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***GAME THEORY AND MULTILATERAL NEGOTIATIONS:
THE SINGLE EUROPEAN ACT AND
THE URUGUAY ROUND***

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Game Theory and Multilateral Negotiations: The Single European Act and the Uruguay Round

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Abstract

The Single European Act (SEA) institutionalized qualified-majority voting for most decisions of the European Community (EC) Council of Ministers that pertain to the "internal market." The de jure Banzhaf voting power of members of the Council is compared with their power under the assumption that France and Germany have de facto vetoes in a new weighted voting body. The power of plausible groupings of members is also analyzed and related to the negotiations leading to the SEA. The power of the Council to act under qualified-majority voting is shown to be 300-400 times greater than under the previous unanimity rule--with or without the de facto vetoes--suggesting a radical shift by the Council toward democratic rule by its members.

A 3-person game is used to analyze the negotiations among the US, the EC, and Japan on two major issues related to the liberalization of trade, agricultural price supports and access to markets. Disagreement on the first issue was the principal reason for the breakup of the Uruguay Round of GATT in December 1990, whereas the second issue has been a bone of contention among the three players for some time. A dynamic negotiation model illustrates both the conditions that led to the conflict and what compromises will be needed to overcome it.

Comparisons are made between the models used to analyze the two cases, and conclusions are drawn about the advantages of using n-person game theory to study multilateral negotiations.

Game Theory and Multilateral Negotiations: The Single European Act and the Uruguay Round

1. Introduction

Game theory assumes that each player in a game, in formulating its own best course of action, takes into account the rational actions of the other players. Negotiations that may lead to the settlement of a dispute, therefore, depend upon the rational actions of all players.

Decision theory also assumes that players act rationally, but it does not make the strategic interactions of players its focus. Rather, it postulates that these interactions, as well as other forces that may affect the rational choices of a decision maker, can be summarized for a single decision maker by probabilities that certain events will occur. This decision maker plays a "game against nature," or one-person game, in an uncertain environment.

One reason for making explicit strategic information about the choices of all players, who may have partially cooperative and partially conflicting interests, is that real-life decision makers seem to factor such choices into their calculations in deciding what course of action is rational. They often ask themselves: What is so-and-so likely to do if I do such-and-such? Depending on the answer, they may decide that such-and-such is a sensible thing to do, compared with the possible consequences of other actions they may consider.

The assumption of rationality underlying this kind of calculation is by and large realistic in the study of negotiations: players do bargain to achieve certain goals, knowing that there are other players who may try to help or thwart them. But beyond its descriptive powers, does game theory offer insights that other theories or perspectives do not?

In modeling negotiations, game theory has been used primarily but not exclusively to study 2-person strategic situations (Brams, 1990; Raiffa, 1982). What we shall endeavor to show here is its applicability to two n-person situations, one of which culminated in an agreement and the other which did not.

In the first case, we use cooperative game theory, which assumes that a binding agreement can be imposed that ensures all parties of some value. We then ask how this value (in this case, voting power) will be distributed among the parties, but not whether it is in their interest to stick with the agreement were it not imposed. In the second case, we use noncooperative game theory, which assumes that a binding agreement cannot be imposed if it is not in the players' interests to adhere to it. But if it is individually rational for the players to make such an agreement, then it will perforce be self-enforcing and, therefore, need not be imposed. In brief, cooperative game theory asks how value will be divided, whereas noncooperative game theory asks what strategies rational players will choose in situations of conflict.

We begin by using the cooperative theory to study the voting power of members of the European Community (EC) Council of Ministers. Looking beyond the assigned weights of the twelve members of the Council, we next analyze the effects of giving de facto vetoes to France and Germany and also consider how grouping members into plausible coalitions affects their powers. We then investigate the power of the Council to act under qualified-majority, simple-majority, and unanimity decision rules.

Our analysis of both the formal and informal decision rules sheds light on how the Single European Act (SEA) came to be adopted. The SEA, it seems, was a response to outmoded rules, which no longer served most members' interests. For example, the veto that all members had on matters they deemed vital to their

national interests had sometimes frustrated the will of the majority. By contrast, the more realistic distribution of power under qualified-majority voting--and weights under this rule which would allow both France and Germany to have vetoes--suggests why these two countries supported the SEA. The UK probably also benefited, in part because it was able to gain concessions from France and Germany that more than counterbalanced giving up part of its sovereignty under qualified-majority voting.

We use noncooperative game theory to analyze the dynamics of negotiations on two major issues related to the liberalization of trade, agricultural price supports and access to markets. Disagreement on the first issue was the principal reason for the breakup of the Uruguay Round of GATT in December 1990, whereas the second issue has been a bone of contention among the US, the EC, and Japan for some time.

We postulate a 3-person game among these players, based on their positions on both these issues (or platforms). We assume that the players begin by supporting only their most preferred platforms, lending their support to lower-ranked platforms, if there is no consensus, until they reach a point at which they would prefer impasse to further compromise. This dynamic negotiation model illustrates both the conditions that led to the conflict and what compromises will be needed to overcome it.

Whereas the cooperative model applied to voting on the EC Council is most useful in drawing out quantitative implications of the formal and informal rules of the voting game, the noncooperative model applied to trade negotiations gives one greater insight into the actual jockeying for position among the major players as each strives to attain its preferred positions in extended negotiations.

Although the viewpoints provided by game theory are quite different in each

case, they both highlight nonobvious consequences of strategic interaction among players in an n -person game.

