

**A MODEL OF DOUBLE SIDED UNCERTAINTY FOR INTERNATIONAL  
NEGOTIATIONS**

***Abstract***

This article uses an intercultural bargaining framework for exporters and importers to analyze co-operation and conflict in international trade negotiations. On the basis of game theoretical reasoning, culturally programmed bargaining behavior is transformed into a buyer-seller interaction of importer-exporter negotiations. The cultural differences of the players can be seen in the initial offer, the strategic approach, the valuation of time, the frequency of rejection and the objectives of the negotiation. In order to provide prescriptions for cross-cultural bargaining, the clash of cultures is dealt with in nine scenarios on an abstract level to show potential conflicts and cooperation between the players.

**Key words:** International business negotiations, cultural implications, game theoretic reasoning, activity based framework, importer-exporter negotiation scenarios.

## **Introduction**

Over the past decades cross-border transactions and globalization have led to a better knowledge of customs and values of other cultures. Thus, communication as the crucial means in negotiations determines the outcome of each endeavor in either bridging or deepening the gap between managers of different business and national cultures. Misunderstandings, originating from differences in cultural backgrounds, show that there are still heterogeneous aspects in international business negotiations to be considered. An anecdotal understanding of the pitfalls is not enough to overcome difficulties. Weiss (1996), in his survey on international business negotiations, came to the conclusion that there is, surprisingly, less literature than expected, though the origins of research in this field go back at least 25 years. Nevertheless, Faure and Shakun (1999) emphasized that visible effects have been made to bridge the gap between theory and practice. The tendency towards conclusions of a more prescriptive nature has been achieved with the help of experiments, simulations and case studies. On the basis of cultural negotiation patterns, a theoretical framework for cross-cultural bargaining should therefore provide generalizable or robust insights about co-operation and conflict. Thus, it is necessary to understand culture and its implications as a starting point for conceptualizing an intercultural negotiation. This paper proposes a theoretical framework for international negotiations by applying a game theoretic perspective to exporter and importer scenarios.

Hofstede (1983) defines ‘culture’ as collective mental programming. Through experiences people become mentally programmed to interpret new experiences. Traditions and common ways of thinking are part of an invisible set of a cognitive program rooted in the common culture but may vary for different cultures. If cultural differences occurred because of the

mental programming and learned behavior, then the bargaining process can belong to one of the basic patterns people were brought up. Faure and Shakun (1999) stated that culture has a direct impact on negotiations through the actors involved and manifests itself at the levels of cognition, beliefs and behaviors. Similarly, D'Andrade (1987) stated that a cultural model is a cognitive schema that is inter-subjectively shared by a social group. Such models consist of a small number of conceptual objects and their relations to each other. The cognitive schema of a simple bargaining situation involves an initial price, a series of converging bids and counter offers, and possibly a final agreement. Salacuse (1999, p. 218) emphasized that 'while the essence of culture may reside in the mind, it must be pointed out that persons gain their understanding of their and others' cultures primarily, if not exclusively, from observing the behavior and institutions of a particular group. Salacuse (1999, p. 217) stated, furthermore, that 'culture profoundly influences how people think, communicate and behave, and it also affects the kinds of deals they make and the way they make them'. Thus, the importance of cultures and in particular different bargaining behavior has to be considered in the failure and success of international business negotiations.

Weiss (1996) following Graham (1985) stated that Japanese made more extreme initial offers than Americans (Americans made 'fair' offers), used the word 'no' less frequently, were silent longer, and used aggressive tactics only later in negotiations and in the buyer not seller role. The Brazilian bargaining behavior (Graham 1983, 1984, 1985) was even more extreme than the Japanese with respect to the initial offer. Brazilians showed fewer promises and commitments, more commands and longer interactions than Americans did. Brazilians interrupted each other more and uttered an extraordinary amount of 'no's'. Furthermore, Graham and Mintu-Wimsat (1997, p. 499) tested in a simulation the determinants of negotiation outcomes based on Americans, Brazilians, Japanese and additionally Spaniards.

The authors found that a problem-solving approach results in a higher negotiation outcome for Americans when their partners reciprocate, the role (buyer or seller) is the key determinant of profits for Japanese negotiations and interpersonal attractiveness lead to higher partner satisfaction for Brazilians. These studies using various methods showed clearly that different culturally determined patterns have an impact on the outcome of a negotiation. Nevertheless, it is necessary to develop a framework for cross-cultural bargaining to predict the potential in an intercultural negotiation scenario.

Pruitt and Carnevale (1993) developed a useful overview of the traditions in the study of negotiations: the first consists of books providing advice, the second consists of mathematical models of rational behavior by economists and game theorists and the third is the behavioral tradition which develops and tests predictive theory about the impact of environmental conditions on negotiator behavior and the impact of these conditions and behaviors on outcomes.

This paper develops a framework for dealing and negotiating with and within different cultural groups based on a game theoretical bargaining model. Such an approach offers an analytical basis for further research. In the last twenty years game theory has seen a rapid expansion to the fields of economics (microeconomics – the largest single area of application), social psychology (two-person bargaining, social dilemmas, coalition formation), evolutionary biology (application to biological contexts, strategic aspects of evolution), political sciences (voting systems, power, international relations), accounting, marketing, law and computer science (Rapoport, A and Zwick, R.; 2000). An analogous study of Hausken (1987) integrated game-theoretic and behavioral negotiation theory, where behavioral negotiation theory has a foundation in psychology, organization theory, sociology

and related fields. This paper can be seen in a similar way to combine ‘cultural’ negotiation theory with game-theoretic negotiation theory. The translation of cultural issues into bargaining rules is viewed as an important requirement for modeling. The paper specifies the categories of culture first and then focuses on the interdisciplinary theoretical underpinning. Game theoretical reasoning is used to provide insights into the bargaining of different cultural programs. The application of the game theoretic perspective to exporter-importer negotiations based on their cultural program has the following structure: the order of the play, the time horizon, the payoffs, conflict and co-operation. The scenarios are developed to abstract problems between an exporter and an importer of different cultural backgrounds.

