Assessing Policy Stability in Iraq:
A Fuzzy Approach to Modeling Preferences

The first Council of Representatives (COR), the Iraqi national legislature established by the post-invasion constitution, found it difficult to enact policy throughout its term. Political gridlock made it difficult for the COR to pass the legislation required to meet the parliamentary benchmarks established by the government in August 2006. Failure to meet these benchmarks contributed to the reigning political instability and fueled social conflict and disillusionment throughout much of the country.

Some scholars claim that the Iraqi parliament lacked legitimacy and was therefore unable to muster a majority vote on policies (Diamond 2004, Dobbins 2005). Others claim that sectarian conflict rooted in social cleavages and competing interests accounts for the inability of the first COR to achieve consensus (Biddle 2006, Fearon 2007, Krepinevich 2005, Morrow 2006). Still others have argued that Iraqi political culture is not conducive to the establishment of democracy (Luttwak 2005).

This paper advances an institutional analysis of the legislative crisis in Iraq. We argue that two constraints on the formation of decisive legislative coalitions account for the political deadlock during the term of the first Iraqi COR. The first is the existence of a three-member Presidency Council that must approve unanimously all bills passed by the COR in order for them to become law. If a single member of the Presidency Council rejects a bill, the COR can only override his veto with a three-fifths majority. The second constraint on the ability of the COR to form decisive coalitions is the fragmentation of the Iraqi party system. A party system becomes more fragmented as the number of salient parties in the system increases. As the number of parties in a political system increases, their individual legislative weights decrease, making it increasing difficult to form a decisive coalition.

We apply a veto players model (Tsebelis 1995, 2002) to analyze the inability of the first Iraqi COR to agree on policy change. Our model represents actors' preferences as fuzzy numbers. Developed by Lotfi Zadeh (1965) fuzzy set theory permits us to characterize policy alternatives as more or less in the set of most preferred alternatives, rather than absolutely in or out of that set. Jettisoning the conventional approach of using Euclidean distance from an ideal point, it invites consideration of thick indifference in the preferences of individual players.

A fuzzy theory approach permits us to make use of a single dimensional model, which is not possible in conventional models. This seems justifiable given the degree to which secular identity overwhelms all other issues, indeed it subsumes the thorny issues of federalism and the secularization of the state in the Iraqi political system. We employ a method for deriving fuzzy preference measures along a single dimension from party level text data using Wordfish, a computer-based scaling model in R that differentiates the policy positions of actors based on word usage.

Our fuzzy veto players model demonstrates that the parties in the first Iraqi COR were incapable of forming a decisive coalition because of extreme polarization in their preferences on the left-right political dimension. Parties' preferences did not intersect to an extent allowing them to affect significant policy change. Rather, political parties were entirely incapable of agreeing to policy change, The study concludes that political deadlock in Iraq can only be overcome by major institutional changes in the legislative and electoral processes.

Veto Players Theory and Fuzzy Preferences

Veto Players Theory

Veto players theory explains policy stability as a result of the number, congruence, and cohesion of veto players in a political system. Veto players are political actors that must approve of a

policy change from the status quo (Tsebelis 1995, 2002, p. 19). Policy stability in a political system is "the difficulty of effecting significant policy change in the status quo."(Tsebelis 2002, p. 21). Political gridlock, such as that described in the Iraqi political system would appear to present a clear example of high policy stability.

Tsebelis (1995; 2002, p. 19) identifies two kinds of veto players; institutional and partisan. Institutional veto players are created by a constitution. A partisan veto player derives its power over policy change in relation to some institutional veto player. Partisan veto players are "generated inside institutional veto players by the political game" (Tsebelis 2002, p. 79). These are most often political parties in a governing coalition. Tsebelis further distinguishes between individual and collective veto players. Individual veto players are institutions that are hierarchically organized and in which a single individual makes decisions. An example is a president. Individual veto players have a single-peaked and monotonic preference profile. Therefore, they are perfectly cohesive. In contrast, veto players such as parliaments and political parties take decisions collectively. These collective veto players are made up of multiple players, each with their own preference profile. Tsebelis (2003, pp. 38-63) argues that the preferences of a collective player are constrained to a circle containing the set of policy alternatives that a majority would prefer given all possible amendment agendas.[1] However, in most cases the number of members in a collective player is large enough that the circle approximates a point. Hence, the preferences of collective veto players can be treated much the same as those of individual veto players.

Veto players theory adopts the Euclidean distance assumption common to spatial models of public choice. Each issue is represented by a continuous dimension of all possible policy

[1] Tsebelis contends that the uncovered set is contained within this circle. For a discussion of the relationship of amendment agendas to the uncovered set see McKelvey (1986), Miller (1980), and Shepsle and Weingast (1984).

positions. Players have an ideal point on each issue dimension, which represents their most preferred policy. In the conventional fashion, veto players theory assumes that each player's preferences are single-peaked and that every incremental movement away from the player's ideal point is less preferred. In one dimension, a player's single-peaked preference profile is represented by two slopes descending monotonically from the ideal point. In two dimensions, a player's preferences descend in a monotonic cone. Cross-sections can be cut into the cone that take the form of circles. Any point in the Euclidean space bound by a circular indifference curve is preferred by the player to any point on that curve. Similarly, any point further from the player than the points on the indifference curve is less preferred by that player than any point on the curve.

The intersection of players' indifference curves through a point representing the status quo contains all points preferred by unanimity to the status quo. These points comprise the winset of the status quo (Tsebelis 1995; 2002, p. 20-21). As the winset of the status quo increases, so does the likelihood of policy change. That is, policy stability decreases. Another indicator of policy stability in veto players theory is what Tsebelis (1995; 2002, p.21) refers to as the unanimity core. (The unanimity core is equivalent to the Pareto set. The unanimity core for three or more veto players is the convex hull.) It is the set of points for which there is no possible winset between the players in the political game. If the status quo is a point in the unanimity core, then any attempt to change policy will be rejected by at least one of the veto players in the political game. As the size of the unanimity core increases, so does policy stability.

