

Your gain my pain?
The effects of accounting information in uncertain negotiations

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Abstract

Prior studies on buyer-supplier negotiations show that refined accounting information can enhance negotiation processes and outcomes. We extend these studies by considering the influence of uncertainty, which is commonly present during negotiations. Uncertainty increases friction between negotiators as they take different reference points, exacerbating the level of conflict. We theorize that refined accounting information, even when unrelated to the source of uncertainty, helps to limit its adversarial effects on behavior and outcomes by enabling negotiators to identify mutually beneficial tradeoffs. We develop an experiment in which 89 dyads of buyers and suppliers participate to test our expectations about how uncertainty interacts with accounting information in affecting negotiation behavior and outcomes. Results show that uncertainty reduces negotiators' use of integrative tactics relative to distributive tactics, which in turn negatively influences joint profit. Refined accounting information, however, weakens the negative impact of uncertainty on behavior, mitigating the negative impact on joint profit.

Keywords: buyer-supplier negotiations, uncertainty, accounting information, negotiation tactics, negotiation outcomes.

1. Introduction

A common theme in the literature on interfirm relationships is that the likelihood of cooperative success increases when partner firms act in a collaborative way. The negotiation stage is considered critical to this end as the process of negotiation sets the stage for future behaviors and can be instrumental in the outcomes that partners achieve. While an extensive literature on negotiation research identifies conditions that influence negotiators' behaviors and outcomes, prior accounting studies have particularly considered the potential of accounting information in stimulating cooperative negotiation behavior (e.g., Chang et al. 2013; Coletti et al. 2005; Drake and Haka 2008; Masschelein et al. 2012; Van den Abbeele et al. 2009). These studies indicate that particularly refined accounting information such as total cost of ownership (TCO) information can (but does not always) stimulate negotiators to act cooperatively, producing better joint outcomes.

Noticeable is that these prior experimental studies typically take place in an environment where the inputs and outputs to be negotiated upon are given. In contrast, the broader literature on interfirm relationships indicates that interfirm negotiations and contracting are often subject to significant uncertainty (such as relating to technology and market changes) that complicates cooperation and can result in suboptimal outcomes (Anderson and Dekker 2005; Krishnan et al. 2011). Similarly, prior experimental economics studies emphasize that uncertainty in negotiators' payoffs can be of substantial influence to cooperative behavior and success (Church and Zhang 1999; Roth and Murnighan 1982). This raises the question whether and how uncertainty influences the way that accounting information affects negotiator behavior. Particularly, uncertainty may decrease confidence in the other partner's true intentions, increasing conflict between negotiators. Uncertainty may also reduce their willingness to (honestly) exchange accounting information that could enhance their exchange, as well as reduce their confidence in the information that is exchanged. On the other hand, uncertainty may stimulate negotiators to exchange information and seek better outcomes, which thus could mitigate negative effects on behavior. This would be

particularly the case when negotiators possess refined information that enables them to identify mutually beneficial tradeoffs (Chang et al. 2013; Van den Abbeele et al. 2009).

In this study we experimentally examine buyer-supplier negotiations to analyze how outcome or payoff uncertainty that is inherent to a transaction interacts with accounting information in influencing negotiation behavior and outcomes. Following prior studies in experimental economics, we study a particular form of uncertainty, namely uncertainty in negotiators' payoffs (e.g., Church and Zhang 1999; Roth and Murnighan 1982). We theorize payoff uncertainty to increase the likelihood of conflict between buyers and suppliers as it induces them to take different reference points on the price interval that a negotiated agreement could fall within.

Prior research on interfirm cooperation argues that accounting information has particular relevance to uncertain contexts as it may help reduce the conflict that uncertainty generates between exchange partners (e.g., Heide and John 1992). Accounting studies emphasize how refined accounting information such as TCO information has the ability to improve outsourcing decisions and negotiation outcomes. The main argument is that refined accounting information enables negotiation partners to jointly find the most optimal agreement. A second argument is more behavioral: refined accounting information supports 'integrative behaviors' that are characterized by joint problem solving and cooperation. These studies, however, also recognize the reservations that firms have in sharing such information because of concerns about distributive partner behavior, which can result in partners withholding information and forgoing potential gains (Chang et al. 2013; Dekker 2003; Drake and Haka 2008; Van den Abbeele et al. 2009). We consider in our experiment accounting information that is unrelated to the source of (payoff) uncertainty, does not directly help to reduce it and thus will not directly assist the negotiation partners in finding the most optimal agreement. We expect payoff uncertainty to increase the tension between negotiators' willingness to (truthfully) exchange information and their cooperative use of it to identify tradeoffs that mitigate the effects of the uncertainty. We hypothesize that the latter effect, where negotiators

use relatively more integrative negotiation tactics, is more likely to take place when they have access to refined (TCO) information that facilitates them in seeking mutually beneficial tradeoffs.

Consistent with expectations, the results of the experiment show that payoff uncertainty evokes a reduction of cooperative behavior (i.e., less use of integrative tactics relative to distributive tactics), and as a result in less joint profit. The presence of TCO information, however, mitigates the adversarial effect of payoff uncertainty on behavior and on joint outcomes. Our results thus lend support to the expectation that in interfirm negotiations, in particular those characterized by high uncertainty, refined accounting information can help to achieve better outcomes by positively affecting negotiation behavior.

The key contribution of this study to the accounting literature is that we develop and experimentally test a model of how accounting information moderates the effects of uncertainty in affecting negotiation behavior and subsequent outcomes. Since negotiations are at the core of decision making in outsourcing relations, we argue that to gain an adequate understanding of collaborative outcomes, it is imperative to understand partners' negotiation behavior and how this is affected by the conditions that they face. The next section reviews the literature on interfirm negotiations, and in particular the effects of uncertainty and accounting information. Section 3 develops the research framework and hypotheses, and Section 4 covers the experimental methods used to test the hypotheses. Sections 5 and 6 discuss the data, results, and limitations of the study.

2. Literature review

In recent years, interfirm collaboration has received much attention in accounting research, in particular because of the recognition that accounting information and control mechanisms may contribute to the successful development and continuation of collaborative agreements. Interfirm relationships often expose exchange partners to significant risk (Anderson and Dekker 2005; Krishnan et al. 2011). Transaction cost economics (TCE) in particular posits that when interfirm exchange involves valuable assets, the presence of uncertainty causes significant exchange hazards

that provide a greater likelihood of conflict and opportunism. While prior accounting studies have considered the implications for interfirm contract design and control, it is the negotiation stage that is first impacted by these exchange hazards (Anderson and Dekker 2014).

Although accounting studies have relied extensively on TCE in the analysis of interfirm relations, they often complement TCE arguments with other theoretical perspectives. Specifically, studies have shown that behavioral perspectives help to understand exchange partners' collaborative behaviors and outcomes (Chang et al. 2013; Coletti et al. 2005; Drake and Haka 2008). In the setting of buyer-supplier negotiations, social exchange theory (e.g., Walton and McKersie 1965) has been used extensively as it offers a theoretical foundation for incorporating social and behavioral factors into the analysis of relationships. Although this theory was initially developed to examine social exchange perspectives that are not purely economic, since its inception many studies have applied social exchange theory to the setting of economic negotiations (Thompson et al. 2010). Social exchange theory describes negotiation as a process characterized by negotiation tactics.

We follow this literature by relying on both economic and social exchange theory to examine interfirm negotiations, and in particular how payoff uncertainty and accounting information influence negotiation behavior and consequent outcomes. In the following paragraphs, we first review the core constructs of this study, and in the section thereafter develop theory how accounting information moderates the influence of payoff uncertainty on negotiation behavior. As summarized in Figure 1, we expect that negotiation behavior (in the form of negotiation tactics) mediates the influence of these two conditions on joint outcomes.

** Insert Figure 1 around here **

2.1. Uncertainty

In TCE uncertainty is a critical transaction feature that generates contracting problems and potential conflict between exchange partners. When an exchange involves specific assets (which is typically

the case in outsourcing settings), uncertainty generates concerns about potential opportunistic behavior. In negotiating the conditions of interfirm exchange, in particular the negotiators who act on behalf of the exchange partners are confronted with this uncertainty. Prior negotiation studies in experimental economics have examined how uncertainty affects negotiators' bargaining behavior and outcomes. These studies typically introduce uncertainty in the payoffs of either or both buyer and supplier (e.g., Bottom 1988; Church and Zhang 1999; Roth and Murnighan 1982). A critical expectation in these studies is that uncertain payoffs of negotiated agreements generate a greater degree of conflict between risk averse negotiators than certain payoffs do. In particular, uncertainty in payoffs leads negotiators to focus on different reference points to reduce the likelihood of unfavorable outcomes after a deal is closed (Church and Zhang 1999; Karagözoğlu and Riedl 2015; Koop and Johnson 2012). In this study, we follow this approach by introducing uncertainty in the payoffs of both buyer and supplier. Exposing them both to payoff uncertainty should provide greatest potential for conflict and disagreement.¹ In particular, when payoff uncertainty causes negotiators to face the potential prospect of reduced or even negative payoffs, they can be expected to make greater use of distributive tactics to obtain more favorable terms that would limit the negative consequences of the payoff uncertainty.

2.2. Accounting information

Negotiation studies posit that when exchange partners possess relevant information and use this actively during their negotiations, this can help overcome exchange problems and promote collaborative behavior (e.g., Pruitt 1981; Pruitt and Lewis 1975). Prior literature has viewed information sharing as a process in which exchange partners voluntarily exchange information with each other (Heide and John 1992). Accounting information in particular has the potential to stimulate cooperation, as relevant information such as about exchange partners' costs provides a basis for analysis and discussion and can enable them to identify, quantify and negotiate value

¹ Church and Zhang (1999) find that when only the seller faces uncertainty, this can lead the buyer to make concessions to compensate for the seller's uncertainty.

enhancing opportunities in the supply chain (Baiman and Rajan 2002; Chang et al. 2013; Dekker 2003; Drake and Haka 2008; Van den Abbeele et al. 2009).