### **International Bargaining and the Importance of Culture**

Several frameworks in international business have been developed over time to show the impact of different cultural variables on the dynamics of international business negotiations (Sawyer and Guetzkow 1965; Fayerweather and Kapoor 1976; Graham 1987; Moran and Stripp 1991; Ghauri, 2003). Early guidelines to international business negotiations considered cultural diversity with respect to antecedent goals, concurrent process and consequent outcome as well as background factors and conditions. Recent discussions focusing on negotiations and culture (D’Amico and Rubinstein 1999; Kopelman and Olekalns 1999) emphasize that language, cognition, rapport, trust, power and outcome play an important role in international negotiations. Though, such frameworks and discussions are important for the development of intercultural communication and negotiations, there is no concept of how to find the potential conflicts and co-operative elements.

In terms of cultural similarities and differences, Pruitt and Carnevale (1993) suggest that future research should consider characteristics in negotiation style found in various cultures, since this field of study is still in its infancy. The authors pointed out that one perspective of cultural differences in negotiations stems from the theory of collectivism and individualism.

In terms of cultural differences, Hofstede (1985, p. 347) stated that among the components of national culture are the prevalent value systems those parents within a culture transfer to their children. This means that cultural values are shaped during one's upbringing through parents and institutions. In a global model of four dimensions of culture, the national value systems are clustered and presented in four value dimensions: power distance, uncertainty avoidance, individualism and masculinity. Hofstede's study is used in international business theory to explain organizational behavior based on cultural differences. Kopelman and Olekalns (1999, p. 375) pointed out that individualist and collectivist cultures may differ with respect to relational and identity goals that shape their negotiation strategy. Steensma et al. (2000) found that entrepreneurs from collective, feminine and uncertainty-avoiding cultures had a greater appreciation for co-operative strategies than entrepreneurs from individualistic, masculine and uncertainty-tolerant societies who might need governmental programs and incentives to make co-operative strategies much more attractive.

The consequences of Hofstede's cultural dimensions for international negotiations (Lewicki, et al, 1999) were discussed in the following way. Power distance has an impact of the length of negotiations, because negotiators from comparatively high power distance cultures may need to seek approval from their supervisors. Individualism/collectivism indicators show the importance of relationship and the emphasis of building up trust, which will influence the time perspective of negotiators. The masculinity/femininity dimension leads to the focus on

competitiveness and compromise in international negotiations. Finally, the index of uncertainty avoidance can be linked to the rules of negotiations and the attitude towards risks in international negotiations. Although some studies (Hofstede, 1985; Schwartz, 1994) showed characteristics in dealing with other cultures by focusing on values, the clash of culture and the potential to avoid certain deadlock scenarios in negotiations could not be delivered. Thus, it is important to focus on the actual decision-making and bargaining process.

Lewis (1999) developed a prescriptive framework for grouping national and regional cultures of the world based on his experience as a chairman of a company with offices in more than 30 countries. The focus of this framework is on activity, time perspectives, process-orientation and confrontational negotiation styles. Three main groups were distinguished: task-oriented, highly organized planners (linear-active culture); people-oriented, loquacious ‘inter-relators’ (multi-active culture); introvert, respect-oriented listeners (reactive culture). The different national and regional cultures can be categorized into the three types linear-active, multi-active and reactive cluster in order to point out the features on an abstract level. Though there are also mixtures of the cultural types, it can be stated that, in general, the negotiation behavior follows the classification. Regional differences can be found within Europe, Asia, Africa and Latin America.

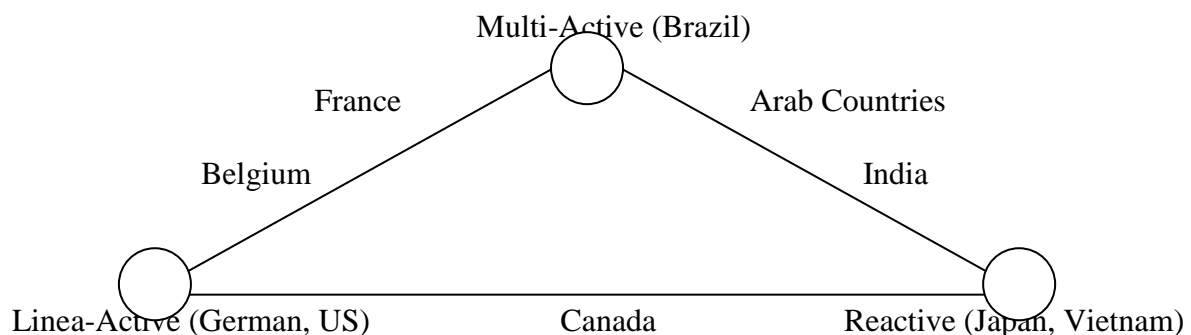
TABLE 1  
Characteristics of the Linear-active, Multi-active and Reactive Cultures

LINEAR-ACTIVE	MULTI-ACTIVE	REACTIVE	FOCUS
<ul style="list-style-type: none"> <li>• works in strict time limit</li> <li>• is dominated by time schedule</li> <li>• divides projects</li> <li>• sticks to the plan</li> </ul>	<ul style="list-style-type: none"> <li>• works at any time</li> <li>• time schedule is not predictable</li> <li>• projects influence other projects</li> <li>• changes plans</li> </ul>	<ul style="list-style-type: none"> <li>• works flexible time</li> <li>• reacts to time schedule</li> <li>• regards the whole picture</li> <li>• makes small</li> </ul>	<p><b>Importance of Time</b></p> <p><b>Strategic configuration</b></p>