Incorporating Fuzzy Preferences

We modify the conventional veto players theory by incorporating fuzzy preferences. There are two good reasons for doing so. First, the cohesion of a collective player can be quite difficult to calculate in the conventional model. One must have data on the positions of each

individual member. This involves collecting roll call data or text data from the speeches or press releases of individuals, which is not possible if we use collective-level data such as party manifestos or government policy agendas. Even if these data are available, calculating the size and position of the collective's ideal point can be terribly complicated and labor-intensive.

A second complication in the Euclidean veto players model is the identification of the position of the status quo in policy space. The position of the status quo is highly determinate in calculating the winset, the major indicator of policy stability. If we wish to use empirical evidence to position the status quo, we must determine not only the appropriate data but the appropriate way of measuring the data. For example, we may wish to determine the position of the status quo from text data in the same manner as we determine the ideal position of political actors. However, texts appropriate to identifying the position of a status quo, such as relevant laws, are written in a language significantly different from the language used by parties to describe their policy positions. Therefore, such a comparison may be inappropriate. Another option might be to apply expert opinion, but then we must rely on a subjective determination of the position of the status quo in an otherwise empirically determined model.

Using a fuzzy approach to represent the preferences of veto players allows us to escape the complications of the conventional Euclidean model. Following the lead of Clark, Larson, Mordeson, Potter, and Wierman (2008), we represent an actor's preferences with a fuzzy number, which is defined by a core and a support. The core of a fuzzy number is the ideal position of the player. All policies within the core of a player's fuzzy preferences are assigned a utility value of $\alpha = 1$. The core of the fuzzy number is a subset (and usually a strict subset) of its support. The support of the fuzzy number is all non-zero values of α, or $\alpha > 0$. Any policy outside of the support of a player's fuzzy preferences receives a utility value of $\alpha = 0$, or completely not preferred by the player. Within the support of the fuzzy number, as a policy position approaches

the core of the player's preferences, its set inclusion in the player's preference increases and so does the player's utility if that policy is achieved.

In a continuous fuzzy number (depicted in Figure 1), the set inclusion of a policy increases monotonically as it approaches the core of the player's preferences. In this way, a public choice model in which players' preferences are represented by continuous fuzzy numbers behave in much the same way as in the Euclidean model. The difference is a model based on continuous fuzzy numbers allows for a "flat" space of indifference at the core of a player's preferences, a player's preferences can decrease at different rates in different directions from the core, and the support creates a bound for the player's preferences beyond which he no longer considers options acceptable. Hence, if the core of players fuzzy preferences are treated as single points, their continuous preferences are set to decrease monotonically at the same rate, and the support of their preferences set to infinity, then preferences would behave exactly the same way as in a Euclidean model. Representing players' preferences with fuzzy numbers makes it possible to release our models from these severe restrictions.

[Place Figure 1 here.]

We can further loosen the assumptions common to the Euclidean model by cutting players' fuzzy preferences into discrete bounded areas, or α-levels, in which all policy positions have the same set inclusion, and therefore the same utility value. Because all policies at the same α-level have the same set inclusion in the player's preferences, the player does not perceive any difference in the utility it derives from the policies and is therefore indifferent between them. A discrete fuzzy number (depicted in Figure 2) represents players' preferences in a stair-step fashion, in which players' preferences remain the same throughout a bounded area and then change at discrete thresholds. A player is indifferent between minor shifts within an α-level, but its utility increases or decreases as policy moves from one α-level to another.

[Place Figure 2 here.]

As a consequence, no player's preferences are represented as perfectly cohesive. Instead, each is represented with significant areas of indifference in which the player's preferences are ambiguous and not precise. This is particularly useful for representing the preferences of collective actors, which are imprecise even in the Euclidean model. Thus, we need not calculate the preferences of collective players based on data for individual players. Instead, we may use data at the level of the collective player and still represent the player's preferences as ambiguous.

Figure 3 depicts the preferences of two players that converge at the highest α-level (as well as at lower α-levels). The use of discrete fuzzy numbers makes it possible that the preferences of players are congruent at a number of regions along a policy continuum, even in single dimensional space. Coalitions to change the status quo form at the intersection of parties' fuzzy preferences.

[Place Figure 3 here.]

As is the case for the conventional model, the unanimity core comprises elements of the Pareto set, the set of policy alternatives for which a move away from makes at least one player worse off. No proposal to change these policies can succeed, as it will be vetoed by the player who prefers the status quo to the proposal. However, the fuzzy approach contains a significant caveat. Where no intersection of parties' fuzzy preference exists in the policy space, no coalition supporting a policy change is possible. It makes little sense for a political party to vote to pass a bill it absolutely dislikes. Thus, coalitions must form at the intersection of parties' fuzzy preferences at $\alpha > 0$ for all players. Players will not agree to any policy change beyond the bound of the support of their fuzzy preferences, even if the status quo is already outside the bounds of their support.

Figure 3 also demonstrates that individual indifference can induce indifference in collective choices. The player whose preferences are portrayed by the fuzzy number on the left, whom we will call player one, is indifferent between alternatives *a* and *b* ($\alpha = 1$). The other player, player two, prefers *b* ($\alpha = 1$) to *a* ($\alpha = .75$). Thus, player one can shift to alternative b, thereby increasing the utility to player one, without any perceived change in utility for herself. Parties will not resist an incremental policy change if the new policy has the same set inclusion within their preferences as the status quo.

In figure 3, all players' ideal set of alternatives (α-level = 1) intersect. In this case, the unanimity is confined to a singe region, the area of the intersection. When the policy preference of all players do not intersect at this level, multiple non-contiguous regions may be included in the Pareto set. Figure 4 demonstrates such a situation. Three players' preferences intersect at various utility levels (α-levels). In the case depicted, the Pareto set, or unanimity core is shaded..