To examine the influence of accounting information on negotiation behaviors and outcomes, prior accounting studies have distinguished ‘coarse’ and ‘refined’ accounting information, such as traditional cost (TC) information versus activity-based costing (ABC) or total cost of ownership (TCO) information (Drake and Haka 2008; Van den Abbeele et al. 2009; Masschelein et al. 2012). TCO information provides buyers with refined information that details the costs associated with specific activities in the supply chain. When buyers possess such information, this is expected to result in different interactions with suppliers (who in prior experimental studies typically are all provided with TCO information). Accordingly, as compared to the coarse and less informative traditional cost information, the more refined TCO information provides a better basis for identifying mutually valuable improvements and agreements.

Prior experimental studies have shown that information sharing in negotiations is an important antecedent of improved joint outcomes (e.g., Pruitt 1981; Pruitt and Lewis 1975). Buyer-supplier relations are also suggested to become closer and stronger when negotiators or collaborators possess and share refined accounting information (Chang et al. 2013; Krishnan et al. 2011). On the other hand, Drake and Haka (2008) show that negotiators are often unwilling to share refined accounting information, as this could increase their exposure to opportunistic holdup. As a result of this unwillingness to share, they limit their ability to use the information to jointly identify opportunities for efficiency improvements.² Thus, in order to have a positive impact on joint outcomes, negotiators need to overcome their concerns about information sharing.

2.3. Negotiation tactics

² In line with these experimental findings, Schloetzer (2012) finds that supply chain partners increase the sharing of information when the potential for opportunistic holdup decreases and vice versa. Similarly, other field research finds that firms are hesitant to share accounting information, not only because of its sensitivity, but also because even if potential efficiency improvements would be identified, concerns arise about the distribution of costs and benefits of supply chain adaptations (Dekker 2003).

Negotiators use various tactics to promote their interests (Weingart et al. 1996). Social exchange theory (Walton and McKersie 1965) is widely used for studying these tactics, and broadly differentiates between two types: *integrative tactics*, which involves maximizing both own and others' gains, and *distributive tactics*, which involves maximizing only own gains, even if this comes at the expense of the other. Integrative tactics are viewed as a means by which parties make tradeoffs or jointly solve problems to realize mutual benefit (Walton and McKersie 1965). Integrative bargaining is used in tasks with multiple issues that vary in importance to each party (Pruitt and Lewis 1975).³ Integrative tactics thus are aimed at first enlarging the pie before subsequently dividing it. On the contrary, distributive tactics are viewed as hard bargaining with the goal of obtaining a greater piece of the pie, given the size of it (Pruitt and Lewis 1975).

De Dreu et al. (2006) found that in choosing negotiation tactics, negotiators need a good understanding of their task in order to realize higher joint profit. This requires them to acquire and share information. Prior experimental negotiation studies have shown that negotiators who exchange information about preferences and priorities are more likely to reach agreements that also have better economic payoffs (e.g., Pruitt 1981). This information exchange thus is built on use of integrative instead of distributive tactics. Indeed, prior studies conclude that joint outcomes improve when negotiators use more integrative tactics and less distributive tactics (e.g., Chang et al. 2013; Pruitt and Lewis 1975; Van den Abbeele et al. 2009). Having described the core constructs of this study, the next section develops hypotheses on how payoff uncertainty and accounting information influence negotiation behavior and outcomes.

3. Hypothesis development

Figure 1 depicts the research model of this study. As the model shows, accounting information is expected to moderate the influence of payoff uncertainty on the use of negotiation tactics, which in

³ Walton and McKersie (1965) postulate several conditions for use of integrative tactics: (a) several issues are considered simultaneously, (b) bargainers view the issues as problems to be solved, and (c) there is free exchange of information about preferences and needs.

turn affect joint profit. The inclusion of both moderation and mediation effects in one model helps to explain when (moderation) and how (mediation) negotiation conditions affect outcomes (Van den Abbeele et al. 2009).⁴ The hypothesis development in this section represents the first-time interaction between buyer and supplier, similar to real negotiations between initially unfamiliar negotiators. This setting mitigates the effects of existing social and economic ties that may alter negotiation behaviors and outcomes.

3.1. The effects of payoff uncertainty and accounting information

As discussed in section 2, uncertain payoffs increase the degree of conflict between negotiators as the uncertainty leads them to focus on different reference points during the negotiation. Accounting information has particular relevance to uncertain exchange settings, as it may help reducing the frictions between exchange partners that uncertainty generates and thus to support use of integrative behaviors (Krishnan et al. 2011). Indeed, a well-recognized effect of the exchange of refined information is that it can help exchange parties to cooperatively adjust to uncertain conditions (Heide and John 1992). Prior negotiation research finds support for the value of information sharing under uncertainty. Haka et al. (2000), for instance, found that when negotiators faced uncertainty, accounting information helped to reduce conflict in reaching agreements. This implies that when payoff uncertainty increases, refined accounting information can enable and induce negotiators to use relatively more integrative tactics. This is particularly the case when the negotiation involves multiple issues that vary in importance to each party, and thus provides space for an integrative agreement (Pruitt and Lewis 1975). Van den Abbeele et al. (2009) identify how refined accounting (TCO) information enables negotiators to identify ways to jointly solve problems.

Prior research, however, also shows that negotiators have restraints in exchanging valuable refined information, which could increase their exposure to opportunistic holdup (Drake and Haka

⁴ Van den Abbeele et al. (2009) combine moderation and mediation to better understand causal effects. They investigate the influence of TCO information and power on buyer–supplier negotiations, and also consider two stages in their model: (1) the direct and interaction effects of TCO information and power on negotiation outcomes, and (2) the mediation effects of negotiation tactics on these outcomes.

2008). Such concerns could be amplified by payoff uncertainty which may reduce information exchange and also limit confidence in the information that is exchanged. Yet, as both parties to the exchange in our setting face payoff uncertainty, they require greater effort to convince the other to accept their proposed offer. Church and Zhang (1999) find that buyers facing suppliers with outcome uncertainty are more willing to make concessions to compensate for the supplier's uncertain outcomes. Our setting is different as both negotiators (instead of only one) face uncertainty which evokes them to take different reference points. In this setting, refined accounting information can be useful to negotiators to provide and through interaction further develop more convincing arguments and identify tradeoffs among the issues to be negotiated. This can result in more integrative agreements and therefore easier concessions by the counterpart. Thus, we expect that payoff uncertainty can induce the revelation of the available TCO information during the negotiations to come to mutually agreeable agreements. In contrast, the absence of refined information leaves negotiators empty handed in providing credible arguments and through interaction to identify mutually beneficial tradeoffs, and therefore does little to help mitigate the negative effect of payoff uncertainty on negotiation behavior.

We build on this logic to argue that particularly when negotiators face uncertainty in the payoffs of possible agreements, the exchange of refined accounting information in a multi-issue negotiation enables them to identify ways to better tradeoff their interests. Important in these arguments is that the accounting information is not directly related to or helps to reduce the payoff uncertainty, but instead enables negotiators to better cope with the given uncertainty by adapting their negotiation behavior. Based on these arguments we provide two hypotheses on the main effect of payoff uncertainty on negotiation behavior, and the moderating effect of TCO information:

***H₁**: Payoff uncertainty negatively affects negotiators' relative use of integrative tactics.*

***H₂**: The presence of TCO information weakens the negative effect of payoff uncertainty on negotiators' relative use of integrative tactics.*

3.2. The effects of negotiation behavior on negotiation outcomes

Prior social psychology studies on negotiation behavior show that choice of negotiation tactics can critically influence economic outcomes. Early studies of Siegel and Fouraker (1960) and Kelley (1966), for example, identified the importance of integrative tactics for negotiators' joint profit, while subsequent research by Pruitt and Lewis (1975) shows how distributive tactics reduce joint profit. Later negotiation studies provide similar results (e.g., De Dreu et al. 2006; Graham et al. 1992), and consistent with this prior research, recent accounting research concludes that negotiation tactics mediate the effects of negotiation conditions on outcomes (e.g., Van den Abbeele et al. 2009). Accordingly, in addition to our hypotheses on how negotiation conditions affect negotiators' choice of tactics, we hypothesize that these tactics in turn influence negotiation outcomes:

H₃: Negotiation tactics influence joint profit such that greater use of integrative tactics relative to distributive tactics increases joint profit.

Jointly, H2 and H3 thus provide an expectation of moderated mediation, in which the influence of payoff uncertainty on joint profit through negotiation behavior is weakened by the presence of TCO information.

4. Research method

4.1. Experimental design

The experiment that we designed to test the hypotheses consists of computerized negotiation games between buyers and suppliers using a completely randomized 2x2 full factorial design. The games closely resembled those used in previous bargaining studies that were based on Kelley (1966). Kelley argues that the process of negotiation is a matter of 'tension between information needs and information restraints, which constitutes the central motivational force for negotiators' behavior (p.58). The Kelley bargaining game was selected because it is considered to simulate the essential elements of actual commercial negotiations well (e.g., De Dreu et al. 2006; Pruitt and Lewis 1975; Van den Abbeele et al. 2009).