2. Voting Power in the EC Council of Ministers

The SEA was approved by the EC Council of Ministers in December 1985 and ratified by the member states in early 1986. When it came into force in July 1987, it committed its members to the progressive establishment, by the end of 1992, of an "internal market," defined as "an area without internal frontiers in which the free movement of goods, persons, services and capital is ensured."

The SEA has been called "the most important amendment to the Treaty of Rome since the latter was adopted in 1957," primarily because "it rejects the national veto" (Sandholtz and Zysman, 1989, pp. 115-116) by extending qualified-majority voting to Council decisions pertaining to the internal market. Indeed, Cameron (1990, p. 49) claims that this extension may represent the "single most consequential aspect" of the SEA.

Although qualified-majority voting was increasingly invoked from 1966 until 1985 (Moravcsik, 1991, p. 51), its scope was circumscribed by the "Luxembourg compromise." Under pressure from France, which had boycotted EC proceedings for six months in 1965, the other five EC countries reluctantly agreed in January 1966 that it would be able to veto proposals of the Council that it declared to infringe on its "very important" national interests, which was a right later invoked by other governments.

The expansion of qualified-majority voting (the decision rule is 54 out of 76 votes on the Council, or 71 percent) under the SEA has greatly reduced use of the veto. To be sure, the SEA allows for certain exceptions relating to the internal market: fiscal (primarily tax) issues, the free movement of people, and worker

rights. But excluding these areas, qualified-majority voting can be invoked relatively easily. If the European Commission unanimously agrees that a matter is pertinent, then a simple majority of the Council (39 out of 76) can sanction a qualified majority of the Council to act on the matter (Garrett, 1991, p. 20). As is usual in such cases, the procedural threshold to decide that a matter is pertinent (39 votes), if unchallenged by any member of the Commission, is lower than the substantive threshold (54 votes) necessary to act on this matter.

The Council, acting unanimously, may amend a Commission proposal, and the European Parliament may in turn approve, reject, or amend a Council decision. There are other intricate relationships among the Council, Commission, and Parliament--as well as the European Court of Justice and the national courts--that are discussed in Garrett (1991), who offers an informal strategic assessment of their effects.

Here we shall focus on the more formal implications of weighted voting in the Council itself, based on a game-theoretic measure of voting power. Then we shall modify this measure to take account of the de facto vetoes that France and Germany allegedly exercise on the Council. We shall also consider likely groupings of members, which reduce the number of players from twelve to three, and analyze the power of the Council to act under different decision rules.

Brams and Affuso (1976, 1985a, 1985b) applied the Banzhaf index of voting power (Banzhaf, 1965) to the original EC Council of six members (1958) and the later expanded Councils of nine members (1973), ten members (1981), and now twelve members (1985). They discovered striking anomalies of weighted voting that have arisen, including

- Luxembourg's dummy status from 1958 to 1973 (i.e., it had zero voting power)

- the “paradox of new members” (Luxembourg increased its voting power in 1973 and again in 1981 when new members were added, despite the fact that it had an increasingly smaller proportion of the vote total)
- the failure of differently weighted members to have different voting power (from 1981 to 1985, Luxembourg with 2 votes had the same voting power as Denmark and Ireland with 3 votes each).

They attributed these bizarre effects to the “capricious nature of constitution writing--done mostly by lawyers uninformed as to the significance of the weights and decision rules they set down--even today” (Brams and Affuso, 1976, p. 52).¹

Because Banzhaf voting power is defined formally in Brams and Affuso (1976, pp. 32-34), among other places, we shall give only an informal definition here. This measure has been compared with other game-theoretic measures of voting power due to Shapley and Shubik (1954) and Johnston (1978) in Brams and Affuso (1976), Brams, Affuso, and Kilgour (1989), and Brams (1975, 1985, 1990). Because these other measures generally attribute greater voting power to larger players than does the Banzhaf index, we probably err in being too conservative in our later estimate of the voting power of the “Big Four” (France, Italy, Germany, and the UK), and the even more substantial influence of France and Germany when they have vetoes.

The Banzhaf power of a member is based on the number of winning coalitions (WCs) in which it is critical--that is, in which its defection would cause such a coalition to become losing. The (normalized) Banzhaf voting power of a

¹Actually, the rationale of the weights and the decision rule of the Council today is quite transparent, leading to a good fit of weighted votes and Banzhaf power values. But, as we shall show, a different story emerges when we factor in the apparent special prerogatives of certain members as well as take account of the likely coalitions.

member is the number of WCs in which it is critical, divided by the total number of critical defections of all members (including this member). The sum of these proportions for all members is, of course, one.

The Banzhaf powers of the twelve current members of the Council under qualified-majority rule are shown in Table 1 (Brams and Affuso, 1985b).² To

Table 1 about here

illustrate the Banzhaf calculation, consider the case of Luxembourg, which has 2 votes. A qualified majority of 54 out of 76 is required in order for the Council to act. Luxembourg will be critical if the sum of the votes of the other members of a coalition is 52 or 53, because then the addition of Luxembourg's 2 votes will give these members, together with Luxembourg, at least 54 votes, the minimum required to be a WC. It turns out that Luxembourg is critical in exactly 40 WCs,³ whereas all countries combined have a total of 2,222 critical defections, giving Luxembourg 1.8 percent of the voting power, or a Banzhaf index of .018, as shown in Table 1. (These calculations were performed on a computer.)

²Under a simple-majority decision rule of 39 out of 76 (used mostly for routine procedural matters), the Banzhaf values are: 10-vote members, .134; 8-vote member, .107; 5-vote members, .064; 3-vote members, .040; 2-vote members, .024. Clearly, the decision rule matters, benefitting the largest four members and the smallest member--vis-à-vis the seven intermediate members--compared with qualified-majority voting (Table 1).