[Place Figure 4 here.]

Players make the most gains in their utility with a policy move to a Pareto efficient position. (The reader is reminded that all alternatives in the unanimity core are Pareto efficient.) Therefore, policy change is more likely in the fuzzy public choice model the higher the set inclusion of the Pareto efficient elements in the players' references. In effect, the set inclusion of the Pareto set is an indicator of policy stability in the fuzzy model. In conventional veto players theory, the most important causes for policy stability are the number of veto players and the relative distance of their ideal points. This is related to the importance of Euclidean distance in the conventional veto players model. Because players prefer each incremental policy movement away from their own ideal point less, they are less likely to agree the further their preferences are from each other.

This is less important in a fuzzy model. The distance between players' preferences is only relevant insofar as it affects the likelihood of their preferences intersecting, particularly at high α-levels. The number of veto players is important in this regard as well. The more veto players in a game, the less likely that all of their preferences will intersect. However, if players' preferences are broad enough, or lack cohesion, intersection at a high α-level is possible no matter how many veto players and how distant their preferences. Hence, while the number of veto players and their distances from one another are important to the outcome of the fuzzy veto players game, the cohesion of the players' preferences is even more important in determining the set inclusion of their intersection, or whether they intersect at all.

Furthermore, because Euclidean distance no longer determines policy stability, *it is not necessary to identify the position of the status quo in order to determine policy stability in the fuzzy veto players model*. While the position of the status quo in the fuzzy model can give us more precise information about policy stability in the fuzzy veto players model, it is not required in order to predict policy stability in the political system. This is due to the fact that we can determine the size of the inverse winset[2] of the Pareto set without reference to a status quo. This differs greatly from the need to identify the winset of the status quo in the Euclidean model based on the intersection of players' indifference curves.

In what follows, we discuss the veto players in the Iraqi political system. We then derive fuzzy preference measures from party level text data using Wordfish. We conclude by considering the implications of these fuzzy preferences within our revised veto player model for the level of policy stability during the term of the first elected Iraqi Council of Representatives (COR).

[2] The inverse winset comprises all policy alternatives x_i that are majority defeated by a given policy alternative y.

Veto Players in the Iraqi Political System

The institutional players in the Iraqi legislative process are the Cabinet, the 275-member Council of Representatives (COR), and the Presidency Council. Members of the Cabinet have the power to propose legislation, however this power is not exclusive.[3] The Iraqi COR must approve of any policy change by simple majority. Article 138 of the Transitional Provisions in the Constitution establishes a three-member Presidency Council for the first electoral period. The Presidency Council must approve any legislation unanimously for it to be signed into law. If one member of the Presidency Council refuses the bill, then it is returned to the COR which then may amend the bill and pass it by absolute majority. If the bill is still rejected by the Presidency Council, then their decision can only be over-ridden by a three-fifths majority (165) of all members in the COR. Hence, the Presidency Council exercises a qualified veto.

Political parties constitute the plausible set of partisan veto players in the Iraqi political system. They fill portfolios in the Cabinet and organize voting coalitions in the COR. Furthermore, the members of the Presidency Council are members of parties as well. In effect, parties determine which legislation is introduced and passed. The political parties in the first Iraqi COR are listed in Table 1.

[Place Table 1 here.]

Not all of the parties in the Iraqi political system during the term of the first COR can be considered partisan veto players. A political party is a veto player only if it can stop any policy change from occurring. The political parties meeting this criterion are the nine parties in the government: the Supreme Islamic Council of Iraq (SICI), the Badr Organization, the Islamic Dawa Party, the Dawa Party (Tantheen), the Solidarity Block, the Kurdistan Alliance, the Kurdistan

[3] Article 77 Section 2 of the Iraqi Constitution grants members of the Cabinet the power to propose laws. Furthermore, Article 60 section 2 stipulates that laws may be presented by ten members of the COR.

Democratic Party (KDP), the Patriotic Union of Kurdistan (PUK), and the Kurdish Islamic Union (KIU).

Together these parties held 163 seats. At first glance, this appears to be far in excess of the 138 needed to assure passage of legislation. However, such a conclusion ignores the Presidency Council veto, which requires 165 votes to over-ride.

In order to gain the 165 votes to assure passage against the threat of a veto, the government coalition must add additional parties to its number. There are two strategies for doing so. The first is to capture the preferences of all three parties represented on the Presidency Council. A decisive coalition capable of co-opting the Presidency Council would have to include Jalal Talabani's party, the Patriotic Union of Kurdistan (PUK), Tariq al-Hashimi's party, the Iraqi Islamic Party (IIP), and Adel Abdul Mahdi's party, the Supreme Islamic Council of Iraq (SICI). In fact, SICI and PUK are also government parties. Thus, pursuing this strategy, the government would only need to secure the votes of the IIP, in which case it would have a 169 deputy majority. The second option available to the COR for dealing with the threat of a veto from the Presidency Council is to gain the support of small parties or independents.[4]

In either scenario, the nine government parties are a necessary component to the decisive legislative coalition. Without them, the government can not pass its legislative program. While the Prime Minister working with some subset of his Cabinet might be tempted to gain legislative approval without the support of one or more parties, the threat of a vote of no confidence makes this a highly unlikely maneuver. Article 61 Section 8 Part B of the Iraqi Constitution requires that the government retain the support of an absolute majority of the legislative body. In effect, even

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[4] The number of additional votes might well require the addition of moderate to large-size parties given the problem with absenteeism in the COR (Katzman 2007, 2008; International Herald Tribune 2007).

a relatively small coalition of government parties is empowered by its ability to threaten the dissolution of the Cabinet. From August 2007 to April 2008, when political deadlock was at its height in Iraq, the COR could have been dissolved by the withdrawal of a single member party.

Thus, we conclude that the nine parties with Cabinet portfolios are veto players in the first COR. They are necessary to any legislative coalition capable of passing legislation that is both supported by the government and able to over-ride a veto of the Presidential Council.