We recruited 178 students from graduate and undergraduate accounting courses of a Dutch university, which resulted in 89 dyadic observations.⁵ Upon arrival at the computer lab, participants were told that they would participate in a simulated negotiation task and received general instructions about their company, position and bargaining task. Participants were randomly assigned the role of buyer or supplier to negotiate multi-issue agreements in three games.⁶ They were randomly matched as pair (for all games), and were randomly balanced over the four experimental conditions (see Table 1).⁷ Buyers and suppliers were placed in different lab rooms to secure anonymity and to avoid interaction in any other way than through the computer. Participants exchanged all information (offers and messages) via their computer screen. Appendix A provides an abbreviated version of the negotiation scenario.

The supplier made the first offer, consisting of a proposal on the three contract issues. Subjects were informed to feel free to use the information they had to shape their bargaining situation and to provide arguments to strengthen their position if they desired. Each game ended when (i) an agreement was achieved, (ii) a player decided to end the game, or (iii) an agreement had not yet been reached after 10 offers.⁸ In the last two situations, joint profit for the game was zero. Participants earned €3 for participating plus a bonus of 0.01% of their company's profit. The average payout was €8.60 (min. €3; max. €17).

We manipulated *payoff uncertainty* similar to prior economic experiments that introduce uncertainty in the buyer's and/or supplier's payoffs which is expected to influence negotiators' probabilistic expectations about the terms of agreement (e.g., Church and Zhang 1999; Roth and

⁵ Participants were enrolled in 3rd year BSc or in MSc-level management accounting courses, and included a significant proportion (54) practitioners enrolled in a part-time MSc program. We deleted two dyads (out of 91) as participants did not understand the instructions, or did not participate in a serious manner.

⁶ To mitigate the use of end-game strategies, participants were informed that they would play three to five games, although in all cases the experiment stopped after three games.

⁷ Participants were not allowed to identify themselves through their messages. Inspection of all exchanged messages confirmed this did not happen.

⁸ In 20 cases (nine in game 1, nine in game 2 and two in game 3) a player decided to end the game. Twelve of these terminations were in the high uncertainty condition and eight in the low uncertainty condition. Eleven were in the TCO condition and nine in the traditional cost information condition.

Murnighan 1982). Variability in the payoff function can be expressed by adding a probabilistic modifier to the most likely outcome and by providing an interval of possible outcomes, with the most complete uncertainty description including a combination of probabilities and intervals (Teigen and Jørgensen 2005). In our study, we used the combination of probabilities and pay-off intervals around expected values.

We used the payoff tables in Kelley (1966) and to manipulate uncertainty constructed probability-based intervals concerning the contract price, with a narrow interval for low uncertainty (maximum deviation of 1%) and a wider interval for high uncertainty (maximum deviation of 30%). More specifically, we introduced in the negotiation scenarios an uncertain external factor that causes variability in the supplier's market price and that, after negotiators have reached an agreement, can cause a deviation from the agreed upon price. For instance, participants facing high uncertainty are told that the exact contract price could end up anywhere between €3400 and €4600, whereas under low uncertainty the interval would be between €3980 and €4020. With an equal expected value (€4000), the high uncertainty condition thus represented a maximum deviation of 30% (-15% to +15%) and the low uncertainty condition a deviation of at maximum 1% (-0.5% to +0.5%; cf. Rode et al. 1999).⁹ In the high uncertainty condition, buyers' and suppliers' payoffs of the different negotiation options partially overlapped, which was not the case in the low uncertainty condition. All participants were explained that the exact price would not be known until the end of all negotiations. In order to enhance credibility of the treatment, participants were provided with a brief description that in previous negotiations the actual price often was a surprise by deviating from the predicted average, including examples of recent negotiations with below and above average price and outcomes. Participants only faced uncertainty about the contract price, which was the most significant negotiation issue.

⁹ We also used an interval in the low uncertainty condition to retain consistency in presentation format that otherwise could confound treatment effects.

We manipulated *accounting information* by providing buyers with one of two types of cost information: traditional cost or TCO information (suppliers always had TCO information). Traditional cost information provided only the purchase price of a particular product and non-monetary (quantity) information for the other two negotiation issues. TCO information also accounts for costs that are caused by buying at a certain supplier, such as the costs of ordering, expediting, receiving, inspecting, quality and administration (Wouters et al. 2005). As in the experiment of Van den Abbeele et al. (2009), the payoff tables of Kelley's (1966) experiment were replaced by cost tables for buyers, and cost and income tables for suppliers. Buyers with TCO information had a payoff table expressing cost information of all three issues to be negotiated in monetary values, whereas buyers with traditional cost information had a payoff table showing the first issue (contract price) in monetary values, and the other two issues only in terms of relative importance (nonmonetary values). All suppliers received the same information regardless of condition; thus they always had TCO and full income information. To incorporate the uncertainty treatment, the contract price information was presented in intervals.

4.2. Experimental tasks and scenarios

The first game. Buyers and suppliers had to bargain about the purchase of a napkin tissue and pocket tissue machine. The instructions explained that maintenance and spare parts are needed to keep the machines running, and are part of the final contract. The negotiation options included five levels (contracts) labeled from "A" to "E" for each of the three issues: purchase price, level (or contract price) for maintenance, and level (or contract price) for spare parts. The supplier's information sheet for each contract option showed the price of the machine and costs for both maintenance and spare parts. In the TCO condition, the buyer's sheet showed for each contract option the cost of the machine, maintenance, and spare parts. In addition, it showed the buyer's expected income after renewing the machine. In addition, for each contract proposal received and sent, the negotiators would be provided with the expected profit range.

In the traditional cost information condition, the buyer's sheet showed for each contract option the price of the machine, the level of maintenance, the number of spare parts, and the expected income from renewing the machine. While suppliers for each contract proposal received and sent were shown the expected profit range, buyers received the numerical information about each negotiation issue and a message that profit would be shown at the end of all negotiations.

Appendix B illustrates the machine prices and cost sheets provided to participants. In the experiment negotiators had only their own sheet, and were not shown their partner's information and payoff tables. Instead, they needed to get insights into their partner's payoffs through the exchange of offers and messages. The games contained one distributive issue (i.e., contract price), while the other two negotiations issues could be logrolling.¹⁰ Distributive issues are purely fixed-sum issues, with gains for one party resulting in equal losses for the other. Logrolling issues instead are variable-sum, with gains for one party not resulting in equal losses for the other.

Buyers achieved the highest profit and suppliers the lowest profit when agreeing on the "A-A-A" contract. The opposite holds for the "E-E-E" contract. For buyers maintenance had the highest cost potential and spare parts the lowest, and the opposite held for suppliers.¹¹ While specifically told that any combination of letters would be acceptable, often dyads approached the task by proposing the same or nearly the same contract level for all three issues (i.e., the middle contract 'C-C-C', which would yield a joint profit of €4000. As the profit schemes in appendix C show, joint profit in excess of this level could only be achieved by means of a "diagonal" option where buyers and suppliers trade off maintenance cost and spare parts. The most integrative agreement was the diagonal contract C-A-E (joint profit = €4800, equally divided among the two partners), in

¹⁰ Pruitt (1981) identified several strategies for reaching integrative agreements, including logrolling, in which bargainers make tradeoffs between issues so that each party gets all or most of his or her preferred outcome on important issues, and compromise on issues of lesser importance.

¹¹ As an example of an unlikely possibility, if a party would convince the other to accept his or her optimal terms (A-A-A for buyers, E-E-E for suppliers), then this party's expected profit would equal €5600 (low uncertainty '€5580~ €5620', high uncertainty '€5000~ €6200'). The exchange partner would incur an expected loss of €1600 (low uncertainty '€1620 ~ €1580', high uncertainty '€2200 ~ €-1000').

which the distributive price issue is immaterial to joint profit, and the two other issues are fully traded off. Participants could only identify the optimal diagonal contract through making offers and counteroffers and exchanging information about their interests and costs.

The second game. Participants again negotiated on three issues simultaneously, concerning a set of spare parts for a toilet tissue machine: price, delivery time and payment terms. Buyers were informed that they preferred a short delivery time for the spare parts, and a long payment term. For each of these issues, the negotiation included seven contracts levels labeled from “A” to “G”. The negotiators’ sheets provided similar information as in the first game (see Appendix B). Again, in the experiment each negotiator only had his or her own sheet. The most integrative agreement is found on the diagonal D-G-A, with a joint profit of €4000 (€2000 for each exchange partner; see Appendix C). As in game 1, the diagonal D-G-A could be reached by setting the distributive issue (price) at the middle and fully trading off the two integrative issues (delivery time and payment terms).

The third game. Participants had to bargain about the purchase of a kitchen towel tissue machine including maintenance and spare parts. For each of these issues, the negotiation included five contracts levels labeled “A” to “E”. The negotiators’ sheets provided similar information as in the first game, and are illustrated in Appendix B. Again, each negotiator only had his or her own sheet. The most integrative agreement is found on the diagonal C-E-A, with a joint profit of €2.200 (€2.600 for each; see Appendix C). As in game 1, the diagonal C-E-A could be reached by setting the distributive issue (machine price) at the middle and fully trading off the two integrative issues (maintenance and spare parts).

4.3. Measurement of the dependent variables

Joint profit. Prior negotiation studies typically capture economic negotiation outcomes in the form of joint profit (e.g., Pruitt and Lewis 1975). At the end of each game, we established the dyad's

joint profit by summing the profits of both negotiators. If in a game a negotiator terminated the negotiations, the game profit for both negotiators is set at zero.

Negotiation tactics. Social exchange theorists (e.g., Pruitt 1981) generally distinguish between two types of negotiation tactics: integrative tactics and distributive tactics. Whereas in previous research negotiation tactics have often been measured through survey questions, their self-reporting nature may result in biases and deviate from the content (i.e., what people actually say). Accordingly, as in Chang et al. (2013) and Van den Abbeele et al. (2009) we allowed participants to send messages along with their offers and counteroffers, and coded these messages to obtain detailed measures of integrative and distributive tactics. Hence, we use a more complete registration of actual negotiation behavior used by participants during the negotiations.