³There are no nonwinning coalitions (NCs)--without Luxembourg--with 52 votes, but there are 40 NCs without Luxembourg with 53 votes, in which case Luxembourg's 2 votes are, therefore, critical:

- 4 with members (10, 10, 10, 10, 8, 5)--4 different countries may be the included "5"
- 16 with (10, 10, 10, 8, 5, 5, 5)--4 different countries may be the excluded "10," and 4 different countries may be the excluded "5"
- 2 with (10, 10, 10, 10, 5, 5, 3)--6 different countries may be the two included "5s," and 2 different countries may be the included "3"
- 8 with (10, 10, 10, 5, 5, 5, 5, 3)--4 different countries may be the excluded "10," and 2 different countries may be the included "3."

Table 1**Banzhaf Voting Power in EC Council of Ministers under Qualified-Majority Decision Rule (54 out of 76 Votes)**

| <u>Class of Member</u> | <u>Banzhaf Power</u> |
|--|----------------------|
| Each 10-vote member (France, Germany, Italy, UK) | .129 |
| One 8-vote member (Spain) | .109 |
| Each 5-vote member (Belgium, Greece, Netherlands, Portugal) | .067 |
| Each 3-vote member (Denmark, Ireland) | .046 |
| One 2-vote member (Luxembourg) | .018 |

What is the rationale behind the decision rule of 54 out of 76? First, note that not only does no single country have a veto, but not even two of the Big Four (with 10 votes each) do. At a minimum, a blocking coalition, whose opposition prevents the Council from acting, must comprise two large countries plus one other country with at least 3 votes, which excludes Luxembourg. This is why Luxembourg has significantly less voting power than either Denmark or Ireland, each of which has 3 votes and therefore can be critical in many different blocking coalitions with other members who have exactly 20 other votes.

Interestingly, the Banzhaf values for Denmark and Ireland, as well as for the eight larger countries, are roughly proportional to their voting weights. However, the weights--and therefore the Banzhaf values--are not proportional to the populations: the populations of the largest countries, especially that of a united Germany today, are disproportionately greater than their weights, which would seem to advantage the smaller countries, in relative terms, on the Council.

To explore this question further, we next consider how the vetoes of two members, and plausible coalitions of other members that might form, affect the Banzhaf values. We will then define a new index, which will be used to measure the power of the Council as a whole to act, with and without the possibility of vetoes.

3. Vetoes, Coalitions, and the Power of the Council to Act

In calculating the "criticalness" of members, the Banzhaf index assumes that all MWCs are equally likely. Surely this is not the case in most voting bodies, including the EC Council. We shall posit likely coalitions of members--based on their apparent common interests--later, but first we recalculate the Banzhaf values to take into account that the numerical weights of members, and the

qualified-majority decision rule, may not give an accurate picture of members' influence on the Council.

In point of fact, the Big Four are not all equal:

Where EC bargaining is concerned, it is axiomatic to assert that no major initiative can proceed without the consent of France and Germany. This is true even though qualified majority voting in the Council does allow for other coalitions formations. Politically, however, it would be most unlikely for a major development to go ahead without their endorsement. This "rule" does not apply to Italy or the UK (Lodge, 1991, p. 7).

In a similar vein, after noting that France and Germany have almost half of the total EC output, Garrett (1991, p. 16) argues that they effectively have vetoes; because they can afford to "go it alone," they have an exit option, whereas the UK, in particular, does not.

To take account of this informal rule, we can modify the weights of France and Germany, and the qualified majority necessary for the passage of acts, so that each of these countries has a veto. Specifically, consider a hypothetical Council in which France and Germany have 23 votes each, but retain the weights of all the other countries as given in Table 1, which gives a new total of 102 votes. In addition, change the decision rule to a qualified majority of 80 out of 102 votes.

Now the ten other countries, plus either France or Germany (but not both), have a total of 79 votes, which is one vote shy of the new qualified majority. Consequently, France or Germany each has a veto--either's exclusion from a coalition that includes all other members causes that coalition to lose.⁴

⁴Other weights could accomplish the same end, but these are the smallest that do so.

This is equivalent to saying that the presence of both countries is necessary in every WC, but--as in the present Council--they are not sufficient by themselves. In the hypothetical Council, their combined 46 votes must be supplemented by an additional 34 votes to reach the decision rule of 80 (when the total is 102). In the actual Council, their combined 20 votes must also be supplemented by an additional 34 votes to reach the decision rule of 54 (when the total is 76). This equality in additional votes needed to form a WC means that the WCs in the hypothetical Council completely overlap those in the actual Council, but the actual Council contains 54 WCs (out of a total of 342) without France, Germany, or both countries.

How do France and Germany's de facto vetoes change the distribution of power in the hypothetical Council? The new Banzhaf values are given in Table 2 and show that these two countries have 60 percent more power (.184 versus .115)

Table 2 about here

than Italy and the UK, their ostensibly equal partners on the actual Council. With the exception of Luxembourg, which has the same Banzhaf power as before (.018), all the smaller countries suffer a power loss but not, relatively, as much as Italy and the UK do.

We conclude that the Banzhaf power values given by the de jure decision rule (Table 1) change significantly when the de facto vetoes of France and Germany are incorporated into the calculation (Table 2). Not only are the latter Banzhaf values probably a better reflection of the actual power of the players on the Council, but--more germane to negotiating the SEA--these values may better mirror the degree to which France and Germany, rather than Italy and the UK, achieved their goals in the SEA.

