

Assessing policy stability in Iraq: a fuzzy approach to modeling preferences

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Abstract The first Council of Representatives elected under the new Iraqi Constitution was unable to pass legislation required to achieve the political benchmarks set by the government. We argue that the exercise of a qualified veto by the three-member Presidency Council essentially required near unanimity among the nine parties of the governing coalition. Given the policy positions of these parties, unanimity was not possible. Our analysis makes use of a fuzzy veto players model. The placement of the government parties along a single dimension based on fuzzy preference measures derived from party text data reveals no common area of agreement.

Keywords Fuzzy set theory · Fuzzy spatial models · Veto players theory · Government formation process · Iraq

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 impeded the COR from passing 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

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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 high degree of fragmentation of the Iraqi party system. As the number of parties in a political system increases, their individual legislative weights decrease, making it more 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 also permits us to make use of a single dimensional model. This seems justifiable given the degree to which sectarian 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 textual 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 altogether 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 effect 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.

1 Incorporating fuzzy preferences in veto players theory

Tsebelis (1995, 2002: 19) defines veto players as political actors that must approve any policy change. He argues that policy stability is dependent on the number, congruence, and cohesion of such institutional actors in a political system. Political gridlock, such as that described in the Iraqi political system, presents a clear example of high policy stability.

In the conventional fashion, veto players theory assumes that each player's preferences are single-peaked and Euclidean. Alternatives lying within the convex hull defined by the spatial positioning of the veto players' ideal points are in the unanimity core. Any attempt to change a policy within the unanimity core will be rejected by at least one of the veto players. Hence, as the size of the unanimity core increases, so does policy stability.

We modify the conventional veto players theory by incorporating fuzzy preferences. Following the lead of Clark et al. (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

Fig. 1 Continuous fuzzy number representing monotonically decreasing preference utilities

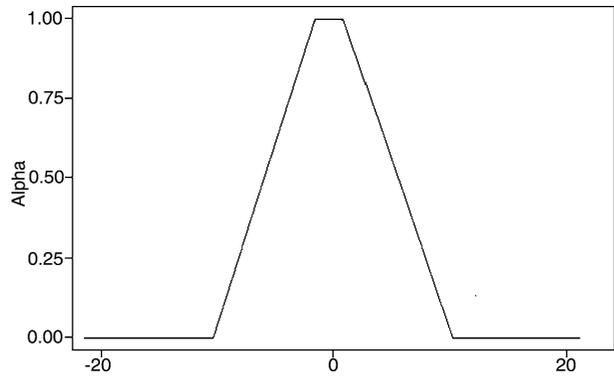
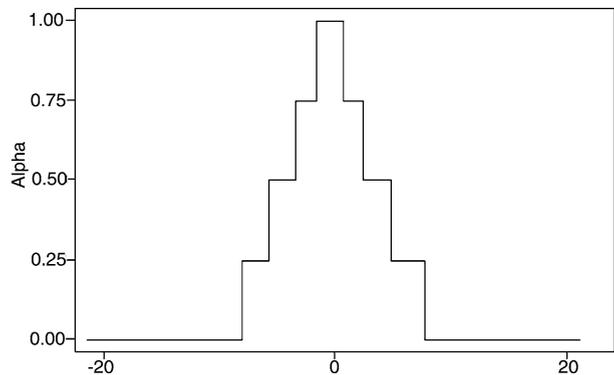


Fig. 2 Discrete fuzzy number representing ordinal preference utilities with large areas of indifference



position of the player. All policies within the core of a player's fuzzy preferences are assigned a utility value of $\alpha = 1$. 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 absolutely not preferred by the player.

In a continuous fuzzy number (depicted in Fig. 1), the set inclusion of a policy increases monotonically as it approaches the core of the player's preferences. A public choice model in which players' preferences are represented by continuous fuzzy numbers differs in three major ways from the Euclidean model. First, a continuous fuzzy number allows for a "flat" space of indifference at the core of a player's preferences. Second, a player's preferences can decrease at different rates in different directions from the core. Third, the support establishes a "preference horizon," a boundary beyond which a player no longer considers options acceptable.