<ul style="list-style-type: none"> <li>believes in facts</li> <li>obtains information from a statistics, handbooks and databases</li> <li>pursues correct procedure</li> <li>finishes actions</li> <li>confronts with logic</li> <li>interrupts rarely</li> </ul>	<ul style="list-style-type: none"> <li>changes facts</li> <li>obtains information first hand (orally)</li> <li>considers relationships as important</li> <li>finishes human transactions</li> <li>confronts emotional</li> <li>interrupts often</li> </ul>	<ul style="list-style-type: none"> <li>changes statements are promises</li> <li>Uses both</li> <li>reacts in a quiet way</li> <li>reacts on partner</li> <li>avoids confrontation</li> <li>Does not interrupt</li> </ul>	(Process orientation)  <b>Information</b>  <b>Action profile</b> (Activity)  <b>Negotiation style</b>
<i>Culture Examples</i>			
US (WASPs), British, Australians, Germanics, Swedish	Mediterranean, Eastern European, Latin American; Arab African, Indian, Pakistan,	Japanese, Chinese, Taiwanese, Singaporean, Korean; Finnish	

Some cultures have features of all the different types, but with different weights. For instance, exporters from the North of Italy could have a high percentage of linear-active features compared to South Italians. Bargaining with an exporter from Milan could create a different time horizon compared to an exporter from Naples. Thus, the latter would fit more in the category of multi-active cultures, whereas the first-mentioned would be a more even mixture of both types.

Figure 1: Cultural Profiles of Linear-active, Multi-active and Reactive Cultures





The triangle shows the national cultures being combinations of linear-active, multi-active and reactive features. It is a matter of putting weights to these combinations to find out personal cultural profiles. Though a combination of all three types can occur in various cultures, it is important to focus on one type negotiating with another type for the sake of abstraction and analytical grounding. This paper examines the clashes of pure types (US-Americans, Japanese and Brazilians) to emphasize the differences between the bargaining behaviors.

TABLE 2  
Empirical Characteristics of Activity-Based Cultural Types

	Linear-active	Multi-active	Reactive
Time preferences (discount factor)	Short	Long	Long
Time interval between offers	Short	Relatively short, many offers	Long
Height of offers (initial price) for buyers	Low	High	High
Frequency of Rejection (Number and Meaning of 'Nos')	Low (no means rejection of offer)	High ('no' implies art of bargaining and continuation of offer/counter-offer)	Low (no means losing face or insult; rejection only after a long period of bargaining or after signing contract)
Leader-follower	Leader	Leader	Follower

### Theoretical Underpinning

For analyzing an international business negotiation setting, game theoretical reasoning can be used due to its possibility to put oneself into the shoes of the other player and to anticipate co-operation and conflict. Thus, the underlying framework determines the games being played by various cultures and develops an abstract model of inter-cultural negotiations.

Based on the classical axiomatic (Nash 1950,1951,1953; Kalai-Smorodinsky, 1975) and strategic (Rubinstein 1982, 1985) bargaining models, the strategic behavior of buyers and

sellers can be analyzed. More complicated games are sequential bargaining games like offer-counter-offer, 'buyer offers', 'seller offers' and alternating offers. Since these bargaining games take more than one period of negotiations into account, the stages of the game pertain to the time structure and the order of the play.

The longer a negotiation process takes, the higher the costs become. Thus, apart from the players' actions, the costs of bargaining indicate the structure of the game. The costs of bargaining can be time dependent or time independent. Time plays a crucial role in bargaining and can be measured as a discount factor related to the costs of bargaining - either proportional to the remaining value of the price or as fixed bargaining costs (e.g. delay costs are equal, delay hurts the exporter or importer more). It matters whether the duration of a negotiation takes place in one day or over the period of two years, since it induces transaction costs and opportunity costs.

Another important property of an intercultural bargaining game is the incomplete information resulting from uncertainties about the other player. Uncertainties about time preferences, utility functions, valuations of the product, strategy profile and cultural background can occur in all kinds of bargaining situations. McMillan (1992) stated that information, in general, is a source of bargaining strength. One player might use his information advantage and the other can take defensive measures to mitigate the informational disadvantage. The Harsanyi doctrine (1967,68) is the basis of games under incomplete information. His type theory was developed under the general assumption that each player appears to his opponent as an unknown type drawn from a known probability distribution of possible types. A bargaining game with incomplete information, therefore, can be transformed to a game of imperfect information by means of the moves of nature (dummy player). This requires a precise

description of all possible combinations of types of players as well as the specification of their subjective probabilities (Harsanyi, 1967/68).

Cross (1978) stated that strategy choices are affected by uncertainty. Large amounts of uncertainty may encourage very large initial payoff demands as a kind of insurance against making an unnecessarily generous offer. The bargaining strategy choice is furthermore based on the maximization of utility which is not only dependent on the settlement payoff, since it also reflects the costs of time delay before a settlement is reached and the losses occurring due to the use of force or coercion.

Bartos (1978) stated that each negotiator is interested to make his opening bid as close to having zero payoff for his opponent. Thus, each negotiator must search for an opening bid that will be accepted by the opponent only with the greatest reluctance. Therefore, having an opening bid accepted reluctantly, each negotiator has an idea what agreement to expect. Opening bids determine what is viewed as a fair agreement and are therefore of crucial importance. Apart from the opening bid, the decision of how large the first concession should be is dependent on psychological and social factors as well as the time horizon. The first concession will be large in case the negotiator is a trusting person. If the negotiator knows that the opponent's reputation is tough, then the concession will be very small. The first concession will be large in case the negotiator is under pressure to reach an agreement.

Since Pruitt and Carnevale (1993) described a strategy a plan of action and distinguished five broad strategies in negotiations, we can distinguish between concession making (reducing one's goals, demands and offers), contending (trying to persuade the other party to concede or to resist similar efforts by the other party), problem solving (trying to locate and adopt

options that satisfy both parties' goals), inaction (doing nothing or as little as possible) and withdrawal (dropping of the negotiation). Pruitt (1981) considers working relationships as involving three related norms for dealing with mixed-motive settings: a norm of problem solving, a norm of mutual responsiveness and a norm of truth in signaling.

