ON THE STRATEGIC ROLE OF OUTSIDE OPTIONS IN BILATERAL BARGAINING

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This paper studies a model of the situation in which two players are bargaining face-to-face over the partition of a unit size cake and, moreover, one of the players can choose to temporarily leave the negotiating table to search for an outside option. A main conclusion is that the equilibrium outcome does not depend on whether a bargainer is allowed (within the game form) to choose to return to the negotiating table to resume bargaining after having searched for some finite time. Moreover, it is shown that our strategic bargaining-search game approximately implements an appropriately defined Nash bargaining solution.

This paper presents a model of the situation in which two players are bargaining face to face over the partition of a unit size cake and, moreover, one of the players can choose to temporarily leave the negotiating table to search for an outside option. The model is a perfect information bargaining-search game in extensive form with complete information, which is built upon a standard sequential search process and Rubinstein's (1982) alternating-offers bargaining process. The novel feature of our game is the manner in which these two processes are interlaced. In particular, the game form incorporates the assumption that the player can choose to return to the negotiating table, to resume bargaining with his opponent, after having searched for some finite time.

A main conclusion of our analysis is that it is redundant to allow, within the game form, the bargainer the option of choosing whether to return to his bargaining partner. This is because the unique subgame perfect equilibrium outcome does not depend on whether the bargainer can or cannot choose to return to his previous bargaining partner.

This conclusion is not a priori evident, because of the following conflicting arguments/prior intuitions. On the one hand, it is, perhaps, the case that a bargainer's equilibrium payoff should be greater if she is allowed to choose whether to return to the negotiating table, because she would have the additional freedom/choice to move between the bargaining and search processes as often as she chooses. On the other hand, it is, perhaps, the case that the opposite should hold; i.e., she obtains a greater equilibrium payoff if she is not allowed to return to the negotiating table. This is because it is well known that being committed can be strategically advantageous (see, for example, Schelling 1965). The bargainer would be committed not to return to the negotiating table once she opts out. Thus, her threat to opt out forever is automatically credible. If she is allowed to return to the negotiating table, then it has to be ex-post optimal for her to credibly threaten to opt out forever. A main reason for this paper is to resolve these opposing prior intuitions.

The immediate relevant literature consists of two papers: Chikte and Deshmukh (1987) and Wolinsky (1987). In Wolinsky's game a bargainer can search between two consecutive offers; we see his game as complementing our game, in that they capture different institutional arrangements. In contrast, Chikte and Deshmukh's game is a different type, as it is not built upon the alternating-offers bargaining procedure. In their model, bargainers are in the search process most of the time. At certain points in this process a bargainer can choose to make an offer to his opponent, which, if rejected, forces both of them to return to the search process, and hence, they cannot choose to continue bargaining.

An important question that is likely to be posed is whether (and if so, how) to apply the axiomatic Nash bargaining solution in these bargaining-search situations. Strategic bargaining models, such as those studied in these papers, can shed light on this question. The models by Wolinsky and by Chikte and Deshmukh support the result that one has to shift the *disagreement point* when applying the Nash bargaining solution. In contrast, the model of this paper generates the result that the *disagreement point* is not to be altered but, instead, a constraint is to be introduced in the optimization problem that defines the Nash bargaining solution. This is similar to the manner in which the Nash bargaining solution is applied when a bargainer has available *one* outside option with *certainty* (cf. the "outside option principle," first discovered in Binmore 1985).

This paper is also related to the "bargaining and markets" literature that was initiated by the Rubinstein and Wolinsky (1985) paper. (For a recent up-to-date of this important literature, see Osborne and Rubinstein 1990.) Many of the models studied in this literature assume that once a bargainer opts out to search for an alternative

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trading partner he cannot choose to return to his previous bargaining partner. The analysis of this paper appears to vindicate such an assumption. Finally, note that there are several other papers that also explore, in various settings, the role of outside options on the bargaining outcome (see, e.g., Shaked and Sutton 1984, Lee 1991, Chatterjee and Lee 1993).