Table 2

**Banzhaf Voting Power in EC Council of Ministers, when France and
Germany Have Vetoes, under Qualified-Majority Decision Rule
(80 out of 102 Votes)**

| <u>Class of Member</u> | <u>Banzhaf Power</u> |
|--|----------------------|
| Each 23-vote member (France, Germany) | .184 |
| Each 10-vote member (Italy, UK) | .115 |
| One 8-vote member (Spain) | .092 |
| Each 5-vote member (Belgium, Greece, Netherlands, Portugal) | .055 |
| Each 3-vote member (Denmark, Ireland) | .036 |
| One 2-vote member (Luxembourg) | .018 |

Garrett (1991) reaches a similar conclusion, based on locating three different groupings of EC countries in an ideological space of two dimensions, one based on "political authority" and the other on "economic principles." Thus, for example, he locates the UK and Denmark as favoring the national veto on the political dimension, and mutual recognition--but not full economic integration and social harmonization--on the economic dimension.

In fact, Greece, along with the UK and Denmark, favored the national veto (Moravcsik, 1989, p. 390; Lodge, 1991, p. 6). Following Garrett (1991)--except for Greece, which he puts in group C (see below)--we call this group of countries group A (total votes: 18). Group B comprises France, Germany, and the Benelux countries, all of which supported a qualified-majority decision rule (total votes: 32). Group C, which favored a simple-majority decision rule, comprises Ireland, Italy, Portugal, and Spain (total votes: 26).

In this 3-person game, only coalition BC, with a total of 58 votes, has a qualified majority of at least 54 votes, giving each of B and C a Banzhaf power value of .5. Whether France or Germany--and therefore group B--has a veto would not change this result; because B and C are both necessary in the only MWC, each has a veto. A, by contrast, not only has no veto but also is a dummy, with zero power.

Insofar as the present Council is a mirror of power relationships that existed before the adoption of qualified-majority rule, A could not have prevented its enactment. (In fact, because BC is the only winning coalition, the SEA would presumably be a compromise between B and C.) A's dummy status perhaps helps explain why the UK, as the dominant actor in A, decided in the end not to go it alone. Not only did its group not have veto power, which requires at least 23

votes in the present Council, but it could not combine with either B or C to produce a qualified majority of at least 54 votes.

The UK's acquiescence on the qualified-majority issue may have enabled it to wring concessions out of the other members on issues that it considered more important. Indeed, Moravcsik (1991, p. 41) argues that the UK was the real winner in a "victory for the minimalists," because it had "little to lose from qualified majority voting on the internal market plan, which it favored in general." In effect, Margaret Thatcher may have successfully postured on the political dimension in order to get concessions on the economic dimension (e.g., liberalization of financial services or a reduction in the UK's contribution to the EC budget), which is a well-known tactic in bargaining theory that has an evident rational basis (Brams, 1990).⁵

One consequence of the compromises hammered out to secure passage of the SEA is that whereas "bargains initially consisted of bilateral agreements between France and Germany, now they consist of trilateral agreements including Britain" (Moravcsik, 1991, p. 26). In fact, Moravcsik (1991, p. 49) claims that Britain is the country "most satisfied with the final outcome."

Notwithstanding possible "inside" agreements among the Big Three (Italy's interests tend more than this triumvirate's to echo those of the poorer, mostly southern countries), Cameron (1990, p. 49) is undoubtedly right that

the broader application of majority voting has changed the political calculus of Council members, who must increasingly search for allies in majoritarian coalitions. Moreover, of course, the broader

⁵Cameron (1990, p. 59) also believes that British intransigence on certain issues may have enhanced its bargaining position, though the specific concessions gained are by no means clear. The budgetary rebates the UK received, for example, may not have been in return for British support of qualified-majority voting but instead for concessions on internal-market issues.

application of majority voting implies a greater likelihood that national preferences might be overridden and, as a result, that national sovereignty might be eroded and diminished.

To shed further light on this "political calculus," we compute a final measure, the power of a collectivity to act (Coleman, 1971), under both qualified-majority voting and the alternative decision rules considered.

This power is measured by the proportion of coalitions that are winning. If there are n members of a voting body, and each member either favors or opposes a measure, then the total number of coalitions favoring the resolution--or complementary coalitions opposing--is 2^n ,⁶ which is also the number of ways of partitioning the voting body into two subsets.

Because there are twelve members of the EC Council, there are $2^{12} = 4,096$ partitions. Under a decision rule of unanimity, in which each country has a national veto, only the grand coalition can pass a resolution. Hence, the power of the Council to act under this decision rule is a miniscule $1/4,096 \approx .000244$, given that all partitions, or divisions of the the body, are equally likely. Under simple-majority rule, by contrast, the power to act is $1,800/4,096 \approx .439$, because, for every partition, the favorable coalition will win in half (2,048)--except for the 248 ($= 2,048 - 1,800$) partitions that lead to a 38-38 tie, in which both coalitions are blocking but neither is winning.

Less obvious is the power of the Council to act under its qualified-majority decision rule. It turns out that there are only 402 winning coalitions under this

⁶These complementary coalitions include the coalition with no members (\emptyset) and the grand coalition with all members. Thus, if $n = 2$, the four partitions, indicated by a slash, are $\emptyset/12$, $1/2$, $2/1$, and $12/\emptyset$. If the coalition to the left of the slash favors a resolution, and the decision rule is simple majority, the favorable coalitions in the first three partitions are losing and only 12 in the last partition is winning. The favorable coalitions in the two middle partitions, 1 and 2, are blocking (as well as losing) because neither side of the partition is winning.

decision rule (342 are minimal WCs in the sense that the defection of at least one member would cause them to be losing), so this power is $402/4,096 \approx .0981$. By comparison, if both France and Germany have de facto vetoes, there are 288 winning coalitions (all are minimal WCs because all include France and Germany, whose defections make them losing). Thus, the power of the Council to act in this case is $288/4,096 \approx .0703$. This is a relatively small reduction (28.4 percent) from the Council's power to act under the qualified-majority rule without the two vetoes. Far more striking, qualified-majority rule, with or without the vetoes, vastly increases the Council's power to act--by factors of about 300-400--compared with the unanimity rule (.000244).