Muthoo (1999) suggests that in real-life bargaining situations the procedures are ambiguous and not well-specified. With regards to offers, the author points out that the player who makes the offer has the greater bargaining power. In real life, bargaining situations the procedure allows only one of the two players to make offers. Muthoo furthermore states that in alternating-offers the time interval between two consecutive offers is  $\Delta > 0$  and it is important to distinguish between the player's time intervals. Incomplete information is considered as the cause for agreements to be delayed. Gul and Sonnenschein (1988) identify delay to agreement with a screening process, where agents with lower valuations distinguish themselves by waiting longer to settle. Thus, we can point out that each player has a different time interval to make offers. The equilibrium partition is dependent on the ratio of these different time intervals. Muthoo found that a small difference between  $\Delta_i$  and  $\Delta_j$ , where the index represent the two players  $i$  and  $j$ , has a significant impact on the subgame perfect equilibrium partition for instance. Therefore, the author postulates that the bargaining outcome depends critically upon the relative magnitude of the players' cost of haggling.

Raiffa (1982, p.54) emphasized on asymmetries in negotiations such as differences in initial endowment or wealth, differences in time-related costs, differences in perceived determination or aggressiveness, differences in marginal valuations, differences in needs and differences in the number of people comprising each side. Time plays an important role and the bargainer who is willing to wait longer, to probe more patiently, to appear less eager for

settlement will be more successful (Raiffa, 1982, p. 78). It was pointed out that when people haggle in a bazaarlike fashion over one-time issues as the price of a used car, each player may have a short-time perspective that might lead to exaggerate the case. Whereas, in other cases, bargainers will have frequent negotiations and the atmosphere at the conclusion of one bargaining session will have an impact on the atmosphere in the next session. Each negotiator will then be concerned about his reputation. Thus, repetitive bargaining will often be more cooperative than single-shot bargaining.

Pruitt and Carnevale (1993) examined the nature of cognitive processes in negotiation and their impact on negotiation behavior and outcome. The focus in this cognitive tradition is on individual cognition in the negotiation setting, on information processes and on the application of cognitive theory and method to negotiate. Cognitive effects are related to schemas, organized knowledge structures that guide and potentially distort the acquisition, storage, recall and use of information. The findings show that a loss frame of negotiator outcomes had a negative impact on the likelihood of agreement when negotiators had an individualistic motive, but a positive impact on the quality of offers when there was a positive concern for the other party's welfare. Overconfidence in one's negotiation position also appears to be specific to the individualistic motive. Since learning and feedback play an important role in negotiation, it could be observed that as negotiators gained experience, they learned to set their first offers higher and offered fewer concessions in their role as buyers.

The next section considers some scenarios of bargaining between different cultural types in the game theoretic sense.

### **A Framework for International Business Negotiations**

The game can be described as a two-player bargaining model or a multistage game with incomplete information.

The set of players  $N = \{Ex, Im\}$  consists of two elements, that is the exporter and the importer. The cultural background of players can be modeled as types or actions indicating the mental program. Both players can be assumed as either a linear-active, multi-active or reactive type  $T = \{t_L, t_M, t_R\}$ . The importer has to judge whether the exporter's type is one of the above- mentioned or just a mixture of the types with different weightings. The probability of being one pure or a mixture of the three types can be reflected in the probability distribution.

Nature determines which type the players are. Player I can be a linear-active, multi-active or reactive type with a certain probability. Considering this scenario the next step will be to think about player II's type. Without loss of generality, player I is the exporter and player II is the importer in the game of intercultural bargaining. For this reason, there exists a special order of the players in this model, see the ordered pairs of players in table 3.

TABLE 3  
Buyer-Seller Model for Different Cultures in International Negotiations

Importer		Importer (Player II - Buyer)		
Exporter		Linear-activeCulture	Multi-activeCulture	Re-activeCulture
Linear-active culture		Similar cultural background with refinements <i>Scenario 1</i> <i>Example:</i> American exporter – German importer <i>'Time is Money' – Approach</i>	Exporter linear-active and importer multi-active <i>Scenario 4</i> <i>Example:</i> American exporter – Brazilian importer	Exporter linear-active and Importer reactive <i>Scenario 5</i> <i>Example:</i> American exporter – Japanese importer

<b>Exporter (Player I - Seller)</b>	Multi-active culture	Exporter multi-active and importer linear- active <i>Scenario 6</i> <i>Example:</i> Brazilian exporter – American importer	Similar cultural background with refinements <i>Scenario 2</i> <i>Example:</i> Brazilian exporter – Italian importer <i>'Combining tasks'-</i> <i>Approach</i>	Exporter multi-active and importer reactive <i>Scenario 7</i> <i>Example:</i> Brazilian exporter – Japanese importer
	Reactive Culture	Exporter reactive and importer Linear-active <i>Scenario 8</i> <i>Example:</i> Japanese exporter – American importer	Exporter reactive And importer Multi-active <i>Scenario 9</i> <i>Example:</i> Japanese exporter – Brazilian importer	Similar cultural background with refinement <i>Scenario 3</i> <i>Example:</i> Japanese exporter – Finnish importer <i>'Building trust'-</i> <i>Approach</i>

Since it makes a difference whether one is in a buyer or seller position, culturally determined behavior might lead to different outcomes when being either an exporter or importer. In the table above, the classification of linear-active, multi-active and reactive types is related to Graham's (1985) study on US-American, Brazilian and Japanese business negotiation behavior, which explores their bargaining strategies.

Thus, in this analytical framework, cultural differences in bargaining behavior are connected to the range of the initial offer, the frequency of rejection and the valuation of time. Different bargaining strategies occur because of setting a reasonable high price in order to obtain the desired price due to the duration of the negotiation period and to the resulting discounted value. For instance, a straightforward approach and the anticipation of a short bargaining period may result in a lower initial offer  $p_0$  and lower costs of bargaining dependent on time. These rules include the range of price, as the final export price  $p_{EX}$ , and the measure of time, as the discount factor  $\delta$ , which will be introduced in combination into this model. As far as both players have incomplete information about the counterpart's cultural bargaining

behavior, uncertainties concerning the offered price, discounting and acceptance/rejection behavior matter.

