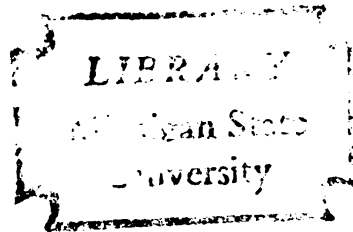


A THEORY OF COALITION FORMATION IN
LEGISLATURES: BARGAINING IN THE U. S. SENATE

Thesis for the Degree of Ph. D.
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ABSTRACT

A THEORY OF COALITION FORMATION IN LEGISLATURES: BARGAINING IN THE U. S. SENATE

BY

Martin Donald Levine

This work entails the development and testing of an original theory of the legislative process. The theory of coalition formation in legislatures conceptualizes the process whereby bills are considered and acted upon to be one of non-coercive bargaining. From this model we derive a series of testable hypotheses describing (a) the expected sizes of winning coalitions for different types of motions, (b) the voting behavior of specific legislators on specific motions, (c) expected abstention rates among legislators under varying circumstances, and (d) the effect of agenda position on legislative outcomes. These hypotheses are then tested employing data from the U.S. Senate, 89th Congress; the findings are reported in detail; the theory is reformulated in light of the findings; and suggestions are made for further research.

Because our theory describes the basis of legislative voting, we borrow from existing roll call studies. Because the model includes a wide range of factors in explaining why individuals vote as they do, we rely especially heavily upon simulations and multi-variate

analyses of congressional behavior. And because our theory assumes the rational calculation of advantage on the part of each legislator in turn, it resembles other existing coalition theories. While our theory resembles many existing models, it is identical to none and is broader than most in terms of the scope of phenomena explained.

The theory of coalition formation in legislatures begins with an assumption that all representatives are rational maximizers of their respective probabilities of re-election. In deciding how to (and whether to) vote on any given motion each legislator is concerned only with maximizing those resources--constituent support, organizational assistance, money--necessary for re-election. We further assume that every member of the legislature is aware of this and is also aware that a calculus of expected resources exists whereby each legislator may determine the amount of resources he will receive for voting "yea," voting "nay," or abstaining. For most legislators on any given roll call their resource payoffs are contingent only upon their voting a particular position. However, for any roll call there also exists at least one legislator who will receive additional resources if the motion passes or fails. These persons act as brokers, bargaining for passage/defeat of the motion through offers of resource side-payments to available members. Our model further assumes that a decision rule is operative within the legislature limiting the offers of side-payment bargains to those representatives who expect to receive less than a specified amount of resources from non-bargaining sources. The basis of this kind of a rule is the notion that in the long run brokers conserve resources by agreeing to

forego offers to "the other side" and thereby also avoiding having to make offers to one's own side. The effect of this decision rule is thus to limit bargaining to that sub-set of all motions on which neither broker has enough committed members in his corresponding proto-coalition to be certain of victory. Put another way, we are able to conclude from our theory that two distinct and identifiable types of roll calls exist--bargaining and non-bargaining motions--and that on only the former will exchanges for votes occur.

From this central conclusion we go on to derive predictions describing absolute and relative winning coalition sizes, abstention rates, and voting choices for different classes of legislators (typed according to the net quantity of resources which each expects to receive from extra-legislative sources on any given motion) and different types of roll calls (typed according to whether or not bargaining is assumed to occur). The test of these hypotheses suggests that our model of the legislative process may, indeed, be accurate. On the single measure of predicting individual voting choices, of the senators for whom our model predicts such choices the predictions are correct 77.4% of the time across a set of 155 roll calls (over 31% of all recorded votes in the 89th Senate). Limiting the sample of senatorial motions examined by issue area, procedural type and party positions taken, the predictive power of most hypotheses is improved still further, lending additional support to the conclusion that our unique theory of the legislative process is an accurate one and allowing us to more specifically identify the conditions under which our model is most applicable.

The work concludes with a discussion of the manner in which the model might be employed to consider other bodies, other points in time, and other questions of legislative choice.

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TABLE OF CONTENTS

	Page
LIST OF TABLES	v
LIST OF FIGURES	vii
CHAPTER I: TOWARDS A NEW THEORY OF THE LEGISLATIVE PROCESS . .	1
The Problem and Previous Formulations	2
Coalition Theory: An Alternative Model	17
CHAPTER II: THE THEORY OF COALITION FORMATION IN LEGISLATURES .	35
Symbols and Definitions	35
Axioms	37
Theorems	48
Hypotheses	58
CHAPTER III: VALIDATION	64
Setting: The U. S. Senate	65
Setting: The 89th Congress, 1965-1966	69
The Roll Calls	72
The Resource Calculus	79
CHAPTER IV: FINDINGS	109
CHAPTER V: CONCLUSIONS	150
Revision of the Theory in Light of the Findings	150
Suggestions for Further Research	155

TABLE OF CONTENTS (Cont'd)

	Page
APPENDIX A: DATA SOURCES	164
APPENDIX B: MEMBERS OF U. S. SENATE, 89TH CONGRESS	165
APPENDIX C: SAMPLE OF ROLL CALLS	174
BIBLIOGRAPHY	182

LIST OF TABLES

Table	Page
1. Civil Rights Motions Included in Sample	75
2. Urban Welfare Motions Included in Sample	77
3. Labor Motions Included in Sample	80
4. Foreign Aid Motions Included in Sample	82
5. Number of Roll Calls Sampled by Issue Area and Year	83
6. Civil Rights Policy Preference and Party Activity by Race, 1964	97
7. Social Welfare Policy Preference and Party Activity by Size of Residence/Income, 1964	101
8. Social Welfare Policy Preference and Party Activity by Income, 1964	102
9. Mean Difference Between Observed Winning Coalition Size and Minimum-Certainty-of-Winning Coalition Size by Type of Roll Call	112
10. Rate of Valence Voting by Class of Legislator and Type of Roll Call	115
11. Abstention Rate by Class of Legislator and Type of Roll Call	119
12. Mean Difference Between Observed Winning Coalition Size and Minimum-Certainty-of-Winning Coalition Size by Type of Roll Call and Agenda Position	124
13. Mean Difference Between Observed Winning Coalition Size and Minimum-Certainty-of-Winning Coalition Size by Type of Roll Call and Issue Area	129
14. Rate of Valence Voting by Class of Legislator, Type of Roll Call and Issue Area	133

LIST OF TABLES (Cont'd)

Table	Page
15. Abstention Rate by Class of Legislator, Type of Roll Call and Issue Area	135
16. Mean Difference Between Observed Winning Coalition Size and Minimum-Certainty-of-Winning Coalition Size by Type of Roll Call and Information Level	139
17. Rate of Valence Voting by Class of Legislator, Type of Roll Call and Information Level	140
18. Abstention Rate by Class of Legislator, Type of Roll Call and Information Level	142
19. Mean Difference Between Observed Winning Coalition Size and Minimum-Certainty-of-Winning Coalition Size for Bargaining Roll Calls by Democratic Party Position	145

LIST OF FIGURES

Figure	Page
1. Frequency Distribution of Winning Coalition Sizes for Bargaining and Non-Bargaining Roll Calls Excluding Cloture Votes	112
2. Frequency Distributions of Winning Coalition Sizes for Bargaining and Non-Bargaining Roll Calls Excluding Cloture Votes: Civil Rights and Labor Motions Only	131
3. Frequency Distribution of Winning Coalition Sizes for Bargaining and Non-Bargaining Roll Calls Excluding Cloture Votes: Urban Welfare and Foreign Aid Motions Only	132
4. Frequency Distributions of Winning Coalition Sizes for Bargaining Roll Calls, Excluding Cloture Votes, by Democratic Party Position	145

CHAPTER I

TOWARDS A NEW THEORY OF THE LEGISLATIVE PROCESS

If much work has been done in the area of legislative behavior, little has been done describing the legislative process, and still less work has addressed itself to the development of theories of the legislative process. In this work we present and test such a theory. While our primary interest is in predicting and explaining the size of winning legislative coalitions, other derivatives of our theory describe the individual voting behavior of legislators; and the axioms from which these theorems are deduced collectively comprise a description/abstraction of the process by which collective legislative decisions are assumed to be made. This process is considered to be one of coalition formation through non-coercive bargaining. Thus, our theory borrows heavily from two minimally overlapping bodies of literature: legislative behavior and the theory of games, particularly the dynamics of coalition formation. In this introductory chapter we examine some exemplary studies in both areas and note the basis of our own theory in these works. The second chapter presents the theory itself, both argumentatively and as a logical system of assumptions and derivations. The third chapter includes a discussion of the setting in which these conclusions are tested and the manner in which necessary variables and key concepts are operationalized. Chapter IV presents the empirical findings and discusses their implications for the theory. In the final chapter we offer a revision of the theory in

light of the data and make suggestions for further research in the form of possible applications of the theory to alternative settings and alternative questions of legislative behavior beyond those of coalition size, voting, and abstentions dealt with here.

The Problem and Previous Formulations

In looking at previous theoretical formulations and empirical research in the area of legislative behavior our attention is limited. The following discussion ignores many significant legislative studies dealing with other matters (committee action, changing rules of the legislative game, etc.) and focuses exclusively on those works concerned with legislative roll call voting. And at that the discussion is by no means exhaustive of the field, nor is it intended to be.

In examining this sub-field of legislative behavior we look at several different approaches to the problem of predicting and explaining individual votes and evaluate the relative strengths and weaknesses of each such approach with respect to: (a) the degree to which each offers a plausible, logically consistent explanation for legislative voting and (b) the contribution of each to the growing body of empirical findings in this area. Throughout we carefully note the insights borrowed from these partial explanations and research findings in developing our own theory of the legislative process.

The most prevalent approach to the study of roll call voting may be loosely labeled the "cross-pressure" theory of the legislative process. This term is meant to encompass the broad range of formulations which predict a legislator's voting behavior on the basis of his party affiliation and his constituency characteristics. Common to most such theories is the assumption that in deciding how to vote on any

given motion a legislator is under possibly contradictory "pressures" from the leaders of his party on the one hand and his constituents on the other; the position the legislator eventually takes is the result of an aggregation of these pressures. As Lewis Froman, Jr. notes in characterizing recent legislative research in the federal arena: "Studies of roll-call voting in Congress have tended to stress two factors: (1) the large amount of party cohesion in Congress on most issues, and (2) the importance of constituency factors in explaining deviations from party votes within parties."¹

In evaluating the utility of cross-pressure theories we must recognize that formulations of this sort are quite useful in predicting roll call outcomes. A legislator's voting behavior is indeed highly correlated with his party's position and with certain characteristics of his constituency (which, in turn, are meant to reflect policy preferences of the persons he represents). However, if these partial theories are to provide explanations for this relationship, one must specify the manner in which these two factors--a legislator's party and characteristics of his constituency--affect his voting behavior. And it is a major criticism of these studies that they are often unclear in specifying even the nature of the pressures which they posit to exist. At one extreme there is no attempt to explain why a congressman should support positions favored by his party leaders and/or the persons he represents; rather these hypotheses are simply tested and we are offered such "explanations" as:

Political pressure [is] a force which brings about distinctive voting behavior on the part of Congressmen, whether the force is applied through conventional types of coercion or through the appeals of loyalties and ideologies.²

and

It is assumed . . . that some logical relationship ordinarily exists between the positions of Congressmen and the demographic characteristics of their districts, whether the connection derived from the pressures of constituents few or many, from Congressman's perceptions of their constituents' needs and demands, or from the workings of the Congressional nomination process.³

Furthermore, where attempts are made to specify what it is about party and constituency pressures which makes these salient in a legislator's determination of how to vote, the alternative explanations are mutually inconsistent.

In concluding that a legislator will support his party, these theories generally make either or both of two underlying assumptions. In some cases it is imagined that the legislator uses his party for voting "cues" so as to avoid the costs he would otherwise incur by actually determining the content of a bill and evaluating its merit. The party is employed for this purpose, so the argument goes, because the representative assumes that leaders of his party share his policy preferences. John Jackson articulates this position in a study of roll call voting in the U.S. Senate.

[The] large volume of complex business, specialization, and multitudinous demands upon a senator's time shape the way he perceives the problem posed by the floor vote and the way a decision is made. The precise stimulus may be the ringing of the bells or the announcement several days in advance that a particular bill is going to be considered The routine or program evoked is a fairly simple search for information about the content, implications, or even the "best" vote on the proposed amendment. These routines save the individual senator a lot of work and time, which he can then devote to his area of specialization, constituents, speeches, etc.

These sources of information and cues on how to vote become the variables hypothesized to influence how a senator votes. It is expected that a senator's vote will correspond to the positions of his sources of information.⁴

One may speculate that, even given the "multitudinous demands" upon a legislator's time, the cost of finding out at least something about

a bill so small and the electoral consequences of voting "wrong" so grave that seeking cues from one's party leaders--or anyone else in the legislature for that matter--would prove a false economy.

The most common alternative hypothesis is that one votes with one's party under a credible threat of some sanction. The sanction may range from social ostracism to exclusion from posts of influence within the party to withdrawal of support for re-election. Typical of the formulations which make this assumption is David Mayhew's Party Loyalty Among Congressmen.⁵ However, Mayhew never identifies the particular sanction(s) which are employed. This failure to specify the kinds of inducements and threats legislative party leaders employ to achieve cohesion is a significant weakness of most such partial theories which hypothesize the threat of sanctions as the major basis of party pressure. For it is obvious that any assumption specifying the particular sanctions that are actually used--symbolic, material, electoral, or otherwise--will itself reflect significantly differing assumptions concerning the sorts of things for which the legislators have the greatest utility. The lack of such an assumption can only result in an incomplete theory.

Turning next to explanations of relationships between constituency characteristics and roll call voting, we find considerably less disagreement as to what it is about the nature of a representative's constituents which leads him to vote in certain ways on certain issues. Constituency-pressure theorists generally assume that: every legislator seeks re-election and that any representative's constituents will decide whether or not to return him to the legislature largely on the basis of the degree to which his voting record conforms to their

preferences. These researchers then go on to assume that particular policy preferences may be attributed to various demographically distinct groups in the population. From these assumptions it is possible to derive the conclusion noted above that constituency characteristics will be systematically related to legislative voting patterns. Froman states this position in a "single complicated sentence":

Since [legislative] districts . . . vary among each other on a number of characteristics (that is, are heterogeneous as a whole), and if we assume that (1) on matters of national public policy many constituents are interested in the outcomes and indicate their interest by contacting their representatives, and (2) congressmen wish to remain in office and have certain perceptions of their districts which lead them to act in such a fashion as to avoid damaging their chances of being re-elected, doing this by behaving in ways congruent with constituency pressures and their perceptions of real and potential interests within their constituencies, then we would expect variations in congressional behavior to be related to differences in constituencies.⁶

The "if" clauses in this statement represent the assumptions or axioms of the theory, and the then clause represents the conclusion derived from these assumptions.

Other legislative voting research examines the relationship between a representative's region and his behavior on roll calls. The findings of such studies are fairly consistent: the most significant correlation between region and voting occurs within the bounds of each legislative party and is issue specific. The following from David Truman's The Congressional Party is typical.

There was among the Republicans no single and sharp line of cleavage such as that which divided the northern from the southern wing of the House Democrats, but rather a series of noncongruent tendencies within the party, reflecting shifting and fluid bases of agreement and, presumably, of association.⁷

There is much less agreement as to the explanations for such relationships. Here the independent variable--region--is not even an

indirect measure of a legislator's constituent interests, and it is, therefore, by no means clear that a representative "votes his region" for the same reason he "votes his district." If the following is a dissatisfying answer, it is also a typical one.

It is not clear what the intervening process is that converts regional affiliation into roll-call vote. It is clear, however, that regional interests constitute an audience that provides cues to congressmen at the roll-call stage.⁸

Of this sort of self-avowedly partial explanation one may ask: what value are these "cues" to the legislator? In following the policy preferences of his constituents a legislator seeks to maximize the possibility of his re-election, but how does voting with his region enhance his electoral chances? The link between a representative's voting in accord with his regional interests--as opposed to his constituent interests--and that representative's re-election is certainly not obvious, and rarely is the attempt made to specify what the conceptual link might be. As an explanation for regional voting the argument cited seems woefully inadequate.

Other researchers argue that region serves the same cueing function as party, that is, as a cost-reducing mechanism allowing the legislator to avoid the expenditure of resources which would be necessary to evaluate a motion on its content/merits. The same criticism we noted of the party-as-cue theories may also be leveled against these region-as-cue explanations. Again, it would seem to be a false economy for a representative to accept the opinion of a group of his colleagues on the merits of a motion over his own evaluation of its effect on his re-electoral chances. This argument is especially telling for the explanation of sectional voting noted, because here it is being assumed that the legislator will look to a group (his regional associates) which

has no direct influence over his future career chances (as his legislative party leaders might) and on a subset of bills presumably highly relevant to him. It is especially on these motions that we would expect a representative to make his own judgment, and it is especially such an inconsequential group as his geographical neighbors that we would expect him to ignore in determining his position.

What seems to be a more plausible explanation for the relationship found to exist between region and voting within each party is that it is not causal but spurious--that the relationship simply reflects the fact that people from both the same section of the country and the same party are likely to represent similar constituencies and thus be under nearly identical party and constituency pressures, and that it is this identity of pressures that "causes" an identity of voting behavior.

Thus far among the cross-pressure theories of legislative behavior we may observe a general underarticulation* of the reasons for the relationships found to exist between a legislator's party affiliation, the characteristics of his constituency, and his region as independent variables and his voting as dependent variable. Where explanations are offered, they are mutually inconsistent to a degree which is clearly unacceptable for an integrated formal theory of the legislative process. Among the explanations for adherence to a party

*The term "articulation" is used in the sense defined by Richard Rudner as follows: "To the extent that a theory has been fully articulated in some formulation, it will achieve an explicit deductive development and interrelationship of the statements it encompasses."⁹ Thus, a fully articulated theory is one in which the entire set of assumptions necessary to deduce the conclusions is made explicit and in which the entire set of theorems which can be deduced from the axioms is given. As noted, one of the major criticisms of existing explanations of legislative behavior is that they are severely under-articulated, and one of the major values assumed for the original theory presented in the following chapter is that it is much more nearly fully articulated.

position there is widespread disagreement, and the most satisfying of these explanations is not entirely in consonance with the generally agreed-upon explanation for voting one's constituency. The inconsistencies become even more marked with the inclusion of region as a third contributing factor in a representative's voting decision.

To avoid this confusion in our own theory we begin with a single assumption describing the motivation of any legislator in determining whether to support or oppose any motion. We present this assumption in the next chapter as the first axiom* of the theory of coalition formation in legislatures. It may be paraphrased as follows: in determining what position to take on any given motion a legislator will be concerned only with maximizing his chances for re-election.

This statement is consistent with the underlying assumption employed by Froman and others to explain the relationship between constituency characteristics and voting behavior. If we further assume that a legislator's party may offer electoral support in direct proportion to the extent to which the legislator votes the party line, then the axiom given above can also serve as the beginning of an explanation for the high incidence of party voting. Turning next to studies of legislative lobbying, we will see that this assumption of a representative's desire to achieve re-election can also explain the generally observed relationship between interest group positions and legislative voting.

Whereas cross-pressure theorists are in general accord at least as to the effects of party, constituency, and region, studies of the effect of interest groups on legislative voting evidence little agreement even as to what the effect is and still less agreement as to its causes. One

* All references are to the axiom-set as presented in Chapter II.

reason for this disagreement over findings is the considerable variance in methodology among such studies. Few attempt roll call analyses to determine the independent effect of interest group positions on voting outcomes. Rather, most works rely primarily on surveys of lobbyists and legislators. What agreement there is among studies of this kind seems to indicate that the impact of interest group preferences in the legislator's voting calculus is marginal, if there is any impact at all.

However, these formulations differ considerably in the assumptions each offers to explain this finding. In an examination of the U.S. Senate Matthews begins with the assumption that "legislators do not like to be 'pressured'"¹⁰ and might react adversely to demands from lobbyists. From this Matthews concludes that senators perceive interest groups primarily as sources of specialized information and that their greatest impact on roll call outcomes consists of spurring those senators already committed to a position into active support of-- rather than simply voting for--specific legislation.¹¹ In a study of the effects of lobbying in the U.S. House of Representatives, Scott and Hunt¹² reach a similar conclusion that interest groups are of little consequence in determining congressmen's eventual votes. Their explanation for this phenomenon is based on the pressure model of legislative voting discussed above and the assumption that interest groups have little with which to press:

From the point of view of the interest group, the problem is that it rarely has anything to give or withhold that is of more than marginal significance to the congressman. Its bargaining position is inherently weak since the instruments available to it are not the stuff out of which 'pressure' can be fashioned.¹³

Lester Milbrath in The Washington Lobbyists¹⁴ employs a similar kind of explanation for the apparent impotency of interest groups, though Milbrath never articulates the assumption made explicit by Scott and Hunt. Milbrath's empirical findings, however, differ from those of the other two works. Through a systematic sampling of legislators and the application of a well-formulated survey instrument--a combination of data-gathering techniques employed in neither of the other works--Milbrath finds that, "on broad political issues commanding considerable public attention, the major determinant [of positions taken by congressmen] is the desire of the public. Lobbyists can do very little to affect the outcome, [however if] the legislation is specialized and affects only a small segment of the population, lobbyists are more likely to play a larger role."¹⁵ This is clearly a more specific conclusion than the little-or-no-effect finding of the other works.

A comparison of these three opposing theories finds no one of them to be obviously superior. In concluding that under almost no circumstances will lobbyists alter the preferences of legislators because interest groups simply "preach to the converted," Matthews appears to contradict a finding common to both the other studies. And because Matthews' is by far the methodologically weakest of the three, there is reason to believe that his conclusion is the least accurate. However, his partial explanation of interest group influence is better articulated than that of either of the other two. The explanation offered by Scott and Hunt, on the other hand, can be criticized for being distinctly underarticulated. Their methodology is also deficient in that the survey instrument they employ appears to be biased toward minimizing the reported importance of interest group pressures in a congressman's overall preference calculus.¹⁶ Of the three studies outlined

above, Milbrath's is the most methodologically rigorous and his findings, indicating the specific circumstances under which interest group pressures are salient, are probably the most accurate. However, the explanation he offers is the least articulated.

In constructing our own theory we assume that Milbrath's finding that interest groups affect a legislator's votes only where his own constituency is unconcerned is the most accurate description of reality. Our explanation for this relationship is based on the earlier assumption of a universal desire for re-election among all legislators and on a secondary assumption, similar to the one employed by Scott and Hunt, that what lobbyists have to offer a legislator only marginally affects his electoral chances. That is, where constituents offer votes directly, interest groups offer primarily monetary payoffs. And money can only be indirectly transformed into votes and, at that, is important only where the candidate lacks adequate financial resources.*

Another approach to the problem of predicting and explaining roll call outcomes conceptualizes the legislature primarily as a social grouping. These studies assume that the legislator takes his voting cues largely from other members of the group (e.g. other legislators with whom he is personally associated). What empirical evidence there

*If one assumes, as we do, that a legislator's party, constituency, and interest group ties are all salient elements in his voting calculus, then one must also specify the relative weights which he assigns to each of these three factors. We address ourselves to this question of relative weights in Chapter III when we present our own calculus of "pressures." There we will discover a variety of findings and a conceptual richness in legislative research which is not evident in this initial cursory discussion.

is seems to indicate that some relationship does exist between the preferences of persons with whom a representative talks and the legislator's voting behavior. In a study cited earlier¹⁷ John Jackson finds that a small amount of variance among voting patterns of junior U.S. senators can be explained by the positions taken by each one's senior colleague, where both are members of the same party. Cherryhomes and Shapiro¹⁸ incorporate a similar notion of interpersonal persuasion into a computer simulation of roll call voting in the House of Representatives which successfully predicts a large proportion of individual votes. Inclusion of a "persuasion phase" does increase somewhat the predictive power of their model over that which is obtained by looking only at party, constituency, and regional factors alone.

Though the methodology and findings of these two works differ considerably, they share a common explanation for the phenomenon they describe. Both assume that it is possible for a legislator to be "talked into" taking a particular position on a particular motion. Thus, both studies also implicitly assume that there are circumstances under which a legislator will accept an acquaintance's opinion of the merits of a motion rather than his own evaluation of the relative rewards to be expected in voting either position. To accept this explanation for the occurrence of voting patterns paralleling associational patterns would violate our primary axiom of the legislator as rational calculator of electoral advantage. Therefore, in our formulation we assume that a legislator may "change his mind" only when offered concrete payoffs affecting his subsequent electoral chances.

Still other studies of roll call voting assume the psychological and attitudinal makeup of each legislator to be the prime determinant

and direct cause of his voting behavior. To the extent that these formulations further assume this makeup to be unique for each individual, such constructions seem ill-suited as the basis for a general theory of the legislative process. It should also be noted that the measurement of relevant psychological and attitudinal variables poses a problem for these studies which does not arise in the case of most of the previously examined works. One means which has been used to measure the effect of attitudes on voting is to determine the extent to which a legislator's past votes can predict his future behavior independent of other factors. Cherryholmes and Shapiro¹⁹ do this indirectly by including "memory" as one of the independent variables in their simulation of voting outcomes, and find that the inclusion of this memory of past votes over and above the other factors incorporated in the model has little effect on the predictive power of the model in most instances. This finding alone serves as partial justification for not considering psychological/attitudinal factors in our abstraction of the legislative process. Furthermore, the assumption that legislators have attitudinal sets which determine their voting behavior is clearly at odds with the basic rationality assumption of our theory. For both these reasons psychological and attitudinal factors do not appear in our theory.

Finally, we may deal briefly with the role theorists, those researchers who focus on a legislator's self-perception of his job and its relationship to his voting behavior. Seminal among such works is Wahlke, Eulau, Buchanan, and Ferguson's study of four state legislatures.²⁰ Unfortunately, the typology they develop for classifying

legislators is not as conceptually precise as might be desired, and thus far no subsequent studies have been carried out to determine the exact behavioral correlates of each legislator-type. There is also some reason to believe that there is less variance in role-perception among members of Congress--where we test our theory--than among state legislators.

One attempt to improve upon this early typology is Joseph Schlesinger's Ambition in Politics.²¹ Schlesinger classifies all office-holders according to their political ambitions: (a) discrete (desiring only a limited number of terms in the current post before retiring politically), (b) static (desiring continual re-election to the current office), and (c) progressive (desiring eventually to secure election to a higher office). Schlesinger does discuss some of the behavior patterns which we might expect to find associated with each of these types, but makes no attempt to empirically validate his hypotheses.²² Our own theory assumes that all legislators have static ambitions or behave as if they do.* Therefore, self-perception of role appears as a constant rather than an independent variable affecting the voting behavior of representatives.

Overall, our theory conceptualizes the legislative process to be one of coalition formation, and in the following section we examine coalition theory in some detail. But before moving on to that section it would be well to look carefully at one final work in legislative behavior; for this work combines many of the features of our own theory

*In Chapter V we discuss the manner in which the theory of coalition formation in legislatures might be altered to explain voting outcomes in legislative bodies with large numbers of discrete and/or progressive members.

in a single formulation, and though the process it hypothesizes to explain roll call voting differs significantly from our own, the outcomes predicted are quite similar. This study, referred to at several points above, is Cherryholmes' and Shapiro's Representatives and Roll Calls.²³ As noted, rather than an additional strictly theoretical formulation, this book is the report of a computer simulation of roll call voting in the U.S. House of Representatives, 88th Congress. However, the simulation does employ several of the factors dealt with both in the preceding theoretical/empirical studies and in our own model of the legislative process.

First, in simulating the legislative process a congressman's party, constituency characteristics, and region, among other factors, are considered in calculating the representative's "predisposition" on any vote. This predisposition is a measure of the tendency of the congressman to support either position on a motion, though how and why the several independent factors contribute to this tendency is left unclear. Our own formulation begins with the axiom that all legislators desire to maximize resources necessary for re-election and the secondary assumption that party, constituents, and interest groups can all offer these resources in some form or another. From these assumptions we are able to calculate a value (in resources) similar to Cherryholmes' and Shapiro's predisposition.

The computer simulation in Representatives and Roll Calls is then programmed so that all legislators below a certain level of predisposition enter a "persuasion phase" in which they come into contact with other members of Congress, and through this process it is possible

for the original congressmen to be talked out of their initial positions. Again there is a parallel between Cherryholmes' and Shapiro's simulation and our theory. We assume (axiom 10) that there is some amount of resources which a legislator may expect to receive from party, constituents, and interest groups for taking a given position on any given motion beyond which no other legislator will attempt to bargain with him for his vote. But if a legislator may not expect to receive this amount of resources (in the pre-bargaining stage), then he may be subject to bargains in the form of offers of side-payments. Here our model differs importantly from Cherryholmes' and Shapiro's: in their simulation those legislators who are not predetermined on a motion will always enter the persuasion phase, whereas from our theory we conclude that bargains will be offered only when neither side on a motion has enough votes from among those legislators who are pre-determined to be certain of victory on the roll call. However, there are also significant parallels between our axiom-set and Cherryholmes' and Shapiro's program; and it is therefore encouraging (in terms of the probability of being able to empirically validate our own theoretical conclusions) to note that the predictions generated by their simulation do conform well to the actual roll call data. For, though they are by no means conceptually the same, the way in which their persuasion phase is programmed makes it very similar to our bargaining process in terms of the empirical consequences of each.

