Abstract: What role does the rotating Council Presidency play in the European Union (EU)? A debate exists in the literature as to whether the Council Presidency is neutral and weak, or plays a strong role in the European Union, through its agenda-setting powers and leadership role in negotiations. Drawing on the mechanism design literature, I argue that the rotating Council Presidency plays a central role in the negotiation of EU legislation within the Council institutions, helping to solve the ‘negotiation dilemma.’ Further, addressing this debate in the literature, I argue that, rather than expected neutrality representing a weakness of the Presidency position, a large part of the important role that the Council Presidency plays in the EU stems directly from this characteristic. To evaluate this argument empirically, I draw on interview evidence gathered in 2005 and 2006 with members of COREPER and the Working Groups of the Council institutions.
Solution to the Centralization-Decentralization Bargaining Dilemma: The Rotating EU Council Presidency

I. Introduction

How can efficiency be credibly fostered in bargaining processes? Both decentralized bargaining and potential centralized solutions bring about problems of inefficiency – decentralized bargaining, because of the incentives it provides to bargaining actors to misrepresent their interests, and centralized bargaining, because of the incentives it provides to political actors to impose inefficiency on the bargaining process to further their own interests. The lack of a credible solution to this bargaining inefficiency problem therefore creates a theoretical puzzle in the institutional literature.

I argue that a leadership position with rotates among the bargaining actors provides a potential solution to this theoretical puzzle. I argue that by rotating the centralized leadership position among the actors involved in the bargaining process, the incentives of the state (actor) in the leadership position to impose inefficiency to further their own interests is significantly lessened. Thus, the rotation of the leadership position helps to create the neutral leader/mediator necessary to help to overcome the decentralized bargaining problem, while at the same time, largely avoiding the problems of centralization.

I argue that the rotating Council Presidency of the European Union is an empirical example of this type of rotating leadership. I therefore draw on this empirical case to demonstrate the role that this rotating leadership position plays in the negotiation of EU legislation within the Council institutions, helping to solve this ‘negotiation dilemma.’ In making this argument, I also address a debate in the literature on the role of the EU Council Presidency, arguing that, rather than expected neutrality representing a weakness of the Presidency position, as is sometimes argued, a large part of the importance of the Council
Presidency stems directly from this characteristic. To evaluate this argument empirically, I draw on interview evidence gathered in 2005 and 2006 with members of the Committee of Permanent Representatives (COREPER) and the Working Groups of the Council institutions.

In presenting this argument, I first present an overview of the decentralization-centralization dilemma of inefficiency in bargaining. I then present a potential credible solution to this dilemma – the rotation of the leadership position among all bargaining actors. I then provide a simple model to illustrate this argument and the dynamics at work in bringing about a ‘neutral’ leader who will foster efficient bargaining outcomes, rather than myopically pursue their own self-interest. I then fit this argument into the current literature on the rotating Presidency of the EU, and demonstrate how the logic at work in this argument exists in this EU case. I conclude by specifying the implications of this argument, and paths for its future use and development.

II. Problems of Decentralization and Centralization in Bargaining

II.A. Decentralization in Bargaining

Decision-making processes both within and outside of institutions, domestic and international, are often analyzed and captured using a bargaining framework.¹ This is particularly true of decision-making in the international system.² The usefulness of the bargaining framework stems from its ability to capture an important feature of many decision-making processes, particularly those in the international system – the importance of decentralized interactions among the actors (individuals, representatives, or states) involved in the joint decision-making process. To evaluate the effect of institutions on this decentralized

---

¹ For examples of a bargaining framework to analyze domestic decision-making, see (Riker 1962; LeBlanc, Snyder et al. 2000; Fox 2006; Volden and Wiseman 2007).
² For examples of a bargaining framework to analyze international decision-making, see (Krasner 1991; Moravcsik 1993; Grieco 1995; Fearon 1998; Moravcsik 1998; Morrow 1999; Slapin 2006).
process, modifications can be made to this standard bargaining framework. I follow this tradition in the literature utilizing a bargaining framework to analyze decision-making.

A ‘bargaining situation,’ as defined in the bargaining literature, refers to a situation in which parties have a common interest in reaching a joint agreement, but disagree on the exact distributional nature of that agreement (Nash 1950; Schelling 1960; Muthoo 1999). In situations defined by this constellation of interests, when the parties have complete information (and no transaction costs), the Coase Theorem predicts that parties will bargain until they reach a Pareto-efficient agreement (Coase 1960). In other words, the actors involved in a decentralized bargain will always bargain until they reach an agreement such that no one actor can gain more from the agreement without another actor being made worse off. This is a ‘normatively desirable’ outcome in much of the economics literature, and therefore under complete information, the bargaining situation does not raise any dilemmas of interaction.

However, many bargaining situations are situations in which actors have incomplete information about the interests, preferences, bargaining and resource capabilities, and the lowest acceptable agreement of other actors involved in the bargaining process. Joseph Farrell even argues that in bargaining, there is always a problem of incomplete information and incentives to keep that hidden (Farrell 1987). This is particularly characteristic of international negotiations, where states have significant incentives to maintain private information regarding their interests and capabilities from other states in the system, given the overriding concern with security and survival that states are argued to possess (e.g. Waltz 1979).

---

3 For example, Fearon (1998) modifies the war of attrition to consider the role of international institutions increasing the shadow of the future; Stasavage (2004) creates a bargaining model to allow for different degrees of transparency; Voeten (2001) considers the effect of outside options on bargaining; Volden and Wiseman (2007) consider different amendment rules, and the combination of particularistic and public goods in legislative bargaining.
In this incomplete information setting, Thomas Schelling (1960) argues that the distributional aspects of bargaining will overpower the common interests of the actors, and be the main factor driving the interactive process that takes place. In particular, the *distributional* aspect of negotiations gives actors an incentive to misrepresent their true interests – presenting their position as more extreme than it actually is – in order to achieve an agreement closer to their most preferred outcome (Walton and McKersie 1965; Farrell 1987).

This strategic misrepresentation and other bargaining tactics brought about by actors’ distributional interests often lead to the inability to reach a joint agreement despite the fact that it in the true interests of the parties involved to reach one – or more generally, a failure to realize potential joint gains (Coase 1960; Riaffa 1982; Farrell 1987; Myerson 1991; Mnookin, Peppet et al. 1996). In other words, the Coase Theorem will not hold, and if an agreement is able to be reached, rarely will that agreement be Pareto-efficient.

Absent some institutional incentive structure or additional mitigating factor in the bargaining process which would help actors to overcome their incentives to strategically misrepresent their interests and focus only on relative gains, Pareto inefficiency and the potential loss of agreements in the interest of the actors will plague bargaining and decision-making processes.

**II.B. Centralization in Bargaining**

These inefficiency problems have been viewed as normatively undesirable by many scholars, and therefore many studies have sought to analyze factors – in particular institutional

---

4 This distributional focus, and the bargaining tactics it incentivizes, are consistent with the realist predictions of states’ focus on relative gains in the bargaining process (Bartos 1995).