Integrative tactics involve the exchange of information about priorities, preferences, or numerical values. We coded use of these tactics separately for suppliers and buyers by focusing on their asking for and giving of information. This was captured by questions and statements such as about how negotiators prioritized issues (e.g., what is the most important issue for you?; The payment term is more important to me than delivery time). The coding included the following elements with sub-dimensions for each category (see Table 2 and Appendix D): exchange of information, creating a pleasant atmosphere, extending invitations to cooperate, and making constructive proposals (Chang et al. 2013; Van den Abbeele et al. 2009; Weingart et al. 1996). A score of '1' was provided if a tactic was present in a message sent by a participant. To measure the dyad's use of integrative tactics we summed the number of occurrences of integrative messages observed during the negotiations.

Distributive tactics refer to tactics such as withholding information while using strategies to get information, offering minimally acceptable offers, sending positional commitments, being slow to give concessions, concealing feelings, and using persuasive arguments and warnings (Graham et al. 1992; Walton and McKersie 1965; Pruitt and Lewis 1975; Weingart et al. 1996). Table 2 provides an overview of the tactics and sub-dimensions used for coding distributive tactics, and

Appendix D provides the operational definitions. Use of distributive tactics was scored and computed in the same way as integrative tactics. We compute our measure of use of integrative tactics relative to distributive tactics (ΔNT) as the difference in their use.

The communications that were recorded during the experiment comprised 243 pages of messages. We used ATLAS.ti v.6.2 to code and analyze them. Coding was conducted independently by two raters (one of which was not involved in the study), and their inter-rater agreement was reasonable but also provided several differences (Cohen's Kappas of above 0.60).¹² Review of the differences resulted in a consensus coding that can be considered sufficiently complete and reliable.

To validate the coding measure of negotiation tactics, we asked participants after each game a question about how they would characterize the bargaining behavior of their partner, on a scale from one (competitive) to seven (cooperative). The average score across the negotiators correlates well and significantly ($r=0.47$, $p<0.01$) with the relative use of integrative tactics, supporting the validity of the content-based measurement. In addition, after the last game participants rated their and their partner's bargaining behavior on items concerning their problem solving orientation (Van den Abbeele et al. 2009). These items similarly correlate positively with relative use of integrative tactics, with negotiators focusing more on their joint instead of individual position, adjusting more to each other, being more honest and exchanging more objective (unbiased) information ($r=0.21$; $r=0.22$; $r=0.16$; $r=0.18$, all $p<0.01$).¹³

4.4. Manipulation checks

After completing the negotiations, subjects filled out a questionnaire (identical for both roles) with questions about their motivation, understanding of the instructions, payoff tables and incentive

¹² Some messages turned to be difficult to code with the ex-ante developed coding scheme. To increase coding reliability, two additional raters recoded part of the messages, resulting in the creation of two new grounded codes: "refusal to share information" as distributive tactic and "proposal to compromise" as integrative tactic. All messages subsequently were recoded by the first two coders.

¹³ When separating the perceptions of own and the exchange partner's behavior, we obtain similar results.

scheme, time pressure to complete the negotiations, pleasure in conducting the experiment, and manipulation checks (see Appendix E).¹⁴ Mean scores on the questions indicate that participants evaluated the negotiation as “interesting” (mean= 5.25; SD= 1.16), understood the instructions (mean= 5.44; SD= 0.94), were well motivated (mean= 5.02; SD= 0.85), and had sufficient time to complete the negotiations (mean= 4.60; SD= 1.27).

A variety of questions was designed to serve as manipulation checks, and the mean scores indicate the manipulations were successful. We asked on which value in the contract price interval the players focused during the negotiations (minimum, maximum or mean). Negotiators facing low uncertainty focused significantly more often on the mean of the interval than negotiators facing high uncertainty ($\chi^2= 9.20$, $df =2$, $p<0.01$). When not focusing on the mean, suppliers most often focused on the minimum price, while buyers most often on the maximum price. A Wilcoxon test shows that this difference in focus on the price interval is significant ($p<0.01$). These results are consistent with the idea that negotiators who face high payoff uncertainty take different reference points, which increases conflict between them. Negotiators facing high uncertainty also felt afterwards that they needed significantly more time to negotiate with their partner than those facing low uncertainty ($F(1,88)= 5.08$, $p<0.05$).

In evaluating the usefulness of the cost information they received, buyers with TCO information judged this to be more useful than buyers with traditional cost information ($F(1,88)= 19.31$, $p<0.01$). Buyers who faced high uncertainty indicated it took more time to reach an agreement as compared to those facing low uncertainty ($F(1,88)= 6.85$, $p<0.01$).

We additionally captured perceptions on information sharing during the negotiations (1= keeping information; 7= giving information). On average, participants evaluated their bargaining strategies more to involve keeping information than to share this (mean= 3.42; SD= 1.17), in particular buyers with traditional cost information (mean= 3.12; SD= 1.13). Similarly, participants

¹⁴ To avoid memory or common method effects, every survey question was presented in a separate screen.

perceived their partners to keep more information than to share this (mean= 3.14; SD= 1.17), in particular suppliers negotiating with buyers with traditional cost information (mean= 3.03; SD= 1.23). Finally, participants were asked to evaluate which outcome they focused on during the negotiations (1= individual results; 7= joint results). The mean scores indicate participants had a slightly greater emphasis on their own results (mean= 3.70; SD= 1.32).

5. Experimental results

5.1. Descriptive statistics and hypothesis tests

Table 3 provides summary statistics for the dependent variables over the three games across the four experimental conditions. The negative means for ΔNT indicate that on average negotiators made more use of distributive tactics than of integrative tactics. To test for differences across the cells, we use Kruskal-Wallis tests since in 20 cases the negotiation was stopped, resulting in zero joint profit. This causes the distribution of joint profit to be non-normal. Regarding negotiation tactics, the Kruskal-Wallis test shows that cells differ significantly from each other ($p < 0.05$). As initial support for H1, negotiators make relatively least use of integrative tactics when they face high payoff uncertainty, in particular when the buyer is provided with traditional cost information. The provision of TCO information results in similar negotiation behavior as in the low uncertainty condition, which result is consistent with H2. Joint profit on average is also lowest in the high uncertainty, traditional cost information condition, and the Kruskal-Wallis test again indicates that cells differ significantly from each other ($p < 0.01$). Across both low and high uncertainty conditions, participants with TCO information reached higher joint profit.¹⁵

** Insert Table 3 around here **

The bivariate correlations in Table 4 show that supplier profit and buyer profit are negatively correlated, but also correlate positively with joint profit. This is consistent with the experiment not being a zero sum game, and the presence of integrative solutions. Negotiators' use of integrative

¹⁵ To support interpretation of the profit differences between cells, conditional on negotiators reaching an agreement, the average profit in game 1, 2 and 3 are €3594, €3639 and €3738, respectively.

tactics correlates negatively with their own profit, but positively with the other's profit, with the other's relative use of integrative tactics and with joint profit. These correlations support the idea that integrative behaviors and the related willingness to compromise can go at the expense of one's profit, but indirectly, through the partner's reciprocating integrative behaviors, result in higher own and joint profit. Payoff uncertainty is associated with less integrative supplier negotiation behavior, and is unrelated to buyer negotiation tactics. It also is positively correlated with supplier profit, negatively with buyer profit, and uncorrelated with joint profit. The presence of TCO information is positively associated with supplier, buyer and joint profit.

** Insert Table 4 around here **

Table 5 reports the results of ANOVA analyses of ΔNT and joint profit based on contrast coding.¹⁶ Given the non-normal distribution, we use the rank-order of joint profit (and later also of individual profit) in the analysis.¹⁷ The ANOVA reveals main effects of payoff uncertainty ($p < 0.05$) and accounting information ($p < 0.05$) on ΔNT . Estimates show that, consistent with Table 3, payoff uncertainty induces a relatively lower use of integrative tactics (cf. H1), while TCO information induces the opposite. The interaction effect on ΔNT is also significant ($p < 0.05$), and the estimates support that TCO information mitigates the negative impact of payoff uncertainty on negotiation behavior (cf. H2). Table 5 also shows a main effect of accounting information on joint profit ($p < 0.01$). The estimates show that negotiators with TCO information reach higher joint profit. Payoff uncertainty and the interaction with accounting information produce no significant effects on joint profit.

** Insert Table 5 around here **

In our theory development, we hypothesize that negotiation tactics mediate the influence of the treatment conditions on joint profit. Specifically, our hypothesis development is based on the

¹⁶ Buckless and Ravenscroft (1990) demonstrate “that contrast coding provides greater statistical power than the conventional ANOVA without increasing Type I error rates” (p. 933).

¹⁷ Despite the non-normal distribution, ANOVA tests of the raw profit data provides similar results.

premise that negotiation behavior affects outcomes, and thus that behavior mediates the influence of the treatment conditions on these outcomes (i.e., ‘moderated mediation’). Importantly, mediation can exist even in the presence of not significant (overall) direct effects between antecedent and dependent variables (Hayes 2009). Given the expectation of mediation effects of negotiation behavior, we conduct a formal test of the hypotheses using structural equation modeling (SEM). SEM has the advantage that mediation effects can be tested simultaneously rather than testing the components in a piecemeal fashion (MacCallum and Austin 2000).