Coalition Theory: An Alternative Model

As indicated, in our own study of the legislative process we take an approach quite unlike the classic" works examined above.

Rather than conceiving of the legislative process as a series of individual voting decisions on the part of each legislator in turn and the roll call outcomes as the simple aggregate of all such individual choices, our theory views the process of passing and defeating motions as involving not only individual decisions of relative advantage by the legislators but also the aggregation of individual interests within the limitations that certain legislators will receive payoffs only if a given motion succeeds/fails and that the concurrence of a specified number of legislators (generally $\frac{N+1}{2}$ of all members) is a necessary and sufficient condition for being certain of winning on the roll call. Our theory of the legislative process is one of coalition formation, and the model upon which our theory is based is the theory of games.

In this section we first discuss the major components of game theory, noting the commonality between the axioms of our own theory of the legislative process and the assumptions of the theory of games. We then compare our formulation to a now classic theory of coalition formation which is similarly concerned with coalition size. The chapter closes with an examination of other applications of coalition theory to the legislative process.

As a model for predicting the resolution of conflict situations game theory is highly parsimonious in terms of the number of assumptions from which conclusions may be derived describing a broad range of phenomena.²⁴ It is in part this parsimony which compels us to examine carefully the few game theoretical axioms which are so valuable.²⁵ We will see how these axioms or analogs thereof are incorporated into our own theory of legislative bargaining.

The first such axiom is rationality. In their introduction to

to the field Luce and Raiffa note the unfortunate ambiguity of this central concept:

Though it is not apparent from some writings, the term "rational" is far from precise, and it certainly means different things in the different theories that have been developed [employing this concept]. Loosely, it seems to include any assumption one makes about the players maximizing something, and any about complete knowledge on the part of the player in a very complex situation, where experience indicates that a human being would be far more restricted in his perceptions.²⁶

As additional game theoretical formulations have been developed, rationality has taken on a more limited and more nearly universally agreed-upon meaning. Disregarding the assumption of complete or perfect information (to be dealt with below as a separate axiom of game theory), rationality has come to be defined as the choice by an individual, when faced with a set of alternative actions, of that action which will result in the greatest utility payoff for him as determined by the individual independent of the act of making the choice. This is similar to Luce and Raiffa's definition of rationality: "Of two alternatives which give rise to outcomes, a player will choose the one which yields the more preferred outcome, or, more precisely, in terms of the utility function he will attempt to maximize expected utility."²⁷

This axiom of utility maximization logically implies that the player has utility for something. And if one is to predict choice, one must specify that for which each individual has utility. That is, the utility function(s) of the relevant actor(s) involved must be given. This is a necessary step in the use of any "rational choice" model to both explain and predict outcomes of complex situations, and it necessarily involves a significant abstraction of reality to specify out of the universe of possible things which any person may covet those objects,

both tangible and intangible, whose desired acquisition will direct the person's actions.*

Our own theory of the legislative process assumes that each legislator is concerned with maximizing the probability of his being re-elected (axiom 1). We further assume that a legislator's desire to maximize resources necessary for re-election is long-term (axioms 1 and 8). Finally, it is posited that the utility functions of all legislators for these resources are everywhere increasing (axiom 2a) and that when engaged in bargaining all legislators have extremely low utility for risk (axiom 13). In game theoretic terms, these axioms taken together constitute an assumption of rationality and a specification of the utility functions of the players involved.

Also included in most game theoretical formulations is some assumption describing the knowledge or information which the players possess. Luce and Raiffa's generalized knowledge assumption states that, "each player is fully cognizant of the game in extensive form, i.e., he is fully aware of the rules of the game and the utility functions of each of the players."²⁸ In our own theory we leave unstated the assumption that every legislator is perfectly knowledgeable as to the formal rules of the legislative game. However, we do explicitly state that each legislator is fully aware of the utility functions of his colleagues (axioms 2b and 4).

*All theorists using a rational-calculus approach have had to deal with the question of specifying that for which the political actor has utility--that which he is attempting to maximize. One of the earliest such formal theories considers the electoral process and hypothesizes that voters seek to maximize the similarity between their own policy preferences and the actions of the government while candidates seek to maximize votes.²⁹ Other theories of voting consider the rational candidate to be a maximizer not of votes but of his chances of re-election.³⁰ A recent empirical test of the voter-rationality

In his discussion of n-person, zero-sum games William Riker considers information as a potential variable in terms of its completeness and perfection. "Systematically complete information" is said to exist where every participant in an n-person game knows precisely how much the addition of each player to a coalition alters the value of the coalition, i.e., how much each person is worth. Similarly, "systematically perfect information" exists where all participants know what moves have already been made, i.e., who has already joined each coalition, what bargains have been struck.³⁴ In our conceptualization of legislative bargaining, we assume systematically complete information without ever making the assumption explicit. This seems a reasonable assumption to make when we recognize that systematically complete information in a legislature only requires that every member be aware of the equal weighting of votes on a roll call. Our theory also assumes systematically perfect information on the part of the sub-set of legislators actively engaged in bargaining (axiom 12). Furthermore, we assume that the level of information is constant across roll calls.*

assumption of such theories extends to the components of the voter's presumed utility calculus to include such factors as candidate-personality characteristics, adherence to interpersonal cues from trusted associates, and the coincidence of the candidate's party affiliation with that of the voter.³¹ In a radically different setting, a theory of interest group behavior assumes that what each member of such a group is concerned with is the maximization of some collective good at a minimum cost to him.³² A theory of bureaucratic behavior, on the other hand, has posited that man qua bureaucrat will be interested in maximizing some combination of his career security, his chances for advancement, and the coincidence between the policy outputs of his bureau and his own preferred position.³³ Whatever the setting, the problem is the same, and the answer always involves a significant abstraction of reality.

*The effect of relaxing the perfect information assumption is examined in Chapter IV where the theory as first presented and several reformulations thereof are tested.

The number of players involved in any game must also be specified if we are to predict outcomes. The distinction generally made in the literature is among (a) one-person games against nature or decision-making situations, (b) two-person cooperative or non-cooperative games, and (c) n-person games where some coalition of players is necessary to win and where the utility payoff associated with each outcome for each player is contingent upon his being a member of the winning coalition. Our abstraction of the legislative process includes elements of each sort of game. We first assume that on any given roll call most of the legislators are concerned only with the re-electoral resource payoff associated with casting their "yea," "nay," or "abstain" and that these payoffs are not contingent upon being a member of the eventual winning coalition (axiom 1). Thus, these legislators are faced only with a complex decision-making situation. On the other hand, we assume that for each motion at least one legislator exists part of whose utility payoff is contingent upon winning on the roll call (axiom 7). We further assume that where more than one such actively concerned legislator or broker exists on the same side of a motion, all brokers on the same side of the motion will behave as a unit (corollary 8-9). So, in this sense, there are never more than two brokers on any given motion. And while these brokers are bargaining agents of sorts, they are not fiduciaries for other legislators. Therefore, even on bargaining roll calls (a distinct sub-set of all motions) the situation reduces to a two-person game between the brokers and a series of one-person games played by the other legislators the collective outcome of which will determine which broker wins.

We may also note that the two-person game between the brokers

is zero-sum in that there are only two possible outcomes--passage or defeat of the motion--and the preference orderings of the two brokers across these two outcomes are precisely opposed.

Finally, games are characterized as involving either a single play or iterations; that is, as being played either in the short- or long-term. Our theory of the legislative process explicitly assumes that any legislator, whether acting as broker or as individual decision-maker, seeks to maximize expected re-electoral resources over his entire term in office (axioms 1, 3, and 8). Put a different way, the legislative game is played over an uncertain number of iterations. The extensive game which each legislator plays thus involves all motions for the entire period of time during which he expects to be a member of the legislature.

In the preceding paragraphs we have pointed out the similarities between our theory of the legislative process and the axioms of game theory. However, there are important differences as well. For one thing, as noted, according to our conceptualization of the legislative process on any given roll call most of the members will be faced with only a simple decision-making situation rather than a competitive game. And whereas we do assume that under specified circumstances the legislative process takes on the form of a complex two-person game involving coalition building, under no circumstances is the process that of an n-person zero-sum game. However, because of the similarities in axioms already noted and the similarities in conclusions which will be evident shortly, it is imperative that we carefully distinguish between our conceptualization of legislative voting and the now-classic theory of n-person zero-sum games developed by William Riker.³⁵ While both the

theory of political coalitions (Riker's) and the theory of coalition formation in legislatures (our own) predict minimum winning coalitions under specified circumstances, the assumptions employed in the two models, the conditions under which minimum winning coalitions are expected to occur, and the definition of a minimum winning coalition differ significantly.

Whereas Riker deals with n-person, zero-sum games, our theory assumes that only for a single broker on either side of an issue will utility payoffs be contingent upon victory on the roll call. From his theory Riker derives the conclusion that:

In n-person, zero-sum games, where side-payments are permitted, where players are rational, and where they have perfect information, only minimum winning coalitions occur.³⁶

The prediction is that all victories will be achieved by minimum winning coalitions. The analogous derivative from our own theory is as follows:

For any motion where neither proto-coalition is large enough to be certain of victory independent of the behavior of other legislators, the eventual winning coalition will be of minimum size necessary to be certain of victory and no larger.

Our theory thus posits the occurrence of limited-size winning coalitions only on a specific sub-set of all motions. Also, Riker's minimum winning coalition is by no means identical to our "coalition of minimum size necessary to be certain of victory." In the context of a legislature, where each member is of equal weight and abstentions are allowed, a minimum winning coalition consists of just one more member than the defeated opposition. In the same context our minimum-certainty-of-winning coalition consists of $\frac{N + 1}{2}$ of the entire membership of the legislature.* Our theory and Riker's thus predict the occurrence of

*Both these examples, of a minimum winning coalition and of a minim-certainty-of-winning coalition, apply only for those motions requiring a simple majority of members present and voting for passage

different sorts of limited-size coalitions, under different circumstances, and derivable from different sets of axioms.*

None of this is to imply that we see no value in Riker's theory; it is clearly among the most significant works produced in recent years. The number and variety of political phenomena to which the theory of political coalitions has been applied and for which it appears to offer a plausible explanation is large and growing. Riker himself suggests applications of his theory to such diverse situations as the "corrupt bargain" of 1825 whereby John Quincy Adams was elected President by the House of Representatives,³⁸ to shifting electoral coalitions in American politics,³⁹ to voting in the Indian Congress following independence,⁴⁰ and to the creation and dissolution of international alliances.⁴¹ Others employ Riker's model to explain the creation of coalition governments in West Germany,⁴² France,⁴³ Norway,⁴⁴ and Japan.⁴⁵ Within the American context The Theory of Political Coalitions has been used in studies of electoral coalitions, judicial behavior on the Supreme Court,⁴⁶ and coalition disintegration leading to the Civil War.⁴⁸

The number of such studies alone is testimony to the value of

or defeat. Where a different decision rule exists, such as the two-thirds majority required on certain procedural motions, each limited-size coalition obviously takes on different values. In the empirical tests of our theory both simple majority and two-thirds majority roll calls in the U.S. Senate are considered.

*Our own notion of a minimim-certainty-of-winning coalition resembles Riker's concept of a subjectively minimum winning coalition which arises under conditions of uncertainty. The concept is presented in the size principle: "In social situations similar to n-person, zero-sum games with side-payments, participants create coalitions just as large as they believe will insure winning and no larger."³⁷

Riker's work. Yet, the collective finding of these studies seems to be that Riker's theory is useful in predicting coalition behavior in some, but certainly not all, institutional contexts; and researchers are beginning to recognize the necessity of developing alternative explanatory models.⁴⁹

And what is true of the work cited above is equally true of studies of legislative coalitions. Riker's theory obviously cannot offer a satisfactory explanation in this setting; winning legislative coalitions clearly are not all of minimum size but, in fact, range up to unanimity. Indeed, the inapplicability of Riker's model in this context first suggested to this writer the possibility of developing an alternative theory of the legislative process which could better predict and explain coalition sizes. A number of other researchers have also developed alternative theories of legislative coalitions, and before presenting our own theory in Chapter II, we will examine several of these other formulations.

Wayne L. Francis was among the first to recognize the need to alter Riker's theory to make it applicable to the legislative setting.⁵⁰ He sees the reason for the inapplicability of Riker's formulation as lying in the fact that the condition of perfect information is not satisfied in most legislatures. Francis contends that the imperfection of information in legislatures results in over-sized and under-sized coalitions being formed by causing defections among potential coalition members and uncertainty among coalition leaders as to the minimum size necessary to win. In the body of his work he offers a series of hypotheses describing the relationships between several variable factors of the legislative game and two key dependent variables: the propensity

of coalition members to defect and the proportion of all legislators sought by coalition leaders in bargaining. These hypotheses consider not only the perceived level of information but such additional independent and intervening variables as the size of the legislature and the percentage of seats held by the majority party.⁵¹ And while the author claims "to interrelate these variables in a formalistic way," it is probably truer that his "analysis should be considered exploratory, and its conclusion, tentative."⁵² However, as an early attempt to adapt coalition theory to the study of American legislatures, this work is highly suggestive of at least some of the factors which must be included in any genuinely formal theory of legislative coalitions.

In work done concurrently with our own, Richard Murray and Donald Lutz apply Riker's minimum-size hypothesis to a study of redistricting decisions in state legislatures.⁵³ Intended to fill what the authors perceive as a lack of direct tests of Riker's theory, the work begins as a straightforward empirical evaluation of the size principle. The authors limit themselves to consideration of votes on redistricting motions in American state legislatures, examining 348 such roll calls. The sample is intentionally limited in such a way as to most nearly approximate the zero-sum and perfect information conditions of Riker's model. Even so, Murray and Lutz find that less than one-third of the roll calls are decided by margins approximating minimal size. In light of this observation, the authors then introduce a series of controls to determine whether or not the tendency towards minimum winning coalitions is any more pronounced for some sub-sets of roll calls than for others. Considering such variables as the extent of the redistricting plan, whether it is aimed at state legislative or con-

gressional districts, and the size of the chamber in which the vote took place (the latter factor suggested by Francis' study), the authors find little improvement in the ability of Riker's theory to explain the observed outcomes. Some improvement is noted when the partisan division in the legislature is taken into account, with minimum winning coalitions significantly more likely to occur in highly competitive bodies. Taking this cue, the authors conclude that minimum winning coalitions are less likely to be formed in legislatures characterized by "dominant faction structuring" (where some fairly permanent faction, usually the majority party, can generally control the behavior of a majority of the members) than in decisional bodies evidencing "sub-dominant factional structuring" (where factions exist but no one of them controls a majority).⁵⁴ Our own theory of the legislative process allows one to deduce a similar conclusion, while defining dominance of factions (proto-coalitions) not only across legislatures but across motions as well according to the characteristics of each member and each motion in turn. Our theory thereby explains variation in coalition size across types of motions within the same body left largely unaccounted for by Murray and Lutz. While our two formulations differ importantly, both concern themselves with specifying the conditions under which minimum winning legislative coalitions are most likely to occur. And we certainly cannot disagree with their conclusion that "more attention should be given to identifying types or classes of empirical situations where Riker's theory can be profitably applied."⁵⁵

Another researcher, also working contemporaneously, who shares this conviction is David Koehler. His approach is similar to our own in that he also attempts to develop an alternative theory of legislative

bargaining to explain variance in the size of winning coalitions.⁵⁶

Our abstractions of the legislative process differ, but our theoretical conclusions are similar--that minimum winning coalitions will be formed only for a limited sub-set of all legislative motions and that for the others we may expect to find larger-than-minimum coalitions. Testing his propositions with data from the U.S. Congress for a 30-year period, Koehler finds them generally supported. This finding is especially encouraging for us not only because of the similarity of theoretical conclusions but because of the similarity of setting and methodology as well.*

Before presenting our own theory one final study of legislative coalitions should be noted: Meltz's model of majority party bargaining.⁵⁷ While Meltz does not deal explicitly with the size of the winning legislative coalitions, he does develop a genuinely deductive theory of the legislative process, something which none of the preceding researchers attempt. Meltz's formulation, like our own, is very much based on coalition theory and, also like our own, specifies in considerable detail the presumed characteristics of the legislative-bargaining game. In outlining the bargaining process Meltz assumes the existence of two distinct types of legislators, the concerned and the unconcerned. For any given motion the concerned legislators have a stake in the wording of the bill, and the unconcerned are those whose votes on the motion may be purchased through the offer of side-payments rather than through the changes in the motion itself. As bargaining proceeds, coalition (party) leaders alter the wording of a motion in

*Specific methodological similarities between Murray and Lutz's and Koehler's studies and our own are noted in Chapter IV where we test our theory of coalition formation in legislatures.

order to secure the support of the concerned members of their party; this produces a motion in its final form. The votes of additional, unconcerned members are then secured through side-payments. Meltz makes other assumptions describing the presumed bargaining process, and he goes on to derive and test a series of theorems; however, it is the set of assumptions outlined above which is of special interest to us. For, the distinction Meltz makes between a group of legislators concerned with the content and passage of a motion and those legislators interested only in seeing that their vote brings the highest price on the market place is reflected in our own theory. It was, in fact, Meltz's theory which first suggested to us an answer to the vexing question raised by Riker. Our extended answer to that question--our explanation for observed variance in the size of winning legislative coalitions--is the theory presented in the following chapter.

It should be clear that neither our own theory nor those works cited above are simple reiterations of Riker's formulation. However, it should be equally clear that this entire body of legislative coalition literature is largely an outgrowth of, and owes an enormous debt to, The Theory of Political Coalitions and the work in the theory of games which preceded this seminal piece of research. It has been the purpose of this section to make explicit the quantity and quality of this debt.*

With the roots of our work--in legislative research and in coalition theory--outlined, we turn in the next chapter to a formal presentation of the theory of coalition formation in legislatures.

*A somewhat less systematic, but equally compelling demonstration of the primacy of Riker's work in the entire field is the fact that The Theory of Political Coalitions is among the first and most frequently cited pieces in all the works on legislative coalitions.

FOOTNOTES: CHAPTER I

¹Lewis A. Froman, Jr., Congressmen and Their Constituencies (Chicago: Rand McNally & Co., 1963), p. 88.

²Julius Turner, Party and Constituency: Pressures on Congress (Baltimore: Johns Hopkins Press, 1951), pp. 26, 36-37.

³David R. Mayhew, Party Loyalty Among Congressmen (Cambridge: Harvard University Press, 1960), p. 8.

⁴John E. Jackson, "Statistical Models of Senate Roll Call Voting," American Political Science Review, LXV, No. 2 (June, 1971), p. 452.

⁵Mayhew, Party Loyalty Among Congressmen.

⁶Froman, Congressmen and Their Constituencies, pp. 11-12.

⁷David B. Truman, The Congressional Party (New York: John Wiley & Sons, 1959), p. 173.

⁸Cleo Cherryholmes and Michael Shapiro, Representatives and Roll Calls (Indianapolis: The Bobbs-Merrill Company, Inc., 1969), p. 33.

⁹Richard E. Rudner, Philosophy of Social Science (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1966), p. 10-11.

¹⁰Harmon Zeigler, Interest Groups in American Society (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1964), p. 271.

¹¹Donald R. Matthews, U.S. Senators and Their World (New York: Vintage Books, 1960), Chapter VIII.

¹²Andrew M. Scott and Margaret A. Hunt, Congress and Lobbies (Chapel Hill: The University of North Carolina Press, 1965).

¹³Ibid., p. 89.

¹⁴Lester W. Milbrath, The Washington Lobbyists (Chicago: Rand McNally & Company, 1963).

¹⁵Ibid., p. 343.

¹⁶Scott and Hunt, Congress and Lobbies, Appendix, pp. 99-106.

¹⁷Jackson, "Statistical Modles of Senate Roll Call Voting."

¹⁸Cherryholmes and Shapiro, Representatives and Roll Calls.

¹⁹Ibid.

²⁰John C. Wahlke, Heinz Eulau, William Buchanan, and LeRoy C. Ferguson, The Legislative System (New York: John Wiley & Sons, Inc., 1962).

²¹Joseph Schlesinger, Ambition and Politics (Chicago: Rand McNally & Co., 1966).

²²Research is now in progress towards this end, testing some of the conclusions of Mr. Schlesinger's theory with data from the representatives originally sampled, in: Paul Hain, "The Legislative System," unpublished Ph.D. disseration, Michigan State University, forthcoming 1971.

²³Cherryholmes and Shapiro, Representatives and Roll Calls.

²⁴For applications of game theory to political conflicts see, among others, the readings in: Sven Groennings, E. W. Kelley, and Michael Leiserson, eds., The Study of Coalition Behavior (New York: Holt, Rinehart, and Winston, Inc., 1970); and Martin Shubik, ed., Game Theory and Related Approaches to Social Behavior (New York: John Wiley & Sons, Inc., 1963). Further applications are suggested by Thomas Schelling, The Strategy of Conflict (London: Oxford University Press, 1960).

²⁵Our description of game theory relies heavily on the excellent introductory work: R. Duncan Luce and Howare Raiffa, Games and Decisions: Introduction and Critical Survey (New York: John Wiley & Sons, Inc., 1957).

²⁶Luce and Raiffa, Games and Decisions, p. 5.

²⁷Ibid., p. 48.

²⁸Ibid., p. 49.

²⁹Anthony Downs, An Economic Theory of Democracy (New York: Harper and Row, 1957).

³⁰See the following, among others: Otto A. Davis and Melvin J. Hinich, "A Mathematical Model of Policy Formation in a Democratic Society," Mathematical Applications in Political Science II, J. L. Bernd, ed. (Dallas: Arnold Foundation, SMU Press, 1966); and Otto Davis, Melvin Hinich, and Peter C. Ordeshook, "An Expository Development of a Mathematical Model of the Electoral Process," American Political Science Review, LXIV, No. 2 (June, 1970).

³¹Michael A. Shapiro, "Rational Political Man: A Synthesis of Economic and Social Psychological Perspectives," American Political Science Review, LXIII, No. 4 (December, 1969).

³²Mancur Olson, Jr., The Logic of Collective Action: Public Goods and the Theory of Groups (New York: Schocken Books, 1968).

³³Anthony Downs, Inside Bureaucracy (Boston: Little, Brown & Company, 1967).

³⁴William H. Riker, The Theory of Political Coalitions (New Haven: Yale University Press, 1962), p. 78.

³⁵Ibid.

³⁶Ibid., p. 32.

³⁷Ibid., pp. 32-33.

³⁸Ibid., Chapter 7.

³⁹Ibid., pp. 54-66.

⁴⁰Ibid., pp. 71-76.

⁴¹Ibid., Chapter 10. For an additional, somewhat more lengthy examination of international relations within a game theoretical framework, see Schelling, The Strategy of Conflict.

⁴²Peter H. Merkl, "Coalition Politics in West Germany," in Groennings et al, The Study of Coalition Behavior.

⁴³Howard Rosenthal, "Size of Coalition and Electoral Outcomes in the Fourth French Republic," in Groennings, et al, The Study of Coalition Behavior.

⁴⁴Sven Groennings, "Patterns, Strategies, and Payoffs in Norwegian Coalition Formation," in Groennings et al, The Study of Coalition Behavior.

⁴⁵Michael Leiserson, "Coalition Government in Japan," in Groennings, et al, The Study of Coalition Behavior.

⁴⁶David Rohde, "Strategy and Ideology: The Assignment of Majority Opinions in the United States Supreme Court" (unpublished Ph.D. dissertation, University of Rochester, 1971).

⁴⁷Gerald M. Pomper, "Conflict and Coalitions at the Constitutional Conventions," in Groennings, et al, The Study of Coalition Behavior.

⁴⁸Dean Yarwood, "A Failure in Coalition Maintenance," in Groennings, et al, The Study of Coalition Behavior.

⁴⁹See: Michael A. Leiserson, "Coalitions in Politics: A Theoretical and Empirical Study" (unpublished Ph.D. dissertation, Yale University, 1966), and Groennings, et al, The Study of Coalition Behavior.

⁵⁰Wayne L. Francis, "Coalitions in American State Legislatures: A Propositional Analysis," in Groennings et al, The Study of Coalition Behavior.

⁵¹Ibid., pp. 416, 423.

⁵²Ibid., p. 405.

⁵³Richard W. Murray and Donald S. Lutz, "Redistricting Decisions in the American States: A Test of Riker's Minimal Winning Coalition Hypothesis," a paper read at the 1971 Annual Meeting of the American Political Science Association, Conrad Hilton Hotel, Chicago, Illinois, September 7-11, 1971.

⁵⁴Ibid., pp. 17-18.

⁵⁵Ibid., p. 16.

⁵⁶David H. Koehler, "Coalition Formation and the Legislative Process," a paper read at the 1971 Annual Meeting of the American Political Science Association, Conrad Hilton Hotel, Chicago, Illinois, September 7-11, 1971.

⁵⁷David B. Meltz, "Competition and Cohesion: A Model of Majority Party Legislative Bargaining (unpublished Ph.D. dissertation, University of Rochester, 1970).

CHAPTER II

THE THEORY OF COALITION FORMATION IN LEGISLATURES

We begin our presentation of the theory by listing a symbolic shorthand and a series of defined terms. Next we offer the axioms presenting each formally and discussing its interrelatedness with other elements of the formulation. We then present the theorems or logical derivatives of these statements, taking care to note the particular axioms from which each of the conclusions is deduced. In the final section of this chapter a series of testable hypotheses are extracted from the theorems. These hypotheses are in the form of specific empirical relationships capable of being disproven by systematic observation.

The manner in which we present the theory permits the reader to either follow primarily the argument in the lengthy notes accompanying the axioms, theorems, and hypotheses while paying only passing attention to these logical elements as they are formally stated, or to examine only the logically necessary elements of the theory.

- (a) R: Resources necessary to a legislator for his re-election. All R is measured by the effect it will have on a legislator's probability of being re-elected. All R must then be translatable into votes; i.e., constituency support, financial contributions, organizational assistance, support for election to a legislative leadership position, etc.
- (b) R_{pb}: Pre-bargaining resources. The amount of resources which a given legislator may expect to receive for voting on a particular side of a particular motion independent of resources

offered in the course of bargaining on the motion. The R value of a motion to a legislator in the pre-bargaining stage.*

- (c) R'_{pb} : The value of R_{pb} such that no legislator expecting to receive R'_{pb} or more resources for voting a particular position on a particular motion will be offered additional resources during bargaining in exchange for a vote commitment. (See axiom 10.)
- (d) Supporting proto-coalition: All those legislators with a value of R_{pb} equal to or greater than R'_{pb} for supporting a given motion.
- (e) Opposing proto-coalition: All those legislators with a value of R_{pb} equal to or greater than R'_{pb} for opposing a given motion.
- (f) Pre-bargaining supporter: Any legislator with a value of R_{pb} on a given motion such that $0 < R_{pb} < R'_{pb}$ for supporting the motion.
- (g) Pre-bargaining opposer: Any legislator with a value of R_{pb} on a given motion such that $0 < R_{pb} < R'_{pb}$ for supporting the motion.
- (h) Indifferent: Any legislator with a value of $R_{pb} = 0$ on a given motion.
- (i) Broker: Any legislator who is not indifferent between passage and defeat of a given motion.
- (j) Side-payment: Resources made available by brokers to other legislators in exchange for vote commitments.
- (k) Bargaining: The process whereby side-payments are exchanged for vote commitments on a motion.
- (l) Long term/long run: A legislator's subjective evaluation of the length of time he has remaining in office.
- (m) Bargaining roll call: Any motion for which neither the supporting nor the opposing proto-coalition consists of $\frac{N+1}{2}$ or more members (where N = the total number of legislators eligible to vote).

*The R_{pb} value of a motion to the legislator thus corresponds roughly to the notion of "pre-disposition" as used by Cherryholmes and Shapiro¹ and Jeanne Martin.²

- (n) Non-bargaining roll call: Any motion for which either the supporting or the opposing proto-coalition consists of $\frac{N+1}{2}$ or more members.

Axioms

Axiom 1. In determining whether to support or oppose any given motion a legislator will seek only to maximize over his entire term in office the resources, R, necessary for re-election.

In trying to explain voting outcomes in legislatures we begin with the assumption that each legislator, in determining whether to support or oppose any given motion, attempts to maximize over his entire term in office those resources which are transferable into electoral support. That is, each legislator is solely concerned with maximizing his chances for re-election by maximizing the resources necessary for re-election. This assumption differs significantly from those implicit in other legislative studies where it is hypothesized that legislators may take positions on such bases as ideological preference, an ill-defined party loyalty, or deference to more senior members from the same or similar constituencies.

We should also note that the ambitious legislator posited in our theory is concerned with calculating his long-run utility. He may thus sacrifice a short term gain if it will increase his chances of securing greater gains on subsequent bills.

Another non-obvious component of this axiom is the implicit assumption that all legislators seek re-election to the same seat; we further assume that any legislator who is not actually pursuing re-election behaves as if he were in order to maximize his expected level of political influence within his electoral district and party

after retirement.* This assumption of uniformly static ambitions has the effect of making every legislator's subjective evaluation of his remaining "term in office" open-ended.

Axiom 2a. The utility functions of all legislators for R are constantly increasing.

Axiom 2b. The fact that the utility functions of all legislators for R are constantly increasing is known to all legislators.