5 In addition, McKelvey and Page (1999) show that not only does information provide difficulties for the Coase Theorem, but that it holds only under extremely restrictive conditions on preferences.
factors – which can be adopted to mitigate these problems brought about by the interest structure of anarchic, decentralized bargaining.

Addressing these normative concerns, the mechanism design literature argues that “incentive compatible mechanisms” can be used to provide bargaining actors with an incentive to truthfully reveal, rather than strategically misrepresent, their interests (e.g. Myerson 1979; Myerson 1983; McAfee and McMillan 1988; Myerson 1991; Miller and Hammond 1994; McCarty and Meirowitz 2006). Though this concept is most often used in a ‘public good allocation’ situation (e.g. Mutuswami and Winter 2004), it has also been utilized in a bargaining framework (e.g. Myerson 1979; Myerson and Satterthwaite 1983; Myerson 1984; Myerson 1991; Talley 1994). In this bargaining framework, incentive compatible mechanisms are institutionalized features which structure the allocation of benefits and costs to actors based on their claimed interests. They structure these benefits and costs in such a way that the costs imposed by the mechanism serve to offset the benefits that may be gained from strategically misrepresenting ones preferences in the bargaining process.

In particular, incentive compatible mechanisms impose a cost on actors for the effects more extreme claims of interests have on other actors’ expected welfare (Farrell 1987). “By paying for the effects of your claim on others' expected welfare, you internalize the whole social problem when you report your private information, so it's not surprising that you have all the right incentives [i.e. to truthfully reveal your interests]” (Farrell 1987, 118-9).

The difficulty with the mechanism design solution to the bargaining dilemma is that incentive compatible mechanisms are not budget-balancing. Myerson and Satterthwaite (1983) demonstrate formally that it is not possible for an institutional mechanism that incentive compatible to be budget-balancing. In an incentive compatible mechanism, there is always a
deficit or surplus brought about by the benefits allocated to or the costs imposed on the bargaining actors, which are used to incentive their truthful revelation of their interests (Miller and Hammond 1994).

A second literature presents ‘leadership’ as a potential solution to the inefficiency brought about by the decentralized bargaining situation. As argued by Zartman (1991) and Metcalfe (1998), in the context of multilateral negotiations, which characterize a large degree of international negotiations, leadership must be exercised for a negotiated outcome to be agreed. Thus, it is argued that to understand how efficient negotiated outcomes can be reached, an understanding of leadership is critical (Metcalfe 1998).

Leaders can emerge to help bargaining actors coordinate on an agreement, as well as to use their centralized position to institute efficient solutions in those agreements. Leadership is a means by which groups try to realize gains from cooperation, coordination, and efficient allocation (Calvert 1992).

These two literature highlight the role that centralized institutions or individuals can play, potentially providing solutions to the inefficiency brought about by the incentives of the bargaining setting. This inefficiency thus pushes toward the need for centralization. However, both the centralized mechanism design and leadership solutions bring about another difficulty – the problem of politics.

In the mechanism design case, Miller and Hammond argue that “the inevitable residual [brought about by an incentive compatible mechanism] must become the object of political conflict” (Miller and Hammond 1994, 11). This residual gives the political actors who institute this mechanism a stake in inefficiency. In particular, the surplus from the mechanism can be enlarged by distorting the mechanism, which would create inefficiency in the solution, but would
also provide those political actors with additional surplus and income. Thus, it is argued that the institution of an incentive compatible mechanism bring about a classic political problem - “who shall guard the guardian?” (Miller and Hammond 1994, 11). Absent purely neutral, altruistic political actors to carry out this mechanism, incentive compatible mechanisms are not credible solutions to the inefficiency problem of decentralized bargaining.

More clearly, leadership faces the problem of politics and power as well. At the same time as proposing leadership as a potential solution to decentralized bargaining inefficiency, scholars recognize the difficulties that leadership brings about. Most importantly, leaders are not purely neutral or altruistic actors solely concerned with bringing about efficiency in the bargaining among actors. Leaders have their own interests and preferences, and they therefore have incentives to use their centralized power to pursue those interests. Because they are in a position of power, and given that changing leaders is costly, leaders often have leeway in making decisions, and can thus impose bargaining solutions that are not optimal for the bargaining actors, but pursue their own interests (Calvert 1992, 17).

**II.C. The Theoretical Puzzle**

Thus, both decentralized bargaining and potential centralized solutions bring about problems of inefficiency – decentralized bargaining, because of the incentives it provides to bargaining actors to misrepresent their interests, and centralized bargaining, because of the incentives it provides to political actors to impose inefficiency on the bargaining process to further their own interests. The lack of a credible solution to this bargaining inefficiency problem therefore creates a theoretical puzzle in the institutional literature.

I argue that a leadership position with rotates among the bargaining actors provides a potential solution to this theoretical puzzle. By rotating the centralized leadership position
among the actors involved in the bargaining process, the incentives of the state (actor) in the leadership position to impose inefficiency to further their own interests is significantly lessened. Thus, the rotation of the leadership position helps to create the neutral leader/mediator necessary to help to overcome the decentralized bargaining problem, while at the same time, largely avoiding the problems of centralization.

III. Rotating Leadership – Solution to the Decentralization/Centralization Problem

The decentralization/centralization dilemma in the bargaining literature is an important one. It addresses normative concerns of efficiency in the outcomes of bargaining processes and gets to the heart of debates about institutional solutions to problems of decentralized interactions in an anarchic setting. Understanding how more efficient bargaining solutions can be brought about thus makes important contributions to several different literatures.

The problem with most institutional solutions, as demonstrated by the literature examining incentive compatible mechanisms and leadership, is that absent a neutral leader to coordinate the actors on efficient solutions or to institute an incentive compatible mechanism, efficiency will again be jeopardized – in these cases, by the political actors in the leadership position. These political actors holding the leadership position have an incentive to pursue their own interests at the expense of the efficiency of the agreement for the bargaining actors. I refer to this type of action by the leader as “defecting” from their supposedly neutral leadership role.

I argue, though, that by rotating that position among the various actors in the bargaining process, the incentives of the actors holding the leadership position to fulfill their own interests at the expense of the efficiency of the agreement among the other actors diminish. The main underlying mechanism which lessens these incentives is the threat of retaliation by other actors when they hold the Presidency. In other words, because each actor does not hold the leadership
for an extended amount of time, the possibility exists that actors who will hold the leadership position in the future can impose costs on actors who defected in the past when they held the leadership position. Conversely, the “promise” of future cooperation by leaders absent a defection by current leaders is also important.

Because these threats rely on the imposition of future costs and benefits to prevent actors from pursuing their own interests when they hold the leadership position must therefore be defended as threats which are credible. If these threats cannot be credibly carried out, their effectiveness in effecting the incentives actors face when they hold the leadership position would be meaningless. However, because future leaders, given their role in the bargaining process, have a good deal of control over the characteristics (payoffs to the multiple actors) of the agreement that is reached, they have a the ability to structure the outcome such that it leaves certain actors worse off, while not harming their own interests. Given that carrying out this treat does not harm the interests of the leader carrying it out, the threat of this type of retaliation is credible.