1. THE MODEL

Two players, **A** and **B**, are bargaining face-to-face over the partition of a unit-size cake according to Rubinstein's alternating-offers procedure. In addition, player **B** can choose to temporarily leave the negotiating table to search for an outside option, which is located according to a Poisson process with intensity $\lambda > 0$. An outside option is an exogenously determined share of a unit size cake. If player **B** accepts such an outside option, then the cake between herself and player **A** is lost forever (i.e., the outside option and the cake under bargaining are mutually exclusive). The magnitudes of the outside options located by player **B** are independent and identically distributed with a continuous cumulative probability distribution function F, whose support is the closed-interval [0, 1].

The move-structure (i.e., the game form) of our bargaining-search game, which is illustrated in Figure 1, is now described. The game begins at time 0 with player **A** making an offer to player **B**; an offer is a number, denoted by $x \in [0, 1]$, such that player **A** receives x units of the cake and player **B** receives $1 - x$ units. Player **B** immediately responds by *either* accepting (A) this offer (in which case the game ends) *or* rejecting this offer and making a counteroffer (RMC) $\Delta > 0$ units of time later *or* rejecting this offer and withdrawing from the negotiating table to search for an outside option (RS).

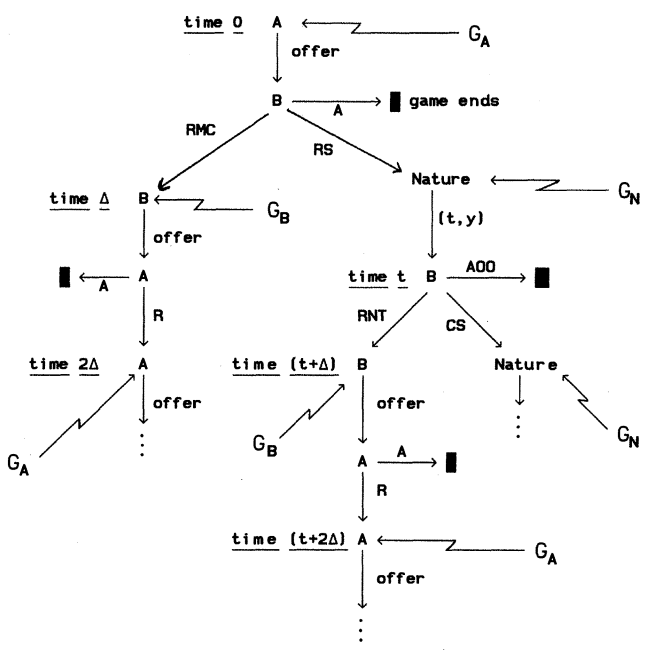

Figure 1. The move-structure of the bargaining-search game.

If player **B** decides to RS, then she will keep on searching until she locates an outside option; during this time neither player **A** nor **B** has any decisions to make. Now suppose that player **B** locates an outside option $t \geqslant 0$ units of time later whose magnitude is $y \in [0, 1]$. Then player **B** has to make a decision. She can *either* accept this outside option (AOO) (in which case the game ends with player **B** receiving y units of a cake and player **A** receiving no cake), *or* reject the outside option and continue searching (CS) *or* reject the outside option, stop searching and return to the negotiating table (RNT), where it takes her Δ units of time to formulate an offer to be proposed to player **A**.

If player **B** decides to continue searching (at time t), then the move-structure of the subgame that follows is identical to the move-structure of the subgame which follows player **B**'s decision (at time 0) to RS. We will denote this move structure, of a subgame that begins with player **B** starting to search, by G_N.

The move-structure of a subgame beginning with player i (where $i = A, B$) making an offer to player j (where $i \neq j$ and $j = A, B$), which is denoted by G_i, is independent of history. The move-structure G_B is as follows. Player **B** makes an offer to player **A**, which is followed by player **A** *either* accepting the offer (in which case the game ends) *or* rejecting the offer and thus, Δ units of time later, the game proceeds to a subgame with move structure G_A. This completes the description of the move-structure of our game.