A second assumption of the theory of coalition formation in legislatures states that every legislator's utility for the resources referred to above is constantly increasing. Axiom 2 also states that this universally increasing utility for R is known to all legislators. Taken together the first two axioms comprise an assumption of rationality on the part of all legislators. Because each legislator's utility for these resources is constantly increasing, it is "rational" for him to be a resource-maximizer, as stated in the first axiom.

The second part of axiom 2 states that this constantly increasing utility for re-electoral resources (on the part of all legislators) is known to all members of the legislature. The utility of this assumption in deriving theorems descriptive of voting outcomes will become clear shortly.

*It is recognized that neither the assumption of seeking reelection nor the assumption of a desire to maintain political influence after retirement may hold for large numbers of members in particular legislative settings, especially state legislatures. This factor is considered in specifying the U.S. Senate as the arena in which the theory is tested. To the extent that any legislature contains discretely and progressively ambitious members, the theory as given here is clearly inapplicable. In the final chapter we discuss the manner in which the theory could be reformulated to account for the behavior of discretely and progressively ambitious legislators.³

Axiom 3. Every legislator assumes that there will be a large number of motions during his term in office.

The third axiom of our theory is that every legislator assumes there will be a large number of roll calls during his term in office. Axiom 3 taken with the assumption in axiom 2a that all utility functions for R are constantly increasing means that any legislator, in calculating his expected resource payoff for taking any given position on a given motion, will always assume that there will be subsequent roll calls with which he must be concerned, and will therefore always be calculating his electoral chances into the indefinite future. Thus, it may be rational for him under specified circumstances to forego some resources in the short run in order to maximize the chances of additional resource payoffs in the future.

Axiom 4. There is a calculus, known to all legislators, whereby it is possible to determine the net amount of resources, R_{pb} , which any given legislator can expect to receive from all sources other than side-payments for either supporting or opposing any given motion.

This axiom (4) states that a calculus exists and is known to all legislators whereby it is possible to determine the net amount of resources any given legislator can expect to receive from all sources for either supporting or opposing any given motion when each such motion is introduced. This quantity is the amount of pre-bargaining resources that a legislator will receive for either supporting or opposing a particular motion independent of any side-payments which he may be offered by other legislators in exchange for his vote.

This axiom serves two important purposes. First, it states that a pre-bargaining component of a legislator's total resource

payoff on any motion can in fact be identified and calculated independently of possible offers of side-payments. Second, this axiom states that the calculus for determining the pre-bargaining value of each motion for each legislator is known to all members of the legislative body. Taken together with the earlier assumption (axiom 2b) that all legislators know the utility functions of all other legislators for these resources to be constantly increasing, axiom 4 corresponds to the game theoretical assumption that all players have perfect information of their own preference schedules and those of all other players.

Axiom 5. Where a legislator votes the position opposite to that for which he could expect to gain a certain amount of pre-bargaining resources, $R_{pb} = X$, he incurs a net cost equal to X . Where a legislator^{pb} abstains on a motion, there is no net change in his accumulation of resources.

To this point we have referred only to positive resource payoffs which accrue to a legislator for taking a particular position. In axioms 5 and 6 we make explicit the assumed costs of either abstaining or voting in a direction opposite to that for which one could expect a positive resource payoff. Specifically, in axiom 5 we assume that where a legislator votes in a direction opposite to that for which he could expect to receive a given amount of resources, X , from pre-bargaining sources, he will suffer a net loss of resources equal to X . Where he abstains, it is assumed that he has neither received resources nor incurred costs; the net effect on his total amount of resources is zero. Thus for any proto-coalition member or pre-bargaining supporter/opposer on any motion a vote for the position opposite to that from which he expects a positive resource payoff is twice as costly as an abstention in terms of the net

resources from pre-bargaining sources.* For any indifferent legislator the pre-bargaining resource payoffs for voting yea, nay, or for abstaining are all equal.

Axiom 6. The act of voting on any motion involves a small cost to the legislator. This cost of voting is always greater than zero and always less than the value of R_{pb} , where the value R_{pb} for a given legislator on a given motion is itself greater than zero.

As initially stated, axiom 6 is as follows: For any legislator on any motion the act of voting involves a cost which is always greater than zero and always arithmetically less than the utility of the pre-bargaining resources which he may expect to receive for voting his most preferred position where such a preferred position exists. This cost of voting corresponds to the opportunity costs of the time spent in either appearing on the floor and answering the roll call or arranging to be paired with another legislator.**

By postulating a cost in voting, axiom 6 has the effect of making abstention the least costly, and therefore most preferred, strategy for any legislator who is indifferent between support and opposition and does not expect to be offered side-payments. This conclusion--that all indifferents on non-bargaining bills will abstain--is in fact the single theorem for which axiom 6 serves as a

* This is not an interpersonal comparison of utility. We are not contending that one legislator's utility for a particular outcome is twice that of another legislator's. Rather, we are stating that for any given legislator one outcome may be worth twice as much to him as a second outcome. Thus, axiom 5 neither entails an interpersonal comparison of utility nor violates the stipulation of game theory that all utility functions be unique up to any linear transformation.⁴

** We record pairings as constituting the equivalent of a floor vote. The rationale for this is discussed at some length in the following chapter.

necessary antecedent. If this theorem is found to be unsupported by our data, it will therefore be possible to alter or eliminate the sixth axiom without affecting other elements of the theory.*

Axiom 7. For any motion there is at least one supporting broker.

In the first axiom we stated that any legislator will decide whether to support or oppose a motion exclusively on the basis of which position maximizes the probability of his getting re-elected. Thus, no legislator necessarily cares whether or not the motion eventually succeeds or fails. In axiom 7 we postulate the existence of at least one legislator for each motion who does care whether or not that motion passes. Specifically, it is assumed that for any motion there is at least one supporting broker, where a broker is defined as a legislator who is not indifferent between passage and defeat of a motion, and where a supporting broker is defined as a legislator with some utility greater than zero for passage of the motion. This axiom is not inconsistent with the initial one in which we assumed that any legislator will determine whether to support or oppose a motion solely on the basis of which position will maximize the resources necessary for his re-election; the broker is simply a legislator who receives additional resources if a motion passes/fails beyond the amount he receives for supporting/opposing it. It should be noted that to derive and test the theorems which follow we need not specify the precise source or amount of these additional contingency payments, or even who the potential recipient--broker--will be.** We need only specify

*See Chapters IV and V.

**In most instances we would expect the sponsor of a motion to act as a supporting broker. Where the motion is a private bill, the sponsor is likely to gain considerable constituent support by being

here that at least one supporting broker exists* and that an opposing broker or brokers may exist.

Axiom 8. Any broker seeks to maximize total, long-term utility in attempting to achieve passage/defeat of all motions for which he may expect to act as broker.

The eighth axiom states that where a legislator acts as a broker for a motion he will continue to behave as a long-term utility maximizer. That is, any legislator will seek the highest overall resource payoff from the actual passage or defeat of all motions for which he will act as either a supporting or opposing broker during his term in office. Axiom 8 is thus largely a restatement of axiom 1, specifying that a legislator will behave rationally in the long run when acting as a broker just as he behaves rationally when determining how to, and whether to, vote on motions for whose passage or defeat he has no utility.

This means that no legislator will pay out more resources in side-payments to secure the passage/defeat of those motions for which he may expect to act as broker than he can expect to receive if the motions do indeed succeed/fail. Nor will any broker expend more resources on any single motion than is necessary in order to be

associated with the passage of an act favorable to their interests. In the case of legislation sponsored by the administration, the broker(s) would probably be that party's leaders in the legislature, and the resource payments would probably be in terms of continuing support in subsequent elections of legislative leaders--something which is readily transferable into electoral support because of the broad influence associated with leadership posts. Similarly, a legislator may be acting as a fiduciary for an extra-legislative interest group, and receive resource payments contingent upon roll call success.

*In a corollary to axioms 8 and 9 it will be shown that the number of individual legislators acting as brokers for either side on any given motion will not affect the outcome of the vote.

certain of winning the roll call. Similarly, no broker will offer any side-payments for any motion which he has no chance of winning. This assumption implies that any potential broker has a finite budget to use for side-payments and that the resources a broker may offer in the course of bargaining are transferable and valued across legislators, across roll calls, and thus across time. Finally, we assume that any legislator who has ever acted as a broker may expect to be a broker again on subsequent motions, particularly those of a similar substantive nature. This secondary assumption makes it meaningful to speak of a legislator qua broker attempting to maximize his long term/long run utility.

Axiom 9a. Any side-payment involves a cost to the broker making the payment.

Axiom 9b. Any offer of a side-payment involves a cost to both the broker and to the potential recipient.

Axiom 9 first states that any side-payment involves a cost to the broker making the payment. This simply makes explicit the implication of the previous axiom noted above--that the resources paid in side-payments are transferable and valued by more than a single legislator and/or at more than a single point in time. Thus, in making a side-payment a broker is surrendering something which is either of inherent value to him or which he values because it may be used to buy support from another person and/or at another point in time. In the second part of the ninth axiom we are assuming that the process of bargaining itself entails a cost to both parties, primarily in time spent and the opportunity costs of that time.

We may now present a logical derivative of axioms 8 and 9 which is itself a necessary antecedent of the theorems which follow.

Because this intermediate derivation is not tested directly, it is not strictly speaking a theorem but is stated as a corollary:

Corollary 1 (from axioms 8 and 9). Where there is more than individual broker on either side of any motion, all such brokers on the same side will act as a unit in bargaining for the passage/defeat of the motion.

Because any broker in such a situation will be seeking to maximize his own payoff in achieving passage/defeat of the motion (axiom 8) and because there is a cost involved in the bargaining process by which this is accomplished (axiom 9), each such broker will maximize his individual net payoff if all brokers behave as a unit, avoiding duplications of expenditures. Thus, brokers on the same side of a motion will bargain as a unit. For the remainder of this work we refer simply to "the supporting/opposing broker."

Axiom 10. There exists some value of $R_{pb} = R'_{pb}$ such that: no supporting broker will offer a side-payment to any legislator with a value of R_{pb} equal to or greater than R'_{pb} for opposing a given motion; and no opposing broker will offer a side-payment to any legislator with a value of R_{pb} equal to or greater than R'_{pb} for supporting a given motion. (Put another way: no broker will offer side-payments to members of the proto-coalition opposing him.)

Presented without the use of symbols axiom 10 may be stated as follows: There is operating within the legislature a decision rule whereby no legislator who will receive greater than a specified amount of pre-bargaining resources for either supporting or opposing the motion will be offered side-payments by the broker for his least preferred position.* This seems to be a not unreasonable assumption

*Any legislator whose value of pre-bargaining resources for supporting/opposing a motion is equal to or exceeds this threshold has been defined as a member of the supporting/opposing proto-coalition for that motion.

concerning the behavior of brokers. It follows in part from axioms 2, 8, and 9, because under the circumstances described in these statements any broker will know that it is likely that the "price" of a member of the other proto-coalition will be very high. Thus, except in situations where a broker has an extremely large amount of resources available for use as side-payments (e.g. where someone's utility for either passage or defeat of a motion is extremely large), he may conclude that only rarely will he be able to afford victory by offering side-payments to members of the other proto-coalition. Therefore, it is rational in terms of maximizing long-run utility for all potential brokers (e.g. all legislators) to agree to a decision rule that no offers of side-payments will be made to "the other side" so as to avoid (a) the cost of such offers, (b) the side-payments themselves, and perhaps most importantly, (c) the costs which any broker would face if he had to be concerned with paying his "own people" to remain loyal. What this means is that a broker may sacrifice an occasional roll call victory and its associated payoff in order to minimize his expenditures over the set of all motions on which he may act as broker.* The decision rule given axiom 10 has the effect of determining that there may be circumstances under which a broker will forego a short-run gain in order to maximize his long-run payoffs. This conclusion is entirely consistent with the earlier assumption that any broker seeks to maximize his long-term utility.

*This is not to imply that all legislators will be equally likely to serve as brokers. Rather, we would expect to find certain individuals (i.e. party leaders, special constituency representatives, etc.) to fill this role much more frequently.

Axiom 11. All vote commitments secured by side-payments are binding.

The eleventh axiom states that all bargains for support on a roll call are final and binding. It should be noted that by making this assumption we are excluding from our definition of "bargains" what Riker calls "contingent payment out of profits."⁵ In the context of the bargaining game described here, a contingent payment out of profits would correspond to the offer by a broker of a side-payment from resources which will accrue to the broker if and only if he succeeds in securing passage/defeat of the motion. Such contingent vote purchases would not satisfy the conditions of bargaining as defined earlier and qualified in axiom 11. For, if at the time a roll call vote was to be taken it became known to a legislator who was offered a contingent payment out of profits that the broker making such an offer was going to lose the motion, the tentative bargain would be "off" and the legislator who was offered a contingency payment would not be bound to vote in accordance with the deal--thus violating axiom 11.

Axiom 12. All brokers have perfect information concerning vote commitments.

This axiom goes beyond the previous one by assuming that any broker will have knowledge not only of the bargains he himself makes but also of any bargains made by the broker for the other side (if one exists). Axiom 12 thus corresponds to the game theoretical assumption that all players have perfect knowledge of previous moves.

Axiom 13. All brokers have extremely low utility for risk.

This final axiom represents an assumption of risk-aversion on the part of brokers. It states that no broker will cease

bargaining in an attempt to achieve passage/defeat of a motion until either: (a) he is certain that there is no chance of losing on the roll call, or (b) he knows that he cannot be certain of winning on the roll call. "Certainty of winning" is defined as obtaining vote commitments from $\frac{N + 1}{2}$ of all legislators where a simple-majority decision rule is operating. Where a two-thirds majority is required for passage, certainty of winning will mean coalitions of $\frac{2N}{3} + 1$ for the supporting broker and $\frac{N}{3} + 1$ for the opposing broker. Other decision rules result in other minimum-certainty-of-winning coalition sizes.

Theorems

The theorems presented here are the logical derivatives of the preceding axioms. We offer each theorem with a listing of the axioms from which it is deduced and a brief statement of the logic by which it was derived. In the final section of the chapter we offer a set of testable hypotheses abstracted from the theorems. These hypotheses are then tested in Chapter IV.

Theorem I. For any legislator the position of a motion on the agenda will not affect his preferences, bargaining, or eventual votes. (from axioms 1, 2a, and 3)

The first theorem, that the position of a motion on the legislative agenda will not affect the course of bargaining, follows from axioms 1, 2a, and 3: If a legislator attempts to maximize the probability of his being re-elected--as measured in resources, R,--over his entire term in office (axiom 1), and if he expects there to be a large number of motions over this term (axiom 3), then for each motion he may assume that there will be subsequent roll calls which

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will also present him with opportunities for accumulating resources. Thus, it is always rational for a legislator to forego some quantity of current resources if it will increase the probability that he will be able to acquire still more resources at some time in the indefinite future. Therefore, the behavior of any legislator on any motion is independent of the motion's position on the agenda. That is, his behavior is independent of the amount of resources he has accumulated up to that point, for he will always value additional resources. This does not mean that the legislators' utility functions for these resources are linear; it only means that these utility functions are constantly increasing as stated in axiom 2a.

The testable hypothesis dealing with agenda position is a straightforward restatement of this first theorem.

Theorem II. No member of the supporting proto-coalition for a motion will vote in opposition to the motion, and no member of the opposing proto-coalition will vote in support of it. (from axioms 1, 2b, 4, 5, 8, 9a, and 10)

In axiom 10 we state that no member of a proto-coalition will be offered side-payments by the broker for the other side. Nor will a proto-coalition member be offered side-payments by the broker for his preferred position, because any side-payment or offer of a side-payment involves a cost to the broker (axioms 9a and 9b), and all brokers seek to maximize their own payoffs in achieving the passage/defeat of motions (axiom 8). Thus, no broker will offer side-payments to any proto-coalition member. Furthermore, this will be known to the proto-coalition members themselves because they have full knowledge of the resource calculus (axiom 4), the legislators' utility functions (axiom 2b), and the decision rule specified in the tenth

axiom. Any legislator in this situation will, therefore, have a greater short-run utility for voting with his proto-coalition than for abstaining--for which he would forego a payoff equal to or greater than R'_{pb} --or casting his vote with the other side--thus incurring a cost equal to or greater than R'_{pb} (axiom 5). Nor would an abstention or defection result in a gain in long-term utility--with which any legislator is solely concerned (axiom 1)--by constituting a threat to defect from proto-coalitions in the future if not offered additional resources in side-payments. Such a threat would not be viewed as credible by any potential broker (e.g. any legislator) because all legislators know that no person will be offered a side-payment under the condition of proto-coalition membership. Therefore, all proto-coalition members who vote will vote in favor of their most preferred position on any roll call.

Theorem III. For any motion where neither proto-coalition is large enough to be certain of victory independent of other legislators' behavior, the eventual winning coalition will be of minimum size necessary to be certain of victory and no larger. (from axioms 8, 9a, 9b, 11, 12, and 13)

Put another way: for any motion for which neither the supporting nor opposing proto-coalition consists of $\frac{N+1}{2}$ or more members (where N is the total number of legislators eligible to vote on the motion), the eventual winning coalition on the roll call will consist of just $\frac{N+1}{2}$ members. Roll calls of this type, where neither side can be certain of victory at the pre-bargaining stage, have been defined as bargaining roll calls. The conclusion that the winning coalition on any bargaining bill will be just large enough to be certain of victory and no larger can be shown to follow from the axioms noted above.

For any motion there is at least one supporting broker, that is, at least one legislator with some utility greater than zero for passage of the motion (axiom 7). Where a broker cannot be certain of a roll call victory with the support of his proto-coalition alone, he must add other legislators to that coalition in order to achieve certainty of victory and thus certainty of collecting the resource payoff which is contingent upon his winning the vote. Such additional coalition members are gained through offers of side-payments to available legislators. These offers and the side-payments themselves, in turn, involve a cost to the broker (axiom 9) who seeks to minimize expenses and thereby maximize his own utility in achieving passage/defeat of any motion (axiom 8). Any broker will therefore buy only enough extra votes to be certain of victory--no more, because he can be certain of those votes which he does obtain through bargaining (axioms 11 and 12); and no less, because he wishes to avoid risks (axiom 13). Thus, on any bargaining roll call the winning coalition will consist of precisely $\frac{N+1}{2}$ of all legislators.

Finally, we observe that while theorem III predicts the size of the winning coalition on bargaining roll calls, it does not predict which of the initial proto-coalitions will win on such motions.

Theorem IV. For any bargaining roll call there is some finite probability greater than zero and less than unity that any given pre-bargaining supporter who votes will oppose the motion and that any given pre-bargaining opposer who votes will support the motion. (from axioms 1, 7, 8, and 10)

The conclusion here is that on bargaining roll calls where a pre-bargaining supporter or opposer votes he will not always vote with his valence, that is, for his most preferred pre-bargaining position. This conclusion concerning the voting behavior of pre-bargaining

supporters/opposers on bargaining roll calls thus differs significantly from both the prediction in theorem II that any voting proto-coalition member will vote his valence and the prediction in theorem VI below describing the voting behavior of pre-bargaining supporters/opposers on a different class of roll calls. Theorem IV is derived from the specific sub-set of axioms noted.

In the axiom-set it was stated that for any roll call at least one broker exists (axiom 7) and that any broker seeks to maximize his total, long-term utility in achieving the passage/defeat of motions (axiom 8). Therefore, on those motions which we have defined as bargaining roll calls it is rational for a broker to expend resources by offering side-payments in exchange for votes so that he may gain the resource payoff which is contingent upon his winning the roll call. However, by an intra-legislative decision rule (axiom 10) no broker offers such bargains to proto-coalition members. Thus, the only legislators with which a broker may bargain are the pre-bargaining supporters, pre-bargaining opposers, and indifferents. Furthermore, any and all brokers on any given bargaining roll call will have to bargain for this same group of availables. Any broker on any bargaining roll call may thus offer side-payments to any pre-bargaining supporter or pre-bargaining opposer. Also, because each available legislator is concerned only with maximizing his own resource payoff in taking a particular position (axiom 1), any pre-bargaining supporter or opposer will be willing to accept side-payments from any broker. Therefore, there is some probability greater than zero that any pre-bargaining supporter or opposer will vote for either position on a bargaining roll call. The particular

legislators bought into each coalition and the price of each vote will be determined by a market mechanism with the pre-bargaining supporters, pre-bargaining opposers, and indifferents constituting the suppliers of votes and the brokers corresponding to the consumers exercising demand.

Theorem V. For any bargaining roll call any pre-bargaining supporter, pre-bargaining opposer, or indifferent who does not accept a bargain to join either coalition will abstain. (from axioms 1, 3, 5, and theorem III)

What theorem V says is that for any given bargaining roll call we may expect some of the indifferents and pre-bargaining supporters/opposers to abstain for "strategic reasons." By a "strategic abstention" we mean that a legislator absents himself from a roll call for reasons other than unavoidable detention (i.e. health, restrictions due to travel, etc.), specifically, because the cost to him in resources for voting exceeds the expected resource payoff.*

It has already been shown in theorem III that on bargaining roll calls once either broker has achieved a coalition large enough to be certain of victory this will immediately become known to all brokers and they will stop buying votes so as to conserve resources expended in bargaining and side-payments. That those available legislators not bought into either coalition under these circumstances will abstain follows then from axioms 1, 3, and 5. Specifically, any legislator under any circumstances seeks to maximize his electoral resources over his entire term in office (axiom 1). Also, he expects

*Throughout this analysis it is assumed that non-strategic abstentions will also occur and that these unavoidable abstentions will be randomly distributed among all legislators. Thus what theorem V asserts is that the groups of legislators specified therein will abstain for reasons beyond those which affect all legislators equally.

there to be a large number of roll calls during this term (axiom 3). Thus, in some situations it may be rational for a legislator to take a position other than the one which is his most preferred in the short run so as to increase the probability of his receiving greater utility/resource payoffs in the future. Because pre-bargaining supporters, pre-bargaining opposers and indifferents are the only legislators who may ever be offered side-payments, and because they will be offered side-payments only on bargaining roll calls, where such a legislator is not bought on this kind of motion he will abstain, foregoing a short-run payoff of greater than zero but less than R'_{pb} (axiom 5) in order to communicate to any potential broker that he is neither a "free vote" (the conclusion which would be drawn from his voting consistently for either position without the offer of a side-payment)* nor "crazy" (the conclusion which would follow from his voing or abstaining randomly). Such a strategic abstention will then increase the probability that the legislator involved will be offered side-payments on future bargaining roll calls, increasing the legislator's long-term expected utility.

Theorem VI. For any motion where either proto-coalition is large enough to be certain of victory independent of other legislators' behavior, the eventual winning coalition will include all members of that proto-coalition who vote, and there is some probability greater than zero that the eventual winning coalition will be greater than the minimum size necessary to be certain of victory. (from axioms 1, 2b, 4, 5, 8, 9a, 9b, 10, and 13)

Roll calls of this type, where one of the proto-coalitions is large enough to be certain of victory at the pre-bargaining stage, have been defined as non-bargaining roll calls. The statement in

*Meltz similarly notes the irrationality of always "going along."⁶

theorem VI, that the eventual winning coalition on non-bargaining roll calls may be greater than $\frac{N+1}{2}$, is in sharp contrast to the third axiom which posited the occurrence of only minimum-certainty-of-winning coalitions on bargaining roll calls. The prediction of greater-than-minimum-winning coalitions is derived from our theory by the following logic. Firstly, if no proto-coalition member will vote with the opposite position (theorem II), then it is impossible for any broker faced with an opposing proto-coalition of $\frac{N+1}{2}$ or more members to achieve certainty of winning by offering side-payments to the non-proto-coalition members. And because any broker has a low utility for risk (axiom 13) and is a rational resource maximizer (axiom 8), the broker for the smaller proto-coalition on this sort of roll call will not expend resources in bargaining when he knows that he will not be able to achieve certainty of victory. Similarly, the broker for the larger proto-coalition will not need to offer side-payments. Thus, on motions where either proto-coalition is $\frac{N+1}{2}$ or larger, no bargaining will occur. So, on non-bargaining roll calls the eventual winning coalition will be greater than the minimum size necessary to be certain of victory where all members of the larger proto-coalition actually vote; and from the theorem which follows, we shall see that the eventual winning coalition on non-bargaining roll calls may be larger than $\frac{N+1}{2}$ even where this condition of complete turnout among the proto-coalition members is not met.

In deriving testable hypotheses describing sizes of winning coalitions theorem VI will be considered in juxtaposition to theorem III, for each describes the expected winning coalition size for a

specific class of roll calls. In theorem III we conclude that the winning coalition for any bargaining bill will be of the minimum size necessary to be certain of victory and no larger; the sixth theorem states that the size of the winning coalition on non-bargaining roll calls may be larger than $\frac{N + 1}{2}$.

It should also be noted that while we are unable to predict the winning side on bargaining roll calls, theorem VI does specify that the winning side on non-bargaining roll calls will be the position whose proto-coalition consisted of $\frac{N + 1}{2}$ or more legislators. For bargaining bills we can derive a prediction of the precise size of the winning coalition but not which coalition will be the winning one; and for non-bargaining roll calls, we are able to predict which of the initial proto-coalitions will win, but we cannot generate from our theory a prediction of the exact size of the eventual winning coalition.

Theorem VII. For any non-bargaining roll call any pre-bargaining supporter who votes will vote "yea" on the motion, and any pre-bargaining opposer who votes will vote "nay." (corollary to theorem VI)

This theorem follows from the same sub-set of axioms as theorem VI. In deriving the earlier theorem we arrived at the intermediate conclusion that on motions where either proto-coalition consists of $\frac{N + 1}{2}$ or more members no bargaining will occur. This means that no pre-bargaining supporters/opposers will be offered side-payments in exchange for their support. Thus, for any pre-bargaining supporter or opposer on any non-bargaining roll call his total expected resource payoff for taking either position or abstaining will be that value arrived at through the pre-bargaining R-calculus. Axiom

5 then tells us that in the short run such a legislator will have the greatest utility for voting the position from which he would expect to gain resources--that is, "yea" for the pre-bargaining supporter and "nay" for the pre-bargaining opposer. Furthermore, because bargaining will never take place on subsequent non-bargaining roll calls, neither defection nor abstention on the part of the pre-bargaining supporters/opposers will represent a credible threat to potential brokers. Therefore, for these legislators the most preferred long-term move corresponds perfectly to the most preferred short-term move; i.e., on non-bargaining roll calls any pre-bargaining supporter who votes will vote "yea" and any pre-bargaining opposer who votes will vote "nay." From the last two theorems we also conclude that no pre-bargaining supporter/opposer on a non-bargaining bill will ever exercise a strategic abstention.

These conclusions differ significantly from the ones reached in theorems IV and V that pre-bargaining supporters and opposers may abstain for strategic reasons on bargaining roll calls and that where these legislators do vote on these kinds of roll calls they may defect to the other side. These predicted differences in the behavior of pre-bargaining supporters/opposers on different kinds of bills are incorporated into the testable hypotheses presented in the next section of this chapter.

Theorem VIII. For any non-bargaining roll call all indifferents will abstain. (from theorem VI and axioms 5 and 6)

The derivation of this theorem is straightforward. From theory VI we conclude that no side-payments will be offered to any legislators on non-bargaining roll calls. This means that for

indifferents on such roll calls, the expected utility payoff in terms of the pre-bargaining resource calculus alone for voting either position or abstaining is equal (axiom 5). However, because the act of voting itself involves a cost (axiom 6), abstention then becomes the preferred move for indifferents on non-bargaining roll calls. The prediction in theorem VIII is therefore that indifferents on non-bargaining roll calls will always abstain.

Theorem VIII states that indifferents on non-bargaining roll calls will always exercise strategic abstentions. By contrast theorem V asserts that indifferents as well as pre-bargaining supporters and opposers on bargaining roll calls will sometimes abstain for strategic purposes. It should also be clear by now that pre-bargaining supporters/opposers on non-bargaining bills and proto-coalition members will never abstain strategically. From these conclusions and the assumption stated earlier that non-strategic abstentions will be randomly distributed across all legislators on all classes of roll calls we derive the following testable hypotheses in the next section: The abstention rate of indifferents on non-bargaining roll calls will be greater than the abstention rate of indifferents and pre-bargaining supporters/opposers on bargaining roll calls and proto-coalition members on both types of roll calls.

Hypotheses

We conclude the theory of coalition formation in legislatures by restating the theorems in the form of a series of readily testable hypotheses. We begin with the hypotheses relating size of the winning coalition to type of roll call. Here we predict that while not all

such winning coalitions will be of the minimum size necessary to be certain of victory, the particular sub-set of motions for which minimum winning coalitions will appear can be identified. A second set of hypotheses specifies the extent to which we would expect to find different classes of legislators eventually voting for their most preferred pre-bargaining positions on different kinds of roll calls. Finally, there is the prediction that all the other relationships will hold independent of the position of a roll call on the legislative agenda.

Of the entire set of testable propositions presented below, not all are in the form of probabilistic statements. While most of the hypotheses are relativistic, describing the expected relationship between variables, some of the propositions (indicated by #) are deterministic in nature, predicting that all legislators/roll calls of a certain type will evidence certain characteristics. Unless our theory is a perfectly accurate abstraction of reality, and unless the manner in which it is tested is completely error-free, we would expect to find these deterministic statements to be falsified. However, these propositions are included in our list of hypotheses as logical derivatives of the theory, and they are tested along with the probabilistic statements in the following chapters. If in so doing we do not find that all X is Y, we may at least hope to discover that a large proportion of all X's are Y's.