Constructing the Veto Player Model with Fuzzy Preferences

Using a single-dimensional veto players model mapping the fuzzy preferences of political parties, we demonstrate that a lack of policy agreement among the government parties explains why the first Iraqi COR experienced legislative gridlock. The potential for a Presidential Council requires the governing coalition to expand the number of parties in the legislative coalition to achieve the necessary qualified majority. As the size of the coalition increases, the likelihood that the preferences of the parties will intersect decreases, rendering the possibility for policy change less likely. Therefore, as political players attempt to build larger legislative coalitions, in order to ensure the ability to over-ride a veto, policy stability is likely to increase. The high level of party fragmentation in the first COR further complicates the task. Fragmentation means that the number of players necessary to form a decisive coalition is increased and the congruence between them is decreased, both of which contribute to a higher degree of policy stability.

Our model treats political parties as individual veto players. There are a number of reasons for doing so. First, following the lead of Tsebelis (2002, pp. 38-63), in most cases the number of party members is large enough to justify doing so. Second, in order to measure preferences of the players in the Iraqi political system, we codify party manifesto data. Since the preferences represented in party manifestos are those of a single party, not individual members,

we are in effect treating political parties as individual players. Third, there are no formal decision rules for policy choices within the party or such rules are not known. Without such information, it is better to simply treat collective players as disciplined; in other words, as individual players (Tsebelis 2002, pp.39-41). Finally, the issue of sheer complexity in the model comes into play. We are dealing with a highly fragmented party system. To add the preferences of each individual or the cohesion of each collective player would add complexity to the model that would leave it less elegant and parsimonious.

We use text data from Iraqi parties, rather than roll-call votes to estimate their policy positions. Given the newness of the Iraqi political institutions, official text releases from political parties are not yet widely disseminated. However, they can be found on-line at political parties' websites; and when not available, speeches and interviews delivered by party leaders can be found on media sites. There are other reasons besides availability for using text data. First of all, few votes have been cast by the Iraqi COR, making a roll-call dataset rather small and diminishing its accuracy. Second, there are a number of institutional, political, and strategic factors that may influence the way a legislator votes. Votes may not reflect players' sincere preferences, but may rather reflect their preferences as they are translated by the institutional and political constraints within which they are voting (Laver 2001). Third, there is a further causal problem inherent in using roll-call votes as inputs to describe the behavior of actors in political situations when it is that same political context within which the vote is a behavioral output (Laver 2001, p. 239). Finally, roll call data does not provide the same opportunities to extract fuzzy preference measures as does text data. Roll call data comes in a binary 'Yea or Nay' format (with 'Abstain' coded as either Missing or Nay) that is not amenable to deriving set inclusion. Text data on the other hand is based in language, which is naturally vague. Vagueness in language allows us to create a distribution of policy positions from which we can derive a fuzzy

policy position. From such a distribution, we can also determine set inclusion values. For these reasons, text data is much more attractive for a fuzzy analysis than roll call data.

One of the drawbacks of using text data to derive preference measures for political players is that text data rarely exists for each individual legislator. Therefore, researchers are forced to collect data for political parties and assume that parties are unitary, voting with perfect discipline. This assumption is only exacerbated in the Euclidean model, in which an assumption of perfect discipline also becomes an assumption of perfect cohesion within the preferences of collective actors. While collecting data at the party-level still forces us to assume that political parties are unitary, the fuzzy model allows us to assume that their preferences are not perfectly cohesive. This is a further benefit of the fuzzy model when working with text data at the party level.

We derive preference measures for Iraqi political parties from text data available on-line. Whenever possible, we collected text data published by the party on its official website. When this was not possible, we found text data from interviews and speeches given by party leaders published on media websites. Text data for four political parties were found on party websites (Dawa, KDP, PUK, INL).[5] Text data for the IIP, SICI, Fadhila, KA, INDF, Sadr, and UIA were found on media websites.[6]

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[5] Dawa website, http://www.islamicdawaparty.org/; KDP website, http://www.kdp.se/; PUK website, http://www.puk.org/, INL website; http://www.ayadallawi.com/index_files/Page364.htm

[6] IIP, SICI and Fadhila text data from interviews published by Media in Cooperation and Transition on the Niqash website; http://www.niqash.org/content.php?contentTypeID=36&lang=0 . An interview with Mish'an al-Sa'id, Diyala governorate regional representative of the Iraqi Front for National Dialogue, by RFI correspondent Salim Husayn in Ba'qubah on 7 November was found at http://rferl.org/featuresarticle/2005/11/7723407e-85ef-48f9-ad8c-0c794c69509e.html . Manifesto text was found for the Kurdistan Alliance (KA) at http://www.lawksalih.com/ . Manifesto text for the UIA was found at Juan Cole's blog; http://www.juancole.com/2004/12/platform-of-unitediraqi-alliance.html . Data for the Sadrist Movement (Sadr) was taken from a transcribed speech by Muqtada al-Sadr.

Whenever possible, we tried to collect data for political parties rather than electoral coalitions. However, this was not always possible. For example, Dawa, SICI, Fadhila, and Sadr made up 98 of the 128 seats controlled by their electoral coalition, the United Islamic Alliance (UIA). Of the thirty remaining seats, twenty were controlled by independents and ten by a small party the Solidarity Bloc. Rather than coding these thirty seats as missing data, we assumed that by joining the UIA they signaled that they agreed with the UIA policy platform, and therefore represented their preferences with a text released by the UIA. In such a case, the coalition text is really the primary text for the individual or political party, since they associate their vote with this coalition and do not present any other text of their own. In total, 169 seats are accounted for by party texts (Dawa, SICI, Fadhila, Sadr, IIP, PUK, KDP, KIU) and 71 by coalition texts (UIA, KA, INL, INDF).

