which legislative agents respond nonuniformly in matters of strategy. More generally, we have demonstrated that strategic and nonstrategic voting decisions may be treated endogenously as the product of instrumental calculation.

We now turn to an environment of richer information.

A Nash Equilibrium Analysis

In the above model we assumed that, in voting on the amendment, each legislator acted in (partial) ignorance of the votes of the other legislators. We now change that assumption and see how it affects our results. We will retain our noncooperative formulation but assume now that each legislator knows how each other legislator intends to vote; he chooses his own optimal action, given the actions of the others, that is, a reaction function. In other words, each legislator learns, through hearings, discussion, and floor debate, the vote intention of others. He needn't know each and every other legislator's plans, but only what would result in the aggregate if each acted as was their intention. He then asks the "Nash conjecture": "If everyone else acts as they intend to, should I do the same or should I act contrary to my initial intention?" If the reactions of all the agents are consistent, such that no agent wishes to change his own action given the intentions of others, then the result is a Nash equilibrium.

For simplicity, we assume that all legislators believe that the failure of the amendment is crucial to the passage of the bill. That is, they believe that the amended bill cannot pass ($p(B|A) = 0$) and that the failure of the amendment assures passage ($\delta = 1$). We show that there are three possible equilibria in such a non-cooperative, but fully informed model. The key difference between this model and the expected utility model above is that each legislator knows exactly how his own behavior affects the outcome. Only if the vote is tied or is within one vote of a tie can a single legislator affect the outcome by changing his own actions. Thus, the strategic tradeoff is only relevant when the vote is "almost tied" (a plurality of no more than one vote). When the vote is *not* almost tied, the only relevant factor in the legislator's calculus is the cost of choosing the wrong action in the eyes of his constituents.

Consider again the legislator from a district which ranks the outcomes: AB , aB , Ab , ab . If the amendment is certain to pass or fail by more than one vote, then he has an incentive to support it (vote Y), as this enables him to vote his constituent's preference on the amendment without being saddled with responsibility for the amendment's fate. Because this is true for all other similarly situated legislators, one equilibrium entails none of these legislators casting a strategic vote. A legislator from a district with the opposite ranking, (ab, Ab, aB, AB) would have no incentive to behave strategically and would vote N for the

same reason. If the outcome of such rationally nonstrategic voting is passage or failure of the amendment by more than one vote, then all legislators have consistent reactions and have behaved in a rationally nonstrategic fashion. Thus, one Nash equilibrium is no strategic voting.

Suppose, however, that some mixture of rationally nonstrategic and strategic voting (ranging from a circumstance in which all legislators cast a rationally nonstrategic vote to one in which all vote strategically) yields an almost-tied, *but failing* outcome on the amendment. This leaves us with the reactions of four classes of voters to consider, as shown in Table 5.

Because the initial situation, with $P(B|A) = 0$, will result in the best feasible outcome (aB) for the AB legislators (I and II), none of those already voting nonstrategically (I) has an incentive to switch to strategic behavior. Some of the strategic supporters (II), however, may have an incentive to switch from N to Y on the amendment, if the costs of behaving strategically are high enough (the C term), compared to the benefits of the bill passing (as represented in the dpD term). It is also possible, however, for none of these voters to wish to change.

The situation is different for the ab voters (III and IV). Some of the rationally nonstrategic voters (III) may wish to tie the vote by voting strategically. But all of the strategic voters (IV), that is, those who voted Y on the amendment even though they opposed it, wish to avoid the costs of behaving strategically, as it will not change the outcome. Because the amendment is already failing in spite of their strategizing, the strategic ab voters (IV) can switch from Y to N and improve the result for themselves. Only if there are no class IV voters could the situation be a Nash equilibrium. The symmetric case of almost-tied with the amendment passing could be a Nash equilibrium only if there were no class II voters. In addition, the case of an exact tie is a possible equilibrium. All of these almost-tied outcomes are static equilibria only. The dynamics of the reaction functions would typically move the outcome by enough votes to be outside the almost-tied range and then toward the no-strategy equilibrium. In sum, in the Nash framework it is highly unlikely

Table 5. Analysis of Legislator Reactions

Most preferred	Action	
	Rationally nonstrategic	Strategic
AB	I	II
ab	III	IV

to find those on both sides of an issue casting strategic votes and, in any event, (*) indicates that even some of the strategic voters would wish to abandon strategy if their individual contribution were inessential.