Furthermore, the bargaining mechanism is either dependent on the exporter making offers, the importer making offers or on an alternation of offers. For this reason, the moves made by the players have to be considered, too. The following sections deal with the order of play, the time horizon, the sources of co-operation and conflict in relation to the types of players.

General assumption: We have three categories of culture. The linear-active cultures set the initial offer they want to receive and have a short-term perspective, multi-active cultures tend to offer a high price considering a longer bargaining time horizon and reactive cultures are inclined to respond to the counterparts' behavior.

The bargaining power determines who sets the price. The exporter might offer  $p_0$  knowing the value of the product  $v$ . Whereas, the importer's private value of obtaining the product must be higher than the price he offers or accepts, which leads to  $v - p$ . Besides the different valuation of the product of a buyer-seller situation, the international business scenario demands the consideration of various strategic perceptions about the bargaining process. The time horizon plays an important role and in connection with the set of actions determines the bargaining problem under incomplete information due to the different time preferences of the players. Since the diverse cases of interaction are developed in a last section of the paper, the following order of the play shows the timing of the model on an abstract level.

FIGURE 1  
Timing of an Intercultural Bargaining Model



Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5...
Nature chooses types of players LMR	Exporter offers price	Importer accepts or rejects	Exporter offers again or importer makes counteroffer	Importer accepts/ rejects, Exporter accepts/rejects	Game may continue over more periods
TIME PERIOD I		TIME PERIOD II.....			

General order of the play:

- (1) Nature chooses types of the players  $t = \{L, M, R\}$
- (2) Exporter offers price
- (3) Importer accepts or rejects offer
- (4) Acceptance leads to the end of the game. Rejection results in either another offer of the first player or a counterproposal of the second player. Depending on the types, there will be a sequence of offers and counteroffers or the break-up of the negotiations.

#### Timing of an Intercultural Bargaining Model

Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Nature draws types $t_L, t_M$ and $t_R$	Exporter learns his type	Exporter offers price	Importer accepts or rejects	Exporter offers again counteroffer	Importer accepts or rejects
TIME PERIOD I			TIME PERIOD II		

Payoffs: We denote  $U_{Ex}$  and  $U_{Im}$  for the exporter's and the importer's payoffs. The payoffs are dependent on the price, the costs and the discount factor involved in the bargaining process. The price  $p_{Ex}$  is for all types, the remaining price, which is left after bargaining over a special time period. The initial offer for each type  $p_0$  consists of  $p_{Ex}$  plus the margin the players anticipate to be put on top dependent on their type  $p_0 = p_{Ex} + z$ . The costs of bargaining are a product of the length of bargaining shown as discount factor  $\delta$ , which is different for the three types such as  $0 \leq \delta_L < \delta_M < \delta_R \leq 1$ . We have  $\delta_L$  for the impatient linear-active type,  $\delta_R$  for the patient reactive type and  $\delta_M$  for the multi-active type. The initial price offer is dependent on the types  $p_0 = \{p_L, p_M, p_R\}$  and can be explained in the following:

1. The linear-active exporter wants  $p_{Ex}$ , he offers  $p_L$  his initial price which includes a small margin  $L$  to cover a short period of bargaining:  $p_L = p_{Ex} + L$  or 
$$p_L = p_0 + \delta_L p_1 + \delta_L^2 p_2.$$
2. the multi-active exporter offers  $p_M = p_{Ex} + M$ , in which  $M$  is a fixed margin considered to be on top of the price anticipating bargaining costs over the period of time, or 
$$p_M = p_0 + \delta_M p_1 + \delta_M^2 p_2 \dots + \delta_M^N p_N.$$
3. the reactive exporter makes his initial offer with  $p_R = p_{Ex} + R$ , considering  $R$  as a margin on top of the exporter's price to consider the costs of delay or 
$$p_R = p_0 + \delta_R p_1 + \delta_R^2 p_2 \dots + \delta_R^N p_N.$$

The payoffs are composed of the price  $p_{Ex}$  minus the costs involved. Since we expect the price to be the result of a bargaining procedure, the final price may be either according to the type of the precise expected final price, or, in case of difficulties during the procedure, the

price  $p_{EX}$  with a margin based on the time horizon. The latter occurs because of asymmetries in the bargaining behavior. With respect to the disagreement point after several periods of bargaining, this outcome includes negative payoffs due to the high bargaining costs. The interval between the offers  $\Delta$  plays another important role to distinguish between the three types. Thus, we have  $\Delta_L \rightarrow 0$  for a short bargaining linear-active type,  $\Delta_R \rightarrow 1$  for a patient reactive-type and  $\Delta_M \in \{0,1\}$  for multi-active type. Since the empirical findings showed that the time interval between offers is dependent on the type of player, we can add to the price function the time interval  $\Delta$  dependent on the type of player. This leads to the following functions  $p_L(\Delta_L)$  for the linear-active player,  $p_M(\Delta_M)$  for the multi-active and  $p_R(\Delta_R)$  for the reactive player. Additionally, we can consider the costs of bargaining dependent on time and type as  $c_L(\delta_L)$  for the linear-active,  $c_M(\delta_M)$  for the multi-active and  $c_R(\delta_R)$  for the reactive player. Similar to these functions, the value of the bargaining process for the importer might be dependent on the duration of the bargaining process. Thus, the value functions for the bargaining process might be  $v_L(\delta_L)$ ,  $v_M(\delta_M)$  and  $v_R(\delta_R)$ , respectively.

The pay-off functions are therefore different for the exporter and importer regarding their types. Let there be the following payoffs for the various types: the payoffs of the three types of exporters are  $U_L^{Ex} = p_L(\Delta_L) - c_L(\delta_L)$ ,  $U_M^{Ex} = p_M(\Delta_M) - c_M(\delta_M)$  and  $U_R^{Ex} = p_R - c_R(\delta_R)$  likewise the importer's payoffs are  $U_L^{Im} = v_L(\delta_L) - p_L(\Delta_L)$ ,  $U_M^{Im} = v_M(\delta_M) - p_M(\Delta_M)$  and  $U_R^{Im} = v_R(\delta_R) - p_R(\Delta_R)$ .