We code the texts using Wordfish in R designed by Slapin and Proksch (2008) which uses words as text units to differentiate texts based on word frequencies. Wordfish is a scaling algorithm that determines text positions on a single dimension by analyzing word frequencies. It assumes that words are generated by a Poisson process, occurring over a fixed period time at an average rate independent of the time since the last event. Wordfish controls for the fact that some words are used more often than others and some authors write or talk more than others with both word and actor fixed effects. The resulting output includes the positions of the actors and the positions of the words that differentiated them along a single-dimension.

The texts varied significantly in length. The longest text had a word count of 2,986 (PUK), while the shortest had 116 words (UIA). The average word count for the texts was about 880. We extracted word frequencies from the texts using Yoshikoder in order to analyze them with Wordfish. Wordfish can assign infinite weight to words that appear in only one document, so all such words were removed, reducing the number of words analyzed from 2,381 to 859.

To derive fuzzy preferences from the Wordfish coding, we run the Wordfish bootstrap process in order to obtain a distribution of points projected by the analysis. The distribution includes the results of 500 reiterations of the Wordfish process. We then identify the mean of the distribution and cut the distribution into segments of ten-percent. We use the segments of the distribution to demarcate the α-levels of the discrete fuzzy numbers. The core of the fuzzy number is set at the twenty percent of the distribution about the mean. All policies within the core of a player's fuzzy preferences have a utility of $\alpha = 1.00$, or full set inclusion in the player's preferences. These are the player's ideal policies. The twenty percent of the distribution about the core is at a set inclusion of $\alpha = 0.75$ in the player's fuzzy preferences. This is the set of policies that the player prefers, but are not ideal. The twenty percent of the distribution about the .75 α-level is at a set inclusion of $\alpha = .5$. This is the set of policies that is neither preferred nor not preferred by the player. The twenty percent of the distribution about this α-level is at a set inclusion of $\alpha = .25$. This is the set of policies that the player likes better than nothing. However, they are more out of the set than in the set of the player's preferences. This is the point at which the player's preferences reach their bound. We set the support of the player's preferences at the eighty-percent of the distribution about the mean. Anything beyond the support of the player's fuzzy preferences has a set inclusion of $\alpha = 0$, absolutely not preferred by the player.

The result of this process is a single-dimensional landscape of fuzzy party preferences in the Iraqi political system. The single-dimensional space upon which the parties' preferences lie runs from -2.00 to +2.00 with 0.00 at the middle position. The most extreme positions are that of the Kurdistan Alliance (KA) on the left, with a mean at about -1.58, and the Sadrist Movement (Sadr) on the right, with a mean at about 1.35. The median party is the KDP with a mean at about 0.145 on the scale. The average position of each party's mean is just slightly to the right of 0.00 at about 0.0057. The average support of a party's fuzzy preferences is about 0.195 in width. The

average core is about 0.038 in width, with an average α-level about 0.1108 in width. This tells us that the parties' preferences are dispersed and narrow, indicating that intersection between parties' preferences may be rare and at a low set inclusion when present.

Policy Stability in the Iraqi Political System

Figure 5 depicts our single-dimensional fuzzy veto player model of the Iraqi political system. Twelve parties and coalitions are represented, each with a fuzzy preference profile. The parties' fuzzy preferences appear in a stair-step fashion. The flat areas are the various discrete α-levels; starting with the core at the top of the fuzzy number and descending to the .75, .5, .25, and ultimately the 0 α-level. Parties remain indifferent to changes within the bounds of the individual α-levels, but experience significant shifts in utility at the bounds of the α-level. The fuzzy numbers contain the eighty-percent of the distribution of points derived by the Wordfish bootstrap procedure, and the support of each party's preferences is at the boundary of the .25 α-level.

Policy change is only possible at Pareto efficient intersections of the fuzzy preferences of the parties in the Cabinet. The model of the Iraqi political system depicted in Figure 5 indicates that no Pareto element includes the preferences of all of the parties in the Cabinet.

[Place Figure 5 here.]

In fact, the preferences of government parties do not intersect at any level in the support of all of their fuzzy numbers (that is at a level $\alpha > 0$). The preferences of PUK, Dawa, and KDP do not intersect with any other parties. While the preferences of subsets of the government parties intersect at two points, neither of them unites a legislative majority. KA and KIU intersect, but the two parties have only eighteen deputies between them. There is also a distinct cluster of four parties and one coalition whose preferences intersect right of center that includes

Fadhila, the Supreme Islamic Council of Iraq (SICI), the Iraqi Islamic Party (IIP), the Iraqi National Dialogue Front (INDF), and the United Iraqi Alliance (UIA). Between them, they have only 110 deputies. Moreover, while two of the presidential parties – SICI and IIP - are included in this group, most of the Cabinet parties are not: Islamic Dawa Party, Dawa Party (Tantheen), Kurdistan Alliance (KA), Kurdistan Democratic Party (KDP), Patriotic Union of Kurdistan (PUK), and Kurdistan Islamic Union (KIU).

Table 2 presents the elements of the Pareto set for the model of the Iraqi political system in Figure 5. Each column lists the set inclusion of each Pareto element in the parties' preferences. As can be seen, the Pareto elements resulting from intersection of the parties clustered right of center on the single dimension have a high set inclusion for those parties. However, these same elements have a set inclusion for $\alpha = 0$ for every other party in the model. The result is a Pareto set of elements with a very low set inclusion in the preferences of the parties in the Iraqi COR. Hence, the government can not agree on policy change; and any attempt to push legislation through the COR would threaten the Cabinet's survival.

[Place Table 2 here.]