The payoffs to the players are now described. The bargaining-search game can terminate *either* if the two players reach agreement over the partition of the unit size cake *or* if player **B** accepts an outside option *or* if the two players perpetually disagree *or* if player **B** searches forever. In the latter two cases each player receives a payoff of zero. If player **B** accepts an outside option at time $t \geqslant 0$ whose magnitude is $y \in [0, 1]$, then her payoff is $y \exp(-rt)$ where $r > 0$ is the common rate of time preference and player **A**'s payoff is zero. If the two players reach agreement over the partition of the unit size cake at time $t \geqslant 0$ with player **A** receiving $x \in [0, 1]$ units and player **B** receiving $1 - x$ units of the cake, then player **A**'s payoff is $x \exp(-rt)$ and player **B**'s payoff is $(1 - x)\exp(-rt)$.

This concludes the description of the bargaining-search game in extensive form. It is a two-player game of perfect information. We will denote this game by G. In this paper we will assume that the game G is common knowledge among the two players.

Before proceeding to study the subgame perfect equilibria (SPEa) of our model, we state two tie-breaking assumptions. These two assumptions allow us to uniquely define player **B**'s behavior at certain off-the-equilibrium-path decision nodes. We emphasize that

the unique equilibrium path of our model does not depend on these assumptions.

Assumption TB1. If player **B** is indifferent between two choices one choice gives her a payoff of β with certainty, while the other choice gives her an expected payoff of β, then she strictly prefers the former choice.

Assumption TB2. Suppose that player **B** is in the search process and has just located an outside option whose magnitude is y. Thus, by choosing to accept this outside option her payoff is y with certainty. If she instead chooses to return to the negotiating table, then suppose her payoff is x with certainty. If $x = y$, then she strictly prefers to accept the outside option.

2. THE MAIN RESULT

We begin by stating three preliminary results that will be used in the subsequent analysis of our model. From standard search theory (see, for example, Kohn and Shavell 1974, Lippman and McCall 1976) it follows that if player **B** does not play the bargaining-search game G, but instead searches for an outside option, then her optimal sequential search strategy has the reservation level property. That is, she will keep on searching until she locates an outside option whose magnitude is greater than or equal to some predetermined value. Let y denote this predetermined value. By standard arguments it follows that the expected payoff that player **B** can achieve by following this search strategy, denote it by $P(y)$, is:

$$P(y) = \left[\int_y^1 x\, dF(x)\right] \Big/ [(r/\lambda) + 1 - F(y)]. \tag{1}$$

It is well known that the *optimal* predetermined value, which we denote by y^*, must satisfy:

$$y^* = P(y^*). \tag{2}$$

Lemma 1 states some standard properties of the payoff function $P(\cdot)$. In particular, Lemma 1a states that (2) has a unique solution, and that this unique solution is the optimal reservation value. Lemma 1b states another feature of the function $P(\cdot)$, which will be used in the proof of Proposition 1.

Lemma 1. *The payoff function $P(\cdot)$ defined in* (1) *has the following properties:*

a. *it has a unique fixed point, which is the unique global maximum, denoted by y^*, where $0 < y^* < 1$, and*
b. *for any $y \in [0, y^*)P(y) > y$, and for any $y \in (y^*, 1]P(y) < y$.*

Lemma 2. *The optimal expected payoff (denoted by y^*)* that player **B** *can achieve if she does not play the bargaining-search game G, but instead searches for an outside option is the unique fixed point of the payoff function $P(\cdot)$.*

We now describe the unique SPE of our model with the move-structure (underlying the extensive form) *modified* as follows. Player **B**, once she leaves the negotiating table to search for an outside option, cannot return to the bargaining process: She is committed/constrained to remain in the search process forever after. Thus, the move-structure is as illustrated in Figure 1 *except* that player **B**, whenever she locates an outside option, has two and not three choices, namely *either* to accept the outside option located *or* to continue searching. We denote this modified perfect information bargaining-search game in extensive form by K. It will be assumed that K is a game of complete information, in keeping with the complete information assumption underlying this paper.