We estimate the mediation model in SPSS AMOS (v.23) using maximum likelihood estimation. Following recommendations of Hayes and Preacher (2004), and similar to the ANOVA tests, we use contrast coding (1/-1) for the treatment variables. Also following their recommendations, we generated 5000 bootstrap resamples and employ a 95% confidence interval to obtain bootstrap confidence intervals for the indirect effects. This procedure not only allows estimating the indirect effects confidence intervals, but also to handle the non-normal data relating to negotiator profit. Because our data is of a repeated nature for dyads of negotiators, we include as control variables indicators for the game that observations relate to (i.e., game 2 and 3, with game 1 as reference category).¹⁸

Table 6 reports the results. We use multiple goodness-of-fit indices to assess model fit (cf. Hu and Bentler 1999), including the Chi-square statistic divided by the degrees of freedom (χ^2/df), Goodness-of-fit index (GFI), adjusted GFI (AGFI), Normed Fit Index (NFI), Comparative Fit Index (CFI), and Root Mean Square Error of Approximation (RMSEA). The following cutoff criteria were used to assess the model-fit: (χ^2/df) ratio less than 3; GFI, AGFI, NFI, and CFI greater than

¹⁸ We also added indicators to control for the different types of students that participated (bachelor, full time master and part-time master students, with the last group including more experienced participants). While full-time students were on average more integrative in their behavior and part time students on average less integrative, the findings with respect to the treatment variables did not change. In addition, controls for risk preferences (cf. Sprinkle et al. 2008), gender, and the times and days in the week the experiments took place were insignificant and did not influence the results.

0.90; and RMSEA acceptable up to 0.08 (Hu and Bentler 1999; Fan et al. 1999). Model fit is adequate, as the fit statistics are within the recommended cutoff values.

Regarding the coefficient estimates, we report direct effects of the treatment variables on ΔNT and total effects on joint profit which allow to assess the indirect effects through negotiation behavior. As Table 6 shows, the results for the treatment variables are consistent with the results of the Kruskal-Wallis tests. In support of H1, payoff uncertainty is associated with a reduced use of integrative tactics relative to distributive tactics ($p < 0.05$). Consistent with H2, the provision of TCO information to the buyer mitigates this negative effect of uncertainty ($p < 0.05$). The estimates also show that the direct effect of TCO information on negotiation behavior is positive and significant, which is consistent with prior experimental research that shows that TCO information supports a cooperative ('problem-solving oriented') mode of negotiation (Van den Abbeele et al. 2009).

In support of the hypothesized mediation effect (H3), ΔNT has a positive and significant effect on joint profit ($p < 0.01$). Consistent with this mediation effect, the total effects show that through negotiation behavior, uncertainty results in lower joint profit ($p < 0.01$), while the provision of TCO information mitigates this negative influence ($p < 0.05$).¹⁹ Overall, these results lend support for the expectation that payoff uncertainty induces relatively less integrative negotiation behavior at the favor of distributive behavior, resulting in lower joint outcomes. Refined accounting information that helps negotiators in identifying mutually beneficial tradeoffs weakens the negative effect of uncertainty on behavior and outcomes. The total effects also show a positive significant direct effect of TCO information, which indicates that the more cooperative negotiations in the presence of TCO information also result in higher joint outcomes.

In addition to these main results, the game indicators show that negotiators are relatively more integrative in the second and third game ($p < 0.05$ and $p < 0.01$), which results in greater joint profit

¹⁹ In an unreported test, we also observe that under high uncertainty negotiators need significantly more time to come to an agreement ($p < 0.01$), which fits with these observations.

($p < 0.05$ and $p < 0.01$). This finding is consistent with a relationship gradually developing in repeated interactions.²⁰

As an alternative specification, we also let the treatment variables and game indicators directly affect joint profit, additional to ΔNT . Inferences of this (unreported) model remain the same. Again, we obtain a negative effect of uncertainty on ΔNT and through that indirectly on joint profit (both $p < 0.01$), which effects are mitigated by TCO information (both $p < 0.05$). However, the results also provide an additional positive direct effect of TCO information on joint profit ($p < 0.01$). This indicates that negotiators with TCO information, irrespective of the influences on negotiation behavior, on average close better contracts resulting in higher profit.

5.2 Individual level analysis

Consistent with prior studies (e.g., Chang et al. 2013), in the main analyses we analyze the data at the dyad level by averaging the buyer's and supplier's scores for ΔNT and profit. To provide insight into how the negotiation behavior and outcomes of the individual negotiators are influenced by the treatments, we also conduct separate analyses for buyers and suppliers. Summary statistics on individual negotiation tactics and profit are reported in the second part of Table 3. Kruskal-Wallis tests show that significant cell differences exist for individual negotiation tactics of suppliers ($p < 0.01$) but not for buyers. The ANOVA test in Table 5 confirms this result. Thus, it appears that while buyers use relatively similar tactics given the uncertainty they face and the information they have, it is the response of the supplier that differs and that creates the differences in joint behavior. In particular, suppliers facing a buyer with traditional cost information under high uncertainty make significantly less use of integrative tactics relatively to distributive tactics. In this case buyers have little meaningful information to share to engage in joint problem solving and to alleviate the negative effects of payoff uncertainty on supplier behavior.

²⁰ When estimating use of integrative and distributive tactics separately in one model, we also observe that negotiators become more efficient in the later games as they make significantly less use of both tactics.

The Kruskal-Wallis tests in Table 3 also show significant cell differences in individual profit of both suppliers and buyers ($p < 0.05$ and $p < 0.01$). Suppliers earn least profit when buyers have traditional cost information, in which case the negotiators have limited means to seek for tradeoffs through information sharing. Supplier profit is highest when negotiators face high uncertainty and the buyer receives TCO information. This is where the negotiators have meaningful accounting information to share to identify mutually beneficial tradeoffs and the uncertainty provides a stimulus to do so. Buyer profit is highest when negotiators face low uncertainty and the buyer receives TCO information, under which condition buyers can best exploit the information. Buyers earn least profit when they have traditional cost information and uncertainty is high, in which condition suppliers are least integrative in their negotiation behavior. The ANOVA tests in Table 4 also show significant main effects of the treatment conditions on both buyer and supplier profit, but not for the interaction between the treatment conditions.

We again examine the predicted mediation effect on individual profit by conducting the SEM analysis for the suppliers and buyers separately, of which the results are reported in Table 7. In this model, we specify the treatment and control variables to influence supplier and buyer negotiations tactics, which variables in turn influence each negotiator's individual profits. As the supplier initiates the negotiations, we also specify a path from supplier tactics to buyer tactics, with the expectation that treatment-induced negotiation tactics are reciprocated by the negotiation partner (Graham 1983; Pfetsch and Landau 2000; Putnam and Jones 1982).

Model fit is adequate, as all fit statistics are within the recommended cutoff values. Consistent with the observations in Table 6, the results show that the treatment conditions have a significant influence on supplier negotiation behavior. High payoff uncertainty results in relatively less integrative negotiation behavior by suppliers ($p < 0.01$), which influence is mitigated if the buyer is in the possession of TCO information ($p < 0.05$). Buyer possession of TCO information also has a direct positive effect on supplier negotiation behavior ($p < 0.01$). These results indicate that suppliers adapt their negotiation behavior in response to the type of information exchanged by buyers, with

more refined TCO information enabling them to adopt more integrative tactics in their negotiation of a mutually acceptable agreement.

The results also provide evidence of reciprocation of supplier negotiation tactics by the buyer, as evidenced by the positive and significant path of supplier ΔNT to buyer ΔNT ($p < 0.01$). The results further support that, in turn, negotiation behavior influences profit. Specifically, when negotiators become relatively more integrative this has a negative effect on their own profit (because of the concessions they are willing to make), but a larger positive effect on the other's profit. As a consequence, individual and joint profit are increased. The total effects for the treatment variables show that though influencing negotiation behavior, payoff uncertainty primarily negatively affects buyer profit ($p < 0.01$), as suppliers becomes less integrative in their negotiation behavior. In contrast, buyers' possession of TCO information reduces supplier profit ($p < 0.05$), while it increases buyer profit ($p < 0.01$). In addition, TCO information reduces the profit disadvantage of uncertainty for buyers by supporting use of more integrative negotiation behavior by suppliers.

6. Discussion and conclusion

This study aims to increase our understanding of the role of accounting information in interfirm negotiations that are characterized by significant payoff uncertainty. It does so by examining how under conditions of low and high uncertainty, the provision of refined accounting information influences negotiators' use of negotiation tactics and the resulting outcomes. Consistent with our expectations, we find that uncertainty results in greater use of distributive tactics relative to integrative tactics, which in turn negatively impacts joint profit. Refined accounting (TCO) information reduces the adverse impact of uncertainty on negotiation behavior, which in turn positively influences joint outcomes.

Our findings provide evidence for significant differences in negotiator behavior and outcomes across conditions and negotiating roles, but also provide support that a negotiator's choice of tactics

evokes reciprocating partner behavior, persists during new negotiations. In addition, the results show that a negotiator's use of integrative (distributive) tactics negatively (positively) affects own results, but through reciprocating partner behavior positively (negatively) affects own profit. Thus while in our individual level analyses we observe mean differences in negotiators' behaviors and outcomes, the pattern of variation is largely consistent with dyadic negotiation analyses. In addition to these main results, the results show that negotiators become relatively more integrative in the second and third game, leading to greater joint profit. This finding is consistent with a relationship gradually developing in repeated interactions that enhances negotiators' ability to close contracts that provide better joint outcomes.

Our findings also offer managerial implications for the design of management accounting in buyer-supplier relations by showing that, in particular in uncertain contexts (which in outsourcing settings are more the rule than the exception), stimulating effective negotiation tactics can contribute to better economic outcomes. Our findings indicate that refined accounting information has the ability to do so, even when the information itself is unrelated to the nature of the uncertainty.