A discrete fuzzy number (depicted in Fig. 2) permits us to 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. A player is indifferent between minor shifts within an α -level, but his/her utility increases or decreases as policy moves from one α -level to another.¹

¹Our fuzzy preferences are quasi-concave. While they need not be represented by a transitive binary relation, we do so in this paper for the simple reason that we cannot think of a situation in which political actors would hold non-transitive preferences in single-dimensional policy space. In either case, Dutta (1987) and Richard-

Fig. 3 Pareto efficient tendency in the fuzzy model

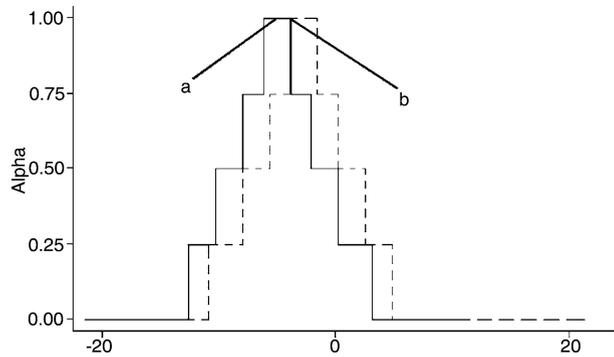


Figure 3 depicts the preferences of two players that converge at the highest α -level (as well as at lower α -levels). The use of discrete fuzzy numbers opens the possibility that the preferences of players are congruent at a number of regions along a policy continuum, even in single dimensional space. Coalitions to change the status quo must form within the intersection of parties' fuzzy preferences (at $\alpha > 0$).

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 ($\alpha = 0.75$). Player one can shift to alternative b , thereby increasing the utility of player two, without any perceived change in utility for him/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.

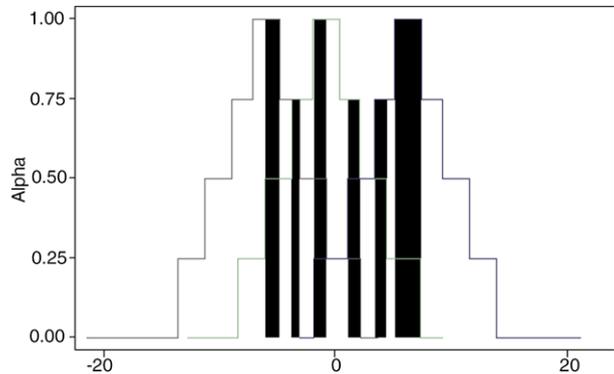
As is the case for the conventional model, the unanimity core comprises elements of the Pareto set, the set of policy alternatives, a movement away from which makes at least one player worse off. No proposal to change these policies can succeed, as it will be vetoed by the player who prefers the status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

In Fig. 3, all players' ideal sets of alternatives (α -level = 1) intersect. In this case, the unanimity core is confined to a single region, the area of the intersection. When the policy preferences 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.

The higher the set inclusion of the Pareto efficient elements in the players' preferences, the greater the likelihood of policy change in the fuzzy public choice model. In effect, the set inclusion of the Pareto set is an indicator of policy stability. Furthermore, in contrast to the conventional Euclidean model, the distances between players' ideal points is less important in the fuzzy veto players model. It is only relevant insofar as it affects the likelihood of preferences intersecting, particularly at high α -levels. If players' preferences are broad

son (1998) have demonstrated that Arrow's Impossibility Theorem does not hold under some definitions of fuzzy transitivity.

Fig. 4 Equally-weighted fuzzy preference profiles with highlighted Pareto set



enough, intersection at a high α -level is possible no matter how many veto players and how distant their preferences.

In what follows, we discuss the veto players in the Iraqi political system. We then derive fuzzy preference measures from party-level textual 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 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; this power is not exclusive, however.² The Iraqi COR must approve of any policy change by simple majority. Article 138 of the Transitional Provisions in the Constitution (Iraqi Constitution 2005) 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, 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 its decision can only be overridden by a three-fifths majority (165) of all members in the COR. Hence, the Presidency Council exercises a qualified veto.³

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.

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

²Article 80 Section 2 of the Iraqi Constitution (Iraqi Constitution 2005) 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.

³The Presidency Council was part of a temporary provisional clause in the constitution, but was extended due to delays in the formation of the Iraqi government.