Cross-border transactions have to take uncertainty about the business environment and cultural background into account. Since both business partners have private information

about their preferences, strategies and time horizon, the bargaining game is a decision-making scenario under uncertainty.

Based on the general framework, the analysis of the nine scenarios of table 2 provides general insights into the order of the play and the time structure of these bargaining games. The scenarios are put together into four sections with respect to the games being played from the exporter's perspective, such as bargaining with importers of similar cultural and culturally distant background. These four sections are structured such that a table of examples of exporter-importer combinations shows the potential co-operation and conflict.

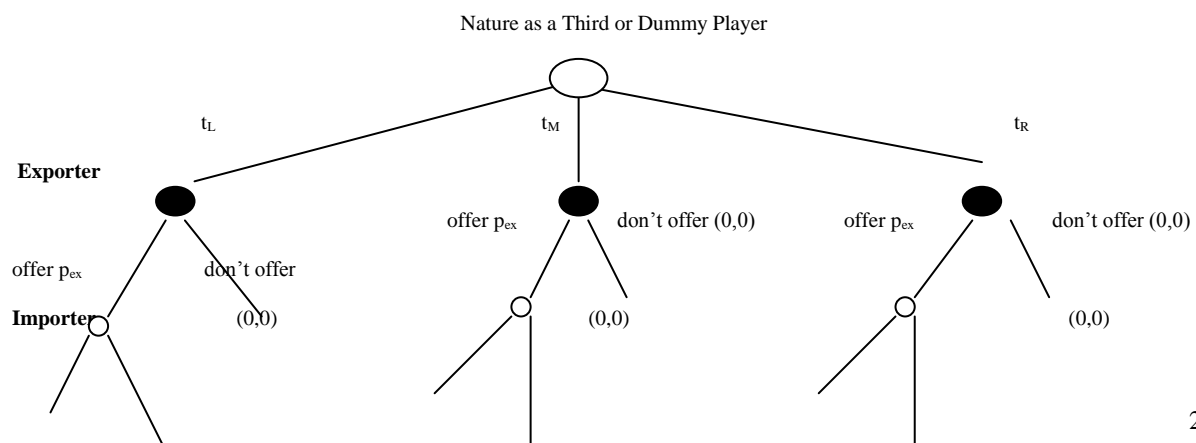
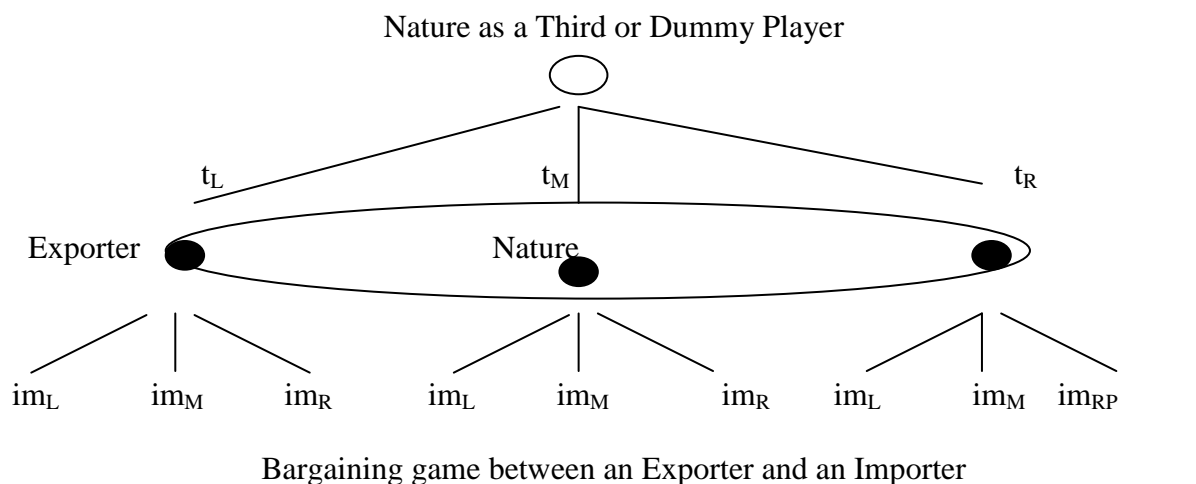
Importer		Importer (Player II - Buyer)		
Exporter		Linear-activeCulture	Multi-activeCulture	Re-activeCulture
<b>Exporter (Player I - Seller)</b>	Linear-active culture	$\frac{\delta_L(v_L + c_L)}{2}$	$\frac{v_M(\delta_M) + c_L(\delta_L)}{2}$	$\frac{v_R(\delta_R) + c_L(\delta_L)}{2}$
	Multi-active culture	$\frac{v_L(\delta_L) + c_M(\delta_M)}{2}$	$\frac{\delta_M(v_M + c_M)}{2}$	$\frac{v_R(\delta_R) + c_M(\delta_M)}{2}$
	Reactive Culture	$\frac{v_L(\delta_L) + c_R(\delta_R)}{2}$	$\frac{v_M(\delta_M) + c_R(\delta_R)}{2}$	$\frac{\delta_R(v_R + c_R)}{2}$

