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EFFECTS OF AGENDA ACCESS COSTS IN A SPATIAL COMMITTEE SETTING

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Introduction

In this paper we examine what decision making costs mean for outcomes in collective choice settings. Our specific focus is with simple majority rule spatial voting games. Well-known findings for such games show that outcomes will cycle throughout the policy space given the *frictionless* nature of simple majority rule processes (McKeivey, 1976; Schofield, 1978). Along with many others, we are uncomfortable with these theoretical results. Our discomfort stems from failing to observe such instability in natural empirical settings. Decision makers remind us that there are real costs to building agendas which are absent in our theoretical models. We use decision making costs as a way of introducing friction into the agenda process. Beginning from the same unconstrained spatial models, we introduce agenda access costs which we show are sufficient to induce equilibria in an otherwise unstable majority rule process.

Others share our discomfort with "institution-free" majority rule processes. A recent approach points to specific institutional rules for constraining majority rule processes. Several theorists have pointed to the importance of agenda control over outcomes in majority rule processes (Plott and Levine, 1978; Shepsle and Weingast, 1987; Wilson, 1986; Ordeshook and Schwartz, 1987). Others have focused on jurisdictional boundaries which protect specialized interests within legislatures (Shepsle, 1979; Krehbiel, 1985; Herzberg and Wilson, 1990a). Finally, one other approach has been to focus on the blocking power awarded to subsets of individuals in decision making settings (Laing et al., 1983;

Denzau and Mackay, 1983; Herzberg, 1985; Wilson and Herzberg, 1987). Much of this research has fallen under the rubric of "structurally-induced equilibrium." These approaches rely heavily upon particular rule configurations and find that the incentives of actors may vary tremendously with only minor changes in rules. The importance of these results is to point out how institutional procedures place constraints on majorities so as to induce stable outcomes where none previously existed.

A decision costs approach takes a different cut at the problem of majority rule cycles. It returns to the notion that decision making is not a frictionless activity. Instead, changes to decisions impose real costs on actors which in turn have independent effects on outcomes. The costs of decision making can be considered in two ways. First we can rely on concepts of transaction costs for decision making (Hoffman and Packel, 1982; Denzau, Mackay and Weaver, 1982). Second we can regard these costs as opportunity costs for decision making (Buchanan and Tullock, 1961). Although both approaches reintroduce *friction* into the decision process, we use a transaction cost approach in which real valued resources are required to introduce changes to the agenda process. The particular mechanism we have in mind pertains to costs which are borne by actors when the status quo is changed. In a collegial collective choice setting like the U.S. Congress, proposing a successful amendment entails considerable transaction costs for the winning coalition. These costs include staff research efforts in putting together the amendment, staff efforts in building a winning coalition through the inclusion or exclusion of subsidiary issues, and finally the lobbying efforts of the chief sponsors in promoting the legislation. All of these "efforts" can be viewed as the transaction costs borne by a Congressman when building a decisive coalition. These expenditures of effort are nothing more than part of the finite resources every Congressman holds. Clearly these resources could just as well be transferred to (other) valued activities such as casework. As we show with our theoretical model, such costs are sufficient to induce equilibrium outcomes over a wide variety of settings.

In many ways our approach is consistent with that used by numerous scholars addressing the question "Why So Much Stability?" raised by Gordon Tullock in this Journal. We do not assert that a model of agenda access costs is the only approach one might take to answering this question. However, it is one of the tools that can be used when examining empirical settings to explain the stability that is commonly observed in collective choice processes.

The paper has four sections. The first details a way of incorporating transaction costs into a spatial majority rule decision setting. In that section we present a general theorem of the effects of agenda access costs. The next three sections present examples of our general model designed to show its robustness. Section two demonstrates how variations in the size of costs changes the equilibrium set. Section three shows the effects of those costs as preference configurations vary. Finally, section four examines what happens as actors bear different agenda access costs.

Theoretical Structure

In this section we begin with results by others showing that employing a binary choice procedure under majority rule the decision process can wander anywhere.[1] Consistent (equilibrium) outcomes emerge from such processes only when actor's preferences meet highly restrictive conditions. This has led at least one prominent scholar to characterize political science as "the dismal science" (Riker, 1980). We show that introducing agenda access costs into this setting induces an equilibrium set with no restrictions on the distribution of actor's preferences. In turn, incorporating these costs into the decision process brings stability to collective choices.

[1] For the clearest statement of this point see McKelvey, 1976, 1979 and Schofield, 1978. Also see McKelvey, 1986 for a restatement and refinement of the process as well as Ordeshook and Schwartz, 1987 for characteristics of different agenda processes.

Definitions and Assumptions.

Let $N = \{1,2,...,n\}$ be the n-membered (odd) set of decision makers charged with selecting a single alternative, x, from a compact, convex policy space $X \subseteq R^m$. Each member $i \in N$ has a strictly quasi-concave binary preference relation (Type one preferences). Utility declines as a function of distance away from i's ideal point, x^i, so that *the set of alternatives preferred to x by member i* is defined as $P_i(x) = \{ x' \in X \mid \|x^i - x'\| < \|x^i - x\| \}$.

For simple majority rule games we define the *set of winning coalitions* in N as $S = \{S_1, S_2, \ldots, S_k\}$ where $S_j \in S$ if and only if $|S_j| > \frac{n}{2}$. An alternative, x', is *socially preferred* if it is preferred by all members of any $S_j \in S$ or $x' \in \mathcal{P}_j(x)$ where $\mathcal{P}_j(x) = \bigcap_{i \in S_j} P_i(x)$. The set of all socially preferred alternatives is defined as the win set of x or $W(x) = \bigcup_{S_j \in S} \mathcal{P}_j(x)$. We define the existing policy, or the status quo, as x^o.

For most distributions of voters preferences and most alternatives, $x \in X$, W(x) will be nonempty which implies that x can be beaten in pairwise comparison. In particular, Cox (1987) has shown that majority rule spatial games under the preference assumptions used here result in an empty win set at some x if and only if x is "*a median on all lines.*"[2]

Agenda Access Costs .

The standard findings hold that equilibrium in multidimensional choice spaces only occur under highly restrictive conditions. Rather than imposing limiting conditions on the distributions of actors' preferences, we turn toward the effect of decision costs on collective choices. Specifically we characterize a single type of decision cost, *agenda access costs*, whereby voters are assessed a fixed fee each time the status quo is amended. We define this cost for an individual as c^i and measure it in terms of utility units. A change from the status quo to

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[2]A median on all lines is simply the median of the induced ideal points on all lines containing that point. For further discussion of the restrictiveness of this condition, see Section 2 (Theorem 1 in particular) in Cox 1987.

an alternative x results in a value for i of $v^i(x) = u^i(x) - c^i$ or the utility of the alternative x minus the access costs assessed to achieve that alternative. For now we assume that the decision cost is the same for all individuals and therefore drop the superscript or $c^i = c, \forall\ i \in N$.