True, the national veto has rarely been invoked, but on the important occasions on which it was (e.g., Charles de Gaulle's veto of the 1966 Common Agricultural Policy, which occasioned the Luxembourg compromise), it has blocked a consensus on the part of all the other members. By comparison, under qualified-majority rule--with or without vetoes by France and Germany--blocking coalitions are still far more numerous than winning coalitions (more than 90 percent of the total), but the latter no longer require an heroic effort if there is a fairly broad consensus and some spirit of compromise.

The winning coalitions that form will obviously depend on the issue, at least if the very different alliances that were put together in negotiating the SEA are any indication (Lodge, 1991). Consequently, a purely formal "issue-independent" power analysis can never perfectly reflect political realities; depending on the issue, members will have partially overlapping and partially divergent interests, making some coalitions more likely than others.

For this reason, we have tried to show how the special prerogatives of members, like France and Germany, or likely groupings, like those given by A,

B, and C, might alter the de jure power calculations. Additionally, it is illuminating to view the Council as a whole and compare its power to act under different decision rules. Unanimity, by a wide margin, is the most stultifying rule, suggesting that the Council made a radical shift toward democratic rule in permitting a 71-percent majority to prevail.

Because this majority requires a preponderance of weighted votes, the Council's greatly enhanced power to act will, one might hope, be power used to serve the interests of most citizens of the EC countries. But the Council, of course, is not directly elected by these people, so the "democratic" character of its rule can be questioned.

Presumably, the decision rule of qualified majority institutionalized by the SEA reflected, at least to some degree, the bargaining power, skills, and interests of the players in the preceding negotiations. Not only do our game-theoretic results quantify the relative powers of the players on the Council--depending on which assumptions about individual and collective players, with and without vetoes, are most accurate--but they also offer a precise notion of the ability of the Council, as a body, to act.⁷

⁷It should be noted, however, that many of the Council's decisions are, in fact, reached without actually taking a formal vote. Yet this fact does not detract from the thrust of our analysis, which is intended to establish a kind of power baseline against which actual negotiations are played out. Moreover, as the European Community faces likely expansion in the near future, such an examination could become critical not only because the proper distribution of power is important but also because the enlargement of the membership is likely to lead to more frequent use of formal voting procedures. Thus, despite its somewhat ambiguous role in the daily proceedings of the Council, members' formal voting power probably reveals important facets of Council negotiations, both now and increasingly in the future.

4. Preferences of Players in the Uruguay Round (and Beyond)

Founded in Geneva in October 1947 by 23 countries, the General Agreement on Tariffs and Trade (GATT) is now an organization with 108 countries that has sponsored eight rounds of negotiations. These multilateral talks have dramatically influenced international economic relations since World War II, primarily through liberalizing international trade by lowering tariff barriers on the order of 70 percent (Sjöstedt, 1990, p. 5). It is variously estimated that between one-third (Bensten, 1991) and two-thirds ("Free Trade Loses a Round," 1991) of world trade is covered by GATT rules, with total trade amounting to about \$4 trillion annually (Greenhouse, 1991; Silk, 1991b).

The latest negotiations have been dubbed the "Uruguay Round" because they began in Punta del Este in September 1986. Scheduled to last four years, they collapsed in Brussels in December 1990. Although they resumed in February 1991 (Farnsworth, 1991), an agreement even on procedural aspects of the talks has yet to be achieved ("Trade Representatives Meet," 1991), lending credence to the rueful GATT appellation, General Agreement to Talk and Talk.

As of this writing (August 1991), the full reinstatement and successful conclusion of the Uruguay Round faces formidable obstacles. The increase in bilateral trade negotiations, the rise of regional trading blocs, and a new debate about free versus fair trade all may undermine an already shaky international trading regime riddled with protectionist proclivities. But the most immediate obstacle is the conflicting interests of the three major players in the current trading round--the United States (US), the European Community (EC), and Japan (JA)--which Oxley (1990, p. 88) calls the "Big Three."

Of course, there are other influential players, most notably the so-called Cairns Group (Higgott and Fenton, 1989), which is an association of fourteen

developed and developing agricultural-exporting countries that has pushed for lower agricultural barriers. Newly industrializing countries (NICs), like South Korea and Taiwan, and developing countries like Brazil, India, and the ASEAN states, also have played a role in the Uruguay Round.

The current impasse, however, is due primarily to differences among the Big Three on agriculture, which Winham and Kizer (1989, p. 43) characterize as "the pivotal issue" and Sjöstedt (1990, p. 3) calls "the most important" unsolved problem. While less consequential to the outcome of the Uruguay Round, the issue of market access also pervades discussions of trade liberalization. Hence, we include the positions of the Big Three on this issue--the "and beyond" allusion in the title of this section--as well as the agricultural issue:⁸

1. Support of agriculture through price supports or export subsidies (favored by EC, opposed by US and JA)⁹
2. Barriers to foreign-market entry (favored by JA, opposed by US and EC).