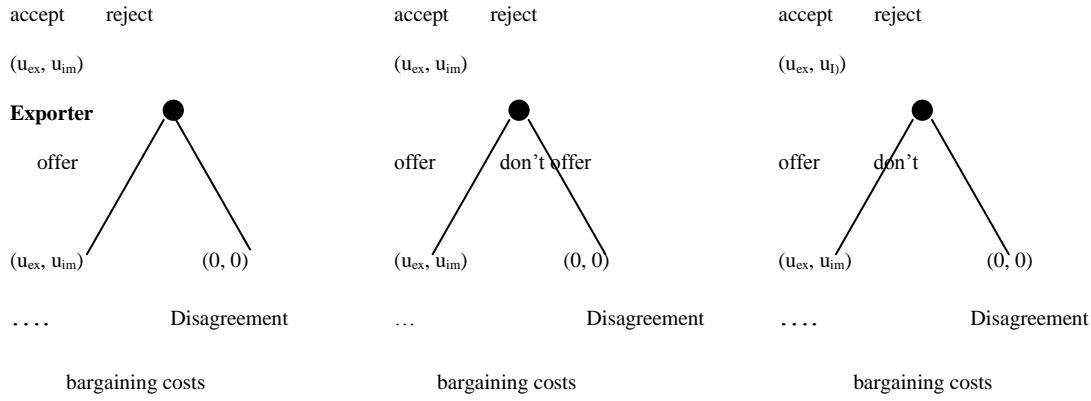
### Double-Sided Incomplete Information

Information asymmetries occur in international negotiations due to incomplete information about the other person's cultural background. If both players have a cultural background like US-American, Japanese and Arab, it is easier to spot the time preferences, than with cultures of a more mixed nature of time orientation. We could even suggest that these three cultural

programs when negotiating with each other could be suggested as full information situations. However, what happens when bargaining occurs between people who have a cultural cognitive programme which has been shaped by upbringing and learning for instance a Nigerian studying in the USA. Globalization has diversified cultures and sensibilities towards other cultures are bigger. This means that we do not know the cultural cognitive scheme of bargaining when we enter negotiations with buyers and sellers of different cultural backgrounds. This leads to higher uncertainties and costs. The world viewed from a linear-active (US, short-termism), multi-active (Arab, haggling) and reactive (Japan, patience) perspective shows the three clear-cut bargaining types and the rest of the cultures have randomized values. We have therefore different preferences of bargaining outcomes.

### Intercultural Bargaining under Two-sided Incomplete Information





#### a) The case of Private Values

The players' reservation values are independent of each other, the exporter's reservation value is her private information and the importer's reservation value is her private information. The importer's reservation value is a random draw from a probability distribution  $F_{Im}$  and the exporter's reservation value is an independent and random draw from  $F_{Ex}$ . The importer knows the realization of the draw from  $F_{Im}$ , but the exporter does not and vice versa. Let  $I_i$  ( $i = Im, Ex$ ) denote the support of  $F_i$ , denote the minimum and maximum values of  $I_{Im}$  respectively by  $\underline{v}$  and  $\bar{v}$ , and the minimum and maximum of  $I_{Ex}$  by  $\underline{c}$  and  $\bar{c}$ . This means that either importer or exporter could have short-term and long-term orientation when it comes to the length of bargaining which is shown in either value or costs. Furthermore, linear-active, multi-active and reactive types have values reaching from low to high, respectively.

In the direct revelation procedure the exporter and importer simultaneously announce their reservation values. If the exporter's announced value is  $c$  ( $c \in I_{Ex}$ ) and the importer's announced value is  $v$  ( $v \in I_{Im}$ ), then with probability  $\lambda(c, v)$  trade occurs at  $p(c, v)$ , and with  $1 - \lambda(c, v)$  trade does not occur.

A direct revelation mechanism is individual rational occurs iff (if and only if) the following is satisfied:

$$U_{Ex}(c) \geq 0 \quad \forall c \in I_{Ex}$$

$$U_{Im}(v) \geq 0 \quad \forall v \in I_{Im}$$

incentive compatible occurs iff

$$U_{Ex}(c) \equiv E_v[\lambda(c, v)[p(c, v) - c]] \geq E_v[\lambda(c', v)[p(c', v) - c]] \quad \forall c, c' \in I_{Ex}$$

$$U_{Im}(v) \equiv E_c[\lambda(c, v)[v - p(c, v)]] \geq E_c[\lambda(c, v')[v - p(c, v')]] \quad \forall v, v' \in I_{Im}$$

The mechanism is ex-post efficient iff the importer and exporter trade when it is mutually beneficial to do so, that is iff for  $c \in I_{Ex}$  and  $v \in I_{Im}$

$$\lambda(c, v) = \begin{cases} 1 & \text{if } v \geq c \\ 0 & \text{if } v < c \end{cases}$$

#### b) The Correlated Values

The player's reservation values are correlated in this part. Each player has some relevant private information. Let us consider two parameters  $\theta$  and  $\mu$  that determine both player's reservation values for this reason. Both parameters are real numbers and the value of  $\theta$  is private information of the exporter and the value of  $\mu$  is private information of the importer. We have the two parameters as independent and random draws from the probability

distributions  $G$  and  $H$ . The exporter knows the realization of the draw from  $G$ , but the buyer does not and vice versa. Let there be  $J$  and  $K$  respectively to denote the supports of  $G$  and  $H$  with minimum and maximum values of  $J$  by  $\underline{\theta}$  and  $\bar{\theta}$ , and the minimum and maximum of  $K$  by  $\underline{\mu}$  and  $\bar{\mu}$ . Thus, the exporter's reservation value can be denoted as  $c(\theta, \mu)$  and the importer's reservation value as  $v(\theta, \mu)$ , both are strictly increasing in  $\theta$  and  $\mu$ . Let us assume further that for any  $\theta$  and  $\mu$ ,  $v(\theta, \mu) \geq c(\theta, \mu)$ .

The direct revelation procedure is characterized by a pair of functions  $(\lambda, p)$ . The exporter announces the value of  $\theta$  and simultaneously the importer announces the value of  $\mu$ . If the exporter's announced value is  $\theta' (\theta' \in J)$  and the importer's announced value is  $\mu' (\mu' \in K)$ , then with probability  $\lambda(\theta', \mu')$  trade occurs at price  $p(\theta', \mu')$  and with  $1 - \lambda(\theta', \mu')$  trade does not occur.