Table 1 Iraqi electoral coalitions and political parties

Electoral Bloc	Party	Abbreviation	Number of Seats	Party or Bloc ^a
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
	Sadr Movement	Sadr	28	Sadr
Kurdistan Alliance	Fadhila	Fadhila	15	Fadhila
		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	

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

Table 1 (Continued)

Electoral Bloc	Party	Abbreviation	Number of Seats	Party or Bloc ^a
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

^aDeputies 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

All nine parties are necessary for forming a decisive legislative coalition. Without them, the government cannot 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 a relatively small party in the government coalition 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.

While the nine government parties are necessary to any decisive coalition, they are not sufficient. Together they hold 163 legislative seats, which is in excess of the 138 needed to assure passage of legislation but short of the 165 votes needed to override a Presidency Council veto. There are two strategies for assuring against the threat of a veto by the Presidency Council. Both involve adding parties to the government coalition majority in the COR. The first strategy is to gain the support of a sufficient number of small parties or independents.⁴ The second 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 need only to secure the votes of the IIP, in which case it would have a 169 deputy majority.

No matter which of these two strategies the government might pursue, however, the nine government parties constitute the common core of every decisive legislative coalition. Without them, no legislation can pass muster. Thus, we conclude that the nine parties with Cabinet portfolios are the veto players in the first COR. They are necessary to any legislative

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

coalition capable of passing legislation that is both supported by the government and able to override a veto of the Presidency Council.

3 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. 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: 38–63), in most cases the number of party members is large enough to justify representing the party's position as a single point in the policy space. 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 either no formal decision rules for policy choices within the Iraqi parties or these rules are not known. Without such information, it is better to simply treat collective players as disciplined, in other words, as individual players (2002: 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 estimate the policy positions of Iraqi parties during the period of the first COR using party platforms found on line at their respective websites. When not available, we use speeches and interviews delivered by party leaders found on media sites. The use of party manifestos to determine policy positions has been much discussed. We follow Laver (2001) in arguing that other methods for fixing party preferences are less likely to be unbiased representations of the party's positions on issues. For example, both roll-call votes and expert opinions likely will reflect the strategic maneuvers of parties at a given point in time. Roll-call votes, in particular, are subject to institutional and contextual political factors at the time of the vote. As Laver (2001: 239) contends, there is an inherent problem 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. Moreover, our use of fuzzy numbers to represent party positions incorporates a preference horizon, a region in the policy space where a party finds any policy abhorrent and, therefore, no compromise is possible. In effect, the intersections of these fuzzy numbers necessarily limit the region within which strategic voting can take place. As we shall demonstrate, this region in the Iraqi political system is insufficient to permit policy change.

There are two practical reasons as well for relying on party documents to estimate their policy positions. First, few votes were cast by the first Iraqi COR, making a roll-call dataset rather small and reducing the reliability of any estimates made on the basis of votes. Second, 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. Textual data on the other hand is based in language. The imprecision and 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, textual data is much more attractive for a fuzzy analysis than roll-call voting.

Whenever possible, we collected textual data published by the party on its official website. When this was not possible, we found textual data from interviews and speeches given

by party leaders published on media websites. Textual data were available on party websites for Dawa (Dawa website 2008), KDP (KDP website 2008), PUK (PUK website 2008), and INL (INL website 2008). We used textual data on media websites for the IIP, SICI, Fadhila,⁵ KA (Kurdistan Alliance 2008), INDF,⁶ Sadr (Muqtada al-Sadr 2006), and UIA (UIA manifesto 2008).

We tried to use the manifestos of political parties rather than those for electoral coalitions. However, this was not always possible. For example, Dawa, SICI, Fadhila, and Sadr held 98 of the 128 seats controlled by their electoral coalition, the United Islamic Alliance (UIA). Of the 30 remaining seats, 20 were controlled by independents and ten by a small party the Solidarity Bloc. Rather than coding these 30 seats as missing data, we assumed that joining the UIA signaled agreement with the UIA policy platform, and their preferences therefore were consistent with text released by the UIA. In such a case, the coalition's text is really the primary text for the individual or political party, since they associate their vote with this coalition and do not produce any 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.

Benoit et al. (2009b) contend that language is inherently vague. Thus, an author may not represent his preferences “precisely,” and any attempt to derive the preferences of a political actor from a political text will be subject to random error. Their argument rests on the twin assumptions that the author's actual policy position is a single precise point in policy space and that the text is intended to communicate that single precise point in the policy space. Our fuzzy approach rejects both assumptions.