Because of their significant ability to structure the agreements that are reached in the bargaining process, future leaders can thus structure the agreements in such a way that costs are imposed on the actors who “defected” when they held the leadership position. In addition, if the agreement is one which requires unanimity support for a decision to be reached, these costs can be imposed such that the actors who “defected” still benefit from the agreement in relation to the status quo absent this agreement, and thus still have an incentive to support the agreement, while

---

6 It may also be argued that a potential threat of the other actors is to reject a solution proposed by a leader which imposes inefficiency costs on the other actors. However, the threat of rejecting any agreement which represents an improvement on the status quo payoffs of the actors, even if it is not Pareto-efficient, is not credible because it would not be in the interests of the other actors to carry out this threat. The threat that I argue serves to constrain leaders – which derives from the rotation of the Presidency – is a credible threat, as discussed below.

7 In addition, given that future leaders face these same potential future costs, the “promise” of future cooperation is also credible, as will be shown below.
at the same time, not achieving all possible benefits from that agreement – and are therefore not as well off as they could have been, had they not defected.\textsuperscript{8}

This retaliation can be carried out on an actor who defected when she held the leadership position by all other actors in the bargaining process. Thus, the potential losses in utility are fairly significant, and therefore provide a cost to actors for defection. For an actor in the leadership position to defect in the face of these future costs, then, requires that the benefits of defection to that actors’ interests be high enough to overcome these future costs.

This logic can be summarized in a very simple game theoretic model. Though this is an extremely simple model, it helps to highlight the logic at work, and the conditions under which this rotation should sustain cooperation – i.e. neutral behavior – on the part of the actors holding the leadership position.

\textit{IV.A. A Simple Illustrative Model}

Consider a very simple bargaining game with $n+1$ players. There are $n$ actors involved in the bargaining process, plus one actor who plays the role of the leader, at any given point in time. The game presented below lays out the strategic interaction which affects the choice made by a single leader. For simplicity, we assume that only one bargain takes place under each leader. The findings of the model presented below will hold with more than one bargain taking place, and would even strengthen the findings, because more bargains would provide additional future instances in which costs could be imposed on a leader who has defected.

In the first stage of the game, player 1 is assigned to the leadership role, and the other $n$ players represent the bargaining actors in this strategic interaction. In this bargain, the leader can

\textsuperscript{8} This logic is similar to the logic of the repeated Prisoner’s dilemma. Cooperation can be sustained by actors in the Prisoner’s dilemma situation by \textit{the threat of future defection} in response to a defection. For more on this, see Axelrod (1981).
propose a potential agreement. In proposing this agreement, the leader can either “defect” (D) and propose an agreement which furthers her own self-interest, imposing efficiency costs on the other actors, or can “cooperate” (C) and play the role of a neutral leader/mediator, proposing an efficient agreement. I assume that even when the leader “defects”, while the agreement proposed is not a Pareto-efficient, it is still an agreement which the other players prefer to the status quo. In addition, the leader, without gaining any additional interest to herself, can impose particularized costs (P) on another actor in the bargaining process, presenting an agreement that is not efficient, only for that player.

Each of the other $n$ players are presented with this proposal, and thus have full information about whether the leader has proposed an efficient agreement or proposed an agreement which furthers the leaders’ own interests. These players thus face the following decision – they can either “accept” the proposal that has been made, or they can “reject” the proposal. These $n$ players all face the same decision-calculus, and therefore I only model one of these $n$ games that are played in each bargaining round.

If the players reject the proposal, regardless of the leaders’ proposals, the leader receives the payoff $p_1$ and the other actors each receive the payoff $p_2$. These payoffs effectively represent the status quo payoffs absent an agreement.

If the bargaining players accept the proposal, and that proposal represents a “defection” by the leader, the leader receives the payoff, $m$ (this can be thought of in Prisoner’s dilemma terms as the ‘temptation payoff’) and the other players each receive the payoff, $s$ (‘sucker payoff’).

If a bargaining player “accepts” an agreement with a particularized cost to herself, she receives the inefficient payoff, $s$, and the leader receives the efficient payoff, $r$. 
If the bargaining players accept the proposal, and that proposal represents an efficient policy for all actors proposed by a “cooperating” leader, the leader receives the payoff, $r$, and the other players each receive the payoff $q$. In addition, if only certain players are targeted by the inefficiency in the proposal (i.e. the cost), they will each receive the payoff $s$ while the other actors receive the efficient payoff, $r$.

The payoffs are ordered as follows. For the leader, $m > r > p_1$, and for the other actors, $q > s > p_2$. In other words, under this particular bargain (i.e. in this stage game alone), the leader does best when she pursues her own interest and proposes an inefficient policy. She does second best when she proposes a policy which is efficient for all actors, and is worst off when no agreement is reached. The other actors do best when they are given a Pareto-efficient policy by the leader. Each of these actors does second best when she is offered a proposal which imposes on her an efficiency cost, and worst off when no agreement is reached.

[Figure 1 here]

This stage game is represented graphically in Figure 1. In each stage game, the bargaining actors have a dominant strategy to accept the proposal of the leader, regardless of whether it is Pareto-efficient or Pareto-inefficient. Thus, the threat of rejecting a Pareto-inefficient proposal is not credible, because these actors would still prefer an agreement which improves on the status quo, even if it is inefficient. That this would be true, I argue, makes empirical sense. A leader who desires to obtain benefits by proposing an agreement which furthers their own interests, would not gain these benefits if the agreement would be rejected by the other players. Thus, the leader has an incentive to propose an agreement which furthers their own interests, but also which will be an improvement on the status quo for the other players, and thus which they have an incentive to accept, even though it is not Pareto-efficient.
This game is then repeated, with a new bargain, and with player 2 as the leader and the other \( n \) players as the bargaining actors. This continues across an infinite time horizon. In calculating the decision of the ‘leader’, I consider the “threat” that if the leader defects, in their next holding of the leadership role, each actor will retaliate on that defector. Thus, the next \( n \) leaders will impose *particularized* costs on a leader who has defected (i.e. propose a policy which offers \( P \) to the defector, and \( C \) to the other actors). These next \( n \) leaders will therefore cooperate, in the sense that they will not pursue their own interests, and will propose efficient agreements, save for the costs they impose on the defector.

