WILL SYRIAN CASE END WITH CONFLICT?

A GAME THEORETICAL APPROACH

Associate Professor E.Muhsin DOGAN*

Atatürk University

PhD Candidate Asli Cansin DOKER**

Erzincan University

Abstract

Syrian political issue continues being one of crucial discussion and cruellest example of modern times humanitarian aggression. There are many scenarios on this; however, it can be observed those still cannot have positive implications on this case. In game theoretical approach, if effective game can be drawn with key assumptions and rules, game will not end with conflict but this situation centres on not only chosen players but determining type of players correctly. It will be discussed that with determining type of players and drawing possible actions and strategies have been tried to analyse effective game and solutions in bargaining game aspects. The analysis will be start with a two person non cooperative game with assuming both parties will receive perfect information and players will be US president and Syrian president. Additionally, there are several examples of bargaining game applications about political conflicts which are Afghanistan, Yugoslavian cases, Cyprus conflict, case relatively, it can be said that game theory is playing important role on international political economics. Another implication of study will highlight that how mediator should join and play role in bargaining process because of assuming lack of information in real politic, mediator will be more important.

Key words: political economy, bargaining process, game theory.

JEL Classifications: C78, C70, F5

*emdogan@atauni.edu.tr
**cansindoker@gmail.com

This paper is based on Doker's MSc Economics Dissertation which is "Mediated Bargaining game with incomplete information"(2011)

1. Introduction

Middle East has been always a crucial issue in many aspects. This area of the world has been subjected many wars and conflict, briefly because of their natural resources such as oil, gas and so on. In this study, it will be discussed whether Syrian crisis will end conflict or not regarding game theoretical approach. It is clear that after occupation of Iraq and also lately Arab Spring waves has been affecting all area. The society who lives in this part of the world demands democracy and human rights in their country. In detail, Syrian civil war has officially started 15 March 2011 with opponents of Bashar al-Assad's government in Aleppo. Opponents of al-Assad's regime demands can be drawn as democratic reforms and they started demonstrations for this aim. However, al-Assad government has used its official guards which can be called Syrian Armed Forces. There are many allied army group with in this war such as Hezbollah, Al-Abbas etc. The main ally of the Syrian regime has been Iran (it is understandable under isolation for Iran) with Basij and Quds Force. Free Syrian Army, Al-Nusra is placed in opposition. Moreover, many international organizations has been tried to find place for the peace with plans and incentives. In 2012 and 2013 Russian government proposed talks to two parties in this game but it didn't succeed. Another important international action which was called Arab leauges launched from UN officer Kofi Annan. This plan was centred on basically incentives from strong countries such as Russia and China. Arab League peace plans withdrew January in 2012. In 2014, Geneva II Middle East Peace conference was organized by United Nations(UN) targeting to give disussing opportunity to Syrian parties. However, this conference ended with conflict because of the parties unacceptable strategies on the table.

This paper examines a model of a bargaining game between two players and using a mediator with incomplete information. Economics and many social sciences have used game theory applications; the bargaining game is the most common game in politics and economics situations and it is still unclear in the literature of the role of mediators in the bargaining process. With either complete or incomplete information bargaining processes, bargaining has some threats which can be fixed or variable, and the expectations of players has important effects on the bargaining. In this paper, mediated bargaining will be discussed, firstly the game theoretical aspect with some empirical evidence to support the theory. Often,