The introduction of decision costs imposes a powerful constraint on this spatial voting game. Costs constrain decision making by reducing the size of an individual's preferred to set by an amount relative to the cost imposed. In particular, i's *cost-induced preferred set*, defined here as $P_i^c(x^o) = \{x \in X | \ u^i(x^o) < v^i(x)\}$, can easily be shown to be a subset of $P_i(x^o)$ whenever $c > 0$:

Lemma 1: If $c > 0$, then $P_i^c(x^o) \subset P_i(x^o)$.

In order to understand how costs affect an individual's choices among alternatives we define an individual's *cost contour* relative to x^o as $C^i = f(x^o, c)$. The upper bound of C^i is represented as i's indifference contour through x^o. The lower bound is defined by first defining a distance $z = ||c||$.[3] Then from any point, x^o, we define i's lower cost bound as the indifference curve exactly z units inside the curve through x^o. C^i is z units wide whenever x^o is greater than z units from x^i. If $||x^i - x^o|| < z$, then C^i is the set of all alternatives inside the indifference curve through x^o. When costs are zero, C^i collapses to the indifference contour through x^o.

The cost contour provides an important dividing point for i's decision making relative to x^o. Every point inside the lower bound of C^i is strictly preferred by i to x^o with or without costs and every point outside the upper bound is strictly inferior regardless of costs. Choices over alternatives within the contour change as a function of the imposed costs. For all $x \in$

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3 Using a mapping of utility into distance, we can define the cost of changing the agenda in terms of distance in the space. Since we assume linear preferences and since costs are measured in terms of utility units, the distance associated with a given decline in utility, c, can be calculated as z and measured from any point in the space.

$C^i(x^o)$, $x R_i x^o$ when costs are absent but $x^o P_i x$ when costs are included. The cost contour, therefore, represents the set of i's decisions over alternatives affected by the introduction of costs equal to c. With costs included, i's preferred set shrinks to incorporate only those points interior to the lower bound of C^i or $P_i^c(x^o) = \{x \in X \mid ||x^i - x|| < ||x^i - x^c||\}$ where x^c is a point on the lower bound of C^i.

The full set of alternatives affected by the introduction of costs is defined as the *social cost set*, $\boldsymbol{C} = \bigcup_{i \in N} C^i$. For each $x \in \boldsymbol{C}$, there is at least one $i \in N$ whose vote in the binary choice between x and x^0 changes as a function of cost. The *cost-induced win set* is simply the union of all winning coalitions' cost-induced preferred-to sets or $W_j^c(x^o) = \bigcup_{S_j \in S} P_j^c(x^o)$.

The cost-induced win set relates to the win set in the following way:

Lemma 2: If $c > 0$, then $W^c(x^o) \subset W(x^o)$.

By lemma one, $\forall\, S_j \in S$, $P^c(x^o) \subset P(x^o) \Rightarrow \bigcup_{S_j \in S} P_j^c(x^o) \subset \bigcup_{S_j \in S} P_j(x^o) \Rightarrow$

$$W^c(x^o) \subset W(x^o).$$

Q.E.D.

Introducing agenda access costs constrains the decision process and limits moves previously preferred by a majority. A comparison of $W(x^0)$ and $W^c(x^0)$ for the three-person example shown in Figure 1 suggests how costs limit the process. Without decision costs, majorities support any move from x^0 into one of the three shaded petals shown on the figure (note that $W^c(x^0) \subset W(x^0)$). For example, the move from x^0 to A results in a higher utility for actors 1 and 3 and, thus, A is part of $W(x^0)$. Similarly, actors 2 and 3 prefer B to x^0. When costs are introduced, however, many previously preferred outcomes, including A (but not B), no longer yield sufficient utility to compensate for the agenda costs. On the figure these costs are represented by the distance z and are symmetrically borne by the actors. The cost-induced win set for this example is shown as the smaller, interior, cross-hatched petal $W^c(x^0)$. No alternatives are preferred to x^0 by actor 1 in the face of this level of costs. Only a coalition of members 2 and 3 will support a costly amendment to x^0 such as B. Costly amendments, therefore, force actors to consider only those alternatives which are sufficiently valued so as to compensate for the transaction costs to decision making.

<Figure 1 About Here>

We define x as a *cost-induced equilibrium*, denoted $x \in E^C$, if $W^C(x) = \varnothing$. We can compare the sets $W^C(x^0)$ and $W(x^0)$ beginning with the general results for majority rule processes. Under most preference conditions: $W(x^0) \neq \varnothing$ for all $x^0 \in X$. For every point there exists a majority preferred alternative so that there is no particular point at which the decision process is expected to stop. By contrast, the presence of costs can result in predictable and stable decisions. If all winning alternatives relative to x^0 under a no-cost condition improve the utility of one member of each winning coalition by a value less than the cost, then once costs are included that status quo will be an equilibrium. To see this consider the following result:

Theorem 1: If $c > 0$, $x \in E^C$ if and only if $W(x) \subset \boldsymbol{C}$.

Proof: *Sufficiency*. We show that for any x' where $x' \in W(x)$ and $x' \in \boldsymbol{C}$, if $x' \notin W^C(x)$ then $x \in E^C$. Assume the contrary, $x \notin E^C$ but $W(x) \subset \boldsymbol{C}$. Then if $x \notin E^C$, there exists an $x' \in W^C(x)$. By lemma two, $x' \in W(x)$. With strictly quasi-concave preferences, $x' \in W(x)$ implies $x' \in \boldsymbol{P}_j(x)$ for some S_j. Then for all $i \in S_j$, $||x^i - x'|| < ||x^i - x||$. By definition of $\boldsymbol{C}$ and the strict quasi-concavity of member's preferences, $x' \in \boldsymbol{C}$ implies that for some $i \in S_j$, $||x^i - x|| < ||x^i - x'|| - z$ which implies $x \; P_i^C \; x'$ for some $i \in S_j$. But then $x' \notin \boldsymbol{P}_j^C(x)$ for any S_j containing i. Then $x \notin W^C(x)$ contrary to our assumption. Therefore, $x \in E^C$.