The model therefore builds in two important features of future leaders’ behavior – the “threat” of retaliation on a defector, and the “promise” of future cooperation in return for cooperation.\(^9\) Current leaders, as well as current bargaining actors share these behavioral expectations.\(^10\)

Thus, each leader, when facing their strategic decision, knows that this threat will be carried out in the next \( n \) rounds, and that she will therefore receive \( s \) in the next \( n \) rounds, while the other players will each receive \( q \) holding all else constant (i.e. that no other defections occur). Let \( \delta \) [add ‘within [0,1] interval] represent the discount factor. In other words, receiving a payment, \( p \), at some time in the future, \( t \), is worth the same to each actor as receiving \( p \cdot \delta^t \) at this moment in time. This discount can be converted into an interest rate, for a more intuitive understanding of what this discounting means. A \( \delta \) of .95 is equivalent to having an interest rate of 5.26%. A \( \delta \) of .9 is equivalent to having an interest rate of 11%. A \( \delta \) of .1 is equivalent

---

\(^9\) This terminology is specifically adopted to correspond to the idea of “threats” and “promises” discussed by Schelling (1960).

\(^10\) This term “expectations” is adopted in the empirical sense of ‘anticipations’, not the formal modeling sense of probabilistic strategies.
to having an interest rate of 900%.\textsuperscript{11} Using $\delta$ to discount these future costs which will be imposed, this model can therefore be used to demonstrate how this threat can sustain neutral behavior by a leader.

Given the threat of the other actors to impose efficiency costs for “defection” for the next $n$ bargains, the leader must weigh the following payoffs. If she defects now, she receives payoff $m$, and will receive the inefficient outcome, $s$, in the next $n$ bargains.\textsuperscript{12} If she cooperates now, she will receive her lesser payoff, $r$, and will receive the efficient outcome, $q$, in the next $n$ bargains.

Each leader therefore weights the following strategic calculation. If she choose to defect, she will receive the discounted future payoff: 
$$m + \left(n \cdot \sum_{t=1}^{n} (s \cdot \delta^t)\right)$$

in this bargain and the next $n$ bargains. If she chooses to cooperate, she will receive the discounted future payoff 
$$r + \left(n \cdot \sum_{t=1}^{n} (q \cdot \delta^t)\right)$$
in this bargain and the next $n$ bargains. Thus, the leader will choose to “cooperate” and play the role of the “neutral” leader/mediator if
$$m + \left(n \cdot \sum_{t=1}^{n} (s \cdot \delta^t)\right) < r + \left(n \cdot \sum_{t=1}^{n} (q \cdot \delta^t)\right).$$

This equation simplifies to the following:
$$n \cdot \left(\frac{q - s}{m - r}\right) < \left[\frac{1 - \delta}{\delta(1 - \delta^n)}\right].$$

In other words, holding all else constant, when the number of future rounds in which the cost for defection will be imposed ($n$) increase and/or the ratio of the cost imposed in each round for defecting to the benefit that would be received from defecting ($q - s$)

\textsuperscript{11} $\delta = 1/1+w$ (where $w$ is the interest rate). For more on this conversion, see Axelrod (1984).

\textsuperscript{12} Given that the actors do not necessarily know what the future bargains will be, I treat them all equally, with payoffs $s$ and $q$ to the future non-leaders in these bargains. The leader does know the bargain at hand, though, and that will determine her value for $m$. In some cases, $m$ may be large enough in the bargain at hand that the leader will still choose to defect, even given the future costs she expects to receive, as will be demonstrated below.
increase, the leader becomes more likely\textsuperscript{13} to play a neutral role in the leadership position, rather than pursue her own interests.

Thus, despite the short-term incentive to pursue her own interests when she is the leader, the credible threat of future retaliation in return for defection, and future cooperative in return for cooperation, can sustain neutrality.\textsuperscript{14}

The following tables provide some intuition and preliminary, formal evidence for how easily the neutral leadership role can be sustained given this threat of future costs in retaliation for defection, and promise of future cooperation in return for cooperation by the current leader. These tables are designed to show the minimum values necessary to sustain cooperation, and to demonstrate their empirical likelihood. The less players, and the less the ratio of cost to benefit, the harder cooperation would be to sustain.

Tables 1 and 2 demonstrate that even in cases in which there is a very small numbers of bargaining actors, ‘neutrality’ can be sustained in the leadership position, for fairly likely valuations of future payoffs. Table 3 sets an extremely low valuation of future payoffs (equivalent to having an interest rate of 400%), and demonstrates that with a relatively low number of other bargaining actors, ‘neutrality’ can be sustained. Table 4 then sets the discount factor at a low, but reasonable amount (.6) and determines, for small numbers of actors, how low the cost imposed can be, and still sustain cooperation.

[Table 1 here]

\textsuperscript{13} In the assumptions of this model, these parameters are \textit{exogenously} determined. The source of the probabilistic component of these statements therefore does not stem from probabilistic mixing strategies, but to whether the cooperative equilibrium holds given different exogenously set values of these parameters.

\textsuperscript{14} By the Folk Theorem, it should be recognized that there are multiple equilibria in any repeated game. In addition, even under the conditions which can sustain cooperation from the leader, the situation in which all players “defect” in the leadership position remains an equilibrium of the game. The argument here is to demonstrate the conditions that \textit{can} sustain cooperation, and then to evaluate whether this in fact holds empirically.
Table 1 considers the case in which there are only two negotiating parties other than the leader \((n=2)\) and for which the cost imposed for defection is equal to the benefit of defecting. This table demonstrates whether cooperation can be sustained for different valuations of future payoffs (different discount factors). This table demonstrates that if the future is valued enough (i.e. with a discount factor greater than or equal to .4, which corresponds to a player discounting future values such that an interest rate equivalent would be 150%), the leader has an incentive to cooperate rather than to defect.

[Table 2 about here]

Table 2 considers the bilateral negotiation case. In this bilateral case, it should be noted that the cost threatened to be imposed must be at least as great as the benefit from defection. Because the cost will be imposed in the future and the benefit will be gained at this moment in time – given that future payoffs are always discounted to some degree relative to current payoffs (i.e. \(\delta < 1\)) – no value of the discount factor can sustain cooperation in this case. Even this condition, though, does not create unreasonable (in the sense of being empirically unlikely/impossible) requirements to sustain cooperation.

If there is only one retaliation round, and the other actor threatens to impose a cost twice as large as the benefit, that threat can sustain neutrality by the leader for a discount factor larger than .5 (equivalent to an interest rate less than 100%). Thus, \textit{even in the bilateral case} this type of rotation and threat/promise can be used to sustain cooperation from the leader under fairly realistic empirical conditions.

[Table 3 about here]

Table 3 considers an extremely low discount factor (equivalent to a 400% interest rate), and demonstrates that if the cost imposed is equal to the benefit to be gained, with 5 rounds of
punishment, ‘neutrality’ can be sustained from the leader, even if that leader has a very low consideration of future costs in the calculations she makes.

[Tables 4]

Table 4 considers the case with a fairly reasonable, but low discount factor ($\delta = .6$, equivalent to an interest rate of 66.7%). It then shows the minimum retaliatory cost necessary to sustain cooperation in a situation with only 2 other bargaining actors, as well as 3 and 4 other actors. If there are only two other actors, cooperation can be sustained in this situation with a cost as low as ¾ of the potential benefit. If there are 3 actors, this cost can be as low as ½ the benefit, and with 4 or more actors, this cost can be as low as ¼ the benefit of defecting.