international negotiations may well be explained with a bargaining game with mediator, for instance, the United Nations (UN) sends a couple of diplomats as mediators to help to reach an agreement in the bargaining process between two parties representing two different countries. The common example of an international bargaining game is between Russia, formerly the United Soviet Socialist Russia (USSR), and the United States of America (USA). Another common use of bargaining game applications is in economics, such as within monopolistic and duopolistic market solutions. In the literature about bargaining games, there are two approaches discussed, which are the strategic approach and the axiomatic approach. Under the Strategic approach, the players' movements are under the assumption of rationality, as expressed by the Nash equilibria. On the other hand, the strategic method has some inherent difficulties and with the axiomatic approach these difficulties adjust the specified assumptions (Rubenstein, 1982). The main questions about the bargaining situations are generally "what will be the agreed contract under rationality assumption for players?", and also what is the effect of the strategic mediator type? What is the effect of players' type in the bargaining game? After those questions one more critical statement appears, which is if there is mediator and also as a factor **a** which is symbolized as biased for mediator "is trust important for a bargaining game" and "does it affect the welfare function?". This paper will try to address these questions for Syrian case.

2. The Game

Within conflict literature lightening, consider a situation where two party will involve in the game process which can be end with a war. The payoffs can be drawn as occurring war centred on a country win and victory utility and defeat with inefficient issues and continuing fighting. In his paper, Cross (1965) asked two questions: "*under what conditions will the solution deviate from an idealized condition, and how will the variation take place?"* and "*acceptance of the descriptive interpretation of the Nash model would imply acceptance of the conclusion that all the information which is necessary for the analysis is contained in the set of possible utility-payoff combinations"* (Cross J., 1965)

2.1 Notation and assumptions of the bargaining process with incomplete information

Under Harsayni and Selten's (1972) bargaining game model, the utilities, or game outcomes, for each player will depend on both players' types, which are k and m. This can be shown with a bimatrix form such that;

(1.1) $K \times M$ is the bimatrix form of the utilities for all agreement points

$u=u_{ikm}$ $i=1,2.$ $k=(1,2,....K)$ $m=(1,2,....M)$

The explanation of the 1.1 equation is that player i and u_{ikm} shows the k or m type player i's payoff which he will get from the agreement point.

(1.2) $c = c_{ikm}$ $i=1,2.$ $k=(1,2,....K)$; $m=(1,2,....M)$;

With actual types k and m of player 1 and player 2 respectively, c is the conflict points set of the game. In other words c is the set including payoffs of player 1 and 2 from the conflict situation of the bargaining process. Another assumption of the game is following such that players are free to bring their action to the conflict point if they desire this. After definition of those assumptions the bargaining process with incomplete information can be examined with notation ***S*** below;

(1.3) $S = (U,c,r)$, where ;

U: all feasible agreements

c: conflict points which is also sub set of the U

r: probability bimatrix

In Nash bargaining analysis, all bargaining situations which are show by S are defined by the payoffs set which is called U. Similarly in Nash solution, players can meet at a point in a feasible agreement set or can meet at a point in a conflict set. As a result the bargaining situation in NS can be written formally as;

(2.1) $S=(U,c)$

As can be seen, the difference between equation (2.3) and (3.1) in NS the bargaining situation does not have a probability set as a subset of S. The explanation is that in the NS bargaining game there is complete information related to this and there is only one possible type of player, as shown in (2.2);

(2.2) If there is complete information $K=M=1$.

Another assumption in NS is the independency of players' actions. Nash(1950) has proposed that the equilibrium points in the bargaining process are given by payoff points which are in the feasible set U, and he has shown the reservation values with inequalities such that;

(2.3) $u_i \geq c_i$ $i = 1,2.$

Nash(1950) argues that there is always a unique solution if the bargaining process can prove that these axioms exists. If we take one point which is $u=(u_1,u_2)$, then using this point the Nash product will be;

(2.4) $$\pi = (u_1 - c_1).(u_2 - c_2)$$

After discussion and comparison of the bargaining game rules and assumptions, in the following section the mediation process will be examined by rules with researcher's choices. In addition, the researcher will use not only game theoretical explanation but also economics and political economics supported by illustrative examples.