We use the Wordfish bootstrap process in order to obtain a distribution of points projected by the analysis. Instead of viewing party texts as subject to random error, we see them as subject to human uncertainty rooted in indifference over broad areas of the policy space. Furthermore, rather than assuming that political actors have precise policy positions that they communicate with error, we conceive of actor's preferences as vague and communicated accurately. Thus, instead of measuring error, the distribution represents degrees of indifference.

⁵Interviews with IIP, SICI and Fadhila published by Media in Cooperation and Transition (2008). Niqash website. <http://www.niqash.org/content.php?contentTypeID=36&lang=0>. Accessed 8 March 2008.

⁶An interview with Mish'an al-Sa'id, Diyala governorate regional representative of the Iraqi Front for National Dialogue (2008). <http://rferl.org/featuresarticle/2005/11/7723407e-85ef-48f9-ad8c-0c794c69509e.html>. Accessed 8 March 2008.

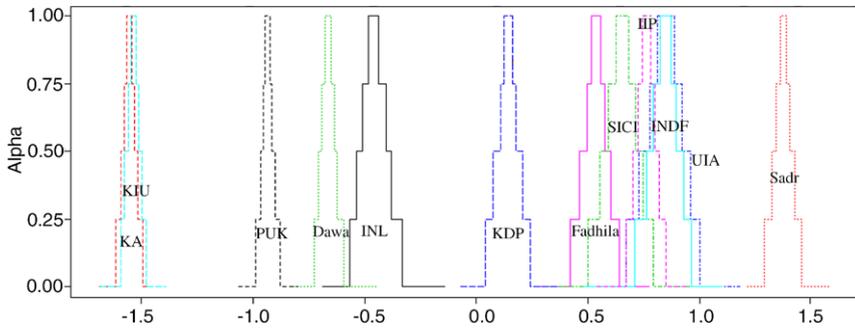


Fig. 5 Fuzzy veto players model of the Iraqi party system

The distribution includes the results of 500 reiterations of the Wordfish process. We cut the distribution into segments of 10% about the mean. The resulting segments demarcate the α -levels of the discrete fuzzy numbers. The core of the fuzzy number is set at 20% 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 20% 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 is not ideal. The 20% of the distribution about the 0.75 α -level is at a set inclusion of $\alpha = 0.5$. This is the set of policies that is neither preferred nor not preferred by the player. The 20% of the distribution about this α -level is at a set inclusion of $\alpha = 0.25$. 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 80% 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, at Fig. 5, is a single-dimensional landscape of fuzzy party preferences in the Iraqi political system. Twelve parties and coalitions are represented, each with a fuzzy preference profile. The parties' preferences are represented by discrete fuzzy numbers. The flat areas are the various discrete α -levels; starting with the core at the top of the fuzzy number and descending to the 0.75, 0.5, 0.25 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 0.25 α -level.

4 Policy stability in the Iraqi political system

The single-dimensional space on which the parties' preferences lie runs from -2.00 to $+2.00$ with 0.00 at the middle position and is depicted at Fig. 5. 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 indicates that the parties' preferences are dispersed and narrow; the intersection between parties' preferences may be rare or at a low set inclusion level.

The distribution of the fuzzy numbers largely accords with a qualitative assessment of the Iraqi party system. The Sadrist Movement is in an extreme position. With a mean of 1.35, it is to the other side of the party spectrum from the Kurdish parties, in particular the Kurdistan Alliance (KA), with a mean at about -1.58 . Moreover, most of the parties of the United Iraqi Alliance (UIA) electoral coalition are clustered together. Furthermore, they are closer to the Sadrist Movement than to the Kurdish parties. Finally, Dawa is at a distance from both the Sadrist Movement and the UIA.

Policy change is possible only at Pareto efficient intersections of the fuzzy preferences of the parties in the Cabinet. The model of the Iraqi political system depicted in Fig. 5 indicates that no Pareto element includes the preferences of all Cabinet parties. 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 comprises a legislative majority. KA and KIU intersect, but the two parties have only 18 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 Fig. 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,

Table 2 Pareto efficient elements in the Iraqi political game^a

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

^aGovernment parties are bold highlighted

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 cannot agree on policy change; and any attempt to push legislation through the COR would threaten the Cabinet's survival.