This simple model illustrates the intuition behind this argument. The neutrality of a leader can be sustained via a retaliatory threat by the other bargaining actors who are themselves future leaders in many quite realistic conditions. The tables above demonstrate that a rotating leadership and the threat of retaliation can even sustain ‘neutrality’ in a leader under fairly unrealistic empirical conditions. Thus, in the more likely realistic situation where the leader’s discount factor is .9 (equivalent to having an interest rate of 11%), ‘neutrality’ by the leader can even be sustained even if there are only two other bargaining actors imposing a cost is as low as 29.25% of the potential benefit gained from using the leadership position to pursue one’s own interests.

In addition, because future leaders will face this same strategic choice when choosing to cooperate or defect when they hold the leadership position, their promise of future cooperation is also credible. When they hold the leadership position in the future, this same mechanism will make it in their interest to cooperate. Thus, the rotation of the leadership position can help to instill ‘neutral’ actions on the part of leaders.
IV.B. Hypotheses, and Set-up for Empirical Analysis

The theory presented here argues that the decentralization/centralization problem of inefficiency in bargaining can be solved by a leadership position which rotates among the actors. The threat of future retaliation sustained by the institution of a rotating leadership position gives current leaders an incentive to forgo their short-term desire to use the leadership position to pursue their own interests at the expense of the other actors, and instead to act as a neutral leader/mediator. This neutrality, then, will lead to the adoption of more efficient bargaining outcomes than would otherwise be possible, as highlighted by the bargaining literature described above.

This theory, thus leads to the following overall relationship: Rotating Leadership $\rightarrow$ Neutrality $\rightarrow$ Efficient bargaining outcomes. The bargaining literature has dealt with demonstrating the efficiency that results from the presence of a neutral leader/mediator. And while this is an important consequence of the argument presented here, the causal argument here is really about the relationship between the rotating leadership position and the neutrality that this brings about in the leader. Thus, this argument leads to the following testable hypothesis.

*Holding all else constant, the presence of a rotating leadership position should lead to actors holding the leadership position to not pursue their own self-interest, but rather to act as ‘neutral’ leaders/mediators in the bargaining process.*

Though neutrality in the leadership position is not expected, as described by the bargaining theories presented above, there exist some other potential explanations for leaders acting in a neutral way, which are not considered by these bargaining theories which treat all actors as rational actors without any characteristics differentiating them, expect for the position that they play in the bargaining game. Two potential alternative explanations exist.
The first is a more comparative politics argument, looking at the inner characteristics of a state. In this argument, neutrality of the leader may be one of political culture (e.g. Pye and Verba 1965; Benedicto 2004). In other words, some cultures may normatively value neutrality in a leader/mediator, and thus may be more likely to act in a neutral way when actors from that culture hold the leadership position than would be actors from other cultures.

A second potential alternative explanation stems from the international relations field – which argues that the power of stages (actors) will play an important role in their strategic choices (e.g. Krasner 1991; Moravcsik 1993; Morrow 1999). Thus, it could be posited that smaller states may also be more likely to be neutral than larger states. This may be due to the fact that they have a smaller number of very important issues, where almost everything being bargained over may have important effects on larger states. In addition, more powerful states may be more likely to utilize their power to prevent retaliation for defection. In the evaluation of the plausibility of this argument, then, these potential mitigating factors need to be considered.

An empirical example of this type of leadership rotation can be seen in the position of the Council Presidency of the European Union, and I therefore use this case to empirically assess this argument. In this empirical data, in support of the theory presented here, I expect to find that the rotating Presidency is expected to play a neutral position in the bargaining process, and that this neutral position in leading and mediating the bargaining process is considered to be a source of strength of the Presidency. In addition, this should hold across different cultures of member states within the EU, as well as across both small and large states.

The analysis of this empirical case is laid out as follows. I first briefly survey the current understanding and theory of the role that the Council Presidency plays in the European Union. I will then evaluate the empirical validity of this argument and hypothesis in the EU decision-
making process by examining empirical evidence gathered from sixty-six interviews conducted in 2005 and 2006 with member state representatives and other individuals involved in the bargaining processes of EU decision-making within the Council institutional structures.\footnote{GIVE MORE INFORMATION ABOUT INTERVIEWS}

**IV. Current Literature on the EU Presidency**

The *de jure* role of the EU Presidency is clear. A publication of the German Presidency, *Deutschland*, lays out the following ‘official’ role of the EU Presidency:

What actually is the Presidency of the Council of the European Union? The Presidency of the Council signifies the chair of the Council of the European Union (Council of Ministers) that rotates among the member states every six months. For half a year, the members of the government of the country that holds the presidency define the European agenda and chair meetings of the Council of Ministers. The duties of the presidency also include the organization and moderation of all meetings of the European Council, the so-called “summit” of the heads of state and government, and the committees and working groups of the Council of Ministers as well as representing the EU in international organizations and to third countries.

Despite agreement on the *de jure*, official role of the Council Presidency, debate exists on the *de facto* role that the Presidency plays, and its impact on EU decision-making. Several different perceptions of the *de facto* role that the rotating Council Presidency plays within the EU exist in the current literature. The first argument is that the Council Presidency was designed to be a weak position, with little *de facto* authority. Thus, the larger, more powerful member states could retain their power within the weighted voting system in the Council, and their greater representation in the Commission and Parliament, while giving nominal power to the smaller, less powerful member states via the Presidency which rotated among all member states. As laid out in the Treaties, the Presidency is designed to be neutral and unbiased, hosting meetings and overseeing negotiations. This ‘official’ neutrality is designed to prevent the Presidency from drawing on national bias in the setting of agendas and overseeing of the bargaining process.
Several scholars have argued that this neutrality, then, serves to relegate the Presidency to a weak position, as a mere “facilitator, administrator and organizer” of EU bargaining processes (Hayes-Renshaw and Wallace, 1997; O’Nuallain and Hoscheit, 1985; Sherrington, 2000).

Several recent works which examine the EU Presidency in actual, empirical cases of decision-making demonstrate that the Presidency’s role is much more complex than the ‘official’ role laid out by the treaties may indicate. The agenda-setting role of the Presidency has been highlighted as an important stage of the EU’s decision-making process in which the Presidency can exert an important effect (e.g. Kirchner 1992; Kollman 2003; Tallberg 2006).

There are several different avenues through which the EU President can influence the agenda of the EU – ways that are not always easily identified by those outside of the institutional process, and which are not always directly laid out in the Treaties (Tallberg 2003). That the Presidency has utilized this agenda-setting role in actual decision-making processes in order to facilitate or delay decision-making has been demonstrated by several different works (e.g. Kirchner 1992; Wurzel 1996; Schout 1998).