A main concern of this paper is to compare the unique SPE payoff that player **B** obtains in game K with the unique SPE payoff that she obtains in game G. The objective is to discover whether being committed not to return to the negotiating table once she opts out (as in game K) confers any strategic advantage to player **B**. For notational convenience, we denote $\exp(-r\Delta)$ by δ; note that, for any $r > 0$ and $\Delta > 0$, $\delta < 1$.

Lemma 3. *Game K has a unique SPE path, in which there is immediate agreement at time* 0 *with player* **A** *receiving x^* units of the cake and player* **B** *receiving* $1 - x^*$ *units of the cake where:*

$$x^* = \begin{cases} [1/(1+\delta)] & \text{if } y^* \leq [\delta/(1+\delta)] \\ [1 - y^*] & \text{if } y^* > [\delta/(1+\delta)]. \end{cases}$$

Furthermore, (i) *if $y^* < [\delta/(1+\delta)]$, then the stationary strategies described in Table* I *constitute the unique SPE;* (ii) *if $y^* > [\delta/(1+\delta)]$, then the stationary strategies described in Table* II *constitute the unique SPE; and* (iii) *if $y^* = [\delta/(1+\delta)]$ and if player* **B** *satisfies assumption* **TB1**, *then the stationary strategies described in Table* I *constitute the unique SPE.*

The proof of this lemma is omitted because it is essentially a statement of the so-called "outside option principle," first discovered in Binmore. Basically, game K is viewed (when finding its SPE) as being equivalent to a Rubinstein alternating-offers bargaining game with the added feature that player **B** has access to *one* outside

Table I
The Unique SPE of Game K When $y^* \leq [\delta/(1+\delta)]$

Player **A**	Offer	$1/(1+\delta)$
	A	$x \geq [\delta/(1+\delta)]$
	R	$x < [\delta/(1+\delta)]$
Player **B**	Offer	$\delta/(1+\delta)$
	A	$x \leq [1/(1+\delta)]$
	RMC	$x > [1/(1+\delta)]$
	RS	—
	AOO	$y \geq y^*$
	CS	$y < y^*$

Table II
The Unique SPE of Game K When $y^* > [\delta/(1 + \delta)]$

Player **A**	Offer	$1 - y^*$
	A	$x \geq \delta(1 - y^*)$
	R	$x < \delta(1 - y^*)$
Player **B**	Offer	$\delta(1 - y^*)$
	A	$x \leq 1 - y^*$
	RMC	—
	RS	$x > 1 - y^*$
	AOO	$y \geq y^*$
	CS	$y < y^*$

option which is available with *certainty*, and whose magnitude is equal to y^*. A rigorous statement and detailed proof of this "outside option principle" can be found in Osborne and Rubinstein (subsection 3.12.1).

We now state Proposition 1 which describes the unique SPE of game G. This proposition is proved in the Appendix. It turns out that the unique SPE of game G is essentially identical to the unique SPE of game K. We first state the proposition and then provide some discussion.

Proposition 1. *Game G has a unique SPE path, in which there is immediate agreement at time* 0 *with player* **A** *receiving* x^* *units of the cake and player* **B** *receiving* $1 - x^*$ *units of the cake where:*

$$x^* = \begin{cases} [1/(1 + \delta)] & \text{if } y^* \leq [\delta/(1 + \delta)] \\ [1 - y^*] & \text{if } y^* > [\delta/(1 + \delta)]. \end{cases}$$