#H₁ The eventual winning coalition for all bargaining roll calls is just large enough to be certain of victory and no larger.

H₂ The mean difference between the size of the eventual winning coalition and the minimum size necessary to be certain of victory is greater for non-bargaining roll calls than for bargaining roll calls.

The first hypothesis is a deterministic restatement of theorem III. Hypothesis H_2 offers a relativistic prediction from theorems III and VI. Because theorem III states that all winning coalitions on bargaining bills will have $\frac{N+1}{2}^*$ members, and theorem VI states that the winning coalition on non-bargaining bills may be larger than this number, we would expect to find the mean difference between the size of the eventual winning coalition and $\frac{N+1}{2}$ to be greater for non-bargaining than for bargaining roll calls. (In testing this hypothesis we will take care to measure not the average winning coalition size for each type of roll call, but, instead, the average difference between the observed coalition size and the minimum-certainty-of-winning size.)

In the next set of hypotheses, dealing with individual votes, "voting one's valence" refers to voting for one's preferred pre-bargaining position on a roll call--that is, supporting the position for which one could expect to receive the greatest amount of resources from sources other than side-payments.

- # H_3 All proto-coalition members who vote vote their valences.
- # H_4 All pre-bargaining supporters and opposers who vote on non-bargaining roll calls vote their valences.
- H_5 The proportion of voting pre-bargaining supporters and opposers who vote their valences is greater on non-bargaining roll calls than on bargaining roll calls.
- H_6 Across all bargaining roll calls, the proportion of voting proto-coalition members who vote their valences is greater than the proportion of voting pre-bargaining supporters and opposers who vote their valences.

* For the case of a simple majority decision rule.

- H_7 Across all roll calls the proportion of voting proto-coalition members who vote their valences is greater than the proportion of voting pre-bargaining supporters and opposers who vote their valences.

Here hypothesis H_3 corresponds exactly to theorem II above; and hypothesis H_4 corresponds to theorem VII. The prediction in both cases is that there will be no "defection" from pre-bargaining positions among these legislators on these kinds of roll calls, because they will never be offered side-payments to alter their preferences. H_5 follows from theorems IV and VII together: while pre-bargaining supporters/opposers will never defect on non-bargaining bills (theorem VII), these legislators may defect on bargaining bills (theorem IV); thus, the rate of valence voting for pre-bargaining supporters/opposers will be greater on non-bargaining than on bargaining roll calls. Also, because proto-coalition members will never defect regardless of the type of roll (theorem II), and because pre-bargaining supporters and opposers may defect on bargaining bills (theorem IV), we conclude in hypothesis H_6 that the rate of valence voting will be greater for proto-coalition members than for pre-bargaining supporters/opposers across all bargaining roll calls. Finally, combining the conclusions in theorems II, IV, and VII, we may deduce hypothesis H_7 which states that across all roll calls the rate of valence voting will be greater among proto-coalition members than among pre-bargaining supporters and opposers.

The following hypotheses deal with abstention rates among different classes of legislators on different types of roll calls:

- # H_8 All indifferents on non-bargaining roll calls abstain.
- H_9 The abstention rate among indifferents on non-bargaining roll calls is greater than the abstention rate among pre-bargaining

supporters/opposers and indifferents on bargaining roll calls, which is, in turn, greater than the abstention rate among pre-bargaining supporters/opposers on non-bargaining roll calls and proto-coalition members on all roll calls.

Hypothesis H_8 is a restatement of theorem VIII. The ninth hypothesis follows from this theorem and theorem V. Between them, these two derivatives of our theory posit that all indifferents on non-bargaining roll calls will abstain for strategic reasons (reasons other than unavoidable detention), that indifferents as well as pre-bargaining supporters and opposers on bargaining roll calls may abstain for strategic reasons, and the pre-bargaining supporters/opposers on non-bargaining roll calls as well as proto-coalition members on any roll call never abstain as a short- or long-term resource maximizing strategy.

The final hypothesis is a restatement of the first theorem:

H_{10} The occurrence of all of the previously hypothesized relationships is independent of the position of the motions on the legislative agenda.

This concludes our presentation of the theory of coalition formation in legislatures. In the next chapter we consider questions of measurement antecedent to testing the formulation.

FOOTNOTES: CHAPTER II

¹Cleo H. Cherryholmes and Michael Shapiro, Representatives and Roll Calls (Indianapolis: The Bobbs-Merrill Company, Inc., 1969).

²Jeanne L. Martin, "Exchange Theory and Legislative Behavior: A Computer Simulation of Roll-Call Voting in the U.S. Senate" (unpublished Ph.D. dissertation, Michigan State University, 1971).

³The distinction between discrete, static, and progressive ambitions is taken from Joseph A. Schlesinger, Ambition and Politics (Chicago: Rand McNally & Co., 1966).

⁴For an excellent discussion of the assumed properties of utility functions see: R. Duncan Luce and Howard Raiffa, Games and Decisions: Introduction and Critical Survey (New York: John Wiley & Sons, Inc., 1957), Chapter 2.

⁵William Riker, The Theory of Political Coalitions (New Haven: Yale University Press, 1962), pp. 115-116.

⁶David Meltz, "Legislative Party Cohesion: A Model of the Bargaining Process in State Legislatures," Journal of Politics (forthcoming November, 1972).

CHAPTER III

VALIDATION

The validation of any theory necessarily involves the specification of a setting in which hypothesized empirical relationships are tested and the operationalization of all concepts and variables employed in these hypotheses. With reference to the latter task, as Kelly notes, the goal is to "so concisely define concepts that their empirical referents are clear and unequivocal."¹ In testing coalition theories operationalization has proven especially difficult because of the many complex concepts to be defined (i.e. bargaining procedures, costs of action, payoffs associated with outcomes, etc.), most of which are not dealt with in earlier empirical studies. While Alker contends that following "some perhaps overoptimistic and over pessimistic early appraisals, game theoretical approaches have produced a number of suggestive normative and empirical studies focused on the nature and existence of rational behavior,"² it still seems clear that little consensus exists among coalition researchers as to the operational definitions of several basic concepts.³ Instead, most of the empirical studies of coalition formation have tended to operationalize variables in the kind of ad hoc manner which precludes the replication of research in alternative settings or the application of models to different political arenas.⁴ In our own study we hope to avoid this shortcoming.

In the latter sections of this chapter we present a detailed

account of the operationalization of concepts necessary to test the theory of coalition formation in legislatures. At that point we consider the measurement of the resource calculus which serves as an indicator of the utility payoffs any given legislator receives in the event of different outcomes of the legislative process. Clearly it will also be necessary to operationalize the concepts of moves (individual legislators' voting choices) and outcomes (the collective legislative decision). By providing generalizable indicators for these and other variables we will be able to show how our theory of the legislative process might be employed to explain behavior in a variety of settings other than the one examined in this study.*

Before turning to the question of measurement, we must specify the particular setting--legislature, time frame, and roll calls--which will be used in the present study and indicate why this setting was chosen for the initial test of our theory.

Setting: The U. S. Senate

In choosing a setting for the testing of any formal, deductive theory one generally desires to satisfy as many as possible of those axioms or assumptions the validity of which can be easily ascertained. This will necessarily be a sub-set of the complete axiom-set. For, if all axioms were directly measureable, one would have no need to test their derivatives in order to draw conclusions about the truth of the axioms themselves. It is because not all assumptions are directly testable that conclusions or theorems are derived and tested as a means of gathering indirect evidence in support of the axioms. However, within

*See the concluding section of Chapter V.

any theory there are likely to be a number of axioms whose applicability to various settings can be estimated. In testing any such theory it is certainly desirable to choose a setting in which these axioms are likely to hold, so that where a theorem is found to be invalidated the particular false axiom(s) might be more easily discoverable. It is primarily for this reason that we test our theory in the U. S. Senate.

We are especially concerned with satisfying the assumption implicit in axiom 1 that all legislators have static ambitions, desiring to succeed themselves in office indefinitely. From previous research it is clear that of the many legislative bodies in the United States only Congress is made up predominantly of members seeking re-election to the same position.⁵ Limiting ourselves to either the House of Representatives or the Senate, the choice was made to consider the latter body primarily because it was felt that certain other assumptions are more likely to hold in the Senate than in the House. Specifically, because the Senate is very much smaller than the House, it is more likely that any given senator could easily obtain the kind of perfect information of other legislators' preferences and commitments described in axioms 5 and 11. Lewis A. Froman, Jr., in an article comparing the two chambers of Congress, notes this greater familiarity among senators, stating that, "because of size, House members are less likely to know, even by sight, all other House members."⁶ In the same piece Froman characterizes the Senate as having a more even distribution of power among its members and a shorter apprentice period during which new members are expected to play passive roles in the legislative process.⁷ Both of these characteristics led us to believe that bargaining within the Senate is more likely to approximate the open market described in our theory.

There were also data considerations involved in the choice of the U.S. Senate. Until the ninety-first Congress no member-by-member roll call record existed for the House for some of the most important actions because of the secret ballot practice of teller votes. Also, within the House every bill must be reported to the floor of the body from the Committee on Rules which is able to limit debate on any bill and even to specify that no amendments may be offered subsequent to reporting.⁸ Such closed rules have the effect not only of reducing the number of floor votes but also of precluding the use of revisions in the content of a bill as a form of side-payment during the bargaining process.⁹ These and other factors typically result in a greater number or recorded roll call votes in the Senate than in the House. In the period we will be examining there were 25% more such roll calls in the upper chamber--394 in the House and 493 in the Senate. Thus, our decision to employ the Senate allowed us to sample roll calls from a larger population. The differences in the constituencies of the two bodies also affected the reliability of certain data that were used in constructing the resource calculus discussed later in this chapter. Because senators represent states instead of the less demographically stable congressional districts, we are able to employ decennial census data collected several years before the time period with which we are actually dealing, with greater assurance that the population parameters will not have changed significantly than we would have if we were looking at congressional constitutncies. Finally, there is the very real advantage that working with the smaller N of the Senate simplifies our analysis.

However, we are also aware that there are apparent disadvnatages

in choosing to test our theory in the Senate. For one thing, as Donald Matthews has pointed out in his detailed examination of the workings of that body, there appear to be certain folkways or legislative norms operative which define to a large degree the legislative process in the Senate; and certain of these behavioral norms would seem to be inconsistent with the processes of rationally calculated bargaining and coalition formation described in our axiom-set. In particular, Matthews contends that within the Senate there is (a) a period of opprenticeship for new members, implying the systematic exclusion of certain legislators from the open bargaining process--inconsistent with our theory; (b) a norm of specialization whereby senators are encouraged to develop expertise in limited areas, implying that only specific legislators are likely to become brokers for specific motions--in no way inconsistent with our theory; and (c) a degree of reciprocity such that senators may at times agree to support bills without receiving side-payments for their support--clearly inconsistent with our theory.¹⁰ It could certainly be argued that because of Matthews' observations we ought to look elsewhere for a setting in which to test our formulation. We contend quite the opposite: it is precisely because "common knowledge" describes the U.S. Senate as a highly consual, non-conflictual body that we should test the conclusions of our theory there. Instead of merely confirming widely held explanations, we have the opportunity to disconfirm by systematic empirical analysis accepted notions which are themselves based largely on non-systematic anecdotal observation.

Another apparent disadvantage of looking at the Senate presents a similar kind of research opportunity. Previous roll call analyses

of the type to be carried out in this study have been able to correctly predict a greater proportion of individual votes in the House than in the Senate.¹¹ By re-examining senatorial voting behavior in our own study we have a chance to improve the level of prediction where such improvement seems most needed.

Setting: The 89th Congress, 1965-1966

The next step in the process of validation is to specify the time frame to be employed. In the present study we examine roll calls taken in the Senate during the 89th Congress, the years 1965 and 1966. A number of factors influenced our choice of the 89th Congress as the temporal arena.

Our foremost concern was that the session of Congress be a recent one. For, as many institutions of government are changing rapidly, the more recent our data the more likely it is that they would be relevant to the contemporary Senate. Also, the further back in time we go the more difficult it would be to subjectively assign policy preferences to various constituency groups as is necessary in operationalizing the resource calculus in order to test our hypotheses. There are still other reasons for choosing to examine the Senate some time during the decade of the 1960's. For one thing, the choice of any Congress preceding the 87th (1961-1962) would necessitate the use of the 1950 census in describing the senators' constituencies. This, in turn, would mean that either there would be a lag of up to ten years between the time the population data were collected and the time to which they would be applied (if a Congress in the late 1950's were used), or the problem of estimating constituency-group policy preferences would be

compounded perhaps beyond solution (if a Congress in the early 1950's were used). Another reason for looking to the decade just past for data involves the presumed nature of the legislative process in the Senate during this time and immediately preceding it. Randall Ripley in a study of the U.S. Senate characterizes that body in the years preceding the 87th Congress as having moderately powerful and aggressive central party leadership and relatively powerless individual members; in the years subsequent to 1961 the party leadership is described as relatively powerless.¹² Of the two systems the latter is clearly more consistent with our assumption that the legislative process is one of open market bargaining for votes.* If we limit ourselves to the examination of a time frame within the past decade, the 89th Congress is the compelling choice.

* As many observers have noted, the primary reason for this shift in the distribution of power within the Senate was the election of Lyndon Johnson to the vice-presidency in 1960 and thus his removal from the Democratic leadership position. The common evaluation is that Johnson's style, experience, and skills allowed him to structure the legislative game in such a way as to severely limit the ability of 13 other senators to bargain independently with persons other than himself. This is clearly reflected in the observation of Hubert Humphrey's special assistant that "Lyndon Johnson's tenure as majority leader of the Senate . . . is likely to stand for some time as the classic example of an elected party leader who with unusual zeal, dedication, and skill sought to control the realistic choices open to senators in such a way that a sufficient majority saw their immediate political interests best served by supporting the senatorial party program than by opposing it." (14) If this evaluation is accurate then it would seem to be obvious that we would be less likely to disconfirm our theory of legislative bargaining with data from the post-Johnson Senate than with data from the time of his leadership (1955-1960). It is for this reason, among others, that we have in fact chosen to conduct the initial test of our theory with roll calls taken after Johnson left the Senate. However, should our hypotheses be borne out by observation of this more recent period we would then have the opportunity to conduct a test to determine whether or not the Johnson era was actually a different game as is commonly claimed. Comparing the results of applying our model to the Senate during Johnson's tenure as Democratic leader with the

The 89th Congress is first of all the most recent one for which re-election data on all legislators are available, with the terms of the last third of the senators expiring in 1970. Also, of the three Congresses since 1961 for which such re-election information would be available, the 89th is the one which has been least studied to date. Roll call analyses similar to the performed here have been carried out for the Senate of the 87th Congress¹⁵ and for both the Senate and the House of the 88th Congress.¹⁶ In examining voting in the 89th Congress we may use the information gained from these earlier studies without replicating them. Furthermore, by collecting roll call data from the years 1965 and 1966 it is more likely that our theoretical assumption of universally static ambitions among legislators will hold for the Senate as this period does not immediately precede a presidential election--a post to which several senators may normally be expected to aspire.*

Finally, there were data-availability considerations in our decision to look at the 89th Congress. Specifically, by collecting our legislative data from these years we have available a cross-national survey of policy preferences taken at the time of the 1964 elections which we can use in verifying certain assumptions underlying our

results obtained in the present work, we would expect the findings to be significantly different if the bargaining game did indeed change with the removal of Johnson from the scene. The manner in which such a test could be performed is discusses in greater detail in Chapter V.

* In the final chapter we consider how our theory may be employed in sessions of the Senate in which either (a) there are a number of senators seeking the presidential nomination of one or both parties, i.e. several Democratic senators in the 92nd Congress; or (b) there is a single senator recognized as one party's likely or actual presidential nominee, i.e. Republican senator Goldwater during the latter part of the 87th Congress.

operationalization of the pre-bargaining resource calculus.* There is also reason to believe that for the 89th Congress an exceptionally large number of roll calls were taken covering a wide range of issue areas. Shortly after it closed the 89th Congress was referred to as, "unique in modern legislative history," in this regard.¹⁷ In the section which immediately follows we specify the sample of motions used in testing our theory and the manner in which this sample was selected.

The Roll Calls

Both for theoretical reasons and because the cost of analyzing all roll calls taken in the Senate during the 89th Congress would be prohibitive, we examine here a sub-set of all recorded motions in the upper chamber in the period 1965-66. Several criteria were applied in selecting this sample of roll calls. Our primary concern was that we feel reasonably confident of our ability to specify the components and relative weights of the senators' resource calculi for all bills. That is, we chose only those roll calls for which the major sources of pre-bargaining resources could be identified with some degree of certainty that we were not excluding important elements. Second, we wished to include all roll calls in each of several issue areas, all roll calls for which it is assumed that an identical calculus is operative. Finally we wanted to look at a wide range of substantive issue areas involving a wide range of salient resource sources for the senators.

Towards these ends we chose four substantive issue areas: (a) civil rights bills and amendments; (b) motions dealing with urban

* See the section of this chapter dealing with the operationalization of the resource calculus.

welfare; (c) motions of immediate and particular concern to organized labor; and (d) votes on foreign aid bills. This sample satisfies our criterion that the roll calls cover a broad range of substantive areas; we will be dealing with both foreign and domestic affairs, regulation and financial assistance, and questions of federal/state jurisdiction. We will also be employing a variety of elements in constructing the calculi of pre-bargaining resources: for civil rights and urban welfare roll calls we assume the existence of concerned constituency groups; on bills dealing with union issues organized labor is taken to be a significant resource source; and for foreign aid motions we assume that neither constituents nor private interest groups will be offering resources to the legislators in exchange for support.

As noted, in sampling the particular roll calls to be used in our study, we include all motions clearly identifiable as falling within one of the issue areas specified. Alternative sampling techniques exist. Specifically, one may employ Guttman scaling to define motions which "belong together."¹⁸ However, the use of the technique involves the examination of the votes of the individual legislators as an antecedent to the identification of the classes of roll calls. And because it is precisely these individual votes that we wish to predict and explain, this method is inappropriate for our study. The sampling procedure we do use has the disadvantage of having to subjectively specify the issue involved in every roll call in the population. To minimize this problem we use the designation of substantive content appearing in the Congressional Quarterly Almanac for 1965 and 1966.¹⁹ Wherever possible we then include in our sample all recorded motions

classified by the Congressional Quarterly as belonging within any of the four issue areas chosen for examination.

For civil rights motions this method presents little difficulty. For each year of the 89th Congress the Congressional Quarterly Service recognized "Civil Rights" as a discrete issue area. During the first session the only motions classified as civil rights related were those associated with S 1564, The Voting Rights Act of 1965, and all twenty-seven of these roll calls are included in our sample. For 1966 there were only two civil rights roll calls in the Senate. Both were cloture votes on the Civil Rights Act of 1966, and both are included in our sample. The Congressional Quarterly summary descriptions of these bills appear in Table 1. (The summaries presented in this and the next three tables are descriptions of the bills as finally voted on by the Senate.)

The sampling of motions in the area of urban welfare is not as clear cut. Because the Congressional Quarterly Service does not recognize this as a separate substantive area, we chose a sub-set of those bills classified as dealing with "Education and Welfare." In selecting this sub-sample we intentionally exclude all bills involving federal aid to education. This exclusion is based on the observation that there are many interest groups which lobby heavily on education bills while not concerning themselves with other social welfare legislation. The battle over passage of the Elementary and Secondary Education Act of 1965 alone involved the National Education Association, The National Council of Churches, The United States Catholic Conference, The Chamber of Commerce, the Daughters of the American Revolution, the American Association of University Women, the American Civil Liberties Union,

Table 1 Civil Rights Motions Included in Sample

Year	Bill Number	Title and Description of Bill in Final Form	Number of Roll Calls/Bill
1965	S 1564	Voting Rights Act of 1965 suspending the use of literacy tests or similar voter qualification devices and providing other relief against voter discrimination. ^a	27
1966	HR 14765	Motion to invoke cloture to allow consideration of the Civil Rights Act of 1966 (banning discrimination in the selection of jurors and in the sale and rental of some housing and to protect civil rights workers.) ^b	2

a. Congressional Quarterly Almanac, 1965; Senate roll call #178.

b. Congressional Quarterly Almanac, 1966; Senate roll call #186.

the American Jewish Committee, and the Council of Chief State School Officers, among others.²⁰ The construction of a resource calculus including all these organizations would be a frivolous task given the current state of knowledge concerning determinants of legislative voting. Similarly excluded from consideration were all bills which stipulated the sole or primary recipient of federal aid to be jurisdictions other than cities. We are thus concerned here with federal assistance to urban areas. Of such roll calls we include as urban welfare motions all those associated with The Housing and Urban Development Act of 1965 (HR 7984), the Economic Opportunity Amendments of 1965 (HR 8283), amending the General Supplemental Appropriations bill for fiscal 1966 to delete rent supplement payments (HR 11588), amending the Second Supplemental Appropriations bill for fiscal 1966 and the Fiscal 1967 Appropriations for Independent Offices and the Department of Housing and Urban Development to affect the rent supplements program (HR 14012 and HR 14921), the Demonstration Cities and Metropolitan Development Act of 1966 (S 3708), and the Economic Opportunity Amendments of 1966 (S 3164). Descriptions of these bills and the number of roll calls sampled from each one are presented in Table 2.

The organized labor bills included in our sample are those designated in the Congressional Quarterly Almanac of 1966 as comprising the major legislative goals of the American Federation of Labor-Councils of Industrial Organization (AFL-CIO) during the 89th Congress.²¹ Within the Senate these are the Manpower Development and Training Act extension of 1965 (S 974), Right-to-Work Repeal (HR 77), District of Columbia Minimum Wage Amendments Act of 1966 (HR 8126), Fair Labor Standards

Table 2 Urban Welfare Motions Included in Sample

Year	Bill Number	Title and Description of Bill in Final Form	Number of Roll Calls/Bill
1965	HR 7984	Housing and Urban Development Act of 1965, providing rent supplements to low-income families and extending and amending laws relating to public housing, urban renewal and community facilities. ^a	5
	HR 8283	Economic Opportunity Amendments of 1965, authorizing \$1,785,000,000 in fiscal 1966 for the Government's anti-poverty program and making numerous changes in the Economic Opportunity Act of 1964. ^b	18
	HR 11588	Amendments to General Supplemental Appropriations bill for fiscal 1966 to delete appropriations for rent supplement payments and contract authority for new dwellings. ^c	2
1966	HR 14012	Amendments to Second Supplemental Appropriations Bill for fiscal 1966 affecting amount of appropriations for rent supplements program. ^d	2
	HR 14921	Amendment to Fiscal 1967 Appropriations for Independent Offices and the Department of Housing and Urban Development to delete language providing \$20 million in rent supplement contract authority in fiscal 1967 and \$2 million in supplement payments. ^e	1
	S 3164	Economic Opportunity Amendments of 1966 authorizing appropriations of \$1.75 billion for the "war on poverty" in fiscal 1967 and making a variety of changes in the law. ^f	5

Table 2 (cont'd.)

Year	Bill Number	Title and Description of Bill in Final Form	Number of Roll Calls/Bill
1966	S 4708	Demonstration Cities and Metropolitan Development Act of 1966 providing "demonstration city" grants for community renewal, a number of new housing programs, and a broadening of numerous other programs providing housing and urban aids. _g	3

- a. Congressional Quarterly Almanac, 1965; Senate roll call #162.
- b. Ibid.; Senate roll call #241.
- c. Ibid.; Senate roll calls #253 and #254.
- d. Congressional Quarterly Almanac, 1966; Senate roll calls #33 and #34.
- e. Ibid.; Senate roll call #142.
- f. Ibid.; Senate roll call #207.
- g. Ibid.; Senate roll call #233.

Amendments of 1966 (HR 13712), and the Unemployment Insurance Amendments of 1966 (HR 15119). Again, we include in our analysis sample all motions taken on these acts. These motions are described in Table 3.

In the area of foreign aid all motions on all appropriations and authorization bills are included in the sample. The Congressional Quarterly identifies fifty-seven such roll calls in the 89th Senate. The bills on which these roll calls were taken are given in Table 4.

Table 5 presents a summary of the number of roll calls selected, the distribution of these roll calls across issue areas and across the two sessions of the Congress, and the proportion of all roll calls from the 89th Senate included in our sample.

As can be seen, our set of motions includes 155 separate roll calls. In terms of absolute size this compares favorably with the number of roll calls examined in other recent studies of voting behavior in Congress which have attempted to explain individual legislators' votes.* Furthermore, our sample represents over 30% of all roll calls recorded in the 89th Senate. Also, the motions we examine not only cover a wide range of substantive areas but a wide range of procedural types as well.** A complete listing of all roll calls by issue area, agenda position, procedural type, and party and constituency/interest group position appear as an appendix to this work.

The Resource Calculus

In this section we develop a set of operational indicators

* Cherryholmes' and Shapiro's study, referred to above, considers fifty-four roll calls from the House of Representatives. Jeanne Martin applies her model to twenty-three senatorial motions.

** The importance of this variety in content and procedural type will become clear in Chapter IV where we present our empirical findings.

Table 3 Labor Motions Included in Sample

Year	Bill Number	Title and Description of Bill in Final Form	Roll Calls/Bill
1965	S 974	Extension of Manpower Development And Training Act training programs for four years, through June 30, 1970, extending full federal financing for one year, expanding the Act's coverage, and transferring Area Redevelopment Act training programs to MDTA program. ^a	2
	HR 77	Motion to invoke cloture to allow consideration of HR 77 (repeal of Section 14(b) of Taft-Hartley Act which permitted states to enact so-called right-to-work laws barring union shops). ^b	1
1966	HR 77	See above description.	2
	HR 8126	Minimum Wage Amendments Act of 1966 extending minimum wage and overtime coverage in the District of Columbia to domestic workers in private industry. ^c	2
	HR 15119	Unemployment Insurance Amendments of 1966 requiring states to meet minimum federal standards for the amount and duration of state unemployment compensation benefits, extending coverage to an additional 2.3 million workers, providing a new program of extended benefits for jobless workers during national states of recessions, and altering the federal unemployment tax structure. ^d	13

Table 3 (cont'd.)

Year	Bill Number	Title and Description of Bill in Final Form	Number of Roll Calls/Bill
1966	HR 13712	Fair Labor Standards Amendments of 1966 increasing the federal minimum wage for non-farm workers in stages from \$1.25 to \$1.60 an hour. ^e	13

- a. Congressional Quarterly Almanac, 1965; Senate roll call #31.
- b. Ibid.; Senate roll call #248.
- c. Congressional Quarterly Almanac, 1966; Senate roll call #5.
- d. Ibid.; Senate roll call #135.
- e. Ibid.; Senate roll call #184.

Table 4 Foreign Aid Motions Included in Sample

Year	Bill Number	Title and Description of Bill in Final Form	Number of Roll Calls/Bill
1965	HR 7750	Foreign Assistance Act of 1965 authorizing appropriations of \$3.36 billion for foreign aid in fiscal 1966. ^a	25
	HR 10871	Fiscal 1966 foreign aid appropriations appropriating \$3,218,000,000 for foreign assistance and \$714,188-000 for related programs in fiscal 1966. ^b	9
1966	HR 15750	Foreign Assistance Act of 1966 authorizing \$3,500,735,000 in appropriations for foreign economic and military aid for fiscal 1967. ^c	18
	S 3583	Military Assistance and Sales Act of 1966 authorizing appropriations of \$792 million for fiscal 1967. ^d	3
	HR 17788	Foreign Assistance and Related Agencies Appropriations for Fiscal 1967 appropriating \$2,936,490,500 for foreign assistance and \$556,-983,000 for related programs in fiscal 1967. ^e	2

a. Congressional Quarterly Almanac, 1965; Senate roll call #201.

b. Ibid.; Senate roll call #245.

c. Congressional Quarterly Almanac, 1966; Senate roll call #183.

d. Ibid.; Senate roll call #115.

e. Ibid.; Senate roll call #209.

Table 5 Number of Roll Calls Sampled by Issue Area and Year

Year	Issue Area			Number of Roll Calls in Session	Proportion of All Roll Calls Sampled
	Civil Rights	Urban Welfare	Labor	Foreign Aid	
1965	27	25	3	89	34.5%
1966	2	11	30	66	28.1%
Total	29	36	33	151	31.4%

comprising the resource calculus assumed in our theory. This is a crucial step in the process of validation. For in testing our theory we are also indirectly evaluating the validity of the resource-calculus values employed in the analysis. It is essential that we have enough confidence in our operational indicators to conclude that the results of tests performed in the next chapter reflect upon the validity of our axioms rather than the validity of the resource calculus. And while we are unlikely to ever reach the level of confidence in our resource calculus necessary to attribute all findings to the theory rather than the measurement techniques, this must be our goal. In striving for this goal previous legislative research is only of limited utility. Recent simulations of congressional voting²² and multi-variate analyses of the factors affecting legislative behavior²³ offer ambiguous and often contradictory findings. Therefore, what follows is necessarily largely ad hoc in terms of the factors included in the calculus and especially the relative weights assigned to the several factors under varying circumstances. In light of this uncertainty we take the conservative approach of including only those groups and individuals whose concern with a particular class of motions can be demonstrated without relying on roll call data.