Most importantly, its important role in this agenda-setting stage allows the member state who controls the Presidency to have the ability further its own interests via EU decision-making (Tallberg 2006). At the very least, Kollman argues that “many commentators agree that Council presidents can [at least] delay action on policies they do not like” (Kollman 2003, 55). Thus, in contrast to the weak and neutral Presidency, this literature argues that the Presidency is not a weak or neutral role, but one that can utilize agenda-setting powers to effect the EU decision-making, and to further its own interests in that decision-making process.

In addition to this agenda-setting role, some other works examine the important role of the EU Presidency in overseeing the bargaining process among the member states in the Council.
institutions (e.g. Metcalfe 1998; Dür and Mateo 2006). Citing the important role of ‘leadership’ in multilateral bargaining, Metcalf (1998) argues that a central role that the Council Presidency plays in EU decision-making is that of leading and overseeing negotiations (Metcalfe 1998). Furthermore, even in the bargaining in intergovernmental conferences (IGCs)– often considered to be more ‘intergovernmental’ and cases similar to that of standard international bargaining processes\textsuperscript{16}, Dür (2006) argues that mediation by the Presidency is one of the conditions necessary for bargaining in these IGCs to be efficient.

Unlike the literature examining the Presidency’s agenda-setting role, the literature examining the mediation role of the Presidency highlight the importance of neutrality in this leadership role. “Sacrificing the national position to hasten compromise is a salient feature of Council negotiations” (Metcalfe 1998, 417). Thus, rather than being a source of weakness, the neutrality of the Presidency can be important to furthering the \textit{de facto} role that the Presidency plays in overseeing and facilitating the negotiation process itself.

These studies, though, do not examine the source of this neutrality – especially given the demonstrated non-neutrality in its agenda-setting role. The Treaties, and the ‘official’ neutral position and role of the Presidency are not, I argue, the main source of this neutrality. That the Treaties themselves do not exert this effect is evidenced by the literature examining the Presidency’s agenda-setting role, member states holding this position can, and do, utilize that power to further their own interests. Why would Presidencies adopt neutrality in leading bargaining processes, but not in their agenda-setting role?

I argue that this neutrality stems from the rotating leadership role, and the expectations of future Presidency actions in the leadership role. Thus, while member state interests can play an

\textsuperscript{16} See the differences in bargaining processes highlighted between Moravcisk (1998) who examines bargaining among the EU member states within intergovernmental conferences and Lewis (1998; 2000; 2005), who examines bargaining within the EU institutional setting.
important role in the agenda-setting role of the Presidency, in their role as leaders/mediators in
the intergovernmental bargaining process that takes place within the Council of Ministers
institutions, the member state holding the Presidency will act largely as a neutral
leader/mediator. Thus, in these empirical cases, then, my argument would expect to find support
for member state interests playing a role in their agenda-setting power, but when they act as the
leader in the bargaining process itself, that they will act in a largely neutral way.

V. The Rotating EU Presidency as Solution to the Bargaining Dilemma

In the analysis of this case, it is important to highlight the empirical, observable evidence
that would provide support for the theory forwarded here. Evidence of this would be the
forgoing of one’s own interests when making compromise proposals to the other member states,
and the expectation of this type of behavior from the other actors. As empirical evidence that
this neutrality is connected to the rotation of the Presidency position, the consequences of not
acting in a neutral way should be highlighted by the member state representatives. Support for
this argument would be finding member states’ consideration that future interests (when they did
not hold the Presidency) would be harmed by self-interested actions when holding the
Presidency position. In addition, related to the relationship between neutrality and bargaining
efficiency, rather than being a source of weakness, this neutrality should be considered to be a
source of strength, and important for the forging of agreements.

V.A. Neutral Actions and Expectations of Neutrality

The first, and most important empirical evidence of this theory at work would be neutral,
rather than self-interested actions within the bargaining process, by the member state holding the
Presidency. This goes explicitly against the centralization predictions of bargaining theory. And
given the rotation of the Presidency position, the theory here predicts neutral action in this
institutional setting. In addition, the expectation of neutrality from other bargaining actors should be evident in the interview evidence. Furthermore, this neutrality and expectation of neutrality should be characteristic of any member state – large or small, and regardless of culture.

That neutrality is expected of the Presidency was clear in all interviews conducted. As one member state representative involved in EU Council negotiations argued, “the Presidency is completely neutral. Never forget that it’s completely neutral. And when we sit as a Presidency in the COREPER, the chair never speaks for his own country. He speaks for the Council, he speaks as the Presidency, as a neutral body” (Interview with Mertens Counselor, May 2005). This expectation of neutrality, though, does not provide real evidence in support of this argument. What needs to be demonstrated empirically is that member state representatives holding the Presidency acted against their own interests in order to bring about compromises.

An examination of two directives and two different Presidencies provide important evidence in support of neutrality in the actions of Presidencies. The Presidencies of the United Kingdom in 2005 and the Netherlands in 2004 allow for a comparison of the Presidency behavior adopted by a large and powerful state versus that of a small state, as well as a comparison of this behavior across different cultures. In the literature examining the European Union, the UK is widely considered to be Euroskeptic, while the Dutch are largely regarded as pro-European countries. The theory presented here predicts that when holding the Presidency, both of these member states should act in a largely neutral manner.

The first case is that of the directive on the Registration, Evaluation and Authorisation of Chemicals (REACH Directive). This was a highly politicized directive which aimed at the regulation of chemicals produced and used by industries within the EU. It therefore was
important both for environmentally-oriented member states and groups as well as for industry, and those member states working to protect their businesses from overly costly requirements. The UK fell into the category of more industry-oriented member states, interested in minimizing the burdens placed on businesses by the REACH directive. The central debate on this directive was aimed at finding the right balance between the protection of the environment, and the costs and obligations for the registration and use of chemicals imposed on industry – small businesses, in particular.

Because of the potential effects on businesses, it was very important for the United Kingdom to have the requirements placed on industry to be as non-invasive on current business practices as possible. Therefore, the UK, before its holding of the Presidency, together with Hungary proposed a “one substance, one registration” (OSOR) requirement. The OSOR requirement would allow them the option of forming consortia in order to file registration for chemical jointly. In comparison to the requirement that every business must register and report on every chemical they made or utilized in their production processes, as laid out under the original proposal, this OSOR requirement was designed to ease the burden on these businesses (MTI Econews 2005).

As described by several interviews with REACH Working Group representatives, it was clear in the bargaining process in early 2005 that the UK needed some form of “one substance, one regulation” (OSOR) in the outcome of the bargaining process in order to accept the agreement (Interviews with REACH Working Group representatives, May and June 2006).

While the OSOR was still under intense debate, the United Kingdom assumed the Presidency position in the second half of 2005. What the interview evidence demonstrates is that once the UK assumed the Presidency position, they were much more flexible and giving on this
proposal, despite the importance of the “one substance, one regulation” requirement for the UK’s interests. As one REACH Working group representative (from a member state other than the UK) reported, “If you have the Presidency, your first concern is to arrive at a compromise. So there [the UK was], of course, much more flexible on their OSOR proposal than they initially were [when they did not hold the Presidency]” (Interview with REACH Working Group representative, May 2006).