3. The Model

The game will start with the basic bargaining assumptions that two players have to reach an agreement point on the splitting of a pie of size 1. In the game each player has to make their proposal in turn, which draws by mediator and each player should announce his offer about splitting the pie, and then the second player has two actions to play, which are either accept or reject and continue the bargaining process under mediation. In this game there will be a bargaining cost for each stage and also every player will have a fixed discount rate $\boldsymbol{\delta_1}$ and $\boldsymbol{\delta_2}$ respectively (Rubinstein, 1982). In paper the analysis of a two person bargaining process with incomplete information with mediator and mediator's role in the game is not active he is passive player so his role is only to spread the information about the state to reach efficient bargaining ending with possible agreement. The types of player also affect operation of the game so to identification of it, country's weapons, economic infrastructure, resources will be considered. From this point, between UN and Syria there is uncertainty and incomplete information for Syria. Moreover, Syrian citizens died with chemical weapons which give power to Syrian government, in contrast UN demand to reach agreement point for the peace and reduce death in Syria. With this aim UN gains very important power and support from all other countries. In mediated bargaining equilibrium, agreements are reached with positive possibility in all time t. Additionally, players cannot communicate before the game, in other words they are nor free to inform the other player about their strategy. It is clear that in this game the mediator carries information between players, which is pie size. Furthermore, incomplete information case is for two sides of players and the mediator knows the state which is in this game the size of the pie and he will announce to the players with his biased rate which is α in the welfare function. Timing in this game will be shown by *t* and it will be

finite and the main aims of the bargaining game is splitting the pie and trying to find agreement and avoid the conflict point. In addition, the role of the mediator in our game will create effective bargaining and help to reach the agreement point. The mediation process in this game will be strategic and trust will be a case to analyse between players and the mediator. Mediation process is helpful for improving efficiency of negotiations and also in some cases there are some deadlock situations and mediation may give directions or help to get an agreement point in the game.(Dunlop, 1984, pg.24). The game structure is bargaining with incomplete information which if the bargaining is with complete information we would not need to have a social planner because in our game the exact size of the pie will be known by the mediator and he will draw the proposal to the players depending on his bias to one of them. Moreover, the main point of the mediation process is that players can take actions without other players knowing; this situation can be called incomplete information bargaining game. However, in our game the mediator will be a passive player and his role will be to announce the information with drawing a proposal every t stage between two parties but he will also have power to shape bargaining efficiency with over reporting and under reporting the pie size. The expected utilities of the players' effect on the welfare function will be examined and findings will be shown in an appendix. The game will be started at stage 0, and the mediator will announce or draw the proposal depending on the utility function f the feasible set of utility $U\ R_{+}^{2}$. And another critical role of mediator will give to one of players the first mover advantage in the bargaining process, after that player 1 will choose to either accept or reject the offer and if player 2 rejects the offer and game will proceed to the next stage where the social planner will draw a new proposal with discount rate β where it is $0 < \beta < 1$. However, if player 2 accepts the offer from mediator's proposal the game ends; the crucial case in this situation is if mediator over or under reports the size of the pie and the game ends with incorrect information, since in our game the mediator does not have an active role to over or under report the state (pie size) this risk is eliminated with this assumption.

The nature of the bargaining game applies to this game which is players responses sequentially at each stage. The model's basic assumptions following the utility function, is continuous, convex, compact and strictly monotonic. S is a set with agreements feasible; set D is a set which shows disagreements points.

S: the feasible set the elements of S the feasible set are the utility pairs that the players can receive under cooperation if they reach a unanimous agreement.

D: the disagreement defeat point d (sometimes threat point or status quo point) is the utility pair that players have for the state of "*negotiations failed, proceed without attempting to reach unanimity.*"(Harsayni,1972; Rubenstein,1965)

Agreement point represents peace and disagreement point represents war. Pay off of the players determined with using cost utilities. The extensive for of the game is placed below.