Necessity: We show that if $x \in E^C$, then $W(x) \subset \mathbf{C}$. Let $x \in E^C$. If $x \in E^C$ then either $W(x) = \emptyset$ or $W(x) \neq \emptyset$, but $W^C(x) = \emptyset$. If $W(x) = \emptyset$ then trivially $W(x)$ is a subset of $\mathbf{C}$. Thus, consider the case in which $W^C(x) = \emptyset$ but $W(x) \neq \emptyset$. Assume $x' \in W(x)$, but $x' \notin \mathbf{C}$. Since $x \in E^C$, $x' \notin W^C(x)$. By definition of $W^C(x)$, if $x' \notin W^C(x)$ then $x\ R_j^C\ x'\ \forall\ S_j \in S$. Then either $x\ R_j\ x'$ contradicting the assumption that $x' \in W(x)$, or $x' \in \mathbf{C}$ contradicting the assumption $x' \notin \mathbf{C}$. Thus, $x \in E^C$ only if $W(x) \subset \mathbf{C}$. Q.E.D.

When costs cover all majority preferred movements from a given status quo, x^0, that status quo is an equilibrium. Suppose that costs increase from z to z* for the example shown in figure 1. Figure 2 illustrates this change. The major difference between these figures is that as z increases to z*, $W^c(x^0)$ is now empty. There is no longer a common intersection of the cost preferred sets of all members of any winning coalition. In Figure 1 the coalition 2 and 3 preferred a set of alternatives to x^0 in the face of costs equal to z. Included in this set was the alternative B. Now, however, the higher access costs imposed at x^0 change the decision calculus for member 2. The value of B to member 2, $v^2(B) = u^2(B) - z^*$, declines so that now $u^2(x^0) > v^2(B)$ and member 2 will not support this costly change. Thus, while member 3 still prefers B in the face of costs equal to z*, he is unable to obtain the support of either remaining member. Since this holds for every alternative to x^0 and every winning coalition, x^0 is stable at costs equal to z*. This example only investigates whether a single alternative, x^0, is stable. With these preferences and this level of cost, x^0 need not be the only stable alternative. Indeed, there may be an entire set of $x \subset X$ in equilibrium.

<Figure 2 About Here>

Differing Levels of Costs

In this section, we outline a set of general cost conditions sufficient to induce a nonempty equilibrium set under a majority rule collective choice process. While the examples shown above and in the rest of the paper demonstrate specific equilibria for a two-dimensional choice setting, the result in theorem one applies to a far more general set of collective decision processes, in particular, the theorem shows that if costs are sufficiently high, a nonempty equilibrium set will exist. As we turn to specific examples we can test the boundaries of this theorem under a variety of reasonable assumptions about the decision process.

The existence of a cost-induced equilibrium depends on a number of factors specific to a given choice setting. Specifically, three variables affect the existence and size of the equilibrium set for any given choice setting: the type and configuration of members' preferences; the level of costs imposed on members; and the distribution of those costs across members. Once each of these variables has been defined the specific equilibrium results for any given choice setting can be determined using an algorithm derived from the conditions of our theorem. We do not present a general algorithm here to generate such results. Instead, we use a number of examples to demonstrate the robustness of the theorem under a variety of preference and cost conditions.

Over the next several sections we show the equilibrium properties of costs on outcomes using a series of examples. These examples are based on a similar structure. Our setting is that of a five member committee in a two dimensional policy space. The policy space is bounded, but not continuous. Instead, it is a dense, 300 by 300 unit space, with 90,000 separate alternatives. Committee members each have Type I Euclidean preferences. For ease of discussion each member has been assigned preferences (in dollars) with utility decreasing as a linear function of distance from their ideal point. The rationale behind this particular structure for our example is that it is identical to the setting used in laboratory experiments testing the costs of voting as reported in Herzberg and Wilson (1990b). It is important to note that the examples used in the following sections are specific cases, using a particular type of preference relation, limited to five actors, and set in a two-dimensional policy space. Our general result is in no way dependent on the limitations adopted in our examples.

In this section we focus on a configuration in which there is no preference-induced equilibrium. This setting is one in which, in the absence of costs, any status quo can be defeated by some majority coalition. Consequently voting cycles can be constructed throughout the policy space. Figure 3 illustrates such a setting with five committee members who are approximately symmetrically dispersed about the center of the policy space. Each has the same valuation for their ideal point and utility decreases as a linear function of distance from each member's ideal point at a rate of $.07 per unit. Finally, the costs for changing the status quo are symmetrically imposed. The mechanism for introducing costs is quite simple. Committee members operate under a forward moving agenda procedure. Any amendment to a status quo is open for consideration. Once an amendment is called, members vote between the status quo and the amendment. For simplicity we assume that only winning amendments are put forward and that all members vote sincerely. Agenda access costs are assessed at each (successful) change to the status quo.

<Figure 3 About Here>

At every level, decision making costs constrain the decision process by limiting the set of alternatives preferred to a given status quo, x^o. At very low levels, costs constrain the decision process, but may be insufficient to induce a stable decision outcome. As costs increase, they provide greater drag on majority processes until reaching a threshold level, defined as c', there exists some $x^* \in X$ such that $W^c(x^*) = \emptyset$. In other words, for any given preference configuration and corresponding utility functions, we can determine the minimum cost level sufficient to produce a nonempty equilibrium set. As costs increase above this threshold level, the equilibrium set expands to incorporate a larger set of alternatives.

To see how variations in the level of cost affect the equilibrium set, we consider the five-person example shown in figure 3. From this we calculated the equilibrium sets associated with two arbitrarily fixed cost levels. Using the payoff functions given on the figure we define *high* costs as $1.50 and *low* costs as $.75 per change to the status quo. In turn we contrast the equilibrium results associated with each. The low cost equilibrium set, E^1, is represented as the smaller shaded polygon centrally located in the Pareto set. As costs increase from $.75 to $1.50, the size of the corresponding equilibrium set increase as well and is illustrated on figure 3. While a relatively small equilibrium set is induced by the lower cost level, the high cost equilibrium set, E^h, incorporates a large portion of the Pareto set.

<Figure 3 about here>

Clearly, as costs increase, far more points satisfy the equilibrium conditions. Similarly, the set of equilibrium alternatives shrinks as costs decrease, until a threshold is reached where the cost-induced equilibrium set becomes empty. In this particular example, when costs go below $.57 a cost-induced equilibrium no longer exists. While sub-threshold costs constrain majority movements, at no status quo are these costs sufficient to offset all potential positive gains for some winning coalition. However, costs close to the equilibrium level can limit the possible winning alternatives to such an extent that while successful moves are possible, constructing an agenda to obtain those outcomes may be difficult, suggesting greater coherence and stability in the process than the no-cost majority rule models would suggest. Thus, costs at all levels constrain the process, but only those costs above a threshold level for a given distribution result in a clear and stable prediction for the game. How well does a cost-induced equilibrium hold up as the distribution of preferences changes? This is the question tackled in the next section.