RESULT (Nash equilibrium): The only possible Nash equilibria are

- 1) Rationally nonstrategic—all vote nonstrategically with whatever outcome this implies;
- 2) Tied—some strategizing on both sides, with those behaving strategically classifiable according to (*); and
- 3) Almost tied—the amendment is within one vote of a tie. Two subcases would occur:

- a) Amendment fails—only those who wish the bill to pass vote strategically, that is, against the amendment; or
- b) Amendment passes—only those who wish the bill to fail vote strategically, that is, in favor of the amendment.

Only in the knife-edge case of ties do we expect both sides to vote strategically; the remaining equilibria involve an asymmetric choice of behavior mode (cases 3a and 3b) or no one voting strategically (case 1). In any other case, the strategic voters always have an incentive to avoid the costs of strategy by voting in a rationally nonstrategic fashion. Given the probable instability of the almost-tied cases, this analysis very strongly suggests that there will be no strategic behavior under the assumptions of the Nash model.

Cooperative Models

Clearly, one of the missing elements in the foregoing models is some form of cooperation or concerted action. In this section, we will examine some aspects of cooperation to see how they may affect the results derived. First, we consider the simplest way of bringing in concerted action—the strong Nash equilibrium.

In examining the types of actions which could "block" an alleged equilibrium, the Nash analysis allowed only reactions taken by single agents, holding the choices of all other agents fixed. The strong Nash approach allows such actions to be the result of a group of agents changing simultaneously, again while all others remain fixed. A strong Nash equilibrium is then a set of actions such that no group of agents has an incentive unilaterally to change their own actions, given the fixed choices of all other agents.

It is well known that any strong Nash equilibrium must also be a Nash equilibrium. Thus the strong Nash equilibria are a subset of the Nash equilibria. The strong Nash equilibria add no new

strategic voting equilibria to those analyzed as ordinary Nash. The most important difference is that the equilibrium of rationally nonstrategic voting by all agents can now be blocked by a group of agents all agreeing to vote strategically. Thus, the nonstrategic outcome *might* not be a strong Nash equilibrium.

An alternative approach to modelling cooperation is to assume that individual agents are organized into political factions or parties. These parties can play two roles. First, the party may be able to publicize the necessity for strategic voting to legislative constituencies, thereby lowering the cost for each legislator of such action. This will involve the party in defending its incumbents against the charges of challengers, but doing so more credibly and at lower cost through economies of scale.

Second, the party can help to change the decision calculus in the legislature by threatening to impose sanctions on those who refuse party discipline (party as alternative constituency). This can help in two ways. The threat of sanctions itself will push the decisions of some of the legislators in favor of voting strategically. But there is also a secondary effect. As more and more similarly situated legislators vote strategically, any such incumbent will have an easier time in responding to a challenger who alleges a wrong vote on the amendment. This latter effect can be modeled as an *n*-person Prisoner's dilemma game.

Consider a typical black congressman faced with Adam Clayton Powell's amendment. The analysis we presented in the previous section suggests that the symbolic effect of the amendment alone may cause the congressman to vote for the amendment. Suppose, however, that the resulting choice on the entire bill is a close one, and the congressman believes that his constituents will benefit from the federal aid to education and perceive the importance of those benefits. He fears, however, the effect of a vote against Powell's amendment on his next reelection campaign. Without any intervention by the Democratic leadership, his situation can be modeled vis-à-vis the other black congressmen as an *n*-person non-cooperative game. Assume the following simple payoff function. If all other black congressmen vote strategically (against the amendment), it is almost costless for him to vote strategically and conceivably costly not to. If all other black congressmen, however, cast rationally nonstrategic votes, then it is very costly for any black congressman to set himself apart by engaging in strategy, a fact borne out by the actual results—only the Chicago machine congressman, William Dawson, was able to support the Democratic leadership with a strategic vote. For intermediate cases, it will involve some costs for a black congressman to

vote strategically because a prospective challenger could ask why the incumbent did not vote with Adam Clayton Powell, a nationally prominent civil rights leader. Powell's amendment put every black congressman, as well as every other northern liberal congressman, in a very difficult position, forcing them to weigh the possible defeat of the education bill against the likelihood of a serious challenge in the next election. We say "possible defeat" because each congressman knew that his own vote was very unlikely to affect the outcome. Voting strategically for the sake of the party can be a very costly and futile act.