Furthermore, (i) *if* $y^* > [\delta/(1 + \delta)]$, *then the stationary strategies described in Table* III *constitute the unique SPE;* (ii) *if* $y^* < [\delta/(1 + \delta)]$ *and if player* **B** *satisfies assumption* **TB2**, *then the stationary strategies described in Table* IV *constitute the unique SPE; and* (iii) *if* $y^* = [\delta/(1 + \delta)]$ *and if player* **B** *satisfies assumptions* **TB1** *and* **TB2**, *then the stationary strategies described in Table* IV *constitute the unique SPE.*

The unique SPE paths (and thus, the outcomes) of the bargaining-search games K and G are identical. Hence, it follows that player **B**'s equilibrium payoff does not increase/decrease by playing game G; her equilibrium payoff is exactly equal to the equilibrium payoff she obtains by playing game K. Indeed, it appears that the

Table III
The Unique SPE of Game G When $y^* > [\delta/(1 + \delta)]$

Player **A**	Offer	$1 - y^*$
	A	$x \geq \delta(1 - y^*)$
	R	$x < \delta(1 - y^*)$
Player **B**	Offer	$\delta(1 - y^*)$
	A	$x \leq 1 - y^*$
	RMC	—
	RS	$x > 1 - y^*$
	AOO	$y \geq y^*$
	CS	$y < y^*$
	RNT	—

Table IV
The Unique SPE of Game G When $y^* \leq [\delta/(1 + \delta)]$

Player **A**	Offer	$1/(1 + \delta)$
	A	$x \geq [\delta/(1 + \delta)]$
	R	$x < [\delta/(1 + \delta)]$
Player **B**	Offer	$\delta/(1 + \delta)$
	A	$x \leq [1/(1 + \delta)]$
	RMC	$x > [1/(1 + \delta)]$
	RS	—
	AOO	$y \geq [\delta/(1 + \delta)]$
	CS	—
	RNT	$y < [\delta/(1 + \delta)]$

constraint (which is built into the move-structure of game K) that player **B** cannot return to the negotiating table from the search process once she leaves it is not binding.

The equilibrium strategies for player **A** in these two distinct bargaining-search games are exactly identical, while player **B**'s equilibrium strategies in these two games are almost identical. The difference in player **B**'s equilibrium strategies arises for parameter values such that $y^* \leq [\delta/(1 + \delta)]$ and for her off-the-equilibrium-path behavior. In game K (off-the-equilibrium-path) she accepts outside options whose magnitudes are greater than or equal to y^*, and continues to search if she locates an outside option whose magnitude is strictly less than y^*. On the other hand, in game G (off-the-equilibrium-path) she accepts outside options whose magnitudes are greater than or equal to $[\delta/(1 + \delta)]$, and chooses to return to the negotiating table if she locates an outside option whose magnitude is strictly less than $[\delta/(1 + \delta)]$. But this difference does not matter to the equilibrium path because she would never leave the negotiating table in the first place; she prefers to continue bargaining if an out-of-equilibrium offer is made rather than opt out.

If, on the other hand, $y^* > [\delta/(1 + \delta)]$, then player **B**'s equilibrium strategies in the two games are identical. Player **B**'s optimal behavior in game G for these parameter values is such that she chooses never to return to the negotiating table once she leaves it. Hence, it is evident that this behavior gives rise to identical equilibrium paths in both games. This behavior rests critically on the underlying stationarity of the move-structure of game G and on the complete information assumption. Basically, if $y^* > [\delta/(1 + \delta)]$, then it is optimal for her to search rather than make a counteroffer. Moreover, and this is the crucial point, this behavior is independent of history, because history does not influence/change the game in any strategic way. However, if player **B** was incompletely informed about the distribution function F, then search would involve learning and her equilibrium strategy would be nonstationary. Thus, with incomplete information player **B**'s equilibrium payoff in game G may strictly differ from her equilibrium payoff in game K.