Differing ***Preference Configurations***

Suppose we assume that costs are sufficient such that a cost-Induced equilibrium exists. As we have already observed, for a setting in which amendments can cycle throughout the policy space, agenda access costs equal to $.75 result in the small, shaded polygon of stable outcomes shown in figure 3 . This translates to no majority coalition able to uncover an alternative that is better than any point in this set by at least \$.75 for all members of a winning coalition. Effectively the introduction of transaction costs removes epsilon changes to the status quo for any coalition. This is not to say that *some* members of a coalition cannot find moves that are preferred in the face of costs. It is simply the case that there is no move for *all* members of any winning coalition. Consequently points in the equilibrium set on figure 3 are stable: no amendment will be proposed, since none can defeat a point in the cost-induced equilibrium set.

Now suppose we move to a setting in which a preference-induced equilibrium exists. The example we use, shown in figure 4 satisfies the sufficient conditions for a Plott equilibrium (Plott, 1967; also see Cox, 1987). Under simple majority rule, a status quo located at x^A is invulnerable to any proposed change. Furthermore, each agenda trajectory will collapse on x^A in the absence of decision costs. As agenda costs are introduced into this preference configuration, the equilibrium set expands to encompass a larger set of stable points.

<Figure 4 about here>

For those instances in which a preference induced equilibrium exists, we consider two cases. In the first case we consider only *connected* minimum winning coalitions. For the example given on figure 4, this means that x^5, the member at the core, is always included in a minimum winning coalition. In this instance we can define a special cost set around the core actor, $C^A(x^*)$, in which x^* is the set of points exactly z units from x^A (in the case of figure 4, costs equivalent to \$.75). From the example, any $x^o \in C^A(x^*)$ is stable since it is the case that $||x^o - x^A|| \geq [||x^* - x^A|| - z]$. Given x^A's position in all connected minimum winning coalitions, that member effectively exercises veto power over amendments that are a function of his particular cost set. For this special case a cost condition sufficient to produce an equilibrium can be stated as follows:

Corollary One: If $z > \|x^A - x\|$, where A is the core member, then $x \in E^C$.

Proof: Let $z > \|x^A - x\|$. Then $v^A(x^A) < u^A(x)$ implies $x^A \notin P^C{}_A(x)$. But by definition of x^A, if $x^A \notin P^C{}_A(x)$ then $P^C{}_A(x) = \emptyset$. But then $P^C{}_j(x) = \emptyset$ for all S_j where $A \in S_j$. As core member, however, $A \in S_j$ for all $S_j \in S$. Thus, if $P^C{}_A(x) = \emptyset$, then $W^C(x) = \emptyset$ and $x \in E$. Q.E.D.

in the second case we consider *unconnected* minimum winning coalitions. Given the symmetry of other actor's ideal points around the core in our example, a subset of feasible amendments for the coalitions {1,2,5} and {2,3,5} are also possible for the coalition {1,2,3} (the same holds true for other combinations of winning coalitions). In such an instance, the core member is not pivotal for the coalition. At a minimum, corollary one points out that the cost-induced equilibrium set is equivalent to the core when only the core member, and no other actor, faces costs. Maximally, when all actors face identical costs, the resulting equilibrium set resembles that outlined on figure 4 for members facing $.75 costs. In general, whether we model preference-induced equilibrium settings with connected or unconnected minimum winning coalitions, we find that imposing costs expands the resulting equilibrium set.

Suppose we return to the case where no majority rule equilibrium exists and the distribution of preferences varies from the "star-like" symmetry of the example depicted by figure 3. What effect do decision costs have on the collective choice process? To explore this, we take the preference configuration portrayed on figure 5 resembling a "stretched" star. We again use costs equal to $.75 per change to the status quo. Once again a cost-induced equilibrium exists. The set remains centrally located, although it is oriented differently than the equilibrium set from the more symmetric example in figure 3. Moreover, even though the agenda access costs are the same for the settings in figures 3 and 5, the equilibrium set for the latter is larger than for the former. This is largely a function of the relative proximity of members C, D and E. This implies that a tightly clustered winning coalition has a difficult time in overcoming these transaction costs.

<Figure 5 About Here>

Our examples illustrate a point noted by Sloss (1973). In a different vein she shows that decision costs can be considered a function of the distance of a stable alternative to members' ideal points and asymmetries in members' preferences relative to that proposal. Basically, we illustrate that from any configuration, with sufficient costs, a cost-induced equilibrium can be uncovered. The set shifts with the distribution of preferences and the specific utility functions of the actors. In the next section we turn to the question of how the distribution of agenda access costs affects the cost-induced equilibrium set.

Differential Decision Costs

In the previous examples, we assumed that all members of the decision making group face equivalent agenda access costs. In most decision settings, however, such costs are differentially assessed. For example, a legislature in which specified committees are granted agenda control over assigned policy jurisdictions may operate with a differential agenda access procedure that advantages committee members over noncommittee members. Committee members may face very low or even zero costs when proposing an alternative to the agenda in their jurisdictional domain, while non-committee members' costs are quite high given a lack of expertise, inadequate information or procedural barriers each of which increases the difficulty of bringing an amendment to the floor. In this section, we consider how differential distributions of decision costs affect the equilibrium results in majority rule processes.

If we reconsider the relatively symmetric five-person example outlined earlier in figure 3 we determined the minimum cost threshold for a nonempty equilibrium set at $c' = \$.57$. This threshold value provides an important dividing line for establishing equilibrium outcomes even when members face differential decision costs. In particular, any institutional arrangement that imposes decision costs on every individual which exceed this threshold results in a stable decision process. The level of cost faced by each actor, c^i, can vary among actors without any change in prediction as long as $c^i > c' \; \forall \; i \in N$. Thus, we might imagine an example in which one or more individuals face low costs while the remainder face high costs. If c^i exceeds the equilibrium threshold a nonempty equilibrium set is guaranteed. However, where some members face higher costs, this will result in a larger equilibrium set than if all members face lower level costs.

While the equilibrium conditions continue to hold for the differential cost case whenever all costs exceed the threshold, we might consider what happens as some individuals are assessed costs that are below c^i ? To evaluate this question we consider a decision setting in which a single individual faces zero decision costs while all other members face non-zero costs for change. Such a setting is similar to the agenda arrangements in which one actor is favored with agenda control. However, in this case, agenda control is no longer monopoly power. Other members can gain access to the agenda, but only if they are willing to absorb some fixed cost. Again, costs will constrain the decision process. However, now the costs for other members of any coalition containing i, the no-cost actor, must be sufficiently high so that they alone cover the appropriate petals of the win set Consequently if i is pivotal for the coalition, then costs must be higher for all actors other than i.