Throughout we recognize that in specifying these measures we are making implicit assumptions concerning the salient sources of re-electoral support for each senator and the relative effect which the support/opposition of each source has on a legislator's probability of being re-elected.

We begin our operationalization of the pre-bargaining resource calculus by identifying the primary sources of re-electoral support for

any given legislator. Specifically, we assume that a senator acquires resources necessary for his re-election from: (a) constituent groups, (b) private interest groups, and (c) his party organization. Most existing studies of congressional behavior focus on these--particularly the first and last ones--as the major determinants of legislators' votes. Included in other studies but not our own are such additional factors as the legislator's region, his committee assignments, and his relationship with other members of his state's congressional delegation. These elements do not appear in our calculus because we assume that none of these associations--a senator's region, his committees, his other state representatives--constitute groups which generally offer resources significantly affecting his probability of re-election.

The next step is the specification of values corresponding to the amounts of resources which a senator may expect to receive from these various groups and individuals for supporting each one's favored position on any roll call. Following the technique employed in Cherryholmes' and Shapiro's Representatives and Roll Calls, all such values are given in integer increments. It should also be noted that the particular numbers used to represent the resource payoffs have no real-world referent and are meaningful only in relationship to each other, to the zero point of "no resources," and to the arbitrarily specified value of R'_{pb} (the threshold of proto-coalition membership).

Indeed, it is by assigning the value of zero (unambiguous) and the value of R'_{pb} (given below) that we begin the construction of the resource calculus. The first element of the calculus is thus:

$$(a) R'_{pb} = \text{two } (2).^*$$

As we develop the remainder of the calculus it is kept in mind that wherever we specify that a senator receives two or more units of pre-bargaining resources for taking a given position, we are saying that he will be a member of the corresponding proto-coalition. Noting, this, we now consider each source of re-electoral support/opposition in our calculus and present the elements of the calculus which describe the resource-payoff associated with each.

The only one of these sources which is not issue-specific is party; that is, we assume that amount of resources which a senator receives from his party leadership for supporting its preferred position on any given roll call to be invariant with the substance of the motion. However, this amount is assumed to vary with the "safeness" of a senator's seat, particularly the likelihood that he will be renominated at the end of his current term. For, once a senatorial nominee has been named, the party of that nominee almost always supports him in the general election.** Therefore, if a senator can be fairly certain of

*All portions of the calculus are stated as general rules to facilitate the replication of our study in other legislative settings.

**Even where the party leaders recognize that one of their nominees will frequently oppose them on roll calls, they are nearly certain to prefer him to his opponent--if for no other reason than because their own candidate will be more likely to vote with his (their) party in organizing the Senate. Indeed, one of the few instances in recent years of a party actively opposing one of its senatorial nominees was in the case of Senator Charles Goodell's (R-NY) re-election campaign in 1970. The extraordinary nature of this non-support may be seen in the intensity and breadth of the condemnation by other Republicans of the official disavowal. Also, it may be noted that this disavowal/non-support occurred in a race where there was another, non-Republican, candidate who appeared likely to vote with the Republicans in organizing the Senate if he won. Thus, the Nixon administration could safely oppose Goodell with some assurance that if Goodell lost the probable winner would still support the Republican party in organization and be

being renominated, his party cannot offer him as many resources for supporting its position. Put another way, the party's support will have less effect on the probability of a senator's being re-elected where he is already likely to be renominated. Incorporating these assumptions into our calculus we have the following:

- (b) Any senator on any motion where his party does not take a position will receive no pre-bargaining resources from his party.
- (c) Any senator from a safe seat on any motion where his party takes a position will receive from his party one (1) unit of pre-bargaining resources for supporting his party's position on the roll call.
- (d) Any senator not from a safe seat on any motion where his party takes a position will receive from his party two (2) units of pre-bargaining resources for supporting his party's position on the roll call.

We need now only offer operational indicators for the concepts of "safe seat" and "party position" to be able to apply these parts of the calculus in testing our theory.

A senator is deemed to occupy a safe seat--that is, be likely to be re-nominated--where he was an incumbent at the time of his last election to the Senate, and he won that election with 60% or more of the total popular vote. This is a less restrictive definition of a safe seat than indicators used elsewhere;²⁴ however, it must be remembered that we are interested in a measure of the probability of subsequent renomination rather than the probability of re-election. With this in mind, it seems reasonable to assume that where a senator has served for more than six years and has won the support of 60% of the people in the

a good deal more likely to support administration positions on substantive motions. This is what occurred; Conservative party candidate James Buckley won and voted with the Republicans to organize the Senate and with the Nixon administration on a number of key issues.

last election, he will have a high enough level of organizational support and/or name identification to succeed in the next nominating convention/primary.

Indicators of "party position" on any given motion are as follows: The preferred position of the party of the President on any given roll call is the position taken by the President on that roll call as reported in the Congressional Quarterly Almanac. This position may be either "yea," "nay," or "none taken." For the party not of the President, on any roll call where both the senatorial leader and whip of that party either voted or were paired and took the same position that position is the preferred position of the party. Where these legislators did not both vote or record an announced pair for the same position the party is assumed to have not taken a position. Thus, for the 89th Senate the position taken by President Johnson on any motion was the Democratic party position for the roll call; and where both Senators Dirksen and Kuchel voted for or were paired on the same side of a motion, that was taken to be the Republican position for the roll call. Employing this measure, of the 493 roll calls taken in the Senate during 1965 and 1966 there were Democratic positions on 287 of them and Republican positions on 271.

These indicators of party position differ significantly from those used in other congressional roll call studies. Elsewhere congressmen and senators are assumed to have a predisposition for voting for or against a given motion depending on the party affiliation(s) of the sponsor(s). The President's position is then taken as a separate independent variable in determining a legislator's vote. Because we

are trying to specify sources of re-electoral support for legislators, we do not consider a motion's sponsor in the pre-bargaining phase. For, while a bill's sponsor may act as a broker offering side-payments in exchange for support, it is unlikely that any single legislator who is not in a leadership post has such control over a party's resources that he can command support without making explicit bargains for it. The President is likely to be in such a controlling position for his party, and it is at least plausible that the legislative leadership of the other party will collectively be able to exercise similar control over that party's admittedly more limited electoral resources.*

One final characteristic of our indicators of party position should be carefully noted. The measure of Republican (non-presidential) party position on any roll call is derived from the outcome of that roll call. The assumption upon which this measure is based is that the preferences of the minority party leader and whip are always known to all senators well in advance of any roll call. If this is so, then the use of this post hoc indicator does not necessarily mean that we are engaged in post hoc analysis. In any event, it is felt that this indicator of non-presidential position is more accurate and more consistent with our theory than the alternative of party affiliation of a motion's sponsor discussed above.**

* These party resources may take the form of organizational assistance, active support by party leaders, and limited financial aid. As such, support from one's party can only be indirectly converted into votes. On the other hand, support from constituent groups will always be in the form of votes and is thus likely to have a greater effect on the probability of a senator's being re-elected. This differential is reflected in the remaining elements of our calculus.

** The most obvious problem with using the party of a motion's sponsor as a measure of party position taken on the motion is that in

We turn next to the other sources of re-electoral support, constituents and private interest groups. As noted earlier, we are assuming--consistent with the findings of most studies of lobbying--that constituent and interest groups cannot both serve as active and effective sources of resources for senators on the same motion. Within our own sample of roll calls, on civil rights and urban welfare motions concerned constituent groups act as resource sources, and on labor-issue roll calls an interest group will be the non-party component of the overall resource calculus. In both instances, but for somewhat different reasons, we incorporate into our calculus an assertion that these sources offer more resources to those senators with the last two years of their present term. The formal element of the calculus:

- (e) For any senator facing re-election within two years the amount of resources which he may expect to receive from any significant concerned constituent or interest group for supporting that group's preferred position on any motion will increase by one (1) over the amount he could expect to receive if he were not facing immediate re-election.

There are two assumptions underlying this rule. First, gathering information on the positions taken by one's representatives involves a cost to constituent groups, and these groups have a short memory, making it more likely that they will be aware of the votes cast by their senators during a campaign period when information costs are lowest and the necessary period of recollection shortest. Second, in evaluating a legislator's performance interest groups weight recent votes more heavily, being interested in the trend of his support or

many cases one finds "atypical" members of a party acting as sponsors on particular classes of roll calls. To assume that these aberrant legislators (generally southern Democrats and liberal eastern Republicans) represent the desires of their respective party leaders seems clearly unwarranted.

opposition as well as the simple proportion of times he supported/ opposed the group.*

We now address the question of what amount of resources a legislator may expect to receive from concerned constituent/interest groups for supporting their preferred positions, independent of the expiration date of the legislator's term. In specifying this value for constituent groups we must first identify those sub-sets of a legislator's total effective electorate for whom particular issues are sufficiently salient so that they will base their voting choices largely on the degree of support evidenced by their incumbent representative for their preferred positions of such issues. We then need to specify the effect which the support/opposition of these groups has on the legislator's probability of re-election, relative to the effect of similar support or non-support from other sources. Put another way, we must now specify the amount of resources which any legislator expects to receive/forego for supporting/opposing the positions of these concerned constituent groups where they exist within his effective electorate.

In constructing this element of the overall resource calculus we assume that the probable party affiliation of any concerned constituent groups vis-a-vis the party membership of any given legislator affects the amount of resources which he may expect to receive from this source (just as the safeness of a legislator's seat affects the amount of resources which he receives from his party for supporting its position on a motion). More precisely, we assume that where a particular

*This element of the calculus is clearly Senate-specific. Applied to the House of Representatives it would have the effect of more heavily weighting constituents and private interests relative to party for all congressmen.

concerned constituent group is historically more likely to support the candidate of a given party in any election, a senator of that party may expect to receive more resources from such a group than would a legislator of another party.²⁵ The reasoning is as follows. Any group closely affiliated with one of the parties is more likely to vote for any candidate of that party than for his opponent. Such a group is also more likely to participate in the nominating process of their own party. Thus, any party-affiliated group may deny the nomination (and thereby the election) to an incumbent legislator of that party who has not supported the group's preferred positions; but the same group is less likely to affect the renomination of an incumbent legislator of the opposing party (because of nonparticipation in the nominating process), nor would members of the constituent group be likely to vote for such an incumbent in the general election. Therefore, a bloc of constituents highly associated with one of the parties will have a greater effect on the probability of re-election of an incumbent where he is a member of that party. In terms of our calculus: the amount of resources which a legislator receives from a concerned constituent group within his effective electorate for supporting its position on any given motion will be greater where the legislator is a member of the same party with which most members of the group identify. An analogous argument with an analogous conclusion may be made with reference to concerned private interest groups.

The final two elements of our resource calculus are thus:

- (f) For any senator on any motion where there exists a concerned constituent/interest group constituting a significant sub-set of his effective electorate, if that group is more closely affiliated with a particular party (than is the electorate as a whole) and the senator is a member of that party, he will

receive two (2) units of pre-bargaining resources for supporting the preferred position of that group on the roll call.*

- (g) For any senator on any motion where there exists a concerned constituent/interest group constituting a significant sub-set of his effective electorate, if that group is more closely affiliated with a particular party (than is the electorate as a whole) and the senator is not a member of that party, he will receive one (1) unit of pre-bargaining resources for supporting the preferred position of that group on the roll call.*

To apply these statements to the roll calls sampled from the 89th Senate we must identify the particular constituent/interest groups concerned with motions in each substantive issue area, the common party affiliation of each group, and the conditions under which any such group may be said to represent a significant sub-set of a senator's effective electorate. It is here especially that a number of ad hoc assumptions about these persons' policy preferences will have to be made. We minimize the number of unsupported assumptions of this kind, first, by empirically evaluating the preferences of groups on different issues and for different parties, and, where this is not possible, by relying on previously reported findings in legislative behavior and public opinion. Noting this, we now look in turn at each of the four issue areas covered in our sample of motions to complete the specification of operational indicators antecedent to testing our theory.

In the case of civil rights motions the necessity of defining what is meant by an "effective" electorate arises immediately. The concept is employed to allow us to discriminate between those residents

*The values given here are for any senator not yet serving the last two years of his current term.

of a legislative district formally eligible to participate in the electoral process (all adult citizens) and those persons for whom the cost of voting has not been increased significantly through quasi-legal discrimination, threats and intimidation, or long-standing historical precedent. This latter group is the effective electorate--those persons who may be reasonably expected to participate in any given election. Those excluded from our conceptualization of an effective electorate are the potential voters who have been excluded from the electoral process through the means described above. Southern Negroes have been the victims of just such a systematic exclusion. If this exclusion is less a fact today, it certainly was a fact during the time period from which our data are taken* and is well documented in the literature.²⁶

For the civil rights roll calls in our study we therefore consider the effective electorate in the South to be all white adult citizens, defining the South, as the Congressional Quarterly does, as the thirteen states of the southeastern U.S.** We further assume that this effective electorate constitutes a concerned constituent group opposing all legislation extending equal rights and increased opportunities to blacks. This assumption of policy preferences is not tested directly here; however, the salience of the civil rights issue for

*Indeed, it was the 89th Congress which passed the Voting Rights Act of 1965 recognizing and attempting to rectify the exclusionary practices in the South.

**These thirteen states are: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia. This operational definition of the South is not unique with our work.

southern voters has been empirically demonstrated elsewhere.²⁷ Any senator from any southern state receives two units of pre-bargaining resources from this dominant constituent group for opposing any pro-civil rights motion.*

Outside of the South Negroes are assumed to be the primary constituent group concerned with civil rights roll calls. We further assume that this constituent group supported pro-civil rights motions in the 89th Senate and was more closely affiliated with the Democratic party than was true for the population as a whole during this period of time. These assertions of policy and party preferences among Negroes are not purely ad hoc assumptions. We may empirically demonstrate outside of the legislative context the relationships posited to exist between race on the one hand and (a) support of a federal role in guaranteeing civil rights and (b) activity in the Democratic party on the other hand.

* The resource value of two for supporting this constituent group on this issue is assigned to all southern senators regardless of party. This reflects several unique characteristics of the constituent group's position within the effective electorate of these senators. For one thing, it would have been impossible to determine with certainty the dominant party allegiance of this group--white adults--on a state-by-state basis. Also, any attempted determination of what the party affiliation of these voters was during the time of the 89th Congress would have been complicated, perhaps beyond solution, by the fact that in the 1964 general elections a significant re-alignment seems to have occurred within the South with many voters abandoning their traditional support of the Democrats at the national level but still adhering to it in the case of state-wide contests. (This shift in party preference is dramatically demonstrated at a different level in Senator Strom Thurmond's change from a Democrat to a Republican in association with this election.) In light of these factors, and because the concerned constituent group here is assumed to be so large as to correspond to the entire effective electorate, the decision was made to score all southern senators of both parties as receiving resources in the amount of two units for opposing civil rights legislation.

To do this we examine demographic, opinion, and political preference/activity data gathered in a nation-wide survey taken at the time of the 1964 general elections.²⁸ In testing for the existence of the relationships posited above, our independent variable in both cases is race, dichotomized as "Negro" and "other." Policy preference in the area of civil rights is operationalized as responses to a question eliciting support or opposition to a federal role in the field of fair employment practices. As an indicator of party preference we use the respondent's report of which party's primary he voted in in 1964.* The relationships found between race and policy preference/party activity appear in Table 6. As can be seen, these results strongly support our contention that Negroes constitute a concerned constituent group favoring federal civil rights legislation and highly affiliated with the Democratic party.**

Having concluded that on civil rights motions Negroes are a concerned constituent group within the effective electorate of non-southern states, we next specify the circumstances under which this group will comprise a significant proportion of the total effective electorate of any senator's district. That is, we need to establish what proportion of a non-southern senator's constituency must be black

* We chose to use this measure of party affiliation rather than the more traditional partisan self-identification indicator for a specific reason. Our concern with party in constructing the resource calculus was based on the assumption that where a constituent/interest group generally participates in the nomination process of one of the parties the support of that group will be more crucial to an incumbent legislator of the same party than to a legislator belonging to a different party. By using primary voting as a measure of party identification we are also measuring participation in the nomination process.

** The figures in Table 6 are for blacks from the South as well as the non-southern states.

Table 6 Civil Rights Policy Preference and Party Activity by Race, 1964^a

Position on Federal Fair Employment Practices Role	Race		Party Primary Vote, 1964	Race	
	Negro	Not Negro		Negro	Not Negro
Support of Federal Role	93.6%	43.2%	Democratic	91.4%	63.7%
Opposition to Federal Role	6.4	56.8	Republican	8.6	36.3
(N)	(141)	(1076)		(58)	(840)

a. Survey Research Center, 1964 Election Study.

in order for him to be coded as receiving re-electoral resources from this group for taking a pro-civil rights stand. Here we follow the practice of simulations of congressional behavior, establishing a threshold level for a particular constituency characteristic such that for any district where the threshold is met or exceeded the presumed effect of the constituency characteristic is included in the prediction of how the representative will vote on the appropriate roll calls. However, we deviate from the methodology of others of calculating the parameter for each district in turn and setting the threshold level for any one district at what seems to be the natural break point in the distribution.²⁹ Instead, we calculate the parameter for the multi-state population and use that figure as our cut-off point.* For all non-southern states this statistic is 6.8% Negroes in the population in 1960. Thus, where Negroes represent 6.8% or more of a non-southern state's total population, we code blacks as a significant constituent group for the senators from that state on civil rights motions. Democratic senators from such states receive two units of resources for supporting an expanded federal role in guaranteeing civil rights; Republican senators in similar circumstances receive one unit of pre-bargaining resources; and where Negroes represented less than 6.8% of a non-southern state's population in 1960, neither senator from the state receives any resources from constituents on civil rights motions.

Corroborative evidence for the presumed relationship between

* We recognize that the national population mean as the threshold of significance for a constituency characteristic is an arbitrary cut-off point. However, such a decision rule is no more arbitrary than the alternative of employing a "natural break point" where the means of arriving at the break point are not specified.

the percentage of Negroes in a state's population and support by the senators of that state for civil rights legislation can be found in an analysis by Charles Andrain of roll call voting in the U.S. Senate in 1960.³⁰

We follow a similar procedure as that outline above in designating interested constituent groups for urban welfare motions. Here we assume that urban poor (operationally defined as persons living in cities of 100,000 or more population and earning an annual family income of less than \$3,000 in 1960) represent a concerned group favoring federal aid to cities and that high-income persons (\$10,000+ annual income, 1960) constitute a group opposing such aid. The party affiliation of the former group is taken to Democratic, and the latter group Republican. Applying our pre-bargaining resource calculus for urban welfare roll calls, each Democratic senator is coded as receiving two units of resources from urban poor for supporting expansion of federal assistance to urban areas where the urban poor constitute a significant proportion of the state's population; where high-income persons represent a significant proportion of the state's population, a Democratic senator is coded as receiving one unit of resources for opposing such legislation. Any Republican senator receives one unit of resources from the urban poor group for voting its preferred position on urban welfare roll calls and two units of pre-bargaining resources from high-income persons for supporting their position on such motions, again with the stipulation that corresponding constituent group comprises a significant proportion of the senator's district/state. No senator of either party is coded as receiving any pre-bargaining resources from either of these groups where the group does not constitute a significant interest in the

senator's electorate. As before, the threshold of significance for each of these groups is set at the corresponding proportion of the national population represented by each one--4.8% of a state's population for the urban poor and 15.1% for high-income persons.

Also as before, the assumptions made here concerning the policy and party preferences of these two groups are supported by data from a survey of potential voters taken at the time of the 1964 general elections. Tables 7 and 8 show the relationships between size-of-residence and income on the one hand and preferences for federal social welfare legislation and political party affiliation on the other hand. The findings as reported clearly support our contentions.* Corroborative evidence also exists for our assertions regarding the kinds of constituent characteristics which are associated with a legislator's supporting urban welfare legislation.³¹

Turning next to roll calls of concern to organized labor, our concern shifts from constituent groups to private interest groups. The labor motions in our sample of roll calls were chosen precisely because they were the ones identified by the AFL-CIO as being their primary legislative objectives for the 89th Congress. The AFL-CIO is,

* Weakness in the association between urban poor and Democratic party affiliation may be partially accounted for by the necessity of defining this group for the purposes of these tests as persons earning less than \$3,000 annual income and living in cities of 50,000 or more population, rather than the limit of 100,000+ cities specified in the calculus. Furthermore, data restrictions forced us to use responses to the question of whether or not the federal government should be responsible for personal living standards as the indicator of policy preference on the question of urban welfare legislation. While these operational indicators do not correspond perfectly to the definitions we have used in our calculus, the results in Table 7 and Table 8 generally support our assumptions of policy and party preferences among these groups.

Table 7 Social Welfare Policy Preference and Party Activity by Size of Residence & Income, 1964^a

Position on Federal Role in Maintaining Stand- ard of Living	Size of Residence and Annual Income		Party Primary Vote, 1964	Size of Residence and Annual Income	
	50,000 + Pop. Below \$3000 Inc.	Other		50,000 + Pop. Below \$3000 Inc.	Other
Support of Federal Role	66.7 %	40.4 %	Democratic	68.6 %	65.3 %
Opposition to Federal Role	33.3	59.6	Republican	31.4	34.6
(N)	(57)	(1013)		(35)	(798)

a. Survey Research Center, 1964 Election Study.

Table 8 Social Welfare Policy Preference and Party Activity by Income, 1964^a

Position on Federal Role in Maintaining Stand- ard of Living	Annual Income		Party Primary Vote, 1964	Annual Income	
	\$10,000 +	Other		\$10,000 +	Other
Support of Federal Role	25.3 %	46.2 %	Democratic	54.4 %	68.7 %
Opposition to Federal Role	74.7	53.8	Republican	45.6	31.3
(N)	(241)	(859)		(204)	(652)

a. Survey Research Center, 1964 Election Study.

therefore, taken to be a concerned interest group with reference to the organized labor motions; the preferred position of this group on each roll call is taken to be the one announced by the group itself. Furthermore, we assume that for these roll calls no concerned constituent groups exist. Finally, we assume the AFL-CIO to be affiliated predominantly with the Democratic party in terms of likely candidate support. The threshold of significance of AFL-CIO presence within any state is set at the proportion of the national work force made up of AFL-CIO members. In 1960 this figure was 21.5%.³²

For foreign aid roll calls we assume that neither constituent nor interest groups are generally concerned enough with the outcomes to act as sources of pre-bargaining resources for senators. Thus, only the position (if any) taken by a legislator's party will enter into his calculations of the R_{pb} value of any foreign aid motion for him. This assertion that members of Congress are relatively free of constituent/interest group pressures on these kinds of bills appears elsewhere in the legislative voting literature as well.³³

This concludes our presentation of the pre-bargaining resource calculus first as a series of general rules and then as applied to the U.S. Senate. If the presentation has been of considerable length, it must be remembered that for this study the resource calculus is also of considerable importance. As we have noted, in testing our theory in the following chapter we are testing the validity of this calculus as well. And while questions may remain concerning some of the assumptions underlying the calculus as operationally defined, we have attempted here to make explicit and justify our indicators as fully as possible.

Before discussing the use of the calculus in classifying legislators and roll calls antecedent to testing our theory, we may summarize some of the unique characteristics of our measurements of legislative voting pressures. First, we include organized interest groups in the calculus of extra-legislative re-electoral support. As indicated earlier, this element is often ignored in roll call analyses. Second, the amount of pre-bargaining resources which any legislator may expect to receive from a concerned constituent/interest group varies with the identity between the party affiliation of the group and that of the legislator. Third, in dealing with the overlapping six-year terms of U.S. senators we incorporate into the calculus an assumption that supporting the goals of any significant constituent/interest group will be more important as the congressman approaches re-election. Fourth, the amount of re-electoral resources which one's party may offer varies with the probability of the senator's being renominated. Finally, we employ a unique indicator of minority party position relying on the recorded votes of the party's leader and whip. Some of these characteristics of our calculus are peculiar to the setting being examined; others are generalizable to any legislature. In any event, it is hoped that the overall set of indicators as presented here and the theory as presented in Chapter II will allow us to more precisely predict voting and non-voting choices in the U.S. Senate than has been possible to date.

We can now classify each senator on each roll call according to the pre-bargaining resource value of the motion for him. This, in turn, will allow us to determine whether any given roll call is a

bargaining or non-bargaining one. To do this we first calculate the amount of resources which each member of the 89th Senate can expect to receive from each relevant source for supporting its preferred position on each roll call in our sample. We then subtract the total amount of pre-bargaining resources which a senator receives for voting "nay" from the amount of resources he would receive for voting "yea" and classify each senator on each roll call as follows: Where the net resource-value of a motion for a senator is +2 or greater, the senator is deemed a member of the supporting proto-coalition on that motion; where his net resource-value is +1, he is classed as a pre-bargaining supporter; for a resource-value of zero (0), he is considered indifferent; for a net resource-value of -1, he is classed as a pre-bargaining opposer; and all senators with resource-values of -2 or less are considered members of the opposing proto-coalition on the roll call. All motions on which neither of the proto-coalitions consists of 51 or more members ($\frac{N+1}{2}$ of all senators) are then designated as bargaining roll calls, consistent with our definition of the concept. Conversely, all motions on which one of the proto-coalitions has 51 or more members are classified as non-bargaining roll calls.*

* On cloture motions (requiring a two-thirds majority for victory) the minimum-certainty-of-winning proto-coalition sizes are 67 for the supporting side and 34 for the opposing side.

FOOTNOTES: CHAPTER III

¹E. W. Kelley, "Utility Theory and Political Coalitions: Problems of Operationalization," in Sven Groennings, E. W. Kelley, and Michael Leiserson, eds., The Study of Coalition Behavior (New York: Holt, Rinehart and Winston, Inc., 1970), p. 480.

²Hayward R. Alker, Jr., "Computer Simulations, Conceptual Frameworks, and Coalition Behavior," in Groennings et al, The Study of Coalition Behavior, p. 377.

³Groennings et al, The Study of Coalition Behavior.

⁴One notable exception is: David B. Meltz, "Competition and Cohesion: A Model of Majority Party Legislative Bargaining" (unpublished Ph.D. dissertation, University of Rochester, 1970).

⁵Joseph A. Schlesinger, Ambition and Politics (Chicago: Rand McNally & Co., 1966).

⁶Lewis A. Froman, Jr., "Differences Between the House and Senate," in Raymond E. Wolfinger, ed., Readings on Congress (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1971), P. 63.

⁷Ibid., p. 62.

⁸The use of the closed rule is discussed with reference to revenue bills in John F. Manley, "The House Committee on Ways and Means: Conflict Management in a Congressional Committee," in Wolfinger, ed., Readings on Congress.

⁹For an examination of this kind of bargain see the discussion of "concerned" legislators in Meltz, "Competition and Cohesion."

¹⁰Donald R. Matthews, U.S. Senators and Their World (New York: Vintage Books, 1960), pp. 92-101.

¹¹For roll call studies of the U.S. Senate see, among others: John E. Jackson, "Statistical Models of Senate Roll Call Voting," American Political Science Review, LXV (June, 1971); and Jeanne L. Martin, "Exchange Theory and Legislative Behavior: A Computer Simulation of Roll-Call Voting in the U.S. Senate" (unpublished Ph.D. dissertation, Michigan State University, 1971).

¹²Randall B. Ripley, Power in the Senate (New York: St. Martin's Press, 1969), p. 14.

¹³Rowland Evans and Robert Novak, Lyndon B. Johnson: The Exercise of Power (Cleveland: The World Publishing Company, 1966), pp. 95-117.

¹⁴John G. Stewart, "Two Strategies of Leadership: Johnson and Mansfield," in Nelson W. Polsby, ed., Congressional Behavior (New York: Random House, 1971), p. 61.

¹⁵See, among others: Jackson, "Statistical Models of Senate Roll Call Voting."

¹⁶Among these studies are: Cleo Cherryholmes and Michael Shapiro, Representatives and Roll Calls (Indianapolis: The Bobbs-Merrill Company, Inc., 1969); Lewis A. Froman, Jr., Congressmen and Their Constituencies (Chicago: Rand McNally & Co., 1963); and Martin, "Exchange Theory and Legislative Behavior."

¹⁷John Bibby and Roger Davidson, On Capitol Hill (New York: Holt, Rinehart and Winston, Inc., 1967), p. 144.

¹⁸William H. Hunt, Wilder W. Crane, and John C. Wahlke, "Interviewing Political Elites in Cross-Cultural Comparative Research," in Samuel C. Patterson, ed., American Legislative Behavior: A Reader (Princeton, New Jersey: D. Van Nostrand Company, Inc., 1968), p. 421.

¹⁹Congressional Quarterly Almanac (Washington, D.C.: Congressional Quarterly Service, 1967), XXII, 1965, p. 6; and 1966, p. 6.

²⁰Eugene Eidenberg and Roy D. Morey, An Act of Congress (New York: W. Norton & Company, Inc., 1969), pp. 59-69.

²¹Congressional Quarterly Almanac, 1966, pp. 1302, 1347.

²²See, among others: Cherryholmes and Shapiro, Representatives and Roll Calls; and Martin, "Exchange Theory and Legislative Behavior."

²³Jackson, "Statistical Models of Roll Call Voting."

²⁴See, among others, the measure used in Raymond E. Wolfinger and Joan H. Hollinger, "Safe Seats, Seniority, and Power in Congress," in Wolfinger, ed., Readings on Congress, pp. 40-41.