Furthermore, a REACH Working group representative from another member state described the OSOR proposal as it was reflected in the ‘common position’\(^{17}\) reached in the Council on December 13, 2005 under the UK Presidency (i.e. the agreement reached in the bargaining process among the member states) with the original proposal made by the UK and Hungary. “Now it has been watered down very much – it has changed very much from their initial proposal. And once they had the Presidency, it’s always that way” (Interview with REACH Working Group representative, June 2006).

Thus, even the UK, one of the three most powerful member states in the EU, and a member state with a political culture which is not widely considered in the scholarly literature to be pro-European and neutral in its approach to the EU, engaged in non-self-interested, neutral types of actions – even on the OSOR. This was a proposal that the UK had helped to table when it did not hold the Presidency position, and involved a highly politicized, extremely important piece of legislation – the REACH directive. Therefore, even this unlikely case – the United

\(^{17}\) The ‘common position’ of the Council refers to the agreement reached in the bargaining process among the member states represented in the Council. This does not end the legislative process in the EU – as the European Parliament is a co-legislator in this issue area, and therefore the final EU legislation will reflect the agreement struck between the Council and the European Parliament based on each institution’s respective agreements. However, it ends the type of “bargaining process” which is considered in this work. In addition, the member state positions in the negotiations with the European Parliament reflect this common position, rather than their own member state interests (Interviews with Deputy Permanent Representatives in COREPER I, May and June 2005), and thus these negotiations are a very different process, which needs to be considered separately from the purely intergovernmental bargaining which is the focus of this work.
Kingdom’s actions on a very politicized, important piece of legislation – provides support for the neutral leadership argument made here.

This is not to say that the UK acted in ways contrary to its interests. The OSOR remained in the final agreement reached. But the behavior of the UK Presidency reflected a more neutral, flexible and compromising orientation than their behavior when they did not hold the Presidency, and the final proposal offered, rather than embodying the original more extreme version of the OSOR that they fought for when they did not hold the Presidency, reflected a more “watered down version” that was more consistent with other, opposing member states’ interests.

A similar finding is demonstrated by the case of the Dutch Presidency and the directive on the recycling of batteries and the possibility of a ban on nickel-cadmium batteries (hereafter referred to as the ‘Battery Directive’). This directive was nowhere near as politicized as the REACH directive, but was important because some member states were already engaged in the recycling of batteries at a very high rate (including the Netherlands), while others did not have battery recycling programs instituted at all. In addition, a ban on nickel-cadmium batteries was very highly debated, as some member states had industries which manufactured these batteries, and more environmentally-oriented member states were in support of a ban.

The Dutch were more on the environmental side, and therefore supported a cadmium ban and high recycling targets. In an effort to support a cadmium ban, the Dutch Presidency undertook its own ‘impact assessment’ – a scientific assessment of the costs and benefits that would arise if a particular decision were implemented. As one Dutch member state representative within the Council institutional structure explained, “we wanted to have an underpinning of the decision to ban the NiCad [nickel-cadmium] batteries in the future. So we
were eager to make an impact assessment” (Interview with former Dutch member state representative, June 2006).

However, in order to reach a compromise in the bargaining process, the Dutch presidency ended up tabling a proposal which abandoned this impact assessment and allowed several exceptions in the nickel-cadmium ban. As one Battery Directive working group representative explained, “And the Dutch, who were perhaps more on the [environmental side] – they had the Presidency so they had to be flexible because they had to find a compromise. And this is also the reason why they abandoned, I suppose, the results of the impact assessment” (Interview with Battery Directive Working Group representative, May 2006).

Therefore, even though the ban was in the Netherlands’ interest, in order to facilitate a compromise agreement among the member states overall, they tabled proposals that were not entirely in their own self-interest. The same was true with the recycling targets, which, in the interest of member states who did not have recycling programs, were set much lower than the targets desired by the environmentally-oriented member states, including the Netherlands.

A former Dutch member state representative in the Council institutional structure summed up this position quite well, “the last half year of 2004, we had the Presidency. So that’s a little bit different, of course, than just being a member state alone – for that half year, you have to be the President of all the member states and find a solution, even if it is not quite in line with the position of your member states”.

These two cases provide empirical support for the argument forwarded here. In this institutional setting of a rotating leadership position, in the bargaining process itself\textsuperscript{18}, actions taken by the UK and Dutch Presidencies demonstrate neutrality. The proposals tabled were not

\textsuperscript{18} The theory here does not say anything about the neutrality v. the pursuit of self-interest in the agenda-setting role of the Presidency. It only makes an argument about neutrality of leadership within the bargaining process itself.
entirely consistent with the leader member state’s own self-interest, but rather, were tabled in the interest of reaching a compromise agreement among the other member states.

While this provides some empirical support for this argument, another important empirical factor needs to be briefly considered – the source of this neutrality. The theory presented here argues that, rather than stemming from the Treaties themselves, this neutrality should be derived from expectations of future benefits and costs. I will therefore, very briefly, examine this aspect of the rotating EU Presidency.

**V.B. Importance of Neutrality**

Do member state representatives evaluate the neutral position of the Presidency in terms of future costs and benefits? Across all interviews conducted with member state representatives in the Council institutional structure, a common theme which was expressed, in speaking about the role of the Presidency, was the repeated nature of interactions. In particular, the future benefits to be derived from bargaining *overshadow* short-term desires to engage in the pursuit of self-interest. A Permanent Representative in COREPER II summed up this logic quite clearly, “Here [in the EU], you should remember that ‘behaving’ today means that others are to behave in your favor tomorrow” (Interview with Permanent Representative, May 2006).

In other words, acting neutral when holding the Presidency, and not imposing costs on the other actors in the proposals that are tabled, helps to ensure the same type of action when the tables are turned. This expectation of reciprocity is what sustains the neutral role of the Presidency. Furthermore, this reciprocity sustains the expectation by other member state representatives that when they are not holding the Presidency, they can express their needs and problems to the President, and know that the President will attempt to address those needs (Interview with a Deputy Permanent Representative in COERPER I, June 2005).
In addition, the member state representatives interviewed expressed the importance of neutrality for agreements to be reached. “If you start putting things in your texts, in your compromise texts, which are not acceptable for the majority of member states, or for a blocking minority, you know you could never come up with an agreement” (Interview with Mertens Counselor, June 2005). As a Deputy Permanent Representative in COREPER I described “it is the ability to look at things from a Council, a European point of view, and not so much from a national perspective [which allows for agreements to be reached]” (Interview with Deputy Permanent Representative, May 2005). Therefore, the benefits to be derived from the reaching of an agreement are also dependent on the extent to which the Presidency is able to put aside its own interests.

Together, this interview evidence demonstrates that in the EU institutional setting which has a leadership position over its intergovernmental bargaining which rotates among all the member states, neutrality on the part of the leader is largely sustained, and that this neutrality is largely derived from future expected costs and benefits, as predicted by the argument forwarded here.