The direct revelation mechanism is individually rational iff the following is satisfied:

$$U_{Ex}(\theta) \geq 0 \quad \forall \theta \in J$$

$$U_{Im}(\mu) \geq 0 \quad \forall \mu \in K$$

We have incentive compatibility iff

$$U_{Ex}(\theta) \equiv E_{\mu}[\lambda(\theta, \mu)[p(\theta, \mu) - c(\theta, \mu)]] \geq E_{\mu}[\lambda(\theta', \mu)[p(\theta', \mu) - c(\theta, \mu)]] \quad \forall \theta, \theta' \in J$$

$$U_{Im}(\mu) \equiv E_{\theta}[\lambda(\theta, \mu)[v(\theta, \mu) - p(\theta, \mu)]] \geq E_{\theta}[\lambda(\theta, \mu')[v(\theta, \mu) - p(\theta, \mu')]] \quad \forall \mu, \mu' \in K$$

The mechanism is ex-post efficient iff

$$\lambda(\theta, \mu) = 1, \quad \forall \theta \in J \text{ and } \forall \mu \in K$$



Proposition: The bargaining outcome can be ex-post efficient if and only if  $v^e(\underline{\mu}) \geq c^e(\bar{\theta})$ ,

where  $v^e(\underline{\mu}) = E_{\theta}[v(\theta, \underline{\mu})]$  and  $c^e(\bar{\theta}) = E_{\mu}[c(\bar{\theta}, \mu)]$

Proof. Let the importer make a price offer to the exporter. If she accepts the offer, then the agreement is struck and the game ends. But if she rejects the offer, then the game ends with no agreement. If  $v^e(\underline{\mu}) \geq c^e(\bar{\theta})$ , then the pair of strategies is a BNE. For any value of  $\mu$  the buyer offers the price  $p = c^e(\bar{\theta})$ , and for any value of  $\theta$  the exporter accepts the price  $p = c^e(\bar{\theta})$  and rejects any price  $p \neq c^e(\bar{\theta})$ . This BNE is ex-post efficient. This is a sufficient condition. To establish necessity, if  $v^e(\underline{\mu}) < c^e(\bar{\theta})$ , then there does not exist a DRP that satisfies individual rationality and incentive compatibility. Suppose to the contrary, that there exists a DRP and after substituting the ex-post efficiency condition into the exporter's incentive compatibility condition, it can be stated that the expectation of  $p(\theta, \mu)$  with respect to  $\mu$  is independent of  $\theta$ . Let it be denoted by  $p_{Ex}^e$ . After substituting the ex-post efficiency condition into the importer's incentive compatibility condition, it follows that the expectation of  $p(\theta, \mu)$  with respect to  $\theta$  is independent of  $\mu$ . Thus, this can be denoted  $p_{Im}^e$ . After substituting the ex-post efficiency into the individual rationality, it can be stated that from the exporter's individual rationality condition for any  $\theta \in J$ ,  $p_{Ex}^e \geq E_{\mu}[c(\theta, \mu)]$ . The same is true for the case of substituting the ex-post efficiency into the importer's individual-rationality condition so that for any  $\mu \in K$ ,  $E_{\theta}[v(\theta, \mu)] \geq p_{Im}^e$ . This implies that  $p^e \geq c^e(\bar{\theta})$  and  $v^e(\underline{\mu}) \geq p^e$ , where  $p^e$  is the expectation of  $p(\theta, \mu)$  with regards to  $\theta$  and  $\mu$ . Thus,  $v^e(\underline{\mu}) \geq c^e(\bar{\theta})$ , which contradicts the hypothesis. QED

We can now transfer the theoretical result to the intercultural framework and relate the value function with the cost functions, respectively:

Importer		Importer (Player II - Buyer)		
Exporter		Linear-active Culture	Multi-active Culture	Re-active Culture
<b>Exporter (Player I - Seller)</b> Linear-active culture Multi-active culture Reactive Culture	Linear-active culture	$v_L(\delta_L) \geq c_L(\delta_L)$	$v_M(\delta_M) \geq c_L(\delta_L)$	$v_R(\delta_R) \geq c_L(\delta_L)$
	Multi-active culture	$v_L(\delta_L) \geq c_M(\delta_M)$	$v_M(\delta_M) \geq c_M(\delta_M)$	$v_R(\delta_R) \geq c_M(\delta_M)$
	Reactive Culture	$v_L(\delta_L) \geq c_R(\delta_R)$	$v_M(\delta_M) \geq c_R(\delta_R)$	$v_R(\delta_R) \geq c_R(\delta_R)$

The intuition behind the results show when the different types will be likely to accept offers and when there is a low probability of success.

### Conclusion

This dynamic intercultural bargaining framework shows the transformation of culturally programmed bargaining behavior into game-theoretical properties.

Scenarios of international business negotiations were developed to clarify the bargaining rules of the culture clusters such as linear-active, multi-active and/or reactive types of players when bargaining either in a similar or a different cultural environment. On the basis of the ‘time is money’-approach of linear-active cultures, the ‘combining tasks’-approach of multi-active cultures and the ‘building trust’-approach of reactive cultures, the combination of the different types could be developed and refined.

In detail, the logic of argumentation, the order of the play, the time horizon and the frequency of rejection were related to the specific categories of culture. Furthermore, bargaining and delay costs had to be considered in connection with the time structure of the players. The disagreement point reflected the conflict between the players, that is the stalemate or even the break-up of a negotiation procedure.

Under the assumption that the differences in bargaining behavior are derived from the inherent time perspectives in cross-cultural negotiations, the games being played by the three types were related to co-operation and conflict. It could be proposed that further research should focus on the two player decision-making processes either in pure or mixed cases. Implications are either to develop formal models or to test connected hypotheses in empirical studies or experiments.

Though this paper can be considered as an introduction to the linear-active, multi-active and reactive way of bargaining, it shows the potential for explanations why some international negotiations might lead to a break-up and stalemate based on cultural mishaps of bargaining. This approach should help to anticipate and avoid conflicts and disagreements which are based on a different cultural program. Conceptualizing strategic reasoning can provide theoretical support for decision-making processes and the revelation of different time perceptions and preferences inherent in various cultures. Relating cost and pricing aspects to the timing of the model should help international managers and policy makers to anticipate future problems and opportunities in cross-cultural trade negotiations.

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