The extent to which other members' costs must increase depends on the preference configuration of ail members and the specific placement of the member with zero costs. As before, the size of the equilibrium set increases as costs for other actors increase. In all cases, however, fewer alternatives satisfy equilibrium conditions when costs to even one individual are reduced. At low costs for all other actors, eliminating costs for one actor may open up the decision process sufficiently so that the cost-induced equilibrium set is empty.

Consider, for example, the preference configuration shown above in figure 3. The equilibrium set is small and centrally located when all actors face low decision costs of $.75. As costs are lowered for a single individual the decision process becomes more fluid and the equilibrium set shrinks further and may disappear altogether. The equilibrium set shown in figure 6 represents the set of points stable in the decision setting with low costs for all members except member 3 who faces no costs at all. Note that the set is considerably smaller than before, as now only those points which are covered by the other actors' cost contours are stable. Zeroing member 3's costs is a propitious choice, since doing so for either member 1, 2, 4, or 5 (and fixing low costs on the remaining actors), yields no equilibrium. Again, this points out the importance of the symmetry of member preferences in determining whether a cost-induced equilibrium exists. On the other hand, if "high" costs are imposed on all actors (except one) a cost-induced equilibrium exists regardless of which single member is allowed free agenda access.

<Figure 6 about here>

Suppose we consider two actors with zero costs. Any equilibrium is a function of which actors face zero costs, the costs to other actors, and the distribution of actors in the decision space. For the preference configuration used in figure 6 and $.75 costs, zeroing the decision costs for any two actors sufficiently opens the decision process so that the equilibrium set is empty. With decision costs of $1.50, a set of stable outcomes arises. For example, $1.50 costs for actors 3, 4, and 5 and zero costs to actors 1 and 2 generates the equiiibrium set shown in figure 7 - a set much smaller than the high cost equilibrium displayed in figure 3 when all actors face the same level of costs.

<Figure 7 about here>

Obviously the differential costs presented here represent one extreme case - where most of the actors face equivalent costs and a smaller set of actors face no costs. Much the same approach could be taken with respect to assigning the actors very different costs. Differential decision costs can result in stable decision processes, but only if those costs cover the full preferred-to set of any winning coalition. Generally, as costs are reduced for a member, fewer points satisfy the equilibrium conditions, and costs must be higher for the remaining members in order to prevent majority-preferred moves.

Conclusion

In this paper we have illustrated a set of conditions under which majority rule equilibrium exist due to costs imposed on the decision setting. The existence of an equilibrium is not guaranteed, but rather is a function of the size of costs, the utility functions of actors and the distribution of their preferences. As such the equilibrium we discuss does not yield a simple point prediction, but generates a set of points which vary with the decision setting. However, we do not regard this as a drawback. It is logical that no single solution can be associated with the friction introduced by incorporating transaction costs. Some decisions will be reached easily while others will require far more resources even when the institutional rules and players remain constant.

The equilibrium we identify, like the Core, is retentive. It exists under relatively low levels of costs and is reasonably easy to calculate for the examples examined here. Most importantly, with a relatively minor, but reasonable, assumption added to standard majority rule models, we can partly explain why we observe so much stability in the empirical world. Moving from decision settings where agenda building is frictionless to settings where there are transaction costs complicates the standard models. By the same token, we gain further insight into one process that may dramatically stabilize the instability of the collective choice process. What we present here is only a sketch of the problem and one of its solutions. Obviously considerable additional work remains.

Figure 1

Example of W(x) and $W^c(x)$ in two dimensions.