Figure 5 further demonstrates that there is little intersection between the fuzzy preferences of parties in the Iraqi political system and that parties' preferences are generally quite distant from each other. In effect, there is no majority coalition uniting parties in or out of the government that is capable of passing legislation. This is due to extreme party fragmentation in the Iraqi political system. The average legislative weight of a party in the Iraqi COR is 20 seats. The party with the highest legislative weight is SICI with 30 seats, and this is only matched by the remaining members of the electoral coalition UIA made up of 30 independents and members of small parties. The smallest party is the Kurdish Islamic Union with five seats. Of the fifteen potential coalitions forming at the intersection of parties' preferences, only five have the support

of even a simple majority of the 138 seat quorum. Moreover, these intersections are outside the support of a majority of the parties in the COR, suggesting that a quorum could easily be boycotted. Therefore, it would be impossible for a coalition supporting these policy positions to pass legislation. There is no possibility for policy change during the first term of the Iraqi COR.

Discussion and Conclusion

The results of our fuzzy veto player model argue that the formation of decisive legislative coalitions in the Iraqi political system along a single left-right dimension is not possible. Parties' preferences do not intersect sufficiently to gain support for a single policy position. Instead, party fragmentation and polarity result in political gridlock in Iraq.

Because parties cannot pass legislation along a single dimension, they must form coalitions based on other considerations. Such considerations might include pay-offs and log-rolling. Parties could develop non-policy incentives for coming to agreements, such as log-rolling or division of the perks of office. These kinds of considerations are not captured in our public choice model.

Another option for parties in a fragmented and polarized system is to change the heresthetics (Riker 1986) of the decision-making process; that is, to change the dimensionality of the decision game. In a single dimension, there are substantial gulfs between the preferences of political parties. However, in a multidimensional model, the intersections of players' fuzzy preferences may change. This depends on the whether the issue dimensions are separable or non-separable. Euclidean models assume that issue dimensions are separable; that is, a political actor's preferences on one issue dimension have no effect on her preferences on the other. The assumption of separable issue dimensions is necessary in Euclidean models, because multidimensional models with non-separable dimensions pervert the shape of the indifference

curves so they are no longer circular but elliptical. The effects of non-separable issue dimensions on the shape of Euclidean indifference curves induces complex cycling problems into conventional public choice models.

In contrast, the fuzzy model can cope with non-separable issue dimensions. This can be extremely useful for analyzing decision-making in a multidimensional model. Our model of the Iraqi party system in which there is little intersection between party systems might conceivably result in some degree of intersection in multi-dimensional space with separable issue dimensions. The likelihood of doing so increases if the issue dimensions are non-separable. However, this depends on the choices made by parties, not modelers; and we have no evidence that any such efforts have been undertaken in the Iraqi political system, at least not yet. The political gridlock marking the term of the first COR suggests as much.

Our analysis of the first Iraqi COR warns us of the need to ensure that policy change can occur. If policy change is too difficult, democratically-elected lawmakers may be rendered ineffectual, leading to a breakdown of the democratic process. Such a breakdown would be a tragedy for a newly born democracy that is still on the brink of political violence. The best way to avoid this is to reduce political gridlock. The most serious causes of political gridlock in Iraq are extreme party fragmentation and polarization. This can be overcome by a reform of the electoral system. Because the Iraqi electoral system is based on proportional representation, the electoral threshold, the percent of the vote a party must win to receive seats in the legislature, is especially important. The Iraqi electoral system currently employs a so-called "natural" threshold that benefits smaller parties by disproportionately allocating seats to parties with small electoral support.

The political gridlock caused by party fragmentation is further exacerbated by institutional roadblocks in the legislative process, such as the Presidency Council. The restriction

of the Presidency Council's veto expands the size of the coalition necessary to enact legislation. Without this requirement, smaller decisive coalitions would be possible, facilitating policy change.

However, a careful balance must be struck between political gridlock and consensus. Policy change should not become too easy. Some degree of party fragmentation and institutional roadblocks necessitate coalition-building to achieve policy change, which forces consensus upon lawmakers. This consensus may keep conflict within the bounds of peaceful democratic institutions. Democratic institutions that do not require such consensus may lead to the disenfranchisement of a group that would turn to violence to pursue its interests.

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Figure 1 Continuous Fuzzy Number Representing Monotonically Decreasing Preference Utilities

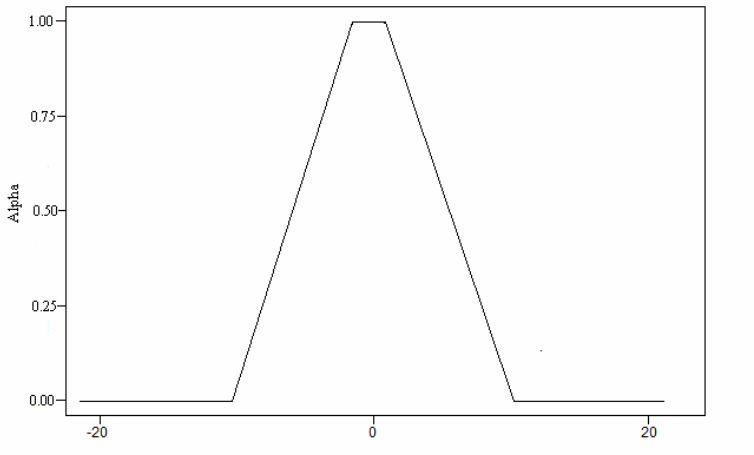


Figure 2 Discrete Fuzzy Number Representing Ordinal Preference Utilities with Large Areas of Indifference