How does this Prisoners' dilemma affect the Democratic leadership's problem? Once it became clear that many northern Democrats would be unable to follow the leadership, any threatened sanctions became toothless. Sanctions can have force if they only affect a few congressmen and if they are supported by most party members. Given the high rate of defection, the potential defectors soon realized that no sanctions would be imposed and simply followed their own individual interests, modelled in the expected utility or Nash equilibrium models. As both of those models predicted, the Powellian Democrats voted in a rationally nonstrategic manner, and the result feared by the Democratic leadership occurred.

Discussion

In this article we have painted with a broad brush, leaving the reader to discover the subtler detail in the bibliographic references. We have claimed that the Political Model provides a serviceable general framework for the analysis of collective choice, but we have also sought to describe a program of further research which injects some institutional richness into an otherwise structure-and procedure-free theory. Although we have not reported on it in any great detail, such research is already well under way.

One of the effects of this research program is to highlight a significant limitation of the Political Model, namely the artificial symmetries among agents and among alternatives that are some of the model's central features. Structural properties differentiate agents from one another, for example, committees and jurisdictions differentiate the proposal and veto power of agents in different policy areas. Procedural properties distinguish among alternatives, for example, some motions are privileged (like the status quo and committee bills), some are out of order (like nongermane amendments). In short, structural and procedural features, which introduce nonsymmetric moves, strategies, and decisiveness relations, characterize a much richer game form than the simple game of pure majority rule.

In the main part of this article, we suggest that an institutionally enriched political model, too, is flawed, although in a different way. It treats an institutionalized social choice process too much in isolation. We argue that embedding an institution in a broader environment strongly suggests that the behavioral mode of the legislator should likewise be freed of artificial symmetries. Assuming that legislators always vote in some fixed relationship to their preferences over outcomes—whether strategically or nonstrategically—fails to accommodate the agency relationships inherent in representation. Partly this point of view comes from empirical observation, as in the asymmetric response of legislators to the Powell amendment. But additionally, we believe it comes from theoretical reasoning about legislators as agents. In this context, the actions of legislators are signals through which constituents (and prospective challengers) monitor legislator performance. Legislators, anticipating in advance the signaling role of their public actions, incorporate these considerations into their voting calculations. Such considerations attenuate the more instrumental connection between vote and outcome. This sort of reasoning permits us to focus on situation-specific features, both inside and outside the legislature, that influence rational choices about strategic behavior. Agents need not be "naive," "myopic," or "sincere" in order to vote nonstrategically. Rather, nonstrategic voting, like strategic voting, may be the product of calculation.

In a more empirical vein, our analysis reinforces the notion of the "position-taking" legislator (Mayhew, 1974), rationally allocating resources—including his votes, but not restricted to votes alone (Fiorina & Noll, 1978). He seeks to convey an attractive image to his constituents, and to leave an impression of strength with prospective challengers in order to deter their entry. Such image-enhancing activity, which discourages strategic behavior, comes ultimately at the expense of constituent welfare. The latter's interests would be better served if their agent felt free to behave in a strategic fashion. The hyperactive monitoring of single-interest groups, as well as sunshine in the legislature aimed at illuminating legislator vote choices, only exacerbate the problem by discouraging the strategic use of resources. Finally, we note that our arguments raise serious methodological questions for roll-call analyses and interest group ratings of legislators. If there is no strategic voting, then these various methodologies (which typically take votes at face value) are subject only to already well-known caveats. If, on the other hand, there is uniform strategic voting, then roll-call analyses oblivious to this feature of behavior are called into serious question. In prin-

ciple, however, roll-call methodologies could incorporate uniform strategizing. If, however, strategic behavior is nonuniform, as we believe it is on the basis of (*) and Nash equilibrium analysis, then roll-call studies are subject to severe question.

Substantively, our analysis of strategic behavior in legislatures forces attention on the relationships among agent behavior, agent rewards, and social outcomes. Agents behave in an *institutional arena*, producing social choices there, but are rewarded in an *electoral arena*. The two arenas hypothesis distinguishes between the payoffs or rewards of agents and the policy choices their behavior produces. Thus, rational behavior in the one arena, whether strategic or not, is conditioned

by the outcome prospects in the other arena. Policy choices are instruments (and perhaps only by-products) of legislators' electoral gambits (a view that echoes Downs, 1957). The expected utility, Nash, and cooperative models of strategic voting are our proposed strategies of inquiry. Although only a first pass, we think it important to continue seeking to unify Feno's concern with agent behavior and style and Farquharson's concern with agent voting calculations. Home style conditions (limits, liberates, etc.) strategic behavior. Its nonuniform effects produce asymmetric responses in legislators who might be otherwise similarly situated. It is time our models incorporated these important nonuniform effects.

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