The "barriers" in (2) do not necessarily apply to intraregional trade, such as between US and neighbors like Canada and Mexico. In fact, (2) more and more may be interpreted as the issue of supporting regional pacts by limiting outside access to internal markets (as EC has done), which may undermine the

⁸Thereby we add "quantity" issues (e.g., related to the volume of trade or its management in particular sectors), which is not generally a subject of GATT, to "quality" issues (e.g., related to rules that allow market forces to operate), which is a subject of GATT, as part of the negotiation game analyzed.

⁹Paradoxically, the SEA has led to liberalization of agricultural trading within the EC through the EC's Common Agricultural Policy (CAP), "which protects 8 million EC farmers against nearly 300 million farmers in the poor countries" (Bhagwati, 1991, p. 8). CAP, incidentally, is estimated to cost more than \$35 billion annually (Greenhouse, 1991), with total subsidies running to between \$100 billion ("A Big Win-Win on Trade," 1991) and \$300 billion (Silk, 1991b).

universality of the GATT and which we shall say more about later. Issue (2), of course, is not unrelated to issue (1) if agriculture is the sector being restricted.

JA, at least for its national market, is more restrictive than either US or EC. It therefore seems fair to say that JA "favors" barriers, whereas US and, to a less extent, EC, oppose them. That the nature of JA restrictions is sometimes heavily governed by culture and practice--not comparative advantage in resources or even wages--is illustrated by the case of automobiles:

Even if U.S. and Japanese automakers attained the same quality and production costs, U.S. producers would likely lose out. Why? Because it takes dealers to sell cars. Establishing a national dealer network from scratch in a country the size of the United States is an expensive and time-consuming task--as it is in Japan because of stratospheric real estate prices. But Japanese automakers selling in the United States don't have to build from scratch. They can piggyback onto existing, GM, Ford, and Chrysler dealers because U.S. antitrust laws stipulate that producers must allow dealers to carry other lines. In contrast, by custom and because the Japanese do not enforce antitrust laws, outside firms find it extremely difficult to hook up with dealers in Japan (Prestowitz, 1991, p. 28).

In the face of such barriers, US and EC have become increasingly less content to be unilateral free traders. For example, US and EC have used import quotas and anti-dumping provisions--sometimes in retaliation against restrictions of JA and other countries (or each other)--or they have negotiated export restraints that evade GATT rules.¹⁰

¹⁰US retaliatory actions have been sanctioned by what are known as the regular, special, and super 301 sections of the 1988 Omnibus Trade and Competitiveness Act, which were largely a response to US trade and budget deficits (an earlier trade act was passed in 1974 with weaker provisions). These actions have been argued as "GATT-illegal," on the one hand, and necessary for the proper functioning of the world trading system by penalizing noncompliance with a GATT tenet, reciprocity, on the other (Bhagwati and Patrick, 1990).

At the same time, JA has not been totally recalcitrant and seems to be improving (Sanger, 1991). It has, under pressure, lifted restrictions in certain areas, like its beef market (Oxley, p. 68) and semiconductor-chip trade with the United States (Prestowitz, 1991, p. 26); the latter agreement from 1986 to 1991 was recently extended for three years (Bradsher, 1990). Currently, however, not only does Japan have a blanket prohibition on rice imports (Farnsworth, 1990), but its rice farmers also benefit from subsidies and have, consequently, become "the most protected farmers in the world" (Passel, 1990).

Other prominent issues debated during the Uruguay round include intellectual property rights, financial and other services, and textiles (Winham and Kizer, 1990). An agreement by developing countries to protect trade in property and services in return for reduced barriers on food and textile imports by developed countries will presumably be part of any eventual settlement, which is the kind of pattern that has been established in previous successful North-South negotiations (Zartman, 1987).

But here we shall focus on issues (1) and (2) among the Big Three, in part because the trade-offs are not so apparent. Call the positions on issues (1) and (2)

- A (for agricultural supports) and \bar{A} (against supports)
- B (for barriers) and \bar{B} (against barriers).

Positions on both these issues define four possible platforms: AB, $\bar{A}\bar{B}$, $A\bar{B}$, and $\bar{A}B$. We assume that the players can order these platforms from best to worst, based on "primary" and "secondary" goals.

A player's (1) primary goal distinguishes its two best from its two worst platforms, whereas a (2) secondary goal distinguishes between its two best platforms and between its two worst platforms. Thus, if (1) were \bar{A} and (2) were

\bar{B} , the player would order the platforms, from best to worst, as follows: $(\bar{AB}, \bar{AB}, \bar{AB}, \bar{AB})$.¹¹

We, in fact, assume these to be the preferences of US. We summarize below the goals, and the preferences they imply, of the other players as well:

US: (1) \bar{A} and (2) $\bar{B} \Rightarrow (\bar{AB}, \bar{AB}, \bar{AB}, \bar{AB})$

EC: (1) \bar{A} and (2) $\bar{B} \Rightarrow (\bar{AB}, \bar{AB}, \bar{AB}, \bar{AB})$

JA: (1) \bar{A} and (2) $\bar{B} \Rightarrow (\bar{AB}, \bar{AB}, \bar{AB}, \bar{AB})$.

Because of its pivotalness in the Uruguay Round, we make the issue of agricultural supports primary for all players.