Our study is subject to several limitations. For instance, as compared to a real life setting, our experiment lacks the effects of important variables such as reputation, information about negotiators' past behavior, other types of controls, and power differences. Future research could investigate whether our results also hold beyond the buyer-supplier negotiations that we examine and where players have a different role, such as in joint ventures and alliances. In our experimental setting, suppliers started negotiations by making a first bid. This fixed ordering of negotiations may have influenced both negotiation tactics and outcomes. Finally, by design this study does not examine the role and effects of trust building between negotiators, which can occur during repeated interactions. Social psychology research (e.g., Pruitt and Lewis 1975) suggests that repeated ties can result in increasing trust that may involve reduced use of distributive tactics and enhanced integrative tactics. In particular how emerging trust interacts within formal accounting information and mechanisms in negotiation settings an important question for further research.

References

- Anderson, S., and H. Dekker. 2005. Management control for market transactions: The relation between transaction characteristics, incomplete contract design and subsequent performance. *Management Science*, 51, 1734-1752.
- Anderson, S., and H. Dekker. 2014. The role of management controls in transforming firm boundaries and sustaining hybrid organizational forms. *Foundations and Trends® in Accounting* 8 (2): 75-141.
- Baiman, S., and M. Rajan. 2002. The role of information and opportunism in the choice of buyer-supplier relationships. *Journal of Accounting Research*, 40(2), 247-278.
- Bottom, W. P. 1998. Negotiator risk: Sources of uncertainty and the impact of reference points on negotiated agreements. *Organizational Behavior and Human Decision Processes*, 76(2), 89-112.
- Buckless, F., and S. Ravenscroft. 1990. Contrast coding: A refinement of ANOVA in behavioral analysis. *The Accounting Review*, 65(4), 933-945.
- Chang, L., M. Cheng, and K. Trotman. 2013. The effect of outcome and process accountability on customer-supplier negotiations. *Accounting, Organizations and Society*, 38, 93-107.
- Church, B., and P. Zhang. 1999. Bargaining behavior and payoff uncertainty: experimental evidence. *Journal of Economic Psychology*, 20, 407-429.
- Coletti, A., K. Sedatole, and K. Towry. 2005. The effect of control systems on trust and cooperation in collaborative environments, *The Accounting Review*, 80(2), 477-500.
- De Dreu, C., B. Beersma, K. Stroebe, and M. Euwema. 2006. Motivated information processing, strategic choice, and the quality of negotiated agreement. *Journal of Personality and Social Psychology*, 90(6), 927-943.
- Dekker, H. 2003. Value chain analysis in interfirm relationships: A field study. *Management Accounting Research*, 14, 1-23.
- Drake, A., and S. Haka. 2008. Does ABC information exacerbate hold-up problems in buyer-supplier negotiations? *The Accounting Review*, 83(1), 29-60.
- Fan, X., B. Thompson, and L. Wang. 1999. Effects of sample size, estimation methods, and model specification on structural equation modeling fit indexes. *Structural Equation Modeling* 6(1) 56-83.
- Graham, J. 1983. Brazilian, Japanese, and American business negotiations. *Journal of International Business Studies* 14 (1): 47-61.

- Graham, J., L. Evenko, and M. Rajan. 1992. An empirical comparison of Soviet and American business negotiations. *Journal of International Business Studies*, 23(3), 387-418.
- Haka, S., J. Luft, and B. Ballou. 2000. Second-order uncertainty in accounting information and bilateral bargaining costs. *Journal of Management Accounting Research*, 12, 115-139.
- Hayes, A. F. 2009. Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication Monographs*, 76, 408-420.
- Hayes, A. F., and K. Preacher. 2004. SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, and Computers*, 36, 717-731.
- Heide, J., and G. John. 1992. Do norms matter in marketing relationships? *Journal of Marketing*, 56(2), 32-44.
- Hu, L.-T., and P. Bentler. 1999. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling* 6(1) 1-55.
- Karagözoğlu, E., and A. Riedl. 2015. Performance information, production uncertainty, and subjective entitlements in bargaining. *Management Science*, 61(11), 2611-2626.
- Kelley, H. 1966. A classroom study of the dilemmas in interpersonal negotiations. In K. Archibald (Ed.), *Strategic interaction and conflict*. Berkeley: University of California Institute of International Studies, 49-73.
- Koop, G., and Johnson, J. 2012. The use of multiple reference points in risky decision making. *Journal of Behavioral Decision Making*, 25(1), 49-62.
- Krishnan, R., F. Miller, and K. Sedatole. 2011. The use of collaborative interfirm contracts in the presence of task and demand uncertainty. *Contemporary Accounting Research*, 28, 1397-1422.
- MacCallum, R., and J. Austin. 2000. Applications of structural equation modeling in psychological research. *Annual Review of Psychology*, 51, 201-226.
- Masschelein, S., E. Cardinaels, and A. Van den Abbeele. 2012. ABC information, fairness perceptions, and interfirm negotiations. *The Accounting Review*, 87 (3), 951-973.
- Pfetsch, F., and A. Landau. 2000. Symmetry and asymmetry in international negotiations. *International Negotiation* 5: 21-42.
- Pruitt, D. 1981. *Negotiation behavior*. New York: Academic Press.
- Pruitt, D., and S. Lewis. 1975. Development of integrative solutions in bilateral negotiation. *Journal of Personality and Social Psychology*, 31, 621-633.
- Putnam, L., and T. Jones. 1982. Reciprocity in negotiations: An analysis of bargaining interaction. *Communication Monographs* 49 (3): 171-191.

- Rode, C., L. Cosmides, W. Hell, and J. Tooby. 1999. When and why do people avoid unknown probabilities in decisions under uncertainty? Testing some predictions from optimal foraging theory. *Cognition*, 72, 269-304.
- Roth, A., and J. Murnighan. 1982. The role of information in bargaining: An experimental study. *Econometrica*, 50(5), 1123-1142.
- Schloetzer, J. 2012. Process integration and information sharing in supply chains. *The Accounting Review*, 87 (3), 1005-1032.
- Siegel, S., and L. Fouraker. 1960. *Bargaining and group decision making- experiments in bilateral monopoly*. New York: McGraw-Hill.
- Sprinkle, B., M. Williamson, and D. Upton. 2008. The effort and risk-taking effects of budget-based contracts. *Accounting, Organizations and Society*, 33 (4-5), 436-452.
- Teigen, K., and M. Jørgensen. 2005. When 90 % confidence intervals are 50% certain: On the credibility of credible intervals. *Applied Cognitive Psychology*, 19, 455-475.
- Thompson, L., J. Wang, and B. Gunia, B. 2010. Negotiation. In S. Fiske (Ed.). *Annual Review of Psychology*, 61, 491-515.
- Van den Abbeele, A., F. Roodhooft, and L. Warlop. 2009. The effect of cost information on buyer-supplier negotiations on different power settings. *Accounting, Organizations and Society*, 34, 245-266.
- Walton, R., and R. McKersie. 1965. *A behavioral theory of labor negotiation*. New York: McGraw-Hill.
- Weingart, L., E. Hyder, and M. Prietula. 1996. Knowledge matters: The effect of tactical descriptions on negotiation behavior and outcome. *Journal of Personality and Social Psychology*, 70(6), 1205-1217.
- Wouters, M., J. Anderson, and F. Wynstra. 2005. The adoption of total cost of ownership for sourcing decisions: A structural equations analysis. *Accounting, Organizations and Society*, 30(2), 167-191.

FIGURES AND TABLES

Figure 1. Representation of the research model

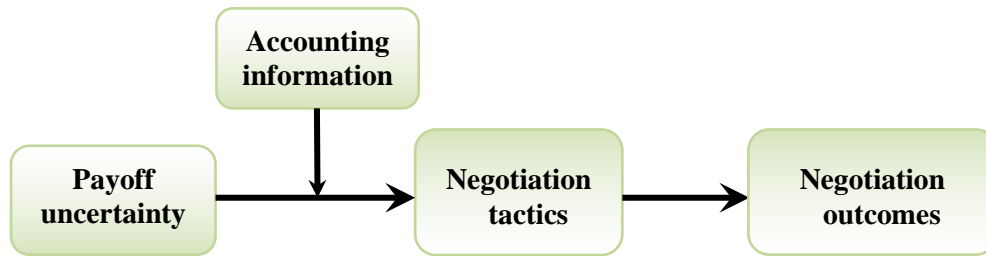


Table 1. Number of observations per experimental cell

Experimental condition		Payoff uncertainty	
		Low	High
Accounting information	TC	22	23
	TCO	22	22

Table 2. Summary of the negotiation tactics coding scheme

Object	Integrative tactics	Distributive tactics
Information exchange	<i>Provision of information</i>	<i>Deceiving and withholding info.</i>
	NIE: numerical PIE: Priority SD: self-disclosure	LI: lies RS: refusal to share info.
Creating atmosphere	<i>A pleasant atmosphere</i>	<i>Unpleasant atmosphere</i>
	REW: rewards PNA: positive normative appeals	PU: punishment NNA: negative normative appeals
Willingness to cooperate	<i>Extending invitations</i>	<i>Posing limitations</i>
	RC: request for cooperation RI: request for information in integrative way	COM: commitment QU: request for information in distributive way PD: putdown
Making proposals	<i>Constructive</i>	<i>Compelling or compulsory</i>
	PR: promise RE: recommendation PC: propose to compromise	PA: persuasive argument WA: warning TH: threat

Table 3. Descriptive statistics across experimental conditions

Experimental Condition		Joint				Supplier				Buyer			
		Payoff uncertainty				Payoff uncertainty				Payoff uncertainty			
		Low		High		Low		High		Low		High	
		ΔNT	Profit	ΔNT	Profit	ΔNT	Profit	ΔNT	Profit	ΔNT	Profit	ΔNT	Profit
Accounting information	Traditional Info.	-1.76 (4.13)	3500 (1066)	-3.81 (5.62)	3354 (1334)	-0.20 (2.63)	1468 (782)	-1.99 (3.74)	1544 (848)	-1.56 (2.32)	2032 (903)	-1.83 (3.22)	1810 (917)
	TCO Info.	-1.62 (4.08)	3877 (902)	-1.80 (4.03)	3911 (925)	0.12 (2.64)	1627 (806)	-0.14 (2.91)	1857 (752)	-1.74 (2.81)	2250 (886)	-1.67 (2.86)	2054 (729)

Statistics are the cell mean and standard deviation (in parentheses) for the variables computed across the three games.