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 one another. 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 largest legislative weight is SICI with 30 seats, and this is matched only 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 15 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.

Our analysis thus far argues that there is no possibility for policy change during the first term of the Iraqi COR. We conduct a robustness test of these results by conducting a simulation of random variations in party preferences. The simulation incorporates error in the fuzzy preferences and then reconsiders the possibility of policy change.

The Wordfish-generated estimates of fuzzy party preferences consist of two parameters: the mean and width of the party's policy position. Let μ_i be the mean of the fuzzy party preference, where $i \in N$, a set of political actors. Let each fuzzy number have a width, σ_i , based on the standard deviation of the Wordfish simulation. We vary values for these two parameters to simulate different party system election environments to determine the probability of policy change.

In the simulated election environments, let μ_{ij} denote the mean of party i in simulation j , let σ_{ij} denote the preference standard deviation of party i in simulation j , and let X denote the policy space in single-dimensional Euclidean space. Thus, μ_{ij} and σ_{ij} are *simulated* parameters that have some predetermined relationship from the observed preferences. We draw μ_{ij} from a uniform distribution over the support of a party's fuzzy preference. Since the support of fuzzy preferences includes any policy within a player's 0.25 α -level, we allow the simulated mean to randomly take any value that the party finds acceptable given the fuzzy preference number generated by Wordfish. Formally, $\mu_{ij} = U(\min(\text{supp}_i(X)), \max(\text{supp}_i(X)))$, where $\text{supp} = \alpha > 0$. Furthermore, we specify $\sigma_{ij} = c \times (\sigma_i)$, where $c > 0$. We vary c from 0.5 to 4.5 in intervals of 0.5 to demonstrate the degree of preference divergence in the Iraqi party system.

Using the procedure outlined above, we replicate the original analysis. We also consider the validity of our procedure by comparing the results with those for two European parliamentary elections, Italy 1996 and France 2002 (Benoit et al. 2009a). The Italian parliamentary elections involve a number of parties similar to the Iraqi elections, $|N| = 11$. We expect that the results will predict that majority parliamentary voting coalitions are more likely in the Italian and French parliaments than in their Iraqi counterpart.

Table 3 reports the results of our simulations. We report the percentage of 10,000 simulated election environments in which there exists a majority coalition for each election by a given value of $\sigma_{ij} = c \times (\sigma_i)$. As before, a majority coalition for policy change exists if there is sufficient overlap in party preferences where the intersecting parties control a majority of the legislative votes.

Table 3 A comparison of the percentage of simulations for which a policy change coalition is possible for different election environments

Election System	0.5σ	1σ	1.5σ	2σ	2.5σ	3σ	3.5σ	4σ	4.5σ
Iraq 2005	0.0	0.0	0.0	0.0	0.0	0.7	19.6	67.8	97.8
Italy 2006	2.4	29.6	65.8	95.3	100	100	100	100	100
France 2002	81.6	99.6	100	100	100	100	100	100	100

As we expected, the results demonstrate the difficulty of policy change in the Iraqi COR. The introduction of error into the mean placement of party preferences does not increase the likelihood of policy change. Even when we widen the preferences of each Iraqi political party, majority coalitions do not form to any substantial degree until $\sigma_{ij} = 3.5$, indicating that the simulation increased party preferences to 3.5 times their original width. These results stand in stark contrast to those for Italy and France. In Italy, the percent of environments with majority coalitions exceeds 50% when $\sigma_{ij} = 1.5$, and $\sigma_{ij} = 0.5$ in France.

5 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. Our conclusion is strengthened by the results of the robustness tests, which also lend validity to our method for estimating fuzzy party preferences.

Because parties cannot pass legislation along a single dimension, they must form coalitions based on other considerations. Such considerations might include payoffs and logrolling. Parties could develop non-policy incentives for reaching agreements, such as dividing 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, together with issue-by-issue voting, 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 positions, might conceivably result in some degree of intersection in multi-dimensional space with separable issue dimensions.

The likelihood of that outcome 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 political process. Such a breakdown would be a tragedy for a newly born democracy that remains 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 percentage 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 them.

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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