It is certainly possible that the players' positions on the market-entry issue--and regional versus worldwide pacts, like GATT, which this issue raises--will assume greater importance in the future. Indeed, the ultimate failure of the Uruguay Round may lead to trade agreements by continental blocs, such as the Americas, Europe, and Asia (Passel, 1991), which some analysts view with alarm (Silk, 1991a), others consider salutary (Prestowitz, 1991), but which may actually be strategic: "By preparing the ground for a series of bilateral trade deals with every country in Latin America," the U.S. and its potential partners may be "quietly hedging their bets" ("Hedging," 1990). Conceivably, however, the "minilateralism" of such blocs may evolve into the multilateralism of the GATT, facilitating rather than undermining world trade, but this consequence is hotly

¹¹See Hillinger (1971) and Kadane (1972) for an analysis of the effects of combining different positions into platforms. The use of primary and secondary goals to order platforms is an example of a lexicographic decision rule, whereby outcomes are first ordered on the basis of a most important criterion, then a next-most important criterion, and so on (Fishburn, 1974); such goals are used to define games in Brams (1983).

debated (Belous and Hartley, 1990; Milner, 1991; Yarbrough and Yarbrough, 1991).

Observe that each of the three players has a different first, second, third, and last preference, suggesting a lack of social consensus. Nevertheless, if we compare, for each pair of platforms, which is socially preferred (i.e., by a majority of two of the three players), we obtain the social preference ordering shown in Figure 1. (Later, however, we shall indicate that social preferences

Figure 1 about here

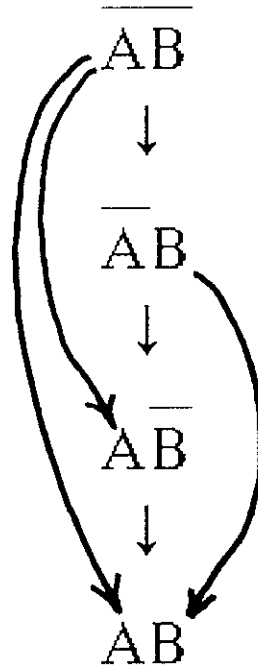
based on majority rule probably are not descriptive of how negotiation outcomes are determined.)

Notice that two of the three players, indicated by the three arrows emanating from \overline{AB} , prefer \overline{AB} to each of the other three platforms. The fact that these other platforms can also be ordered so that all social preference relations flow "downward" from \overline{AB} to \overline{AB} to \overline{AB} to \overline{AB} establishes the existence of a social hierarchy of platforms.¹²

Even \overline{AB} , however, if pitted against each of the other platforms, would be opposed by one of the three players. Thus, if each of the players is able to veto the social choice of a platform, the fact that there exists a social hierarchy based on majority preferences does not establish that a social consensus will develop around \overline{AB} at the top of the hierarchy: in a contest with every other platform,

¹²Such a hierarchy will not exist if the players' individual preferences lead to cyclical majorities, whereby social preferences cycle because there is no platform that is preferred to all others; for an example, see Brams (1985, pp. 55-57). Such a cycle creates a paradox of voting, which may aggravate the problem of achieving a consensus--or, for that matter, reaching an agreement in our negotiation model, to be described in section 5.

Figure 1
Social Hierarchy of Majority Preferences for Platforms



Note: Arrows emanating from a higher platform to a lower platform indicate that the former is socially preferred (i.e., by a majority of two of the three players) to the latter.

there will be one player who will prefer that other platform. Hence, if unanimous consent is required (as is probably the case among the Big Three in the Uruguay Round), it will not be achieved.

5. A Dynamic Negotiation Model

Now consider a negotiation model, whereby players begin by supporting only their first preferences. If there is no agreement among these, as in our example (they differ for all three players), we assume players next lend their support to their second preferences as well.¹³ At this second stage, observe that \overline{AB} would have the support of US and JA, as would \overline{AB} .

Only if the players--at least EC--then give their support to their third preferences will a consensus (i.e., unanimous support) form around \overline{AB} --but not for any of the other platforms. The support by EC of \overline{AB} (at level three) is what led to the breakup of the talks in December 1990 when the EC failed to alter significantly its position on agriculture.

Resolving this sticking point, according to our model, would end the conflict and produce unanimous consent for \overline{AB} . Moreover, the other players, also pledging support for all platforms down to level three, would not induce unanimous support for any other platform. US or JA would have to dip down to their last preferences (level four) to cement unanimity for either \overline{AB} or \overline{AB} .

¹³The negotiation model to be described, with one significant difference, is illustrated with another example--involving cyclical majorities--in Brams (1991) and developed fully in Brams and Doherty (1991). The significant difference in the latter model is that it assumes that the players have incomplete information about each other's preferences, which is only revealed as they progressively indicate support for lower-ranked alternatives during the negotiation process; also, the model does not assume an impenetrable N but allows players to breach this threshold if doing so may prevent an inferior alternative from being selected. For more on games of incomplete information as well as models relevant to negotiation analysis, see Siebe (1991), Sebenius (1991), and Young (1991).

We next introduce a player's N threshold, or point at which it would prefer no agreement (N) to any lower-ranked platform. Assume EC is adamant in its position on (1); unalterably opposed to \bar{A} , it insists on agricultural supports and so puts N in third place.

Assume US puts N in fourth place: it will not give up on both its primary and secondary goals. Then the only way that unanimous consent can be achieved is if JA puts N in fifth place. If this is the case, support of the various alternatives will evolve to the following:

US: (\bar{AB} , \bar{AB} , \bar{AB} , N | \bar{AB})

EC: (\bar{AB} , \bar{AB} , N | \bar{AB} , \bar{AB})

JA: (\bar{AB} , \bar{AB} , \bar{AB} , \bar{AB} | N)

By the time the players have lowered their support to the points indicated by the vertical bars--where they will stop because, by assumption, they prefer N to further concessions (i. e., support for lower-ranked platforms, if there are any)--there will be unanimous support for \bar{AB} .