ΔNT is the difference in negotiators' joint use of integrative and distributive tactics. Measurement of negotiation tactics was based on coded exchanged messages between buyers and suppliers (Appendix D). Use of each of the specific tactics was coded '1' if the tactic was present in a message and '0' if not. For both integrative and distributive tactics, all scores of the buyer and supplier were summed to obtain overall construct scores. *Joint profit* is calculated as the sum of buyer and supplier profit across games.

For joint ΔNT and joint profit, Kruskal-Wallis tests indicate the differences across the experimental cells are significant at $p < 0.05$ and $p < 0.01$, respectively. For supplier ΔNT and profit, Kruskal-Wallis tests indicate the differences across the experimental cells are significant at $p < 0.01$ and $p < 0.05$, respectively. For buyer ΔNT and profit, Kruskal-Wallis tests indicate the differences across the experimental cells are insignificant ($p > 0.10$) for, and significant for profit at $p < 0.01$.

Table 4. Spearman correlation matrix

	Supplier profit	Buyer profit	Joint profit	ΔNT supplier	ΔNT buyer	ΔNT joint	Payoff uncertainty	TCO information
Supplier profit	1							
Buyer profit	-0.44***	1						
Joint profit	0.45***	0.39***	1					
ΔNT supplier	-0.15**	0.42***	0.21***	1				
ΔNT buyer	0.38***	-0.18***	0.13**	0.10	1			
ΔNT joint	0.11*	0.20***	0.24***	0.78***	0.64***	1		
Payoff uncertainty	0.14**	-0.15**	0.02	-0.13**	-0.01	0.11*	1	
TCO information	0.13**	0.15**	0.39***	0.18***	-0.01	0.09	-0.01	1

Explanation of variables:

Profit is measured as the (joint or individual) game profit.

ΔNT is measured as the difference in use of integrative and distributive tactics.

Uncertainty: '-1' for low uncertainty, '1' for high uncertainty.

TCO information: '-1' for traditional cost information, '1' for TCO information.

Table 5. ANOVA of Negotiation Tactics and Joint Profit

	ΔNT			Profit (rank-ordered)		
	Joint	Supplier	Buyer	Joint	Supplier.	Buyer
Payoff uncertainty	4.39**	7.86***	0.08	0.22	5.26***	5.66***
TCO information	4.04**	8.82***	0.01	47.06***	4.61**	6.37***
Payoff uncertainty x TCO information	3.08**	4.40**	0.26	0.42	0.01	0.56
Game 2 dummy	5.15***	2.67**	3.35**	0.94	0.30	0.05
Game 3 dummy	22.69***	9.57***	17.69***	2.77*	3.98**	2.04
R ²	0.12	0.11	0.07	0.16	0.03	0.04

Explanation of variables:

ΔNT is measured as the difference in use of integrative and distributive tactics.

Profit is measured as the joint and individual game profit for the buyer or supplier, and rank-ordered for the ANOVA.

Uncertainty: ‘-1’ for low uncertainty, ‘1’ for high uncertainty.

TCO information: ‘-1’ for traditional cost information, ‘1’ for TCO information.

Game 2 dummy: indicator variable for game 2.

Game 3 dummy: indicator variable for game 3.

Table 6. Parameter estimates on Negotiation Tactics and Joint Profit

This table reports the parameter estimates of a structural equation model that includes the main and interaction effects of the manipulated variables on joint negotiation tactics and joint profit.

Variables	ΔNT	Total effect on joint profit
ΔNT		77,15***
Payoff uncertainty	-0,56**	-43,13***
TCO information	0,54**	41,37**
Payoff uncertainty x TCO information	0,47**	36,11**
Game 2 dummy	1,48**	114,43**
Game 3 dummy	3,11***	240,12***
R ²	0,12	0,11

N=267. Cell statistics are the coefficient estimate. ***, **, * indicate significance based on bias-corrected (BC) confidence intervals at the 1%, 5%, 10% level (one-tailed), respectively. The fit indices are $\chi^2/df=0.90$, GFI=0.99, AGFI=0.97, NFI=0.93, CFI=0.99, and RMSEA=0.01

Explanation of variables:

ΔNT is measured as the difference in negotiators' joint use of integrative and distributive tactics

Joint profit is calculated as the sum of buyer and supplier profit for each game

Uncertainty: '-1' for low uncertainty, '1' for high uncertainty

TCO information: '-1' for traditional cost information, '1' for TCO information

Game 2 dummy: indicator variable for game 2.

Game 3 dummy: indicator variable for game 3.

Table 7. Parameter estimates on Individual Negotiation Tactics and Profit

This table reports the parameter estimates of a structural equation model that includes the main and interaction effects of the manipulated variables on negotiation tactics and individual profit.

Variables	ΔNT Supplier	ΔNT Buyer	Profit Supplier	Profit Buyer
ΔNT - Supplier	-	0,15**	-29,14*	118,30***
ΔNT - Buyer	-	-	115,78***	-39,78**
Payoff uncertainty	-0,51***	-0,05	18,03	-61,59***
TCO information	0,54***	-0,006	-25,56*	67,46***
Payoff uncertainty x TCO information	0,38**	0,085	-7,72	44,10**
Game 2 dummy	0,73	0,75	53,58	60,68
Game 3 dummy	1,38***	1,73***	136,80**	102,66
R ²	0.11	0.09	0.17	0.19

N=267. Cell statistics are the coefficient estimate. ***, **, * indicate significance based on bias-corrected (BC) confidence intervals at the 1%, 5%, 10% level (one-tailed), respectively. The fit indices are $\chi^2/df=1.17$, GFI=0.98, AGFI=0.96, NFI=0.92, CFI=0.99, and RMSEA=0.03.

Explanation of variables:

ΔNT is measured as the difference in use of integrative and distributive tactics.

Profit is measured as the individual game profit for the buyer or supplier.

Uncertainty: '-1' for low uncertainty, '1' for high uncertainty.

TCO information: '-1' for traditional cost information, '1' for TCO information.

Game 2 dummy: indicator variable for game 2.

Game 3 dummy: indicator variable for game 3.

Appendix A - Instructions and negotiation scenarios

This appendix provides an extended summary of the instructions and negotiation scenarios provided to experimental participants. The text is based on the documentation provided to suppliers. Deviations in the text provided to buyers are presented between brackets. Note that the contract and payoff tables in the scenarios deviate from the tables that participants received during the game (see Appendix B), and were included to explain the negotiation process.

General instructions

Welcome to this interactive computer game. The game is a simulation of negotiations in practice between buyers and suppliers. By random assignment you have been given the role of supplier [buyer]. In this game you will be matched to a buyer [supplier] and presented with a number of negotiation scenarios. You engage in three to five negotiations with this buyer [supplier]. You have 10 minutes to read the instructions.

Each negotiation round ends when (1) you reach an agreement with the buyer[supplier], (2) you or the buyer [supplier] decide to end the negotiation, or (3) an agreement has not yet been reached after 10 rounds. You will earn € for your participation in this game and a bonus of 0.1% of the profit that you make for your company in each game. Your total result will be determined after the last game by adding up the results from each negotiation game.

Example: if you have made a profit of €000, then you will receive a payment of €12 (€ + [€000 x 0.1%]). However, this will only happen if you fill out all of the online questions about the negotiations during and after the game seriously and genuinely

You [your supplier] will start the negotiations by sending an offer and your buyer receives [you receive] the offer with three options:

- a. Accept (in this case, you and your buyer [supplier] will earn a bonus for this game).
- b. Reject (in this case, your buyer [supplier] must provide a new offer, which you can accept or reject).
- c. Stop the negotiation (in this case, you and your buyer [supplier] will not get any profit and consequently any bonus for this game).

It is important to choose your negotiation tactics, like:

- Critically use information (ask questions, give information to get information, etc.).
- You can provide correct or wrong information about your profit and costs.
- You can ask your buyer [supplier] about his or her income and/or costs.

You are not allowed to open other applications or to communicate with other participants. You can communicate with the buyer [supplier] by writing messages, talking is prohibited.

Scenario of the first game: Selling/buying a napkin and pocket tissue machine

Suppliers received the following introduction: Assume that you are the representative of a supplier of **Carmen** Corporation which, provides new machines and spare parts for the tissue business, offering a unique opportunity for improving operations and profits for the tissue industry. Your buyer is the representative of **Flora** Company, which manufactures tissue paper. Once Flora's machines have to be renewed, Flora needs to purchase a napkin tissue and pocket tissue machine from your company.

Buyers received the following introduction: Assume that you are the representative of a buyer of **Flora** Company which manufactures tissue paper. And your supplier is the representative of **Carmen** Cooperation which provides new machines and spare parts for the tissue business, offering

a unique opportunity for improving operations and profits for the tissue industry. Your firm needs to purchase a napkin tissue and pocket tissue machine from Carmen.