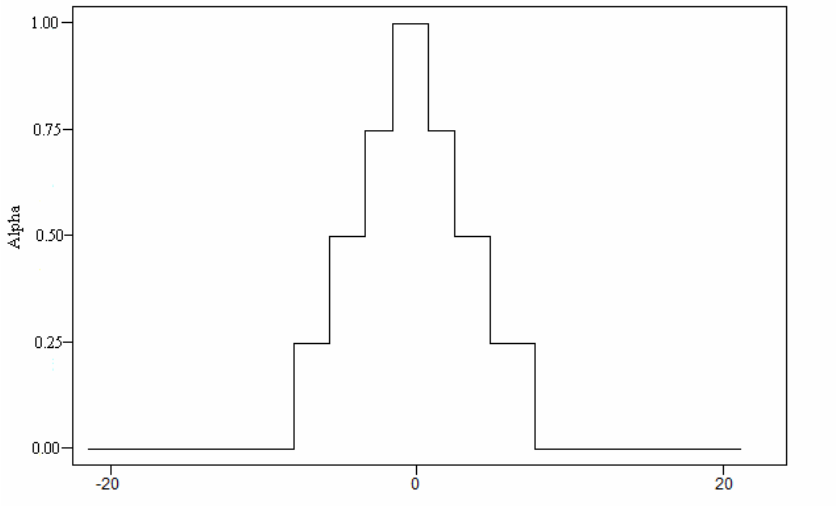


Figure 3 Two Discrete Fuzzy Preference Profiles Intersecting at their Cores (Alpha = 1.00)

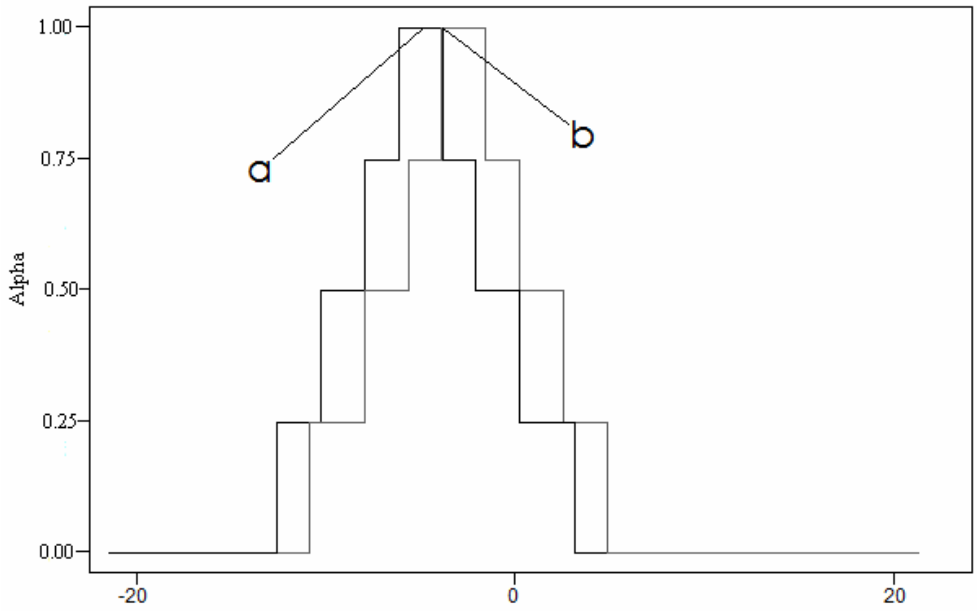


Figure 4 Equally-Weighted Fuzzy Preference Profiles with Highlighted Pareto Set

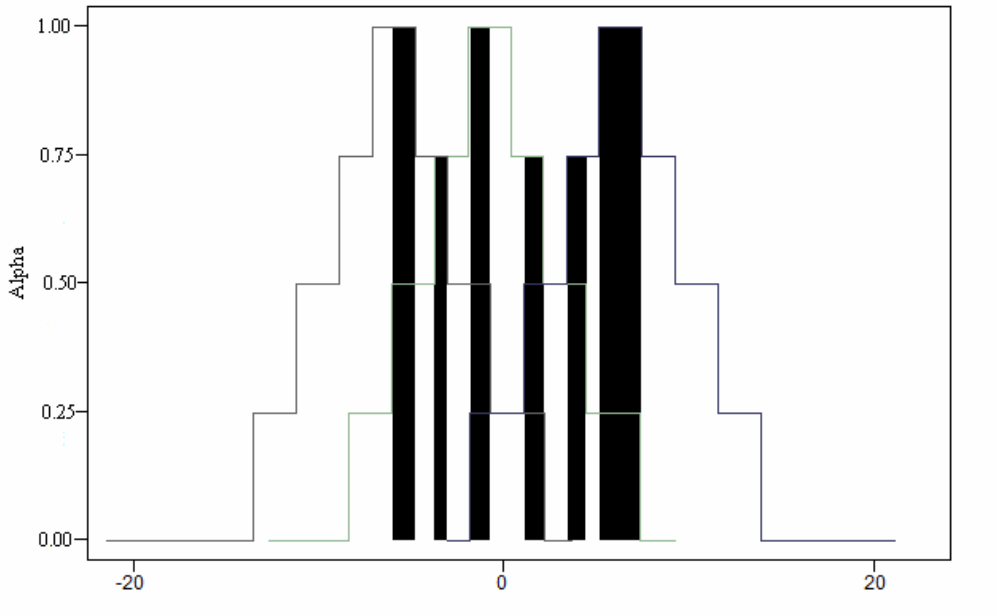
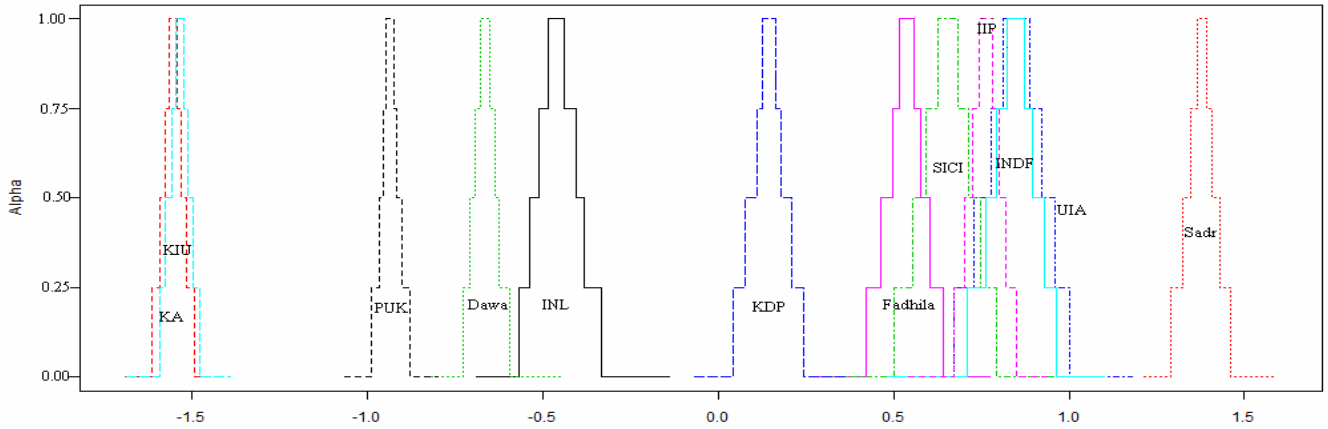