²⁵See: Anthony Downs, An Economic Theory of Democracy (New York: Harper and Row 1957) for an imaginative explanation of the appearance of these kinds of party affiliations.

²⁶See: Donald R. Matthews and James Prothro, Negroes and the New Southern Politics (New York: Harcourt, Brace, and World, Inc., 1966).

²⁷V. O. Key, Southern Politics (New York: Alfred Knopf, 1949), among others.

²⁸1964 Election Study, Survey Research Center (Ann, Arbor, Michigan).

²⁹Cherryholmes and Shapiro, Representatives and Roll Calls, footnote on p. 49.

³⁰Charles F. Andrain, "Senators' Attitudes Toward Civil Rights," in Patterson, American Legislative Behavior.

³¹See, in this regard, an analysis of the constituency characteristics of the congressmen who supported the federal food stamp program in 1964: Randall B. Ripley, "Legislative Bargaining and the Food Stamp Act, 1964," in Frederic N. Cleaveland and Associates, Congress and Urban Problems (Washington: The Brookings Institution, 1969), p. 305.

³²Source: U.S., Bureau of the Census, Statistical Abstract of the United States 1963, 84th edition.

³³The assumption is implicit in the calculus of predisposition developed in Cherryholmes and Shapiro, Representatives and Roll Calls, Chapter 7. It is also supported by the findings of James A. Robinson, Congress and Foreign Policy-Making (Homewood, Illinois: The Dorsey Press, 1967).

CHAPTER IV

FINDINGS

In this chapter we test the hypotheses derived in Chapter II within the setting and employing the operational indicators specified in Chapter III. We report the results of these tests first for the entire sample of roll calls and legislators, then for sub-samples of roll calls and legislators to determine whether or not our theory of the legislative process is a more accurate description of reality under certain more limited circumstances. Throughout we discuss the implications of our findings for the theory of coalition formation in legislatures.

As we did in first presenting our theoretical propositions, we begin here by dividing the full set of testable hypotheses into four discrete sub-sets each dealing with a different phenomenon. Within each hypothesis-set the empirical tests employed are similar; across sets the test vary considerably. The first hypothesis-set predicts absolute and relative sizes of winning coalitions for bargaining and non-bargaining roll calls. Here we wish to demonstrate that two distinct types of roll calls do indeed exist and that on only one type of roll call will minimum winning coalitions occur. The initial deterministic proposition is as follows:

- H₁ The eventual winning coalition for all bargaining roll calls is just large enough to be certain of victory and no larger.

The second proposition is in the form of a relativistic hypothesis:

- H₂ The mean difference between the size of the eventual winning coalition and the minimum-certainty-of-winning size is greater for non-bargaining roll calls than for bargaining roll calls.

To test these hypotheses we develop an index of deviation between any given winning coalition size and the associated minimum-certainty-of-winning size. This index of deviation is calculated by subtracting the minimum-certainty-of-winning coalition size from the observed winning coalition size, dividing the absolute value of that figure by the difference between the total number of possible votes and the minimum-certainty-of-winning coalition size, and multiplying that fraction by one hundred.¹ Expressed as a general formula the index of deviation for any given roll call is as follows:

$$\frac{(\text{observed winning coalition size}) - (\text{minimum-certainty-of-winning size})}{(\text{total possible number of votes}) - (\text{minimum-certainty-of-winning size})} \times 100$$

This index may take on values from zero through one hundred, inclusive, corresponding to winning coalitions ranging from exactly minimum-certainty-of-winning (zero) to a winning coalition of the whole (one hundred). In our application of the measure to voting in the U.S. Senate the "total possible number of votes" is always one hundred. The "minimum-certainty-of-winning size" is 51 for most roll calls. However, for procedural votes requiring a two-thirds majority of those present and voting (e.g. cloture, veto-override, etc) the minimum-certainty-of-winning size is 67 for the supporting proto-coalition and 34 votes for the opposing proto-coalition.

We may now apply the index of deviation to our sample of roll calls from the 89th Senate in order to test the initial pair of

hypotheses. In so doing we calculate (a) the mean index of deviation for all 116 motions (including six cloture votes) classed as bargaining bills, and (b) the mean index of deviation for all thirty-nine roll calls which our theory predicted to be of the non-bargaining type. The results of these calculations appear in Table 9 and Figure 1.*

The data in the first table are generally supportive of our theory. They disconfirm the deterministic prediction of H_1 , as would be expected, but, at the same time, the data strongly support the relativistic prediction of H_2 . While not all bargaining motions are passed or defeated by an exactly minimum-certainty-of-winning coalition, there is a significant difference in the expected direction between the average deviation from minimum size for bargaining roll calls and the same statistic for non-bargaining roll calls. Indeed, the average deviation for non-bargaining motions is nearly twice that of bargaining roll calls (as reported in Table 1). Thus, we may tentatively conclude that our central proposition that there are two distinct types of motions in legislative bodies is correct. Furthermore, the probability of minimum-certainty-of-winning coalitions occurring is, as we predicted, greater for one type of roll call than for the other.

Figure 1, comparing the distributions of winning coalition sizes for bargaining and non-bargaining roll calls (excluding cloture votes), illustrates these phenomena dramatically. From this figure we

* In this and in all subsequent tests we include recorded positive and negative pairs as the equivilants of "yea" and "nay" votes respectively. This is based on the assumption that such pairs are known to all brokers before a roll call is taken and that they are thereby equivilant to other vote commitments in the bargaining process. Other research on congressional coalitions has similarly counted recorded pairs as the equivilants of votes.₂

Table 9 Mean Difference Between Observed Winning Coalition Size and Minimum-Certainty-of-Winning Coalition Size by Type of Roll Call

	Bargaining Roll Calls	(N) ^a	Non-Bargaining Roll Calls	(N)
Mean Index of Deviation _b	16.7 %	(116)	32.5 %	(39)

a. Number of roll calls.

b. Figure in each cell is the mean index of deviation for all roll calls of the type specified. See text for definition of index of deviation.

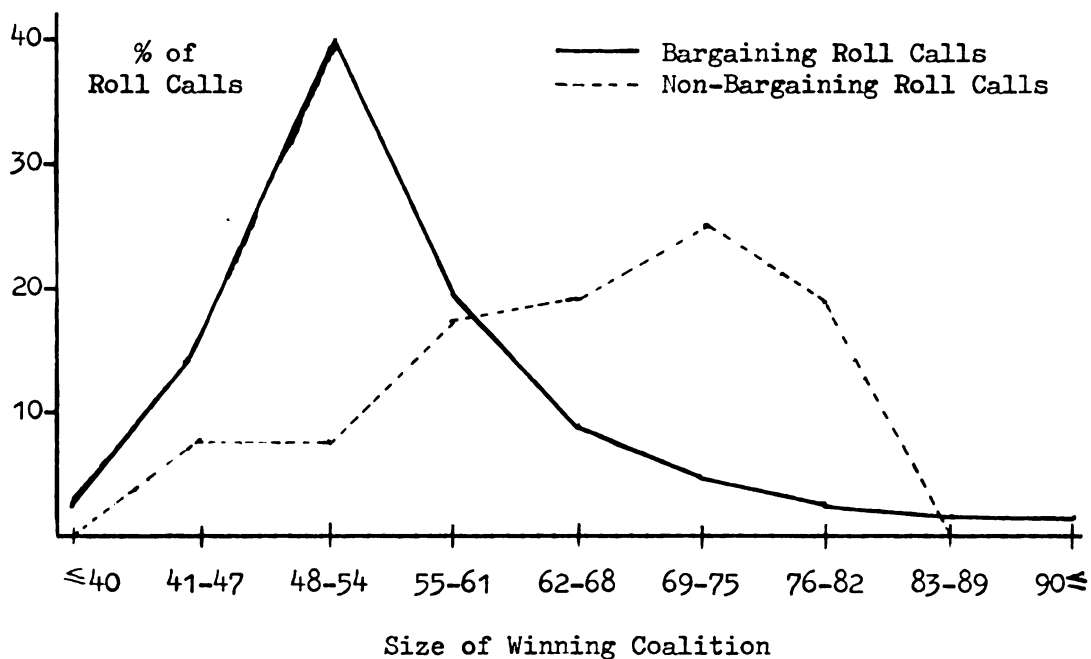


Figure 1 Frequency Distribution of Winning Coalition Sizes for Bargaining and Non-Bargaining Roll Calls Excluding Cloture Votes

see that the modal size of winning coalitions for non-bargaining bills is considerably greater than the corresponding figure for bargaining roll calls. The modal winning coalition size for bargaining bills is within three votes of 51, as our theory suggests, while the modal winning coalition size for non-bargaining motions is in the 69-75 member range. Furthermore, fully 38.2% of the winning coalitions for the bargaining roll calls in our sample are within three votes of 51, and 73.7% of the coalitions fall within the 41-61 vote range. For non-bargaining roll calls these figures are 7.7% and 33.4% respectively. While these figures are certainly supportive of the second hypothesis, again, they fail to confirm H_1 .^{*} Possible explanations for the deviations from minimum-certainty-of-winning coalitions among bargaining roll calls are presented and empirically examined later in the chapter. But before looking at such explanations, we turn next to the second series of theoretical derivatives.

This second hypothesis-set, $H_3 - H_7$, describes the absolute and relative rates of valence voting among different classes of legislators on bargaining and non-bargaining motions. The third and fourth propositions state that all proto-coalition members on any roll call and all pre-bargaining supporters/opposers on non-bargaining roll calls who vote will vote for the position for which they can expect to receive

* The disconfirmation of this and the other deterministic hypotheses is in no way unexpected. Explanations for 100% of the variance in complex social/political phenomena simply do not now exist. For the remainder of Chapter IV we shall acknowledge this fact by treating all deterministic statements as intermediate propositions in the derivation of the probabilistic hypotheses. Evidence relating to these deterministic statements will be noted only in passing, and conclusions as to the validity of our theory will be based on the results of tests of the relativistic hypotheses only.

the greatest resource payoff from pre-bargaining sources. That is:

- H₃ All proto-coalition members who vote vote their valences.
- H₄ All pre-bargaining supporters and opposers who vote on non-bargaining roll calls vote their valences.

As outlined in Chapter II, these propositions follow from the conclusions that no proto-coalition member and no pre-bargaining supporter or opposer on a non-bargaining motion will be offered any side-payments to shift his vote. A further conclusion from our theory (theorem IV) states that pre-bargaining supporters/opposers on bargaining roll calls may vote for the position opposite to that for which they can expect to receive the greatest amount of pre-bargaining resources. This theorem taken together with the pair of statements just presented allows us to derive the following testable hypotheses:

- H₅ The proportion of voting pre-bargaining supporters and opposers who vote their valences is greater on non-bargaining roll calls than on bargaining roll calls.
- H₆ Across all bargaining roll calls, the proportion of voting proto-coalition members who vote their valences is greater than the proportion of voting pre-bargaining supporters and opposers who vote their valences.
- H₇ Across all roll calls, the proportion of voting proto-coalition members who vote their valences is greater than the proportion of voting pre-bargaining supporters and opposers who vote their valences.

To test these hypotheses we calculate the proportions of proto-coalition members and pre-bargaining supporters/opposers voting their preferred pre-bargaining positions on both bargaining and non-bargaining roll calls as percentages of the total numbers of each class of senator voting on each class of motion. Table 10 gives the results of these calculations for the entire sample of roll calls. As with the preceding hypothesis-set, the deterministic statements (H₃ and H₄) are

Table 10 Rate of Valence Voting by Class of Legislator and Type of Roll Call

Rate of Valence Voting _a	Proto-Coalition Members		Pre-Bargaining Supporters/Opposers	
	Bargaining Roll Calls	Non-Bargaining Roll Calls	Bargaining Roll Calls	Non-Bargaining Roll Calls
	78.3 %	80.5 %	53.9 %	67.9 %
(N) _b	(4271)	(2338)	(2060)	(1129)

a. Figure in each cell is the proportion of all the corresponding group of legislators who voted for their most preferred pre-bargaining positions as a percentage of the total number of legislators in the group who voted.

b. Number of individual votes cast by all legislators in the group.

disconfirmed while the testable probabilistic generalizations (H_5 , H_6 , and H_7) are supported by the data.

The observed rates of valence voting for proto-coalition members across all roll calls and for pre-bargaining supporters/opposers on non-bargaining roll calls are found to be 79.0% and 67.9%. While neither of these findings are equal to the 100% rate predicted, neither of the findings are unexpected, and both figures represent fairly high levels of correctly predicted voting choices.

Of greater interest are the results of the tests of the fifth through seventh hypotheses. Proposition H_5 hypothesizes that the proportion of pre-bargaining supporters/opposers voting their valences will be greater on non-bargaining roll calls than on bargaining motions. Our findings support this prediction, with the respective rates of valence voting for the two groups being 67.9% and 53.9%. The sixth hypothesis, predicting a greater rate of valence voting among proto-coalition members than among pre-bargaining supporters and opposers on bargaining roll calls, is also supported by the data (78.3% vs. 53.9%), as is the seventh proposition predicting a greater rate of valence voting among all proto-coalition members than among all pre-bargaining supporters/opposers (79.0% vs. 58.9%).

These results are generally supportive of our theory. Furthermore, additional manipulations of the data presented in Table 10 may be performed to suggest that what error does exist lies not in the theory but in the indicators employed to test it. Specifically, if our theory is valid, in addition to the results described in hypotheses H_5 - H_7 we would also expect to find a greater difference between the rates of valence voting for pre-bargaining supporters/opposers on

non-bargaining roll calls and the same class of legislators on bargaining roll calls than between the rates of valence voting for pre-bargaining supporters/opposers on non-bargaining motions and proto-coalition members on the same roll calls. Put another way, we would expect the voting behavior of the pre-bargaining supporters/opposers on non-bargaining roll calls to more closely resemble that of proto-coalition members on the same roll calls than that of other pre-bargaining supporters/opposers on bargaining roll calls. This additional hypothesis is weakly supported by the data in Table 10 where we find the difference between the figure in column three and the corresponding figure in column to be 14.0% while the difference between the figures in columns two and four is only 12.6%. Another secondary hypothesis can be offered to the effect that there will be a greater difference between the voting behavior of pre-bargaining supporters/opposers on the two different types of roll calls than there will be between proto-coalition members on the two kinds of motions. Our data support this conclusion as well with the two differences in valence voting rates being 14.0% and 2.2% respectively. Still another such hypothesis which we may derive from our theory predicts a greater difference between the rates of valence voting of proto-coalition members and pre-bargaining supporters/opposers on bargaining motions than between these same two groups of senators on non-bargaining roll calls. Again, the results reported in Table 10 conform to this expectation; we find the difference between column one and column three, 24.4%, greater than the difference between columns two and four, 12.6%. These additional findings offer further evidence for believing that our theory is an accurate abstraction of the legislative process.

The third set of hypotheses deals with abstention rates. The first proposition in this set is a deterministice restatement of theorem VIII:

H₈ All indifferents on non-bargaining roll calls abstain.

The ninth hypothesis describes the relative abstention rates we expect to observe among the various types of legislators on the various types of roll calls. This generalization follows from theorems VIII and V wherein we posit that: all indifferents on non-bargaining roll calls will abstain for strategic reasons--reasons other than unavoidable detention; pre-bargaining supporters/opposers and indifferents on bargaining roll calls may abstain for strategic reasons; and pre-bargaining supporters/opposers on non-bargaining roll calls as well as proto-coalition members on any roll call will never abstain as a short- or long-term resource maximizing strategy. The testable theoretical derivative is:

H₉ The abstention rate among indifferents on non-bargaining roll calls is greater than the abstention rate among pre-bargaining supporters/opposers and indifferents on bargaining roll calls, which is, in turn, greater than the abstention rate among pre-bargaining supporters/opposers on non-bargaining roll calls and proto-coalition members on all roll calls.

The testing of these propositions is a fairly simple matter of calculating and comparing the abstention rates for each class of legislator on each type of roll call. The results of this analysis appear in Table 11. As is readily observable from this table, neither of these statements is supported by the data. Indeed, the group of senators hypothesized in H₈ to always abstain evidences the lowest abstention rate--1.1% non-voting for indifferents on non-bargaining motions. Also, pre-bargaining supporters/opposers and indifferents on

Table 11 Abstention Rate by Class of Legislator and Type of Roll Call

	Proto-Coalition Members		Pre-Bargaining Supporters/Opposers		Indifferents	
	Bargaining Roll Calls	Non-Barg. Roll Calls	Bargaining Roll Calls	Non-Barg. Roll Calls	Bargaining Roll Calls	Non-Barg. Roll Calls
Abstention Rate ^a	11.0 %	9.0 %	10.1 %	9.0 %	12.2 %	1.1 %
(N) ^b	(4796)	(2568)	(2291)	(1240)	(4513)	(92)

a. Figure in each cell is the proportion of legislators in the corresponding group neither paired nor voting as a percentage of the total number of votes that could have been cast by the group.

b. Number of potential votes (base for calculating abstention rate).

bargaining roll calls, predicted to have the next highest abstention rate, are found to abstain at the highest rate, or 11.5%. Finally, we observe that the group of legislators posited to vote most frequently did, in fact, abstain at the rate of only 10.1%, corresponding to the weighted average of columns one, two, and four in Table 11.

These results make it clear that at least one of the axioms from which these hypotheses are deduced must be false. Because of the wide variation between the prediction of H_8 and the corresponding observation, our attention is drawn to theorem VIII in searching for an explanation for our unexpected findings. Any such explanation will entail the designation of which axiom(s) antecedent to the invalidated theorem is (are) false. Of the sub-set of axioms used to derive theorem VIII there is only one which does not appear as a logical antecedent to any other conclusion. This is axiom 6 which posits a small cost in the act of voting. If we substitute for this axiom the alternative assumption that:

Axiom 6'. The act of not voting involves a small net cost for any legislator on any motion.*

we may drop theorem VIII and hypotheses H_8 and H_9 and derive a single new testable hypothesis describing the relative rates of abstention which we would now expect to find among the different groups of legislators on the different class of roll calls. Our theory so revised now predicts that the only legislators who will be willing to incur the

* One may still assume that there is some cost in attending a roll call and yet conclude that the net cost of abstaining is greater, where the cost of not voting is measured in the negative effect it can have on a senator's probability of re-election by lowering his overall attendance rate and thus projecting a "Tuesday-Thursday Club image to his constituents.

cost of abstaining are those for whom an abstention serves to communicate a threat of non-support to potential brokers; these legislators are the indifferents and pre-bargaining supporters/opposers on bargaining bills. If these are the only persons who will abstain for strategic reasons, we would expect to find a greater overall abstention rate among them than among other legislators on types of roll calls.

This new probabilistic hypothesis may be stated as follows:

H_8' The overall abstention rate among pre-bargaining supporters/opposers and indifferents on bargaining roll calls is greater than the overall abstention rate among proto-coalition members on all roll calls, pre-bargaining supporters/opposers on non-bargaining roll calls, and indifferents on non-bargaining roll calls.

This alternative hypothesis is consistent with the data presented in Table 11 where we find an abstention rate among those senators predicted to sometimes abstain for strategic reasons greater than the corresponding abstention rate among those senators predicted to never abstain for strategic reasons. The two abstention rates are 11.5% and 10.0% respectively, a 15% greater proportion of non-voting among those legislators posited to strategically abstain on occasion. We also note that the figure in column five of Table 11 (abstention rate for indifferents on bargaining roll calls) is greater than any of the figures in columns one, two, four, or six (abstention rates among those legislators posited to never strategically abstain); and the figure in column three (abstention rate among pre-bargaining supporters and opposers of bargaining roll calls) is greater than all but one of the abstention rates of those groups of persons predicted to not abstain for strategic reasons. These secondary observations would seem to lend further support to our alternative hypothesis H_8' . However,

none of these secondary relationships are very strong, and there still remains unexplained the wide variance among groups predicted to never abstain for strategic reasons. In light of these observations and because the initial hypotheses concerning abstention rates were found to be invalid, we will be especially careful to note relative abstention rates as we examine sub-sets of our sample of roll calls later in this chapter.*

The last of our hypotheses is a restatement of theorem I and follows from the assumption that all legislators are long-term resource maximizers, that during any legislator's term in office there will be a large number of roll calls, and that each legislator's utility function for the resources acquired in the bargaining process is constantly increasing.

H₁₀ The position of a motion on the legislative agenda does not affect the processes of bargaining and coalition formation.

To test this proposition we divide our complete sample of roll calls into four sub-sets according to the session of the 89th Congress and the calendar-half of each session in which each motion was voted on in the Senate. The first sub-set includes those roll calls taken from the opening of the 89th Congress through June 30, 1965; the second sub-set of motions consists of those voted on during the period of

* While the size of our current sample of roll calls does not allow it here, in further tests of this and other theories of non-voting it might be useful to introduce as a control variable the number of other roll calls taken on the same day as that for which abstention is predicted. If a legislator is already on the floor (or at least in town) for another vote the same day, it is more likely that he will also vote on all other motions; having incurred the cost of attending one roll call for the day, the additional cost of attending others will be minimal. Lacking the data to test it ourselves, this secondary hypothesis remains a suggestion for further research.

July 1, 1965 through the close of the first session; the third group is made up of those roll calls recorded during the second session through June 30, 1966; and the last sub-set of motions consists of the roll calls taken during the remainder of the 89th Senate. We chose these groupings because the creation of any additional sub-samples would seriously reduce the number and variety of roll calls appearing in each one. Also, by splitting the agenda of each session at June 30/July 1 each calendar year is equally divided and the demarcation date corresponds to the end of the fiscal year and the time of the traditional Independence Day congressional recess. With our sample of roll calls divided in this fashion, we test hypothesis H_{10} by calculating and comparing the mean indices of deviation (between observed winning coalition size and minimum-certainty-of-winning size) for all bargaining and non-bargaining motions with each sub-set. The findings appear in Table 12.

These data clearly support our prediction that the process of coalition formation is independent of the position of a roll call on the legislative agenda. While the strength of the relationship varies, for each of the four sub-sets of roll calls in our sample the average percent deviation from the minimum-certainty-of-winning coalition size is greater for non-bargaining motions than for bargaining motions. Where the relationship is weakest, for the first half of the second session, the N's are also smallest (five bargaining roll calls and a single non-bargaining motion). But throughout, including this small sub-set, the indices of deviation are related as predicted.*

* With a larger overall sample of motions one could also test the effect of agenda-position on valence voting and abstention rates.

Table 12 Mean Difference Between Observed Winning Coalition Size and Minimum-Certainty-of-Winning Coalition Size by Type of Roll Call and Agenda Position

Agenda Position	Bargaining Roll Calls	(N)	Non-Barg. Roll Calls	(N)
1965, 1st. Half	26.3 % ^a	(27)	38.4 %	(25)
1965, 2nd. Half	11.9	(28)	21.1	(9)
1966, 1st. Half	20.2	(5)	20.4	(1)
1966, 2nd. Half	14.2	(56)	24.5	(4)
All Roll Calls	16.7	(116)	32.5	(39)

a. See note Table 9.

Another interesting relationship is evident in Table 12 and may be noted in passing. While the mean observed winning coalition size among non-bargaining motions is consistently greater than the same statistic for bargaining bills, the proportion of each type of roll call varies significantly and systematically with agenda-position. For our entire sample of roll calls the proportion of bargaining motions is 74.8%. However, of the sub-set of these roll calls taken from the first half of the first session of the 89th Senate only 51.9% are of the bargaining type. For the next three time periods in sequence the proportion of bargaining roll calls increases consistently to 75.7%, then 83.3%, and finally 93.3% for the last half of the second session. One plausible explanation for this phenomenon which is not at all inconsistent with our model of the legislative process is that on certain motions the potential resource payoff to the brokers is very large, the side-payments offered are also large, and, therefore, bargaining takes a longer time delaying votes on such motions until late in the legislative session. At the same time, the less controversial non-bargaining motions may be taken up at an earlier date while the new and returning senators adjust to the reconstitution of the legislative body and the redefinition of the parameters of the legislative game.

The empirical results reported thus far are supportive of most of our theory's testable, probabilistic hypotheses; and for the one instance in which the observation differs consistently from the prediction we are able to propose a tentative explanation consistent with the results. However, the deterministic propositions are in all instances disconfirmed (as expected), and the findings which support the relativistic hypotheses are not everywhere as strong as might be desired (not

unexpected, but disappointing). In the remainder of this chapter we offer a series of explanations for the still unexplained observations and, wherever possible, test these explanations in an attempt to increase the power of our theory.

Discrepancies found between observation and prediction may result from a variety of causes. For one thing, as we have noted repeatedly, in testing our formal theory of the legislative process we are also indirectly testing the validity of the operational indicators employed in the analysis. It is thus possible that where the data are only partially supportive of a particular hypothesis or hypotheses, the fault may lie not in the veracity of the antecedent axioms but in some error in measurement. To test this possibility we examine separately each issue-area sub-set of our roll call sample to determine whether or not our operationalization of the resource calculus might be more accurate for certain classes of motions than for others.

A second explanation for weakness in our findings, particularly where observation has only partially supported our probabilistic hypotheses, is that some logically antecedent axiom or axioms are accurate descriptions of reality only under certain circumstances more limited than those used to define our analysis sample. That is, our assumptions concerning the legislative process may hold only for specific types of motions rather than across all roll calls. In the following analysis we look at the possibility that the axioms positing perfect information on the part of legislators hold only where all senators may reasonably be expected to have had considerable fore-knowledge that a particular motion would be introduced and voted on. We also test whether or not the description of bargaining and coalition formation

presented in our theory is an accurate abstraction only where one of the brokers can control the timing of a roll call vote and thus control also the minimum coalition size necessary to be certain of victory. Finally, we discuss how one might indirectly test the assumption of legislator-rationality to see whether or not only some sub-set of all senators is behaving as resource-maximizers.

To reiterate, the following analysis attempts to improve the predictive power of our theory by examining various sub-samples of roll calls on the assumption that: (a) our operationalization of certain concepts is more accurate for some types of motions than for others; and/or (b) our theory, or certain parts thereof, holds only under a more limited and identifiable set of circumstances than was initially assumed. Whether or not this analysis succeeds in making our theory more predictive, it should certainly succeed in giving us a greater insight into the legislative.

As already noted, the most likely source of measurement error in the preceding analysis is in the operationalization of the resource calculus. That error in the designation of the R_{pb} calculus could produce significant discrepancies in our findings may be readily seen when we recall that it is the set of values generated by the calculus which is used to classify both the senators and roll calls in our sample. And because the operational indicators employed in constructing the calculus are specific to each issue-area in our sample of motions, any measurement error involved is also likely to be issue-specific. To determine if such error has been introduced, we repeat here for each issue area separately the tests performed in validating the first three

hypothesis-sets.* The results of these issue-specific tests appear in Tables 13 through 15 and in Figures 2 and 3.

Looking first at the hypothesis describing relative expected winning coalition sizes (H_2), Table 13 compares the mean indices of deviation between the minimum-certainty-of-winning coalition size and the observed winning coalition size for bargaining and non-bargaining roll calls by issue area. Our earlier full-sample analysis supported the prediction of hypothesis H_2 that the mean index of deviation for non-bargaining roll calls is greater than the same figure for bargaining motions. The issue-by-issue tests reported in Table 13 reveal considerable variance in the extent to which the data support this hypothesis. Specifically, we find hypothesis H_2 supported for three of the issue areas but clearly disconfirmed in the case of urban welfare votes (where we note only two non-bargaining roll calls appear). Also, the expected relationship, the mean index of deviation for non-bargaining roll calls exceeding the mean index of deviation for bargaining motions, is only very weakly evident among foreign aid motions. At the same time the relationship is as expected and quite strong for the labor and civil rights bills. From these observations we may tentatively conclude that our operationalization of the R_{pb} calculus offers a more accurate description of the kind and amounts of resources which a senator may expect to receive from extra-legislative sources on civil rights and labor motions than on urban welfare and foreign aid motions. To further test this conclusion we reconstructed the frequency distributions of winning coalition sizes by class of roll call

* The test of hypothesis H_{10} is not repeated because the small sizes of the sub-samples of roll calls precludes meaningful analysis.

Table 13 Mean Difference Between Observed Winning Coalition Size and Minimum-Certainty-of-Winning Coalition Size by Type of Roll Call and Issue Area

Issue Area	Bargaining Roll Calls	(N)	Non-Barg. Roll Calls	(N)
Civil Rights	23.1 % ^a	(16)	41.4 %	(13)
Urban Welfare	12.2	(34)	7.1	(2)
Labor	11.2	(31)	36.7	(2)
Foreign Aid	23.1	(35)	29.1	(22)
All Roll Calls	16.7	(116)	32.5	(39)

a. See note Table 9.

(as appeared in Figure 1) first for civil rights/labor motions, then for urban welfare/foreign aid motions. These new distributions are presented in Figure 2 and Figure 3, respectively. It is apparent from these representations that not only is the eventual winning coalition size close to the minimum-certainty-of-winning size of 51 for a greater proportion of civil rights and labor motions, but also there is much less overlap between the observed winning coalition sizes on bargaining and non-bargaining bills among these roll calls than among the urban-welfare/foreign aid votes. Again, there is evidence that in the initial operationalization of the resource calculus more measurement error may have been introduced into our analysis for certain issue areas than for others.