VI. Conclusion

The theory presented here argues that the rotation of the leadership position among the bargaining actors provides a potential solution to the decentralization/centralization problem of inefficiency that arises in bargaining processes. It then evaluated the empirical validity of this argument by examining the case of the rotating Council Presidency in the European Union.

This solution is interesting, and important, because it is a solution which can be imposed even without an organization such as the European Union. Any institution or rule of rotating the leadership position among the bargaining actors, even outside of a formal international
organization, can theoretically sustain this ‘neutrality’ of the leader. Thus, this argument makes potential important contributions to decentralized, anarchic bargaining interactions among actors.

Therefore, while the case here served to highlight the plausibility of this argument, a more rigorous test of this argument is necessary. The difficulty is that there are few – if any – other empirical cases of this type of rotating leadership position – especially outside of a fairly highly institutionalized organization such as the European Union or a domestic institutions. Therefore, in order to more fully test this argument, the conducting of experiments in order to obtain more rigorous empirical evidence may be necessary.

Furthermore, this argument is based on the assumption of full information. In particular, it assumes that the leader – and future leaders who threaten retaliation – know the preferences and interests of the other actors in the bargaining process. However, in many empirical situations, this assumption may not be a wholly realistic one. Therefore, an important extension of this argument would be to consider what would happen in a situation in which proposals made by leaders must rely on the information provided by the ‘claimed’ interests of actors, and how the incentives created by this incomplete-information setting impact not only the incentives which leaders (and bargaining actors face), but also the characteristics of the proposals made by leaders.

Thus, while this project provides an important first-step in understanding and evaluating a potential solution to the decentralization/centralization problem actors face in bargaining situations, its limitations also highlight several possible avenues for future research and assessment.

\[^{19}\text{Any ‘rule’ of this form, even outside of a standard international organization corresponds to recent definitions ‘institution’ in international relations (Simmons and Martin 2002).}\]
Figure 1: Stage game of simple bargaining game
Table 1: If Cost Imposed is equal to Benefit, and only 2 other players

<table>
<thead>
<tr>
<th>n</th>
<th>q-s</th>
<th>δ</th>
<th>Cooperation by Leader?</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>m - r</td>
<td>.1</td>
<td>9.09091</td>
</tr>
<tr>
<td>2</td>
<td>m - r</td>
<td>.2</td>
<td>4.16667</td>
</tr>
<tr>
<td>2</td>
<td>m - r</td>
<td>.3</td>
<td>2.5641</td>
</tr>
<tr>
<td>2</td>
<td>m - r</td>
<td>.4</td>
<td>1.78571</td>
</tr>
<tr>
<td>2</td>
<td>m - r</td>
<td>.5</td>
<td>1.33333</td>
</tr>
<tr>
<td>2</td>
<td>m - r</td>
<td>.6</td>
<td>1.04167</td>
</tr>
<tr>
<td>2</td>
<td>m - r</td>
<td>.7</td>
<td>0.840336</td>
</tr>
<tr>
<td>2</td>
<td>m - r</td>
<td>.8</td>
<td>0.694444</td>
</tr>
<tr>
<td>2</td>
<td>m - r</td>
<td>.9</td>
<td>0.584795</td>
</tr>
</tbody>
</table>

Table 2: If Only 1 other player (i.e. Bilateral Negotiation), Cost imposed Twice the Benefit

<table>
<thead>
<tr>
<th>n</th>
<th>q-s</th>
<th>δ</th>
<th>Cooperation by Leader?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2(m - r)</td>
<td>.1</td>
<td>10</td>
</tr>
<tr>
<td>1</td>
<td>2(m - r)</td>
<td>.2</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>2(m - r)</td>
<td>.3</td>
<td>3.33333</td>
</tr>
<tr>
<td>1</td>
<td>2(m - r)</td>
<td>.4</td>
<td>2.5</td>
</tr>
<tr>
<td>1</td>
<td>2(m - r)</td>
<td>.5</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>2(m - r)</td>
<td>.6</td>
<td>1.66667</td>
</tr>
<tr>
<td>1</td>
<td>2(m - r)</td>
<td>.7</td>
<td>1.42857</td>
</tr>
<tr>
<td>1</td>
<td>2(m - r)</td>
<td>.8</td>
<td>1.25</td>
</tr>
<tr>
<td>1</td>
<td>2(m - r)</td>
<td>.9</td>
<td>1.11111</td>
</tr>
</tbody>
</table>
Table 3: Cost imposed equals benefit – how many players does it take for very low value of future?

<table>
<thead>
<tr>
<th>n</th>
<th>q-s</th>
<th>δ (interest rate is 400%)</th>
<th>1 − δ ( \delta(1−δ^n) )</th>
<th>Cooperation by Leader?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>= m − r</td>
<td>.2</td>
<td>5</td>
<td>no</td>
</tr>
<tr>
<td>2</td>
<td>= m − r</td>
<td>.2</td>
<td>4.1667</td>
<td>no</td>
</tr>
<tr>
<td>3</td>
<td>= m − r</td>
<td>.2</td>
<td>4.03226</td>
<td>no</td>
</tr>
<tr>
<td>4</td>
<td>= m − r</td>
<td>.2</td>
<td>4.00641</td>
<td>no</td>
</tr>
<tr>
<td>5</td>
<td>= m − r</td>
<td>.2</td>
<td>4.00128</td>
<td>yes</td>
</tr>
</tbody>
</table>

Table 4: What size relation necessary to sustain cooperation for different numbers of other actors and δ=.6?

<table>
<thead>
<tr>
<th>n</th>
<th>q-s</th>
<th>δ (interest rate is 400%)</th>
<th>1 − δ ( \delta(1−δ^n) )</th>
<th>Cooperation by Leader?</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>= ( \frac{1}{4}(m − r) )</td>
<td>.6</td>
<td>1.04167</td>
<td>no</td>
</tr>
<tr>
<td>2</td>
<td>= ( \frac{1}{2}(m − r) )</td>
<td>.6</td>
<td>1.04167</td>
<td>no</td>
</tr>
<tr>
<td>3</td>
<td>= ( \frac{3}{4}(m − r) )</td>
<td>.6</td>
<td>1.04167</td>
<td>yes</td>
</tr>
<tr>
<td>3</td>
<td>= ( \frac{1}{2}(m − r) )</td>
<td>.6</td>
<td>0.85034</td>
<td>no</td>
</tr>
<tr>
<td>4</td>
<td>= ( \frac{1}{4}(m − r) )</td>
<td>.6</td>
<td>0.85034</td>
<td>yes</td>
</tr>
<tr>
<td>4</td>
<td>= ( \frac{1}{2}(m − r) )</td>
<td>.6</td>
<td>0.765931</td>
<td>yes</td>
</tr>
</tbody>
</table>

\[ For \ delta=.1, \] cooperation by the leader will be sustained when \( n=10. \)
REFERENCES