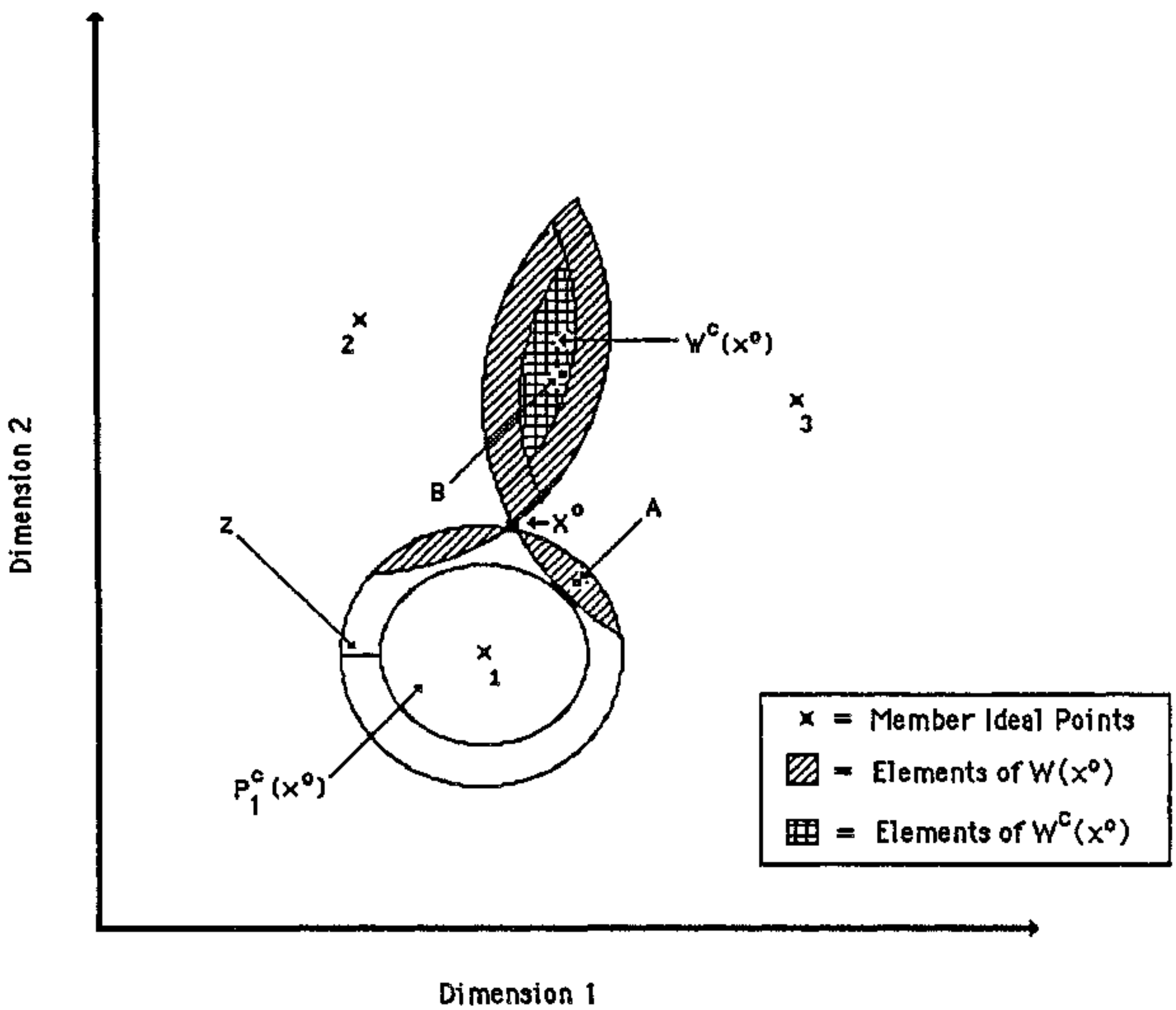


Figure 2

Example of a Stable Status Quo

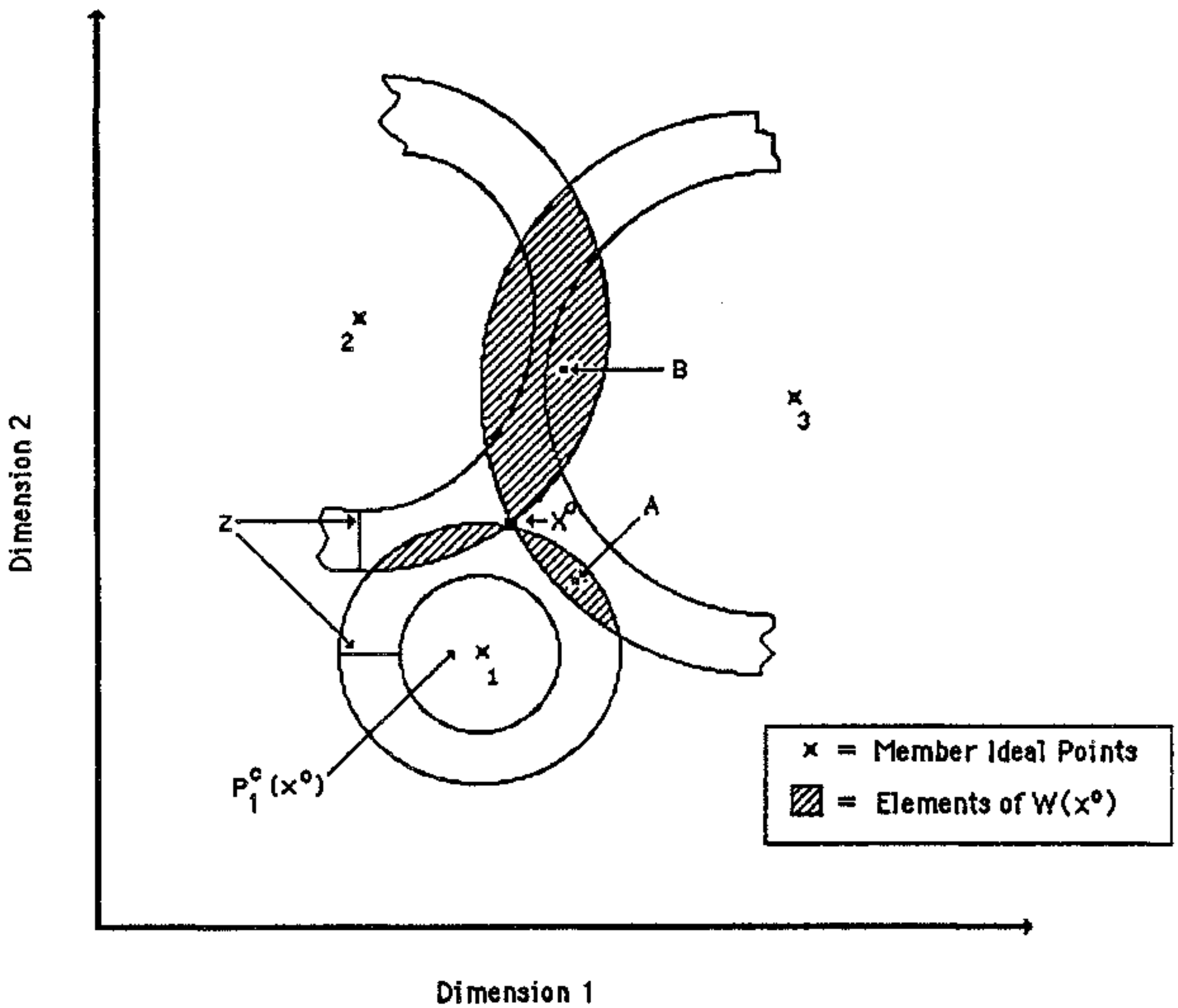
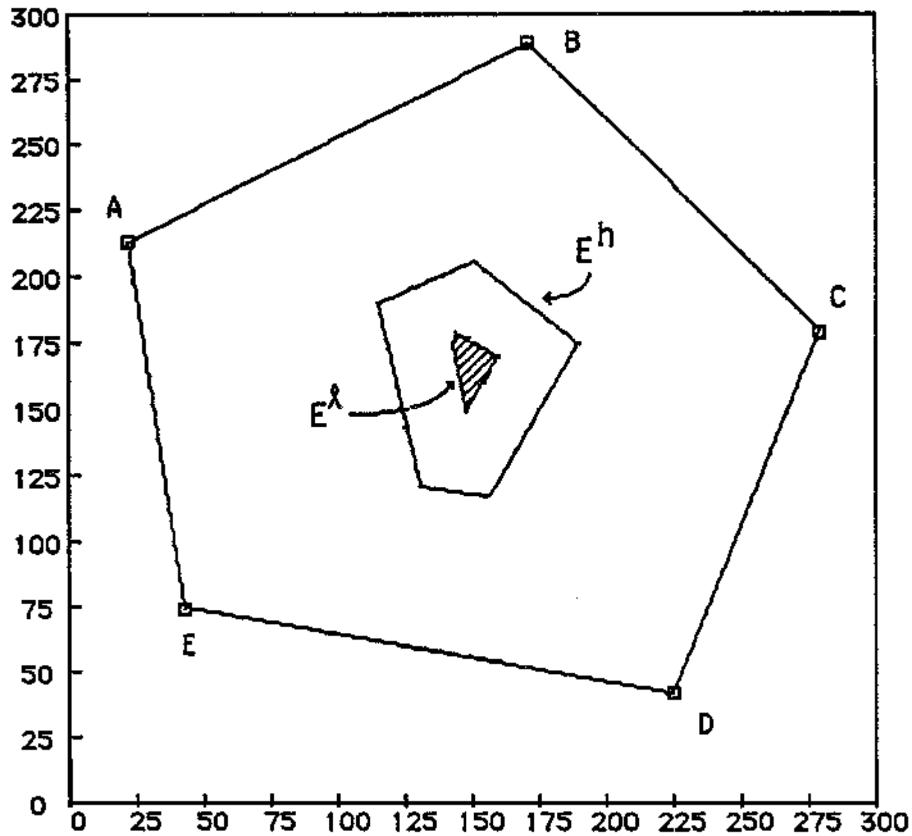