This explanation for our earlier findings is further tested by turning to those hypotheses which predict relative rates of valence voting. Here too the tests performed earlier are repeated with the results divided by issue area. Table 14 presents these data. As is the case for our entire sample of roll calls, hypotheses $H_5 - H_7$ are all supported for each issue-area sub-set of motions. However, as we observed above, the strength of the predicted relationships varies considerably across issue areas. Again we find the level of prediction improved for civil rights and labor motions but diminished for urban welfare and foreign aid bills. These results lend further support to our conclusion that measurement error has been introduced and that the error is issue-specific.

Finally, the abstention rate of each class of legislator for each class of roll call is calculated with the roll calls further divided by issue area. The results of these calculations appear in

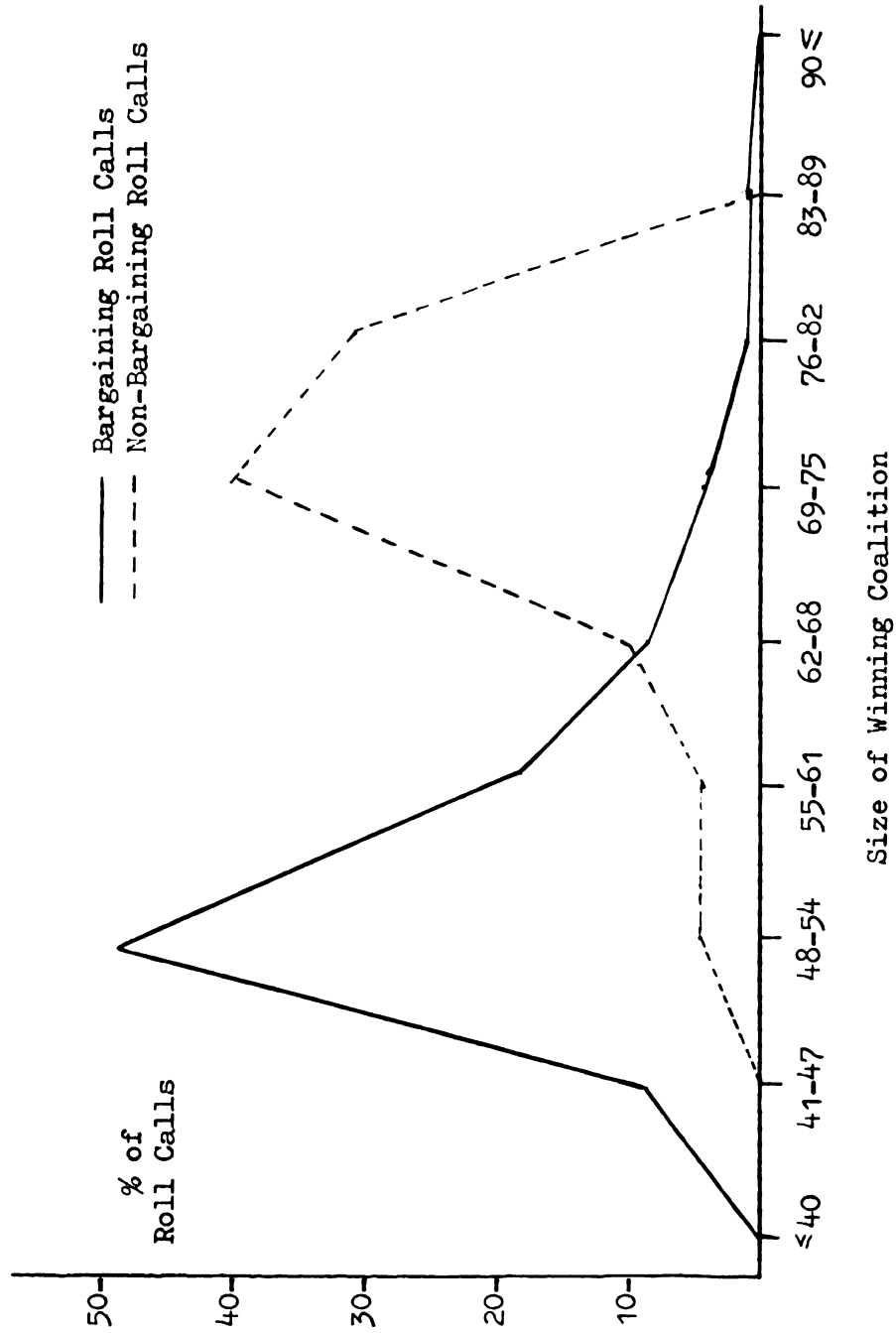


Figure 2 Frequency Distribution of Winning Coalition Sizes for Bargaining and Non-Bargaining Roll Calls Excluding Cloture Votes: Civil Rights and Labor Motions Only

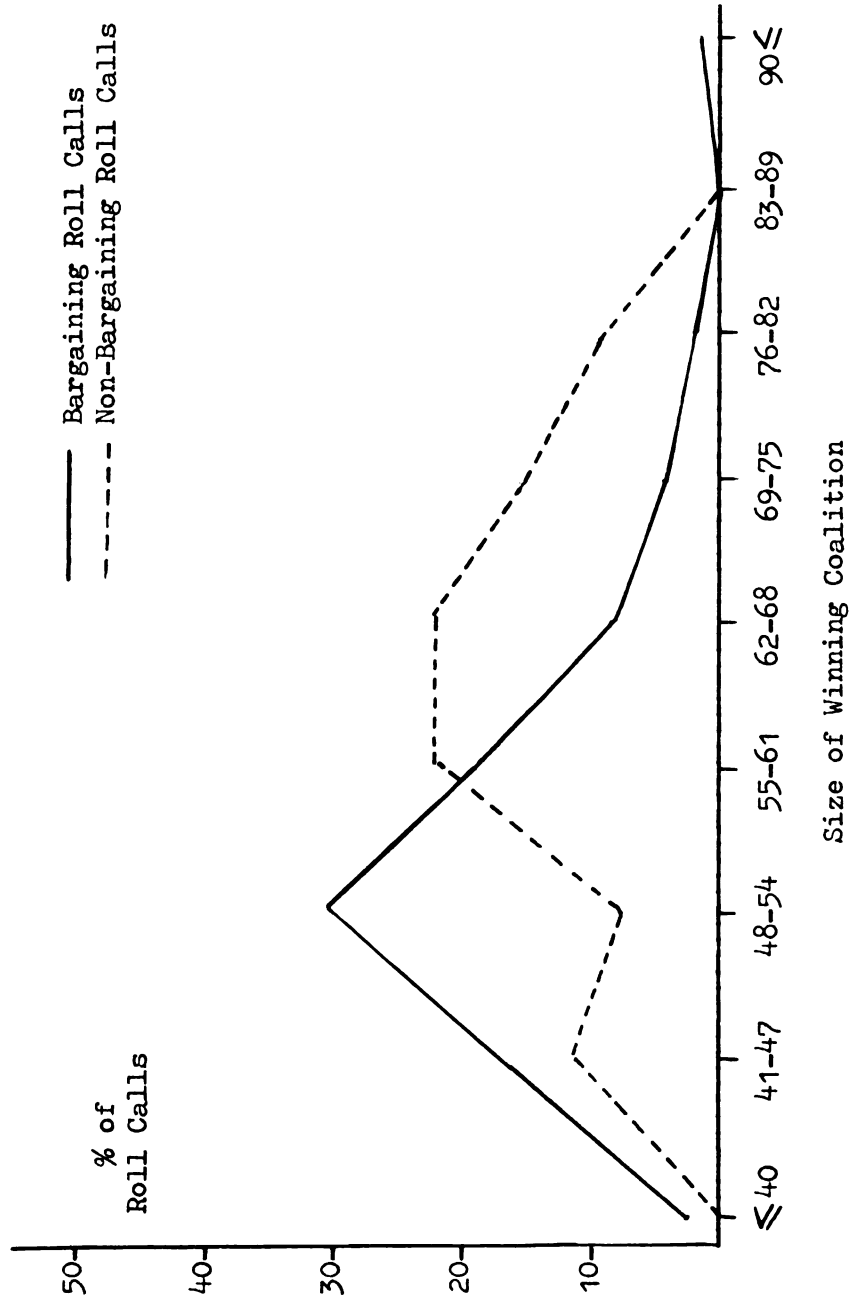


Figure 3 Frequency Distribution of Winning Coalition Sizes for Bargaining and Non-Bargaining Roll Calls Excluding Cloture Votes: Urban Welfare and Foreign Aid Motions Only

Table 14 Rate of Valence Voting by Class of Legislator, Type of Roll Call and Issue Area

Issue Area	Proto-Coalition Members		Pre-Bargaining Supporters/Opposers	
	Bargaining Roll Calls	Non-Bargaining Roll Calls	Bargaining Roll Calls	Non-Bargaining Roll Calls
Civil Rights	82.5 % ^a	91.2 %	76.9 %	81.7 %
Urban Welfare	75.6	57.1	53.1	54.1
Labor	85.4	93.5	48.6	77.6
Foreign Aid	69.0	74.3	51.7	61.6
All Roll Calls	78.3	80.5	53.9	67.9

a. See note Table 10.

Table 15. We are interested here in seeing whether or not the extent to which the data support hypothesis H_8^* varies significantly with issue area. The prediction in this revised hypothesis is that the abstention rate among pre-bargaining supporters/opposers and indifferents on bargaining roll calls will be greater than the rate of non-voting among all other representatives on all other types of motions. For the entire sample of roll calls analyzed earlier these two abstention rates are 11.5% and 10.0%, moderately supporting the hypothesis. In examining Table 15, we see that the strength and direction of this relationship does indeed vary with the issue area being considered. The relationship between the two abstention rates is in the expected direction and strongest for civil rights motions with the rates of non-voting being 12.6% and 5.2%, respectively. However, where we found the predicted relationships in the preceding hypotheses holding more strongly among labor roll calls as well, here we observe relative abstention rates on such motions which tend to disconfirm H_8^* . Across all labor roll calls the senators predicted to abstain only for reasons of unavoidable detention evidenced a non-voting rate of 12.8%, while those predicted to abstain for strategic reasons failed to vote 10.4% of the time. On urban welfare motions the non-voting rates for the presumed high-frequency and low-frequency abstainers are 10.1% and 9.6%; on foreign aid roll calls the figures are 13.1% and 11.9%, respectively. This means that for three of the four issue areas the expected relationship holds, but in only one of these three instances does the strength of the relationship increase over what it is for the entire sample of roll calls. And while the one sub-set of motions for which the expected relationship is strengthened is civil rights roll

Table 15 Abstention Rate by Class of Legislator, Type of Roll Call and Issue Area

Issue Area	Proto-Coalition Members		Pre-Bargaining Supporters/Opposers		Indifferents	
	Bargaining Roll Calls	Non-Barg. Roll Calls	Bargaining Roll Calls	Non-Barg. Roll Calls	Bargaining Roll Calls	Non-Barg. Roll Calls
Civil Rights	7.4 % ^a	3.7 %	9.2 %	4.8 %	14.0 %	1.3 %
Urban Welfare	9.6	13.2	9.4	6.2	10.7	0.0
Labor	11.4	25.2	7.4	14.0	12.3	-
Foreign Aid	15.0	10.2	14.8	10.7	12.6	-
All Roll Calls	11.0	9.0	10.1	9.0	12.2	1.1

a. See note Table 11.

calls, consistent with the results reported in Tables 13 and 14; the one issue area for which H_8' is found not to hold is the sub-set of motions of concern to organized labor, inconsistent with the improvement in prediction noted on these roll calls for the previous issue-specific tests.

Perhaps the most conservative conclusion to be drawn from this issue-by-issue analysis is that the substantive content of the roll calls being examined does affect the observed strength (and, occasionally, the direction) of relationships described in our theory, and that there is thus some basis for believing that issue-specific measurement error is present. For all hypotheses the observed strength of expected relationships improves when attention is limited to civil rights motions alone. Similarly, the expected relationships are found to be everywhere weaker for urban welfare and foreign aid roll calls. The results are mixed in the case of labor motions; however, on balance it appears that less error is introduced for these roll calls than for those dealing with urban welfare and foreign aid. In any event, it is clear from this analysis that not all of the variance between prediction and observation can be explained by examining issue-specific subsamples of roll calls to test for measurement error. In what follows we consider alternative explanations.

One such alternative explanation is that the axioms in our theory which assume perfect information do not hold across all roll calls. Obviously, the less complete and perfect the information, the less the individual and aggregate voting outcomes will resemble those predicted by our theory. The plea of imperfect and/or incomplete information is often made by researchers testing game theoretical

formulations where results do not conform to expectations. Indeed, William Riker, after advancing the size principle of minimum winning coalitions in n-person zero-sum games with side-payments, makes explicit an "information effect hypothesis":

The greater the degree of imperfection or incompleteness of information, the larger will be the coalitions that coalition-makers seek to form and the more frequently will winning coalitions actually formed be greater than minimum size. Conversely, the nearer information approaches perfection and completeness, the smaller will be the coalitions that coalition-makers aim at and the more frequently will winning coalitions actually formed be close to minimum size.³

In the case of our theory of the legislative process we examine the effect of information level not only on sizes of eventual winning coalitions but also on the patterns of valence voting and abstention. The procedural type of each roll call is used as an indirect indicator of the level of information on the assumption that the more forewarning a senator has that a motion will come up for a vote, the more likely it is that he will be able to acquire information on both the R_{pb} value of the bill for each of his colleagues (axioms 2b and 4) and on any bargains which may already have been made (axiom 12). With this in mind we class as high-information roll calls (a) final votes on conference committee reports, (b) final votes on Senate versions of bills, (c) votes on Senate committee amendments, and (d) all closure motions. All other votes including floor amendments, substitute motions, tabling motions, and motions for reconsideration are considered to be low-information roll calls. Of our full sample of 155 motions, 35 are high-information roll calls and 120 low-information roll calls. Retesting the first sets of hypotheses for each of these two sub-samples, if our extension of the information effect hypothesis

is valid, we would expect the results of our analysis to more closely conform to theoretical expectations for high-information roll calls than for low-information motions.

For propositions H_1 and H_2 , we find the data support the information effect hypothesis. As reported in Table 16, the mean index of deviation from minimum-certainty-of-winning coalition size is closer to zero for high-information bargaining motions than for low-information bargaining motions--15.1% vs. 17.1%. Also, there is a greater difference between the mean indices of deviation for bargaining vs. non-bargaining roll calls among high-information motions than among low-information motions.

Turning next to the hypotheses dealing with relative rates of valence voting, the effect of information level is mixed but generally in the expected direction. Table 17 gives the rates of valence voting among the members of the 89th Senate by class of legislator, type of roll call (bargaining or non-bargaining), and information level. We see a substantial improvement in the proportion of voting proto-coalition members whose votes are correctly predicted between low- and high-information roll calls. Among pre-bargaining supporters and opposers on non-bargaining roll calls, we find a slightly higher rate of valence voting on low-information motions as opposed to the rate on high-information roll calls, and this latter result is counter to what the information effect hypothesis would lead us to believe. Of greater interest are the effects of information level on the probabilistic relationships described in hypotheses H_5 through H_7 . From Table 17 we see that all of the predicted relationships do hold for both high- and low-information roll calls, and in two of the three cases the

Table 16 Mean Difference Between Observed Winning Coalition Size and Minimum-Certainty-of-Winning Coalition Size by Type of Roll Call and Information Level

Information Level ^a	Bargaining Roll Calls	(N)	Non-Barg. Roll Calls	(N)
High Information	15.1 % ^b	(24)	36.7 %	(11)
Low Information	17.1	(92)	30.8	(28)
All Roll Calls	16.7	(116)	32.5	(39)

a. High information roll calls include final passage votes (both Senate and conference bills), committee amendments, and cloture motions. Low information roll calls are votes taken on floor amendments and other procedural motions (substitute motions, tabling and reconsideration motions, etc.).

b. See note Table 9.

Table 17 Rate of Valence Voting by Class of Legislator, Type of Roll Call and Information Level

Information Level ^a	Proto-Coalition Members		Pre-Bargaining Supporters/Opposers	
	Bargaining Roll Calls	Non-Bargaining Roll Calls	Bargaining Roll Calls	Non-Bargaining Roll Calls
High Information	84.5 % ^b	85.8 %	51.8 %	65.1 %
Low Information	75.9	78.4	54.8	68.9
All Roll Calls	78.3	80.5	53.9	67.9

a. See note Table 16.

b. See note Table 10.

b. See note Table 10.

observed relationship is stronger where the information level is greater. Only in the case of the fifth hypothesis, where we propose that the rate of valence voting among pre-bargaining supporters/opponents will be greater on non-bargaining roll calls than on bargaining ones, is the relationship found to be stronger on low-information motions. And here the difference is very small indeed ($68.9 - 54.8 = 14.1\%$ for low-information roll calls as opposed to $65.1 - 51.8 = 13.3\%$ for high-information roll calls). Furthermore, for all those senators whose eventual votes are predicted by our theory--proto-coalition members on all roll calls and pre-bargaining supporters/opponents on non-bargaining roll calls--these predictions are correct 82.0% of the time on high-information motions and only 75.6% of the time on low-information motions. This result, as well as the others cited in this paragraph, seems to support the information effect hypothesis as it relates to predictions of individual voting.

However, in predicting abstention rates the opposite is true. As reported in Table 18, the relationship described in hypothesis H_8' holds among low-information roll calls but not among high-information motions. On the latter sub-set of roll calls the senators predicted to sometimes abstain for strategic reasons--pre-bargaining supporters/opponents and indifferents on bargaining motions--failed to vote 7.9% of the time, while for all other legislators on all other motions the abstention rate is 9.1%; on low-information roll calls the figures are 12.2% and 10.3%, respectively. The information effect hypothesis as operationalized and tested here is disconfirmed. That is, there is less conformity between prediction and observation for high-information roll calls than for low-information roll calls.

Table 18 Abstention Rate by Class of Legislator, Type of Roll Call and Information Level

Information Level ^a	Proto-Coalition Members		Pre-Bargaining Supporters/Opposers		Indifferents	
	Bargaining Roll Calls	Non-Barg. Roll Calls	Bargaining Roll Calls	Non-Barg. Roll Calls	Bargaining Roll Calls	Non-Barg. Roll Calls
High Information	8.2 % ^b	11.2 %	7.9 %	8.4 %	8.0 %	0.0 %
Low Information	12.0	8.1	11.0	9.2	12.7	1.5
All Roll Calls	11.0	9.0	10.1	9.0	12.2	1.1

a. See note Table 16.

b. See note Table 11.

On balance, the findings reflecting on the validity of the information effect hypothesis are ambiguous. Clearly, only a limited amount of the error in the original findings can be explained on the basis of differential applicability of the perfect-information axioms in our theory. Other possible explanations should be considered.

The next such explanation to be examined is that the axioms assuming all vote commitments secured by side-payments are binding (axiom 11) and all brokers have perfect information concerning vote commitments (axiom 12) are not every where applicable. It is possible that these assumptions are somewhat inaccurate abstractions of reality. Such an inaccuracy does not affect our predictions describing individual and aggregate voting outcomes on non-bargaining motions. However, in the case of bargaining motions this inaccuracy, if it exists, would result in the eventual winning coalitions being larger or smaller than the minimum-certainty-of-winning size. Furthermore, such a shortcoming in our theory could explain the difficulties we have found in predicting abstention rates. For, if the fact that one side has already achieved certainty-of-winning size is not immediately known to the other broker and/or if it is possible for support acquired through bargaining to revert to the other side in the face of alternative offers, at least two specific results would occur: First, some of the members of the eventual winning side might be bought away (producing a smaller than minimum-certainty-of-winning coalition), or the broker for the eventual winning side might continue to buy members (producing a larger than minimum-certainty-of-winning coalition). Second, in this process of "unnecessary" bargaining some of the unbought pre-bargaining supporters/opposers and indifferents who would otherwise

abstain might be bought into one of the coalitions, lessening their overall non-voting rate and thus weakening the expected relationship between their abstention rate and the abstention rate of other representatives.

To test this possibility we divide all bargaining roll calls in our sample into two sub-sets according to whether or not the Democratic party took a position on each motion. Assuming the Democratic majority party leadership--the presumed broker for at least some of the roll calls on which it takes a position--has some control over the scheduling of votes, there will be less unnecessary bargaining on these, the Democratic-party-position bargaining motions, than on the other bargaining motions. Minimum-certainty-of-winning coalitions would occur more frequently on the Democratic-party-position bargaining roll calls because the majority party leadership in the Senate would be able to call for the vote as soon as--and if--they, as broker, achieved a coalition large enough to win. If these assumptions are valid, we would, therefore, expect to find less deviation from minimum-certainty-of-winning size among the eventual winning coalitions on Democratic-party-position bargaining roll calls than among other bargaining roll calls. Our data support this conclusion.

As indicated in Table 19, the mean index of deviation for all bargaining roll calls on which the Democratic party took a position is 12.5%, while the mean index of deviation for all other bargaining roll calls is 21.4%. This finding is presented graphically in Figure 4. The relationship is in the expected direction and also quite strong, leading to the tentative conclusion that axioms 11 and 12 are not completely accurate and that this inaccuracy may account not only

Table 19 Mean Difference Between Observed Winning Coalition Size and Minimum-Certainty-of-Winning Coalition Size for Bargaining Roll Calls by Democratic Party Position

	Democratic Party Position Taken	(N)	No Democratic Party Position Taken	(N)
Mean Index of Deviation _a	12.5 %	(61)	21.4 %	(55)

a. See note Table 9.

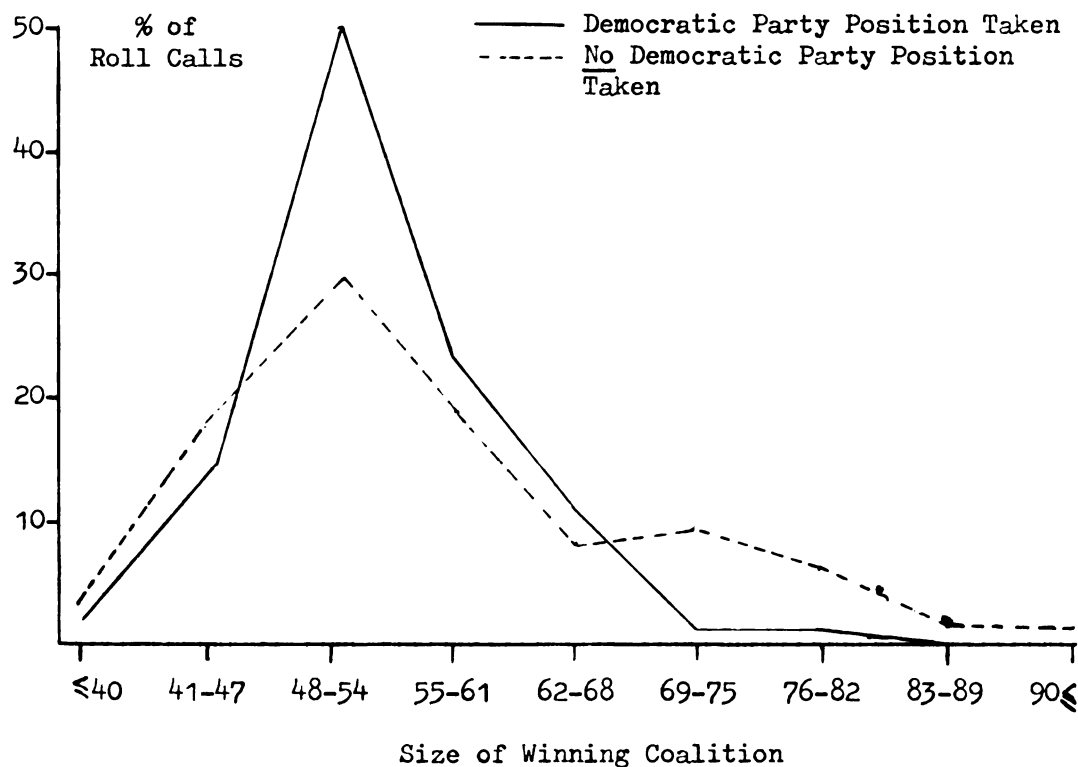


Figure 4 Frequency Distribution of Winning Coalition Sizes for Bargaining Roll Calls, Excluding Cloture Votes, by Democratic Party Position

for some of the error in predicting winning coalition sizes but also for some of the error in predicting relative abstention rates among senators.

While this conclusion may appear more satisfying than those drawn from the issue-specific and information-effect analyses, it should not close our mind to other explanations for the variance observed in our results. Though we do not pursue it, before concluding our discussion of the empirical findings, we ought to note one final explanation. This is the possibility that the differentially applicable axiom is the initial one--the assumption of legislator rationality. If, in fact, certain senators are "crazy" in the sense of being unwilling or unable to calculate their rational voting strategies, it is likely that they will be excluded from bargaining and that their eventual votes will be randomly distributed, thus distorting all of our findings. Furthermore, if this were true, we would expect the irrational senators to be the least successful in achieving re-election. One could test this secondary hypothesis by comparing the rates of defection from proto-coalitions with re-electoral success rates, the expected result being that the legislators defecting most frequently would be least likely to be re-elected having failed to acquire sufficient resources in the inter-election period.

To summarize our body of empirical findings: In evaluating the validity of the hypotheses derived from our theory of legislative coalitions, we found trends in the data to be supportive of all but one of the deterministic propositions, while all save one of our testable probabilistic hypotheses were supported. In this one case--predicting relative abstention rates--we proposed an alteration in

the theory resulting in an alternative derived hypothesis, this one consistent with observation. These generally supportive findings led us to the conclusion that the theory of coalition formation in legislatures offers an accurate abstraction of the legislative process in most instances and that what error does exist in our findings may have been introduced in operationalizing the complex resource calculus antecedent to testing the formulation. Examining this possibility, it was determined that, indeed, for two of the four issue areas included in our sample of roll calls there was consistently greater conformity between prediction and observation. We next attempted to improve the predictive power of our model by considering the possibility that the theory is an accurate abstraction of reality for only certain identifiable sub-sets of all roll calls. Here we found that we were able to specify a priori those motions (by procedural type and majority party position) for which our theory comes closest to correctly predicting individual and aggregate voting outcomes. Again, the single exception occurred in the case of predicting relative abstention rates among senators. This difficulty in predicting abstentions remains an empirical disappointment if not an unexpected one.

Particularly encouraging in terms of the probable validity of our theory is the fact that we found considerable and consistent evidence for the existence of two specific sorts of roll calls on only one of which bargaining will occur and the eventual winning coalitions will approach the minimum size necessary to be certain of victory. Limiting our attention to those roll calls for which we hypothesized our model to be most accurate, we find that of all the motions in our

sample dealing with civil rights and organized labor issues, where the information level is presumed to be high for all senators, where the Democratic (majority) party takes a position, and where the minimum-certainty-of-winning size is 51 votes and pairs fully 67% were carried with coalitions within three votes of the expected size, and the other 33% of these motions were carried by winning coalitions within ten votes of 51.

Furthermore, our findings in terms of correctly predicting individual votes and roll call outcomes compare favorably with other studies on congressional behavior. Across all motions in our sample, of the senators whom we predict specific votes, 77.4% of those paired or voting did take the expected position. This compares with 84% correctly predicted in a simulation of the House of Representatives⁴ and 66.2% correctly predicted in a similar simulation of voting in the U.S. Senate.⁵

Of all motions for which our theory predicts a winning side, e.g. all non-bargaining roll calls, these predictions are correct 97% of the time (38 of 39 roll calls).

FOOTNOTES: CHAPTER IV

¹Our index of deviation is similar to the independently arrived at "index of minimalness" developed by Richard Murray and Donald S. Lutz in "Redistricting Decisions in the American States: A Test of Riker's Minimal Winning Coalition Hypothesis," a paper read before the 1971 Annual Meeting of the American Political Science Association, Conrad Hilton Hotel, Chicago, Illinois, September 7-11, 1971.

²David H. Koehler, "Coalition Formation and the Legislative Process," a paper read at the 1971 Annual Meeting of the American Political Science Association, Conrad Hilton Hotel, Chicago, Illinois, September 7-11, 1971.

³William Riker, The Theory of Political Coalitions (New Haven: Yale University Press, 1962), pp. 88-89.

⁴Cleo Cherryholmes and Michael Shapiro, Representatives and Roll Calls (Indianapolis: The Bobbs-Merrill Company, Inc., 1969).

⁵Jeanne L. Martin, "Exchange Theory and Legislative Behavior: A Computer Simulation of Roll-Call Voting in the U.S. Senate," (unpublished Ph.D. dissertation, Michigan State University, 1971).

CHAPTER V

CONCLUSIONS

The results reported in the preceding chapter are simultaneously heartening and discouraging. On the one hand, we find considerable support for our central coalition-size hypothesis; on the other hand, support for some of the hypotheses is quite weak, and in another instance the findings disconfirm one of the original hypotheses. On balance, there appears to be reason to believe that the theory of coalition formation in legislatures offers a non-obvious and, by no means completely inaccurate abstraction of the legislative process. However, to make the derivatives of our theory consistent with observations of voting in the U.S. Senate we have already found it necessary to alter certain parts of the formulation and to qualify the applicability of others.

In this concluding chapter we first note the changes made in the theory. We then discuss applications of the revised theory to other legislative settings and note further opportunities suggested by our analysis. We close with a brief evaluation of the utility of the current work and its significance for the study of legislative behavior.

Revision of the Theory in Light of the Findings

Throughout the analysis in Chapter IV we note implications of our findings for the theory of coalition formation in legislatures.