Finally, it note that in the limit, as $\Delta \to 0$ (i.e., as $\delta \to 1$), the equilibrium outcome x^* converges to

$$\arg\max_{\substack{x\in[0,1]\\ x\leq(1-y^*)}} [x(1-x)].$$

(Note that y^* is independent of Δ). Thus, our strategic model approximately implements a Nash bargaining solution, in which the *disagreement point* is not to be altered (it remains at (0, 0)) but instead a constraint ($x \leq (1 - y^*)$, i.e., $(1 - x) \geq y^*$) is introduced in the relevant optimization problem, reflecting that player **B**'s payoff must not be lower than y^*. This is similar to the manner in which the Nash bargaining solution is applied when a bargainer has available *one* outside option with *certainty* (cf. the "outside option principle" first discovered in Binmore).

APPENDIX

Proof of Proposition 1

The *existence* of an SPE follows by verifying that the stationary strategies described in Tables III and IV satisfy the "one-shot deviation" property. In this Appendix we establish that those strategies constitute the *unique* SPE. Let M_i (respectively, m_i) denote the supremum (respectively, infimum) of the set of SPE *payoffs* to player i in *any* subgame of game **G** with move-structure G_i (where $i = A, B$). Let H_B (respectively, h_B) denote the supremum (respectively, infimum) of the set of SPE *payoffs* to player **B** in *any* subgame of G with move-structure G_N. The following six equations state the (relevant) relationships between these suprema and infima. The arguments that establish these relationships are standard (see, for example, chapter 3 in Osborne and Rubinstein).

$$M_B = 1 - \delta m_A, \tag{3}$$

$$m_B = 1 - \delta M_A, \tag{4}$$

$$M_A = 1 - \max\{h_B, \delta m_B\}, \tag{5}$$

$$m_A = 1 - \max\{H_B, \delta M_B\}, \tag{6}$$

$$H_B = \int_0^\infty [\exp(-rt) \int_0^1 \max\{\delta M_B, H_B, y\}\, dF(y)]\lambda \exp(-\lambda t)\, dt, \tag{7}$$

$$h_B = \int_0^\infty [\exp(-rt) \int_0^1 \max\{\delta m_B, h_B, y\}\, dF(y)]\lambda \exp(-\lambda t)\, dt. \tag{8}$$

We now show that these equations have a *unique* solution, namely:

$$M_A = m_A = \begin{cases} [1/(1+\delta)] & \text{if } y^* \leq [\delta/(1+\delta)] \\ [1 - y^*] & \text{if } y^* > [\delta/(1+\delta)] \end{cases} \tag{9}$$

$$M_B = m_B = \begin{cases} [1/(1+\delta)] & \text{if } y^* \leq [\delta/(1+\delta)] \\ [1 - \delta(1-y^*)] & \text{if } y^* > [\delta/(1+\delta)] \end{cases} \tag{10}$$

$$H_B = h_B = \begin{cases} [\lambda/(r+\lambda)][\alpha F(\alpha) + \int_\alpha^1 y\, dF(y)] \\ \qquad \text{if } y^* \leq [\delta/(1+\delta)] \\ y^* \quad \text{if } y^* > [\delta/(1+\delta)], \end{cases} \tag{11}$$

where $\alpha = [\delta/(1 + \delta)]$.

First, *assume* that $H_B > \delta M_B$ and $h_B > \delta m_B$. Thus, from (7), we have that

$$H_B = \int_0^\infty [\exp(-rt) \int_0^1 \max\{H_B, y\}\, dF(y)]\lambda \exp(-\lambda t)\, dt.$$

Solving this, we obtain that

$$H_B = \left[\int_{H_B}^1 y\, dF(y)\right] \Big/ [(r/\lambda) + 1 - F(H_B)].$$

Hence, it follows from (1) and (2), and from Lemma 1, that $H_B = y^*$. Similarly, $h_B = y^*$. Since $M_A = 1 - h_B$ and $m_A = 1 - H_B$ (from (5) and (6)) it follows that $M_A = m_A = 1 - y^*$. Finally, using (3) and (4), we obtain that $M_B = m_B = [1 - \delta(1 - y^*)]$. These results will hold, given our assumption, if $y^* > \delta[1 - \delta(1 - y^*)]$, i.e., if $y^* > [\delta/(1 + \delta)]$.