Figure 3

Cost-Induced Equilibrium Under High and Low Costs



	Ideal Points	High Costs	Low Costs
Member A:	(22,214)	\$1.50	\$.75
Member B:	(171,290)	\$1.50	\$.75
Member C:	(279,180)	\$1.50	\$.75
Member D:	(225,43)	\$1.50	\$.75
Member E:	(43,75)	\$1.50	\$.75

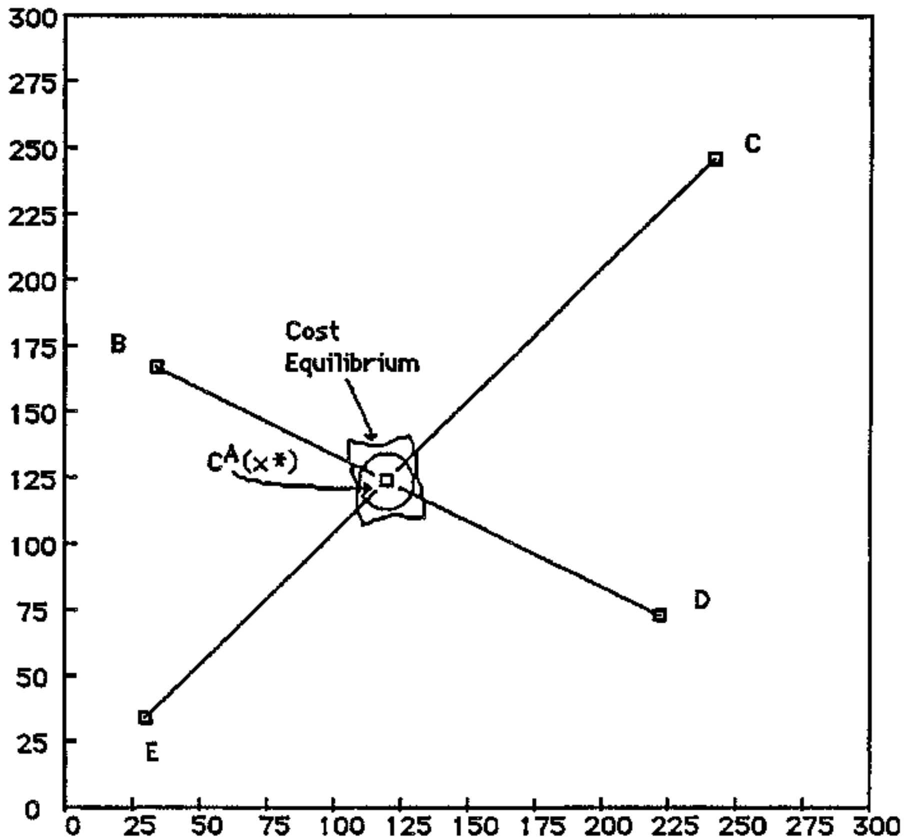
The utility for each member is given by:

$$U_i = \$20.00 - (\|X - X^i\| * \$.07)$$

where: X^i = ith member's ideal point and
X = any alternative

Figure 4

Cost-Induced and Preference-Induced Equilibrium



	Ideal Points	Costs
Member A:	(120,125)	\$.75
Member B:	(34,168)	\$.75
Member C:	(242,247)	\$.75
Member D:	(222,74)	\$.75
Member E:	(30,35)	\$.75

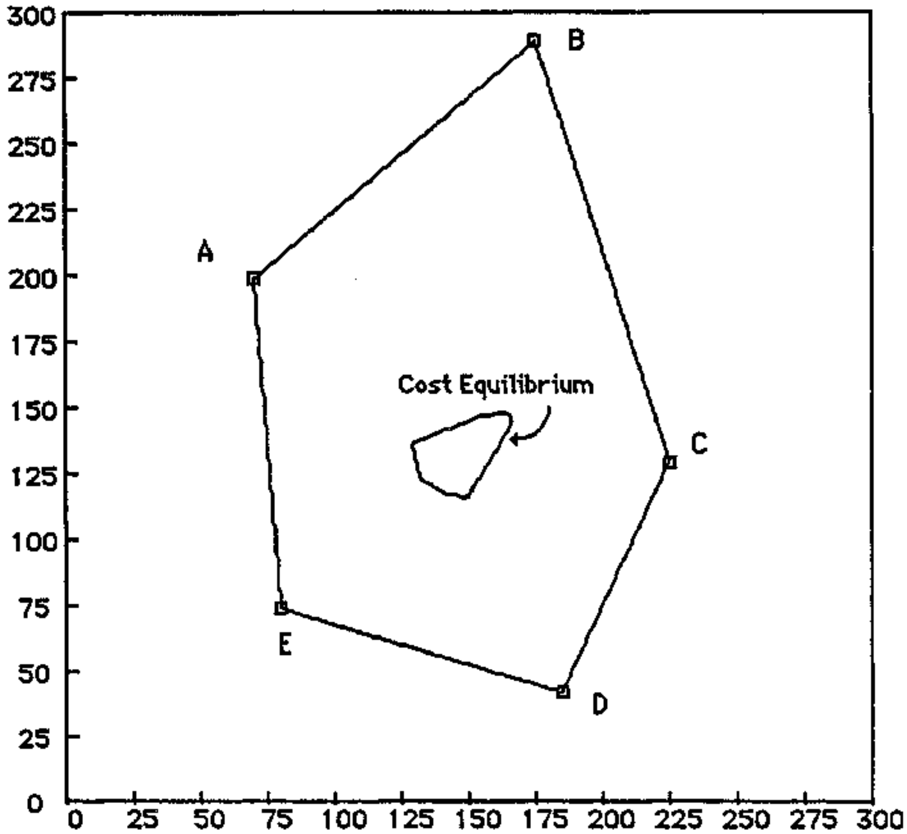
The utility for each member is given by:

$$U_i = \$20.00 - (\| X - X^i \| * \$.07)$$

where: X^i = ith member's ideal point and
X = any alternative

Figure 5

Cost Equilibrium Under a "Stretched Star" Configuration



	Ideal Points	Costs
Member A:	(70,200)	$.75
Member B:	(175,290)	$.75
Member C:	(225,130)	$.75
Member D:	(185,43)	$.75
Member E:	(80,75)	$.75