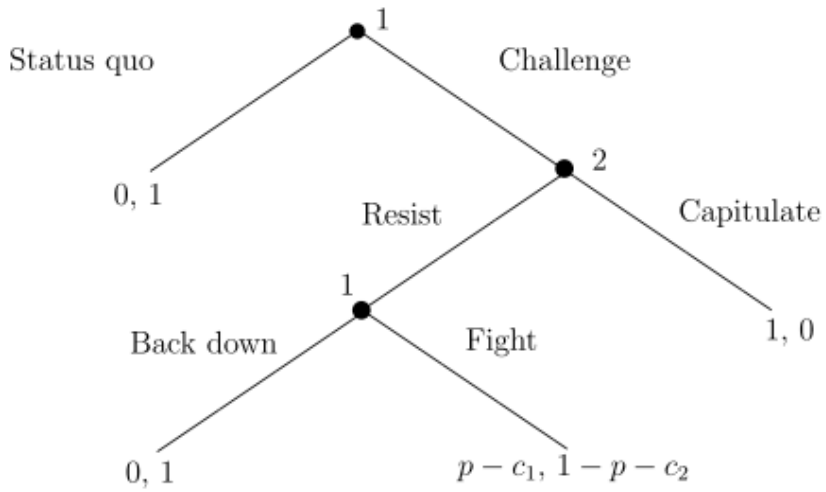

Figure 1: Extensive form of bargaining process

From figure 1, challenge represents war or disagreement point. Another important part of analysis is the normal form of the game which can show and make easier to understand game process and mechanism showed below.

PLAYERS	SYRIA(BASHAR AL-ASSAD REGIME)		
UN AND OPPOSITION PARTIES		PEACE	DEFEAT
	PEACE	1,1	0,1
	DEFEAT	0,1	0,0

Figure 2: possible scenario with normal form game.

3.1 The notations of the model's rules

There are two players which are Syrian government and UN as an opponent ;

(3.1) $i = 1,2.$

The bargaining is to determine how those two players will share the pie which will be shown below;

(3.2) $x \in (1,0)$

Assumption 1.2 gives the proportion of players payoffs such that;

(3.3) If player 1 receives x, player 2 will receives $(1-x)$.

The set of agreements reached at time $t \in [0,\infty)$ will be used in this paper such that

(3.4) (x^r, t)

(3.5) $r_{km} \geq 0$ for all values of k and m

(3.6) $\sum_{k=1}^{K}\sum_{m=1}^{M} r_{km} = 1.$

Let us consider the probabilities of the elements;

(3.7) $p_k = \sum_{m=1}^{M} r_{km}$ and $q_m = \sum_{k=1}^{K} r_{km}$

The interpretation of the 3.7 equation is that k and m represent the types of player 1 and 2 respectively and the marginal probabilities p_k and q_m are assumed to be more than *zero*. According to those assumptions and identifications of the game rules the payoffs of players will be such that; with (x^r, t) outcome will produce payoffs of player 1 with

(3.8) $$u_1^{s1}(x^r, t) = (x^r - s_1)e^{-\beta 1 t}$$

(3.9) $$u_2^{s2}(x^r, t) = (1 - x^r - s_2)e^{-\beta 2 t}$$

The all reservation values, which are utilities, will be known only from the mediator. After each section of the bargaining game players will realise other player's type from the proposals. Following information's privacy assumption there will be realization probabilities distribution function for each player and this will be in the game as common knowledge such that;

(3.10) $F_i(s_i), i = 1,2.$ $s_i^L, s_i^H > 0.$ and

$s_1^L < x^1 \leq 1 - s_2^H.$

With (3.10), player 1 or 2's offers definitely will be within range. Equation (3.11) will show that there will be at least one agreement point which will be accepted by players.

(3.11) $x^{R-1} < s_1^H \leq x^R < 1 - s_2^L.$

From (3.10) and (3.11) the feasible set of agreements is determined endogenously with types of players function.

With application of rules above, bargaining process can start. Mediator active role in the game will be sending and receiving message or offer by one player and send to other one. Before sending offers, mediator will inform to players about the size of pie meaning state. Mediator's role should be restricted with unbiasedness and trying to make an agreement with effective game with rules. Players strategies are θ_i and γ_i respectively and both have functions which represents measurability of strategies.