Now, *assume* that $H_B \leq \delta M_B$ and $h_B \leq \delta m_B$. Thus, from (3)–(6), we obtain that $M_A = m_A = M_B = m_B = 1/[1 + \delta]$. From (7) we obtain that

$$H_B = \int_0^\infty [\exp(-rt) \int_0^1 \max\{\delta M_B, y\}\, dF(y)]\lambda \exp(-\lambda t)\, dt.$$

Solving this, we obtain that

$$H_B = [\lambda/(r+\lambda)][\alpha F(\alpha) + \int_\alpha^1 y\, dF(y)],$$

where $\alpha = [\delta/(1 + \delta)]$. Similarly, h_B is equal to H_B. These results will hold, given our assumption, if $H_B \leq \alpha$, i.e., if

$$\left[\int_\alpha^1 y\, dF(y)\right] \Big/ [(r/\lambda) + 1 - F(\alpha)] \leq \alpha,$$

i.e., if $P(\alpha) \leq \alpha$, where the function $P(\cdot)$ is defined by (1). From Lemma 1b it follows that $P(\alpha) \leq \alpha$ if and only if $y^* \leq \alpha$.

Finally, it is easy to verify that contradictions are obtained from the remaining possible assumptions, namely, (i) $H_B > \delta M_B$ and $h_B \leq \delta m_B$, and (ii) $H_B \leq \delta M_B$ and $h_B > \delta m_B$.

We have thus established that the *payoffs* to the players in *any* SPE are *uniquely* defined. The *uniqueness* of the SPE *strategies* will follow immediately after we establish the following result.

Step 1. *In any SPE of game G and in any subgame of game G with move-structure G_i (where $i = A, B$) player i will make an offer which is accepted by player j (where $j = A, B$ and $j \neq i$).*

Proof of Step 1. The proof is by contradiction. Thus, consider a subgame with move-structure G_A such that, in equilibrium, player **A** makes an offer, denote it by $\hat{x}$, which is not accepted by player **B**.

If $y^* > [\delta/(1 + \delta)]$, then $H_B > \delta M_B$. Thus, in equilibrium, player **B** (by not accepting $\hat{x}$) will choose to reject and search (RS) *and*, moreover, will choose never to return to the negotiating table. Hence, in the proposed SPE, the payoff to player **A** is zero. Obviously, player **A** can profitably deviate from this proposed SPE, by not offering $\hat{x}$, but instead offering $H_B + \epsilon$, where ϵ is such that $0 < \epsilon < 1 - H_B$.

On the other hand, if $y^* < [\delta/(1 + \delta)]$, then $H_B < \delta M_B$. Thus, in equilibrium, player **B** (by not accepting $\hat{x}$) will choose to make a counteroffer (RMC). Hence, in the proposed SPE, player **A**'s (discounted) payoff can be *at most* equal to $\delta(1 - M_B)$. Again, player **A** can profitably deviate from the proposed SPE, by not offering $\hat{x}$, but by offering $1 - \delta M_B$.

Finally, if $y^* = [\delta/(1 + \delta)]$, then one of the above arguments establishes a contradiction.

Proposition 1 now follows in a straightforward manner. Note, in particular, that assumption **TB2** is used (when $y^* < [\delta/(1 + \delta)]$) to establish that if player **B** locates an outside option whose magnitude equals $[\delta/(1 + \delta)]$, then she will choose to accept it rather than RNT, and that assumption **TB1** is used (when $y^* = [\delta/(1 + \delta)]$) to establish, that if player **B** receives an offer $x > [1/(1 + \delta)]$ she will choose to RMC rather than to RS, and if she receives an outside option whose magnitude is $y < y^*$ she will choose to RNT rather than to CS.

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