Yet both \bar{AB} and \bar{AB} beat \bar{AB} in the hierarchy! The former platforms "lose," once we introduce N into the preference rankings, because of EC's hypothesized intransigence--it will not support \bar{AB} and \bar{AB} because they rank below N on its preference scale. The diminished intransigence we hypothesize for US--and still less for JA--ensures that \bar{AB} rather than \bar{AB} will be the outcome (the reverse would be the case if JA ranked N fourth and US ranked it fifth). In this manner, a player's higher placement of N induces the choice of a preferred platform, even though this platform may fall lower in the social hierarchy, based on majority-rule voting, than others (Brams and Doherty, 1991).

Time will tell, if our hypothetical attribution of preferences for the players is correct and the unanimity rule is operative, whether EC's N threshold is higher than those of US and JA. The latter players' N thresholds also matter, as we have just shown, and also may not be as we have hypothesized. Indeed, the fact that the Big Three have disagreed for some time suggests that one or more of these players ranks N higher than we have hypothesized.

The hypothesized preferences of the Big Three (for N as well as for the different platforms), the unanimity decision rule, and negotiations that unfold in the manner of our model certainly do not capture all the nuances of any endgame that may be played out in the Uruguay Round and later. Other preferences and rules, and even new players, might be incorporated into the analysis if it is believed that they offer a more realistic portrayal of the current negotiation game.

It is the game-theoretic methodology that we have introduced for analyzing negotiation processes, simple as it is, that is the main contribution of this section. We believe it offers a compelling way of viewing the unfolding of positions, and possible changes in support patterns, as players compromise by progressively supporting lower-ranked platforms--at least up to some point N.¹⁴ A model in which players respond to each other over time provides, we think, an innovative and enlightening way to explicate the dynamics of negotiation processes.

¹⁴We are hampered, however, in having insufficient information to test whether support patterns evolved in the manner predicted by the model. In fact, we are not even sure what the "true" preferences of the players are, which is why we claim only to have illustrated a methodology, not rigorously tested a model.

6. Conclusions

Multilateral negotiations often can be reduced to bilateral negotiations, or a series of bilateral negotiations, but sometimes they resist such a simplification. This seems to be the case in both the SEA and the Uruguay Round negotiations, in which there were at least three major players and a reduction of either set of negotiations to 2-person games would do violence to reality.

It is true that there has been a serious 2-person conflict between the developed and developing countries on the Uruguay Round, but these collective players also have intersecting interests on which reasonable compromises seem possible. The fact that they have yet to be fashioned, even after four years of negotiations, suggests that there are more basic conflicts that divide other players. Also, the existence of the Cairns Group, comprising both developed and developing countries that share an interest in lowering barriers to agricultural imports, is testimony that the North-South division may not be the fundamental one.

We were thus led to analyze a 3-person game among the Big Three, in part because their positions on agriculture, the most contentious issue, were divergent. But the issue of market access also seemed salient, even if it is less relevant to the Uruguay Round but instead part of a larger game.¹⁵ The latter issue, should it become paramount, may be instrumental in restructuring the players into regional blocs and altering the fundamental nature of the trading game.

Our analysis of the game among the Big Three, reflecting their positions on both agriculture and market access, indicates that not only do their preferences differ but also that they all will have to make significant compromises to reach a

¹⁵Clearly, the identity of the players, and what games are being played, is not always evident.

consensus. Our dynamic negotiation model showed that a consensus will not be achieved if the EC considers a continuing impasse preferable to compromising on its primary goal of maintaining agricultural supports.

The SEA was successful in redistributing power, based on qualified majority voting, that probably mirrored the strengths of the negotiating positions of the major players, especially France, Germany, and the UK. The UK, even though it did not have a veto and therefore could be isolated, nevertheless probably managed to attain most of its goals by posturing on some issues in order to get concessions on others. In particular, qualified-majority voting, which it opposed, probably was never a dire threat to its sovereignty, so it could afford to compromise on this issue in order to get its way on other issues, such as the liberalization of financial services or a reduction in its contribution to the EC budget.

To be sure, we did not explicitly model these tradeoffs but rather focused on power-related consequences of voting. One of the more revealing quantitative findings is that the Council enhanced its power to act by a factor of 300-400 by renouncing national vetoes on most questions. At the same time, a 71-percent majority is not trivial to muster, especially if France and Germany have de facto vetoes, so precipitous action that threatens major national interests seems improbable.

We view the SEA to be a major step toward democratic rule, despite the fact that the compromises reached so far may have a "lowest common denominator" ring. Like the 69-percent majority needed to ratify the US federal constitution (9 of the 13 original states), or the 75-percent majority (again, of states) needed to ratify constitutional amendments, the 71-percent EC Council majority is of the order of magnitude to make possible important and necessary

changes without trampling on the rights of members, who remain the key actors even if most are dispossessed of their national vetoes.¹⁶

It is hard to say at this point whether a compromise agreement will eventually be worked out on what seem to be the most divisive issues in the trade talks, both inside and outside the Uruguay Round. If not, failure will occur because an agreement, at least in the eyes of some players, is worse than no agreement. Our game-theoretic analysis, we believe, illuminates why this is the case and why a different game, in which regional blocs become the new players, may supplant the present game.

¹⁶With respect to democratic rule, however, it should be recalled that the Council (unlike the Parliament) is not elected, though it represents elected governments. Also, the US qualified majorities we refer to in the text apply to the enactment and amendment of the US Constitution; amendments to the Treaty of Rome still require unanimity. Perhaps a more appropriate comparison is to the two-thirds majorities of the US House of Representatives and the Senate that are needed to override a presidential veto.

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