(3.12) $i = 1\,, \theta_i, [s_i^L, s_i^H] \times [0, \infty)$.

From (3.12), player 1 any time and every strategy he can draw proposal and also he can change his strategies. We also put forward another rule with those assumptions about player i's preferences relations;(Wilson,2001;Camina,1997) such that; completeness, reflectivity and transitivity. Another important point on bargaining process is bargaining cost which is pt fixed in our model c_i will be assumed.To make clear all those assumptions in mediated bargaining game there is an example below which is modified from Rubenstein (1972). According to Nash, a bargaining game should have an axiomatic approach; however, in this paper axiomatic and strategic approach (Rubenstein, 1982) will be used. Nash's Bargaining solution used in this paper and the axioms of NS are satisfied by the model. Though the game has von Neumann-Morgenstern utility functions which satisfies u: [0,1] X {d} → R such that; u is non-negative and continuous, concave , strictly increasing on ,N is the number of turn which is finite set, mediator choice of first mover advantage is independent of players respectively.

4. Conclusion

In this study our game with two party and incomplete information with continuum of type of players. Moreover with our game there is peaceful solution within bargaining game aspect. Additionally the peaceful strategy will be (p,p-1) and it can happen without and timing delay with our assumptions or rules of game.(Leventoğlu and Tarar, 2008)The mediator position is also important issue in this case because here there is incomplete information for players about each other, thus the pie size and the type of players is known by mediator. Mediator cannot use those information for his own good in other words he has to be unbiased. The main aim of game theory, game should be effective and minimize the possibility of conflict. (Ponsanti,1995) From our game and general findings from the literature it can be said that bargaining game holds an agreement in every crisis case.(Schultz, 1998) However as it is

known from economics theory there is uncertainty issue which cannot be measured easily but can affect directly to the results. For Syrian case the main uncertainty is to predict the cost of conflict or delay. There are some approaches to handle this issue which are costly talk and cheap talk games, ultimatum games (trust game etc) and game free analysis. Studying international conflict with game theoretical approach would be enhanced using those perspectives so it is recommended to expand or discuss this subject with those new approaches.(Fey and Ramsay,2010)

After all mathematical design of the chosen bargaining process in this study, it has been discussed that Syrian government position in country and which type of player Syria will be with level of co-integration with global actors(such as NATO, UN etc.) economic, social and international activities in this section. Syrian Arab Republic could have followed upward trend among Middle Eastern Countries with GDP. There is remarkable point from Syrian case, economic infrastructure have been shaped the movement of opposition mainly. During Bashar al-Assad regime, people who are highly conservative Sunnis from especially poorest areas have been joining civil war against the regime. (Fey and Ramsay,1999)Furthermore, after liberalization of the economy poorer areas could not integrate quickly to the new system and unemployment arose in youth. Despite all those domestic or national problems, Syrian government still can play the game as strong player. Chemical weapons are identifying mostly the type of player. After Ghouta attacks many countries and also some international organization blamed al-Assad used chemical weapons to kill innocent people. However UN still does not blame any party about identified chemical. This has been changed the rules of war in serious and dangerous way because Syrian government's allies can be written Iran, Russia and some regional groups in Middle East. Uncertainty and related risk cannot underestimate from policy maker and international organizations because they play active role in game as a mediator to renew peace proposals and plans.(Morrow,1985)Since Middle East has many reconstructions, Syrian case should not continue with conflict. Although al-Assad won the last election by 70 per cent, he does not have potential to represent their citizens. In this study, the findings showed that there is an agreement point in bargaining game with incomplete information but there is always uncertainty and risk. In conclusion, international conflict-especially in Middle East- may well cause many violence and contagious result for the countries which have borders with Syria. Al-Assad and opposition leaders must arrange talks and negotiate in bargaining game frame.

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