Figure 5: A Fuzzy Veto Players Model of the Iraqi Party System



Deputies are included under the party or bloc noted in Table 1.

Table 1 Iraqi Electoral Coalitions and Political Parties

Electoral Bloc	Party	Abbreviation	Number of Seats	Party or Bloc*
United Iraqi Alliance		UIA		
	Supreme Islamic Council of Iraq	SICI	15	SICI
	Badr Organization		15	SICI
	Islamic Dawa Party	Dawa	12	Dawa
	Dawa Party/Tantheen		13	Dawa
	Solidarity Block		10	UIA
	UIA Independents		20	UIA
	Sadrist Movement	Sadr	28	Sadr
	Fadhila	Fadhila	15	Fadhila
Kurdistan Alliance		KA		
	Kurdistan Democratic Party	KDP	23	KDP
	Patriotic Union of Kurdistan	PUK	17	PUK
	Kurdish Socialist Party		3	KA
	Iraqi Turkmen Brotherhood		2	KA
	Chaldean Democratic Union		1	KA
	KA Independents		7	KA
Iraqi Accord Front		IAF		
	Iraqi Islamic Party	IIP	26	IIP
	Iraqi People's Conference		5	Missing
	National Dialogue Council		5	Missing
	IAF Independents		4	Missing
Iraqi National List		INL		
	Iraqi National Accord		2	INL
	Iraqi Communist party		1	INL
	The Iraqis		1	INL
	Assembly of Independent Democrats		1	INL
	INL Independents		8	INL
	Missing Party Affiliation		6	INL
Iraqi National Dialogue Front		INDF		INDF
	National Iraqi Front		5	INDF
	National Front for the Unity of Iraq		3	INDF
	Christian Democratic Party		1	INDF
Iraqi Arab Independent Bloc			8	Missing

Others				
	Kurdish Islamic Union	KIU	5	KIU
	Upholders of the Message		2	Missing
	Reconciliation and Liberation Bloc		1	Missing
	National Rafidain List		1	Missing
	Iraqi Turkmen Front		1	Missing
	Mithal Al Aloosi List		1	Missing
	Yazidi Movement for Reform and Progress		1	Missing
	Independents		3	Missing
	Missing Party Affiliation		2	Missing

*Deputies are included in the analysis under the party or bloc noted. If no manifesto was available for the party or bloc, we excluded it from the analysis. These parties and blocs are identified as "missing" in the table.

Table 2 Pareto Efficient Elements in the Iraqi Political Game*

Pareto	**KA**	**KIU**	**PUK**	**Dawa**	INL	**KDP**	Fadh	**SICI**	IIP	INDF	**UIA**	Sadr
1	**1.00**	**1.00**	**0.00**	**0.00**	0.00	**0.00**	0.00	**0.00**	0.00	0.00	**0.00**	0.00
2	**0.00**	**0.00**	**1.00**	**0.00**	0.00	**0.00**	0.00	**0.00**	0.00	0.00	**0.00**	0.00
3	**0.00**	**0.00**	**0.00**	**1.00**	0.00	**0.00**	0.00	**0.00**	0.00	0.00	**0.00**	0.00
4	**0.00**	**0.00**	**0.00**	**0.00**	1.00	**0.00**	0.00	**0.00**	0.00	0.00	**0.00**	0.00
5	**0.00**	**0.00**	**0.00**	**0.00**	0.00	**1.00**	0.00	**0.00**	0.00	0.00	**0.00**	0.00
6	**0.00**	**0.00**	**0.00**	**0.00**	0.00	**0.00**	1.00	**0.50**	0.00	0.00	**0.00**	0.00
7	**0.00**	**0.00**	**0.00**	**0.00**	0.00	**0.00**	0.25	**1.00**	0.00	0.00	**0.00**	0.00
8	**0.00**	**0.00**	**0.00**	**0.00**	0.00	**0.00**	0.00	**1.00**	0.25	0.00	**0.25**	0.00
9	**0.00**	**0.00**	**0.00**	**0.00**	0.00	**0.00**	0.00	**0.75**	0.50	0.25	**0.25**	0.00
10	**0.00**	**0.00**	**0.00**	**0.00**	0.00	**0.00**	0.00	**0.50**	1.00	0.25	**0.50**	0.00
11	**0.00**	**0.00**	**0.00**	**0.00**	0.00	**0.00**	0.00	**0.25**	1.00	0.50	**0.75**	0.00
12	**0.00**	**0.00**	**0.00**	**0.00**	0.00	**0.00**	0.00	**0.25**	0.75	0.75	**0.75**	0.00
13	**0.00**	**0.00**	**0.00**	**0.00**	0.00	**0.00**	0.00	**0.00**	0.50	0.75	**1.00**	0.00
14	**0.00**	**0.00**	**0.00**	**0.00**	0.00	**0.00**	0.00	**0.00**	0.25	1.00	**1.00**	0.00
15	**0.00**	**0.00**	**0.00**	**0.00**	0.00	**0.00**	0.00	**0.00**	0.00	0.00	**0.00**	1.00

*Government parties are bold highlighted.