Below we offer a reformulation of the theory, revised in light of the empirical findings. As most of these findings are supportive of the initial formulation, the theory given here closely resembles the one first presented in Chapter II. Where changes are made, they are duly noted.

Symbols and Definitions:

- (a) R: Resources necessary to a legislator for his re-election. All R is measured by the effect it will have on a legislator's probability of being re-elected. All R must then be translatable into votes, i.e. constituency support, financial contributions, organizational assistance, support for election to a legislative leadership position, etc.
- (b) R_{pb} : The amount of resources which a given legislator may expect to receive for voting on a particular side of a particular motion independent of resources offered in the course of bargaining on the motion. The R value of a motion to a legislator in the pre-bargaining stage.
- (c) R'_{pb} : The value of R_{pb} such that no legislator expecting to receive R'_{pb} or more resources for voting a particular position on a particular motion will be offered additional resources during bargaining in exchange for a vote commitment.
- (d) Supporting proto-coalition: All those legislators with a value of R_{pb} equal to or greater than R'_{pb} for supporting a given motion.
- (e) Opposing proto-coalition: All those legislators with a value of R_{pb} equal to or greater than R'_{pb} for opposing a given motion.
- (f) Pre-bargaining supporter: Any legislator with a value of R_{pb} on a given motion such that $0 < R_{pb} < R'_{pb}$ for supporting the motion.
- (g) Pre-bargaining opposer: Any legislator with a value of R_{pb} on a given motion such that $0 < R_{pb} < R'_{pb}$ for opposing the motion.
- (h) Indifferent: Any legislator with a value of $R_{pb} = 0$ on a given motion.
- (i) Broker: Any legislator who is not indifferent between passage

and defeat of a given motion.

- (j) Side-payment: Resources made available by brokers to other legislators in exchange for vote commitments.
- (k) Bargaining: The process whereby side-payments are exchanged for vote commitments on a motion.
- (l) Long term/long run: A legislator's subjective expectation of the duration of his term in office.
- (m) Bargaining roll call: Any motion for which neither the supporting nor the opposing proto-coalition consists of $\frac{N + 1}{2}$ or more members (where N = the total number of legislators eligible to vote).
- (n) Non-bargaining roll call: Any motion for which either the supporting or the opposing proto-coalition consists of $\frac{N + 1}{2}$ or more members.

Axioms:

- 1. In determining whether to support or oppose any given motion a legislator will seek only to maximize over his entire term in office the resources, R , necessary for re-election.
- 2a. The utility functions of all legislators for R are constantly increasing.
- 2b. The fact that the utility functions of all legislators for R are constantly increasing is known to all legislators.
- 3. Every legislator assumes that there will be a large number of motions during his term in office.
- 4. There is a calculus, known to all legislators, whereby it is possible to determine the net amount of resources, R_{pb} , which any given legislator can expect to receive from all sources other than side-payments for either supporting or opposing any given motion.
- 5. Where a legislator votes the position opposite to that for which he could expect to gain a certain amount of pre-bargaining resources, $R_{pb} = X$, he incurs a net cost equal to X . Where a legislator abstains on a motion, there is no net change in his accumulation of resources.
- 6'. The act of not voting involves a small net cost for any legislator on any motion.

7. For any motion there is at least one supporting broker.
8. Any broker seeks to maximize total, long-term utility in attempting to achieve passage/defeat of all motions for which he may expect to act as broker.
- 9a. Any side-payment involves a cost to the broker making the payment.
- 9b. Any offer of a side-payment involves a cost to the broker and to the potential recipient.
10. There exists some value of $R_{pb} = R'_{pb}$ such that: no supporting broker will offer a side-payment to any legislator with a value of R_{pb} equal to or greater than R'_{pb} for opposing a given motion; and no opposing broker will offer a side-payment to any legislator with a value of R_{pb} equal to or greater than R'_{pb} for supporting a given motion. (Put another way: no broker will offer side-payments to members of the proto-coalition opposing him.)
11. All vote commitments secured by side-payments are binding.
12. All brokers have perfect information concerning vote commitments.
13. All brokers have extremely low utility for risk.

Theorems:

- I. For any legislator the position of a motion on the agenda will not affect his preferences, bargaining, or eventual votes.
- II. No member of the supporting proto-coalition for a motion will vote in opposition to the motion, and no member of the opposing proto-coalition will vote in support of it.
- III. For any motion where neither proto-coalition is large enough to be certain of victory independent of other legislators' behavior, the eventual winning coalition will be of minimum size necessary to be certain of victory and no larger.
- IV. For any bargaining roll call there is some finite probability greater than zero and less than unity that any given pre-bargaining supporter who votes will oppose the motion and that any given pre-bargaining opposer who votes will support the motion.
- V. For any bargaining roll call any pre-bargaining supporter, pre-bargaining opposer, or indifferent who does not accept a bargain to join either coalition will abstain.

- VI. For any motion where either proto-coalition is large enough to be certain of victory independent of other legislators' behavior, the eventual winning coalition will include all members of that proto-coalition who vote, and there is some probability greater than zero that the eventual winning coalition will be greater than the minimum size necessary to be certain of victory.
- VII. For any non-bargaining roll call any pre-bargaining supporter who votes will vote "yea" on the motion, and any pre-bargaining opposer who votes will vote "nay."

Hypotheses:

- H₁ The eventual winning coalition for all bargaining roll calls is just large enough to be certain of victory and no larger.
- H₂ The mean difference between the size of the eventual winning coalition and the minimum size necessary to be certain of victory is greater for non-bargaining roll calls than for bargaining roll calls.
- H₃ All proto-coalition members who vote vote their valences.
- H₄ All pre-bargaining supporters and opposers who vote on non-bargaining roll calls vote their valences.
- H₅ The proportion of voting pre-bargaining supporters and opposers who vote their valences is greater on non-bargaining roll calls than on bargaining roll calls.
- H₆ Across all bargaining roll calls, the proportion of voting proto-coalition members who vote their valences is greater than the proportion of voting pre-bargaining supporters and opposers who vote their valences.
- H₇ Across all roll calls the proportion of voting proto-coalition members who vote their valences is greater than the proportion of voting pre-bargaining supporters and opposers who vote their valences.
- H₈' The overall abstention rate among pre-bargaining supporters/opposers and indifferents on bargaining roll calls is greater than the overall abstention rate among proto-coalition members on all roll calls, pre-bargaining supporters/opposers on non-bargaining roll calls, and indifferents on non-bargaining roll calls.
- H₁₀ The occurrence of all of the previously hypothesized relationships is independent of the position of the motions on the legislative agenda.

The differences between the theory as presented here and as first offered in Chapter II lie in the propositions dealing with non-voting. In light of our empirical findings we have substituted for our original assumption that the act of voting involves a small net cost to any legislator (axiom 6) the alternative assumption that the act of non-voting involves a net cost (axiom 6'). This complete reversal eliminates theorem VIII and hypothesis H_9 from our list of theoretical derivatives and causes the eighth hypothesis to be altered in the manner indicated. With these changes the theory of coalition formation in legislatures becomes consistent with our observations. Furthermore, none of the changes noted alters the logical inter-relationships among the remaining elements of the formulation.

Suggestions for Further Research

The work presented in the preceding pages suggests several possibilities for further investigations of the legislative process. Our own theory of this process deals with a wide range of phenomena (sizes of winning legislative coalitions, the probability of particular legislators supporting/opposing particular motions, the act of abstaining), but other aspects of legislative behavior are largely ignored. Also, to a large degree, our formulation is specific to the setting in which it is tested. In this final section we consider ways in which the theory of coalition formation in legislatures might be applied to answer some of these other questions of legislative politics and applications of theory to alternative legislative settings. We also note a number of significant qualitative changes which could be made in the theory to examine still other aspects of the

legislative process.

The first suggestions for further research are direct extensions of the series of tests reported in Chapter IV. One loose end remains in the tests of hypothesis H_{10} which posits that the position of a motion on the legislative agenda will not affect the process of bargaining on the roll call. We have already tested the proposition by examining relative winning coalition sizes of bargaining and non-bargaining roll calls across the entire 89th Senate. One test which was not performed was one to determine the effect of agenda position on the predicted patterns of valence voting and abstentions. With a larger sample of roll calls these additional tests of our tenth hypothesis could be carried out. The entire question of agenda position suggests another possibility for research. As noted in the preceding chapter, one might wish to test this--or any other--theory of the legislative process controlling for the position of each roll call vis-a-vis other roll calls taken on the same day. It may well be that where a motion is the first or only one on a given day behavior conforms more closely to theoretical expectations, while roll calls taken subsequent to the first one of each day may be decided with greater reliance upon interpersonal cues. That is, legislators may calculate carefully the expected payoff of their votes on the initial roll call and yet vote on other roll calls simply because they are already in the chamber, thus following the lead of other more interested members on these latter motions. Until systematic empirical evidence is gathered, such a proposition remains hypothetical.

Another series of tests was also suggested explicitly in Chapter IV as a means of accounting for deviance between observed

and expected results. In evaluating a number of possible explanations for this variance we noted but did not test the possibility that some of the members of the U.S. Senate, 89th Congress, were not behaving rationally at the time; that is, some of the persons in the Senate during the 1965-66 sessions may have been unwilling to or incapable of accurately calculating their electoral advantage. If this were the case, then we would expect such irrational senators to be more frequently defeated for re-election. Such a conclusion could be tested by examining the relationship between the rate of defections from proto-coalitions and re-electoral success, with a negative association supporting the assumption of differential rationality across senators. As was also noted in Chapter IV, we might expect to find a negative relationship as well between the number of sources of pre-bargaining resources and re-electoral success on the assumption that legislators with many concerned constituent/interest groups will find it difficult to adequately represent them all and will necessarily have to alienate some during the course of his term, as the groups' interests conflict.

Other research opportunities address themselves to the improvement and continued testing of the pre-bargaining resource calculus. This central element of our analysis has proven useful in predicting legislative outcomes and voting/non-voting behavior. There is thus some reason to believe that it approaches an accurate abstraction of reality. However, without further testing we cannot be at all certain which of the factors included in this complex calculus of re-electoral advantage improve prediction and which do not. As we noted in the third chapter, there are many unique characteristics to our calculus. In refining the calculus still further, one could test

the derivatives of our theory employing various calculi with various combinations of factors included. This procedure of altering the elements of a personal calculus of "predisposition" is common to simulations of the legislative process.¹ Subsequent work with our own theory could employ a similar technique of manipulating the calculus to improve prediction. One should remember that our theory assumes only that a R_{pb} calculus exists, and does not recognize that the calculus be immediately identifiable to extra-legislative observers. In attempting to discover the best empirical approximation of this calculus one might also include elements not considered in the current work. Among such additional elements to consider are the possibility of a number of regional leaders acting as brokers and R_{pb} sources for specific sorts of bills and the influence which a senior senator may have on the voting behavior of his junior colleague from the same party and state. Both of these factors are included in a recent multi-variate analysis of voting in the U.S. Senate.²

Even without refining the calculus, we have demonstrated the utility of our theory of the legislative process in explaining roll call outcomes. One could also employ the theory to test for and explain other aspects of the workings of Congress. For one thing, our theory could be tested in the U.S. House of Representatives to determine whether or not the differences generally alleged to exist between the two chambers of Congress³ can be discovered and explained. If, as is claimed, bargaining in the U.S. Senate is a closer approximation of the free market exchange hypothesized in our model, then we would expect to find greater disparity between prediction and observation in applying our theory to the House. The lower level of

information in the House also leads us to believe the theory of coalition formation in legislatures would generate less accurate predictions of outcomes in the larger body. In any event, the application of our theory to the House of Representatives remains as an unfilled research opportunity.

Another opportunity for research is the application of our model to other sessions of the Senate. Such a series of tests would begin to allow one to answer the question of whether or not differences in leadership style actually affect the structure of the legislative game. A cross-time analysis could also serve as a test of the claim that in recent years the legislative process in the Senate has gone through a number of phases of lesser and greater centralization of power. The particular period of time in which we have tested our theory has been characterized as one of decentralization within the Senate;⁴ it is during such a time especially that we would expect our model to accurately reflect the legislative process.

If we expect our model to generate variably accurate predictions for different sessions of the Senate, we can also hypothesize that the theory of coalition formation in legislatures will generate variably accurate predictions of voting under certain circumstances. Specifically, an application of our theory to the U.S. Senate during the one or two years immediately preceding a presidential election might allow one to identify the probable presidential candidates as among those senators whose behavior was predicted least accurately. For, we would expect any senator running for President to be behaving towards a different (national) constituency where he is seeking to maximize resources necessary for election to the higher office.

Furthermore, this disparity between predicted and actual voting patterns would be especially pronounced for representatives of states which are very dissimilar to the nation in terms of relevant population characteristics. Finally, applying our model to the House of Representatives, we might be able to identify those congressmen who are seeking higher, state-wide office (the governorship or a Senate seat).

Looking at the Senate in presidential election years offers an opportunity to answer a further question, e.g. what influence, if any, does the presence of a presidential nominee have on the voting of the other members of his party in the Senate. By applying our model to relevant sessions and employing various formulations of the R_{pb} calculus incorporating presidential candidate positions in different ways, one could determine indirectly whether or not members of the nominee's party generally view the chosen senator as an effective source of re-electoral support/opposition. Obviously, such a perception of the presidential nominee as a resource source would be predicated on a belief that he has some chance of winning. We would then hypothesize that the magnitude of the nominee's effect on the calculus of his party colleagues would be greatest where the candidate was generally viewed as having the best chance of victory. In recent years we might thus expect to find the positions taken by Senator John F. Kennedy in the closing days of the 86th Congress to have been more significant in the voting calculi of the other Democratic senators at the time than would have been true of Senator Barry Goldwater among Republican members of the 88th Congress.

As we have noted at several points in this work, our theory

as operationalized here implicitly assumes universally static ambitions on the part of all legislators. (This assumption is embodied in the first axiom that all legislators are maximizers of resources necessary for re-election.) It was largely in order to meet this requirement that we chose to examine voting in the U. S. Senate. However, one might now apply our partially-validated theory to other legislatures as a means of determining the proportion of non-statically ambitious members and of identifying those legislators who are either planning political retirement or seeking election to a higher post. To the extent that there are discretely ambitious members in any body we would expect to find less difference between winning coalition sizes for bargaining and non-bargaining bills. The reasoning is as follows: any legislator who has no further political ambitions can be expected to vote either randomly or according to his pre-established views which could not then be subject to change through offers of resource payoffs. Faced with this kind of uncertainty we have some reason to believe (in light of our findings) that a broker will either over-buy or under-buy votes, producing larger-than or smaller-than minimum-certainty-of-winning coalitions. We further suggest that those persons defecting most frequently from proto-coalitions are most likely to be harboring either discrete or progressive ambitions. We might expect this use of our theory to have particular application to American state legislatures.⁵

However, the theory of coalition formation in legislatures could be used to predict and explain behavior in any multi-member, representative decision body. Indeed, it would be an interesting exercise to examine a number of bodies of different sizes and to

determine at what critical size the sort of decision rules constraining bargaining described in our theory develop. Such a question might also be studied experimentally in a controlled laboratory environment, altering the size of a simulated legislature to determine how this factor affects the bargaining process which evolves. Such experiments and additional applications of our model could define more precisely the settings in which the model has predictive and explanatory utility.

While the list of further research opportunities presented here is lengthy, we do not mean to imply that we see this work as primarily heuristic. The theory developed here and the empirical tests of that theory are themselves contributions to our understanding of the processes of legislative choice and coalition formation.

FOOTNOTES: CHAPTER V

¹Cleo Cherryholmes and Michael Shapiro, Representatives and Roll Calls (Indianapolis: The Bobbs-Merrill Company, Inc., 1969); and Jeanne Martin, "Exchange Theory and Legislative Behavior: A Computer Simulation of Voting in the U.S. Senate," (unpublished Ph.D. dissertation, Michigan State University, 1971).

²John Jackson, "Statistical Models of Senate Roll Call Voting," American Political Science Review, LXV, No. 2, (June 1971).

³Lewis A. Froman, Jr., "Differences Between the House and Senate," in Raymond E. Wolfinger, ed., Readings on Congress (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1971).

⁴Randall B. Ripley, Power in the Senate (New York: St. Martin's Press, 1969).

⁵Joseph Schlesinger, Ambition and Politics (Chicago: Rand McNally & Co., 1966).

APPENDICES

APPENDIX A

DATA SOURCES

Congressional Quarterly Almanac, XXI, 1965 (Washington, D.C.: Congressional Quarterly Service, 1966).

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APPENDIX B

MEMBERS OF U.S. SENATE, 89TH CONGRESS

Senator	Party _a	Date of Next Election _b	Safeness of Seat _c	Significant Concerned Constituent/Interest Groups _d				
				Negroes	Southern Whites	Organized Labor (AFL-CIO)	Urban Poor	High- Income Persons
Aiken	R		S					
Allott	R	1966						
Anderson	D	1966	S					
Bartlett	D	1966	S			X		X
Bass	D	1966			X		X	
Bayh	D							
Bennett	R							
Bible	D		S					X
Boggs	R	1966		X				X

Significant Concerned Constituent/Interest Groups

Senator	Party	Date of Next Election	Safeness of Seat	Negroes	Southern Whites	Organized Labor (AFL-CIO)	Urban Poor	High- Income Persons
Brewster	D			X		X	X	X
Burdick	D							
Byrd, Jr. (Va.)	D		S		X			
Byrd III (Va.) ^e	D				X			
Byrd (W.Va.)	D		S					
Cannon	D							X
Carlson	R		S					
Case	R	1966		X				X
Church	D							
Clark	D			X		X		
Cooper	R	1966			X			
Cotton	R							
Curtis	R	1966						
Dirksen	R			X		X	X	X

Significant Concerned Constituent/Interest Groups

Senator	Party	Date of Next Election	Safeness of Seat	Negroes	Southern Whites	Organized Labor (AFL-CIO)	Urban Poor	High- Income Persons
Dodd	D		S					X
Dominick	R							
Douglas	D	1966		X		X	X	X
Eastland	D	1966	S		X			
Ellender	D	1966	S		X		X	
Ervin	D		S		X			
Fannin	R						X	
Fong	R						X	X
Fulbright	D		S		X			
Gore	D				X		X	
Griffin	R	1966		X		X	X	X
Gruening	D					X		X
Harris	D	1966			X			
Hart	D		S	X		X	X	X

Significant Concerned Constituent/Interest Groups

Senator	Party	Date of Next Election	Safeness of Seat	Negroes	Southern Whites	Organized Labor (AFL-CIO)	Urban Poor	High- Income Persons
Hartke	D							
Hayden	D						X	
Hickenlooper	R							
Hill	D				X		X	
Holland	D		S		X		X	
Hruska	R		S					
Inouye	D						X	X
Jackson	D		S			X		X
Javits	R			X		X	X	X
Johnston	D				X			
Jordan (N.C.)	D	1966	S		X			
Jordan (Ida)	R	1966						
Kennedy (Mass.)	D		S			X		X
Kennedy (N.Y.)	D			X		X	X	X

Significant Concerned Constituent/Interest Groups

Senator	Party	Date of Next Election	Safeness of Seat	Negroes	Southern Whites	Organized Labor (AFL-CIO)	Urban Poor	High- Income Persons
Kuchel	R					X	X	X
Lausche	D		S	X			X	X
Long (Mo.)	D			X		X		
Long (La.)	D		S		X		X	
Magnuson	D					X		X
Mansfield ^g	D		S			X		
McCarthy	D		S					
McClellan	D	1966	S		X			
McGee	D							
McGovern	D							
McIntyre	D	1966						
McNamara	R	1966		X		X	X	X
Metcalf	D	1966				X		
Miller	R	1966						

Significant Concerned Constituent/Interest Groups

Senator	Party	Date of Next Election	Safeness of Seat	Negroes	Southern Whites	Organized Labor (AFL-CIO)	Urban Poor	High- Income Persons
Mondale	D	1966						
Monroney	D				X			
Montoya	D							
Morse	D					X		
Morton	R				X			
Moss	D							
Mundt	R	1966						
Murphy	R					X	X	X
Muskie	D	S						
Nelson	D					X		
Neuberger	D	1966						
Pastore	D		S				X	
Pearson	R	1966						
Pell	D	1966					X	

Significant Concerned Constituent/Interest Groups

Senator	Party	Date of Next Election	Safeness of Seat	Negroes	Southern Whites	Organized Labor (AFL-CIO)	Urban Poor	High- Income Persons
Prouty	R							
Proxmire	D					X		
Randolph	D	1966						
Ribicoff	D							X
Robertson	D	1966	S		X			
Russell (S.C.) ^h	D	1966			X			
Russell (Ga.)	D	1966	S		X			
Saltonstall	R	1966				X		X
Scott	R			X		X		
Simpson	R	1966		X				
Smathers	D		S		X		X	
Smith	R	1966	S	X				
Sparkman	D	1966	S		X		X	
Stennis	D		S		X			

Significant Concerned Constituent/Interest Groups

Senator	Party	Date of Next Election	Safeness of Seat	Negroes	Southern Whites	Organized Labor (AFL-CIO)	Urban Poor	High- Income Persons
Symington	D		S	X		X		
Talmadge	D		S		X		X	
Thurmond	R	1966	S		X			
Tower	R	1966			X		X	
Tydings	D			X		X	X	X
Williams (N.J.)	D		S	X				X
Williams (Del.)	R			X				X
Yarborough	D				X		X	
Young (N.D.)	R		S					
Young (Ohio)	D			X			X	X

- a. R = Republican. D = Democrat.
- b. All other senators face re-election in either 1968 or 1970.
- c. S = renomination to seat is assumed safe (see Chapter III).
- d. Preferences of those groups not marked do not enter into pre-bargaining resource calculi of respective senators.
- e. Filling unexpired term of Senator Byrd, Jr. (Va.).

Notes to Appendix B, Cont'd.

- f. Filling unexpired term of Senator McNamara
- g. One additional unit of resources is assumed to accrue to Senators Mansfield and Long (La.)
for supporting the President's position on any given motion because of the leadership
posts held by these legislators.
- h. Filling unexpired term of Senator Johnston.

APPENDIX C

SAMPLE OF ROLL CALLS

Issue Area	Agenda Position	Congress'1 Quarterly Number	Proce- dural Type _a	Demo- cratic Party Position _b	Repub- lican Party Position _b	Constituent/ Interest Group Position _{b,c}
Civil Rights	1965, 1st half	49	FA	0	+	+
		51	FA	-	0	-
		52	FA	-	0	+
		53	FA	-	0	-
		54	FA	0	-	-
		56	FA	0	0	-
		57	FA	-	0	-
		59	FA	-	0	-
		60	FA	0	0	+
		61	FA	0	0	+
		62	FA	0	0	+
		64	FA	0	-	-
		65	FA	-	-	-
		66	FA	-	-	-
		67	Clo	+	+	+
		68	FA	-	-	-

Issue Area	Agenda Position	Congress'l Quarterly Number	Proce- dural Type	Demo- cratic Party Position	Repub- lican Party Position	Constituent/ Interest Group Position
Civil Rights	1965, 1st half	69	FA	-	-	-
		70	FA	-	-	-
		71	FA	-	-	-
		72	FA	-	-	-
		73	FA	-	-	-
		74	FA	-	-	-
		75	FA	-	-	-
		76	FA	0	-	-
		77	Sub	+	+	+
		78	PS	+	+	+
	2nd half	178	PC	+	+	+
Civil Rights	1966, 2nd half	185	Clo	+	0	+
		186	Clo	+	-	+
Urban Wel- fare	1965, 2nd half	158	Sub	0	0	+
		159	FA	-	+	-
		160	FA	-	+	-
		161	FA	0	+	-
		162	PS	+	0	+
		183	FA	-	+	-
		184	Sub	0	+	-
		185	Tab	0	-	+
		186	ReC	0	+	-

Issue Area	Agenda Position	Congress'l Quarterly Number	Proce- dural Type	Demo- cratic Party Position	Repub- lican Party Position	Constituent/ Interest Group Position
Urban 1965, Wel- fare	2nd half	187	Sub	0	+	-
		188	FA	0	0	-
		189	FA	-	+	-
		190	FA	0	0	-
		191	FA	0	0	-
		192	FA	0	0	-
		193	FA	0	0	-
		194	FA	0	+	-
		195	FA	0	+	-
		196	FA	-	0	-
		197	FA	+	+	+
		198	FA	0	+	-
		199	PS	+	0	+
		241	PC	+	0	+
		253	FA	-	+	-
		254	FA	-	+	-
Urban 1966, Wel- fare	1st half	33	FA	+	-	+
		34	CA	-	+	-
	2nd half	142	FA	-	0	-
		161	FA	-	0	-
		163	PS	+	0	+
		201	FA	0	0	-
		204	Sub	+	0	-

Issue Area	Agenda Position	Congress'l Quarterly Position	Proce- dural Type	Demo- cratic Party Position	Repub- lican Party Position	Constituent/ Interest Group Position
Urban Wel- fare	1966, 2nd half	205	Tab	0	0	+
		206	FA	0	0	-
		207	PS	+	+	+
		233	PC	+	0	+
Labor	1965, 1st half	30	FA	-	+	-
		31	PC	+	+	+
		248	Clo	+	0	+
Labor	1966, 1st half	4	FA	0	0	-
		5	FC	+	+	+
		8	Clo	+	0	+
		9	Clo	+	0	+
	2nd half	122	CA	+	-	+
		123	CA	+	-	+
		124	CA	+	-	+
		125	FA	+	-	+
		127	Tab	-	+	-
		128	CA	+	-	+
		129	CA	+	-	+
		130	CA	+	-	+
		131	Sub	-	+	-
		132	FA	0	0	+
		133	FA	+	0	+

Issue Area	Agenda Position	Congress'l Quarterly Number	Proce- dural Type	Demo- cratic Party Position	Repub- lican Party Position	Constituent/ Interest Group Position
Labor	1966, 2nd half	134	FA	+	0	+
		135	PS	+	0	+
		165	FA	-	0	-
		166	Sub	0	0	+
		167	FA	0	0	-
		168	FA	0	+	+
		169	FA	0	0	-
		170	FA	0	0	-
		171	FA	0	0	-
		172	FA	0	0	-
		173	FA	-	0	-
		174	FA	0	0	-
		175	FA	0	0	-
		176	PS	+	0	+
		184	PC	+	0	+
For- eign Aid	1965, 1st half	86	FA	-	0	0
		87	FA	+	0	0
		88	FA	0	+	0
		89	FA	0	-	0
		90	FA	0	0	0
		91	FA	+	-	0
		92	FA	0	0	0

Issue Area	Agenda Position	Congress'l Quarterly Number	Proce- dural Type	Demo- cratic Party Position	Repub- lican Party Position	Constituent/ Interest Group Position
For- eign Aid	1965, 1st half	93	FA	-	-	0
		94	FA	0	+	0
		95	FA	0	0	0
		96	FA	0	-	0
		97	FA	-	-	0
		98	FA	-	-	0
		99	FA	-	-	0
		100	FA	0	+	0
		101	FA	0	+	0
		102	FA	-	-	0
		103	FA	-	-	0
		104	FA	-	-	0
		105	FA	-	-	0
		106	FA	-	-	0
		107	FA	-	-	0
		108	FA	-	-	0
		109	PS	+	+	0
	2nd half	201	PC	+	+	0
		233	FA	-	+	0
		234	FA	-	0	0
		235	FA	-	-	0
		236	FA	-	-	0
		237	FA	-	-	0

Issue Area	Agenda Position	Congress'l Quarterly Number	Proce- dural Type	Demo- cratic Party Position	Repub- lican Party Position	Constituent/ Interest Group Position
For- eign Aid	1965, 2nd half	238	FA	-	0	0
		239	FA	-	-	0
		240	PS	+	+	0
		245	PC	+	+	0
For- eign Aid	1966, 2nd half	96	Sub	+	0	0
		97	Gs	+	0	0
		98	FA	-	+	0
		99	FA	-	0	0
		100	FA	0	-	0
		101	Sub	0	-	0
		102	FA	-	0	0
		103	FA	0	+	0
		104	FA	+	0	0
		105	FA	+	-	0
		106	FA	0	-	0
		107	FA	0	-	0
		108	Tab	0	0	0
		109	Tab	0	0	0
		110	FA	0	-	0
		111	FA	0	0	0
		112	PS	+	+	0
		113	FA	-	-	0
		114	FA	-	-	0

Issue Area	Agenda Position	Congress'l Quarterly Number	Proce- dural Type	Demo- cratic Party Position	Repub- lican Party Position	Constituent/ Interest Group Position
For- eign Aid	1966, 2nd half	115	PS	+	0	0
		183	PC	+	0	0
		208	FA	-	0	0
		209	PC	0	+	0

a. High Information Roll Calls:

PS = Final passage, Senate bill

PC = Final passage, conference bill

CA = Committee amendment

Clo = Cloture motion

Low Information Roll Calls:

FA = Floor amendment

Sub = Substitute motion

Tab = Tabling motion

ReC = Reconsideration motion

b. + = Supporting position taken

- = Opposing position taken

0 = No position taken

c. Constituent/Interest Group positions given are for:

Negro constituents on Civil Rights motions (Southern white constituent position is opposite of the one given)

Organized labor on Labor motions

Urban poor constituent positions on Urban Welfare motions
(High-income persons' position is opposite of the one given)

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