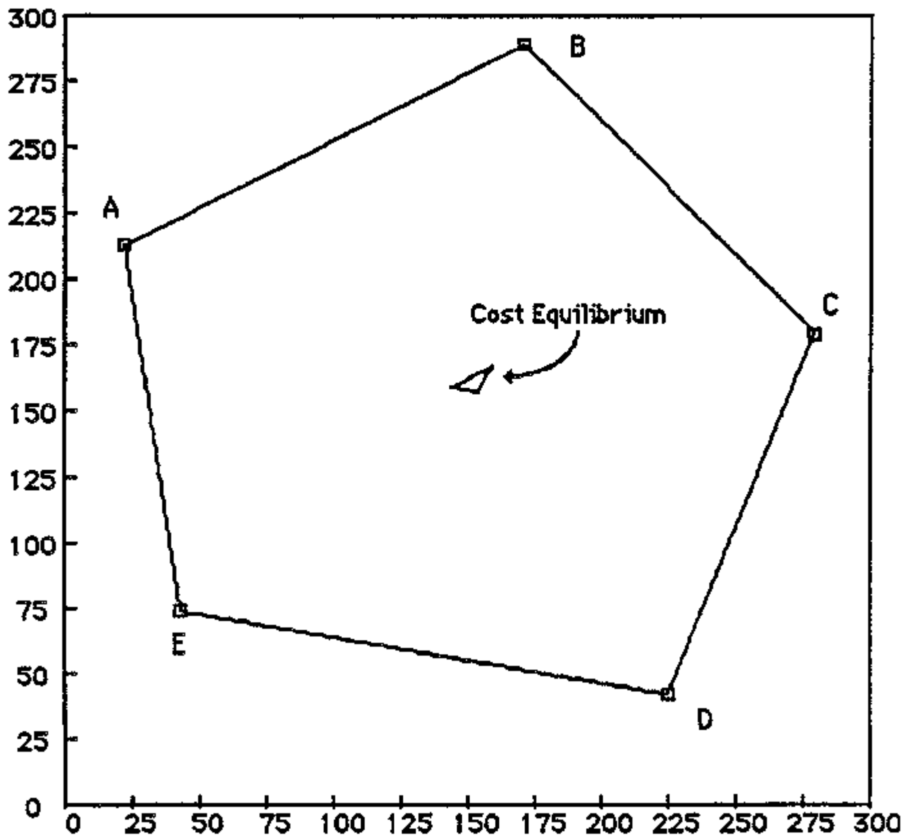
The utility for each member is given by:

$$U_i = \$20.00 - (\|X - X^i\| * \$.07)$$

where: X^i = ith member's ideal point and
X = any alternative

Figure 6

Cost Equilibrium With Member C Bearing No Costs



	Ideal Points	Costs
Member A:	(22,214)	$.75
Member B:	(171,290)	$.75
Member C:	(279,180)	$.00
Member D:	(225,43)	$.75
Member E:	(43,75)	$.75

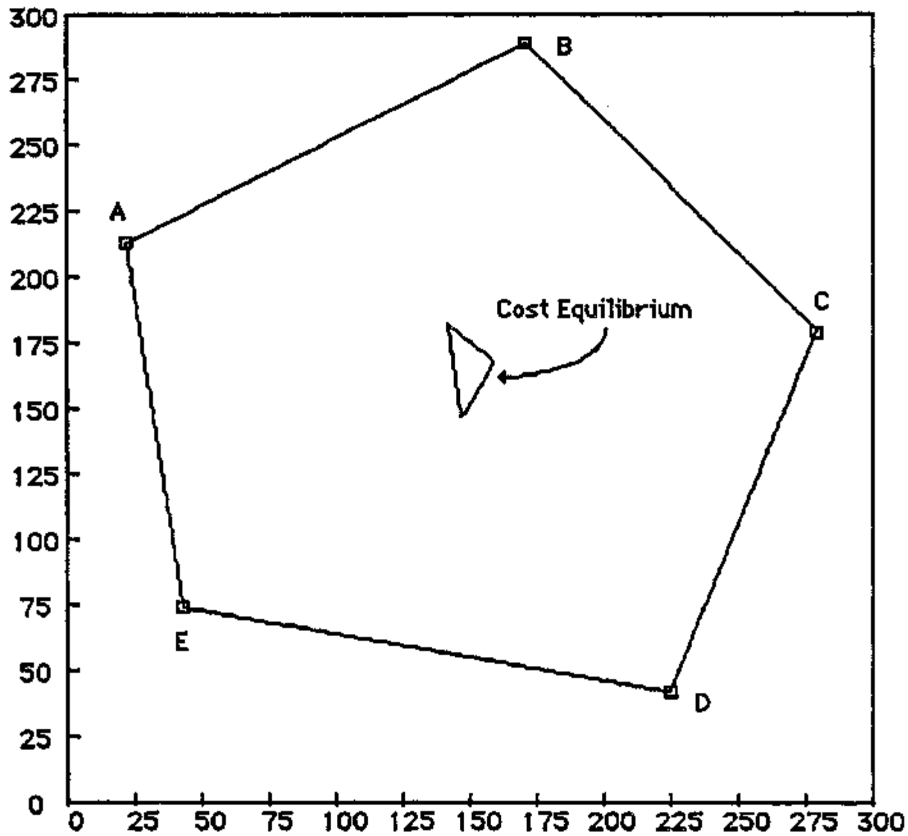
The utility for each member is given by:

$$U_i = \$20.00 - (\| X - X^i \| * \$.07)$$

where: X^i = ith member's ideal point and
X = any alternative

Figure 7

Cost Equilibrium With Members A and B Bearing No Costs



	Ideal Points	Costs
Member A:	(22,214)	$0.00
Member B:	(171,290)	$0.00
Member C:	(279,180)	$1.50
Member D:	(225,43)	$1.50
Member E:	(43,75)	$1.50

The utility for each member is given by:

$$U_i = \$20.00 - (\| X - X^i \| * \$.07)$$

where: X^i = ith member's ideal point and
X = any alternative

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