Participants were provided with a description of the tissue making process (details omitted), including that the production process is highly mechanized and that it is important that the production process will not be interrupted. Thus, proper maintenance and availability of spare parts are important to the machine. These issues need to be negotiated and considered as part of the final agreement. From the tissue making process viewpoint, maintenance and spare parts are needed to keep the machines running, and are part of the final contract. Consequently when you offer a buyer [when a supplier offers you] new machines, this must be accompanied by maintenance and spare parts.

Every contract that you negotiate thus consists of three components:

- a. The machine price contract. This generates income [cost] for your company, so the higher [lower] the better.
- b. The maintenance cost contract; the lower costs for you the higher costs for your buyer [supplier] and vice versa.
- c. The spare parts cost contract, same as maintenance contract, the lower costs for you the higher costs for your buyer [supplier] and vice versa.

[In addition to the costs of these contract components, you expect that the new machine will lead to an increase in income (sales) for you. This is presented as a fixed amount.]

The quality of soft paper from this machine does not differ from that of competitors and the profit of the firm is only determined by these three components: machine price, maintenance costs, and spare parts costs. The cost of each of these components will be shown by five contracts levels labeled “A” through “E” as illustrated in the table below.

	Machine price				Maintenance (cost)		Spare parts (cost)	
	Low	~	High					
A	90	~	110	A	100	A	50	
B	135	~	165	B	80	B	40	
C	180	~	220	C	60	C	30	
D	225	~	275	D	40	D	20	
E	270	~	330	E	20	E	10	

Buyers in the TCO condition received the following table:

	Machine price (costs)				Maintenance (costs)		Spare parts (costs)	
	Low	~	High					
A	90	~	110	A	20	A	10	
B	135	~	165	B	40	B	20	
C	180	~	220	C	60	C	30	
D	225	~	275	D	80	D	40	
E	270	~	330	E	100	E	50	

Buyers in the traditional cost condition received the following table:

	Machine price (costs)			Maintenance (number #)	Spare parts (number #)		
	Low	~	High				
A	90	~	110	A	2	A	1
B	135	~	165	B	4	B	2
C	180	~	220	C	6	C	3
D	225	~	275	D	8	D	4
E	270	~	330	E	10	E	5

The buyer [supplier] has a sheet like you that includes the same five options, but with different values about his or her machine prices [income] and costs. It means that you and your buyer [supplier] have own information, and you are not shown the other's payoff table. However, you are able to get insight into your buyer's [supplier's] payoff table through the procedure of offers and the messages which you can send during the negotiations. Feel free to use part or all the information provided in shaping your bargaining situation and to create additional arguments to strengthen your position if you desire.

As a supplier you have [The supplier has] uncertainty about the market price for the tissue machine. Consequently the machine price agreed upon can fluctuate and the final price will fall within an interval with a minimum and maximum value. The exact price is not available until the end of all negotiations. The costs of maintenance and spare parts are fixed and thus are not subject to uncertainty. In your experience as a buyer, the uncertainty about the machine prices always seemed to be a surprise and the exact price in most cases deviated from the predicted average price. Thus, the final price of your last negotiation round, reached almost the maximum of the predicted price range, whereas the final price in the round before the last one ended up at the minimum of the predicted price range. In the negotiations it is therefore important to pay attention to this uncertainty during the negotiation process, because it can influence the final result as well as the bonus payment you receive. The costs of maintenance and spare parts are fixed and do not contain uncertainty. Note: if you take care of more maintenance and spare parts, the supplier [buyer] will have to do less of those things and your costs will increase. If you take care of less of those things, the supplier will have to do more and his/her costs will rise. The quality will remain the same in both cases.

While you are negotiating about these three parts in order to make acceptable price and cost contracts, it is important to consider them in relation to each other, with attention for the risks and uncertainties that you and the supplier have to deal with. You have to reach one agreement for the price contract, the maintenance contract and the spare parts contract and every combination of the three contracts is possible (for example: the offer A-C-B means price contract A, maintenance contract C and spare parts contract B. Hence you are making a 'package deal'. Therefore you can calculate your profit interval by:

$$Profit = machine\ price - maintenance\ cost - costs\ of\ spare\ parts.$$

As example, from the table above you can infer that the best agreement for you is "E-E-E" ($[270\sim330] - 20 - 10 = [240\sim300]$ profit), and the worst agreement is "A-A-A" ($[90\sim110] - 100 - 50 = [60\sim40]$ loss).

Buyers in the TCO condition received the following formula and example:

$$\text{Profit} = \text{Income} - \text{machine price} - \text{maintenance cost} - \text{costs of spare parts}.$$

Suppose the extra income of the machine is 400. From the table above you can infer that the best agreement for you is “A-A-A” ($400 - [90\sim 110] - 20 - 10 = [280\sim 260]$ profit), and the worst agreement is “E-E-E” ($400 - [270\sim 330] - 100 - 50 = [80\sim 20]$ loss).

Buyers in the traditional cost information condition received the following formula and example:

$$\text{Profit} = \text{Income} - \text{machine price} - \text{costs for the amount of maintenance} - \text{costs for the number of spare parts}.$$

Suppose the extra income of the machine is 400. From the table above you can infer that the best agreement for you is “A-A-A” ($400 - [90\sim 110] -$ the cost of two times maintenance — the cost of one spare part), and the worst agreement is “E-E-E” ($400 - [270\sim 330] -$ the cost of 10 times maintenance)– the cost of 5 spare parts).

The following description was generic to all participants: During the negotiations you will see in your screen tables that show the consequences of offers and counteroffers, including the expected result (profit or loss interval). Your counterparty will see similar tables for his/her situation. An example for the agreement B-C-A is provided below.

Variables	Round 1		Round 2		Round 3		Round 4	
	Supplier	Buyer	Supplier	Buyer	Supplier	Buyer	Supplier	Buyer
Machine Price contract	B							
Maintenance contract	C							
Spare parts contract	A							
Your company result	2400 ~ 3000							

Buyers in the traditional cost information condition did not receive reference to “the expected result” nor the last line of the table.

Scenario of the second game: Selling/buying spare parts of toilet tissue machine

In this game you offer the buyer [the supplier offers you] spare parts for his/her [your] existing toilet tissue machine. The agreement for spare parts also includes agreements about delivery time and payment terms. In case your buyer prefers [you prefer] to improve the existing machine, the contract will consist of:

- a. The price for spare parts price (an income for you) [(a cost for you)].
- b. The delivery time cost contract. To obtain a short delivery time, you [the supplier] will have to incur more delivery cost, and vice versa.
- c. The payment terms contract. This follows the same principle as for delivery: the lower the cost for you, the higher the cost for the buyer [supplier] (and vice versa).

[In addition to the costs of these contract components, you expect that the new machine will lead to an increase in income (sales) for you. This is presented as a fixed amount.]

You can calculate your profit range with the following formula:

$$\textit{Profit} = \textit{price of spare parts} - (\textit{delivery cost} + \textit{payment cost}).$$

Buyers in the TCO condition received the following formula:

$$\textit{Profit} = \textit{Income} - (\textit{costs of spare parts} + \textit{delivery cost} + \textit{payment cost}).$$

Buyers in the traditional cost condition received the following formula and example:

$$\textit{Profit} = \textit{Income} - (\textit{costs of spare parts} + \textit{cost for number of weeks for delivery} + \textit{costs for number of weeks for payment}).$$

Scenario of the third game: Selling/buying kitchen towel tissue machine

In this game you offer the buyer [the supplier offers you] a new machine for kitchen towel tissues. This is similar to the first game, and you can follow same instructions of the first game.

Appendix B - Payoff tables of the two negotiations games

Game 1

Low uncertainty

Supplier

		Machine price				Maintenance (cost)		Spare parts (cost)	
		Low	High						
A	1980 ~ 2020			A	1350	A	2250		
B	2980 ~ 3020			B	1050	B	1750		
C	3980 ~ 4020			C	750	C	1250		
D	4980 ~ 5020			D	450	D	750		
E	5980 ~ 6020			E	150	E	250		

Buyer

Income = 8000

		Machine price (cost)				Maintenance (cost)		Spare parts (cost)	
		Low	High						
TCO info.	A	1980 ~ 2020		A	250	A	150		
	B	2980 ~ 3020		B	750	B	450		
	C	3980 ~ 4020		C	1250	C	750		
	D	4980 ~ 5020		D	1750	D	1050		
	E	5980 ~ 6020		E	2250	E	1350		

		Machine price (cost)				Maintenance (#)		Spare parts (#)	
		Low	High						
Traditional info.	A	1980 ~ 2020		A	1	A	2		
	B	2980 ~ 3020		B	3	B	6		
	C	3980 ~ 4020		C	5	C	10		
	D	4980 ~ 5020		D	7	D	14		
	E	5980 ~ 6020		E	9	E	18		

High uncertainty

Supplier

		Machine price				Maintenance (cost)		Spare parts (cost)	
		Low	High						
A	1400 ~ 2600			A	1350	A	2250		
B	2400 ~ 3600			B	1050	B	1750		
C	3400 ~ 4600			C	750	C	1250		
D	4400 ~ 5600			D	450	D	750		
E	5400 ~ 6600			E	150	E	250		

Buyer

Income = 8000

		Machine price (cost)				Maintenance (cost)		Spare parts (cost)	
		Low	High						
TCO info.	A	1400 ~ 2600		A	250	A	150		
	B	2400 ~ 3600		B	750	B	450		
	C	3400 ~ 4600		C	1250	C	750		
	D	4400 ~ 5600		D	1750	D	1050		
	E	5400 ~ 6600		E	2250	E	1350		

		Machine price (cost)				Maintenance (#)		Spare parts (#)	
		Low	High						
Traditional info.	A	1400 ~ 2600		A	1	A	2		
	B	2400 ~ 3600		B	3	B	6		
	C	3400 ~ 4600		C	5	C	10		
	D	4400 ~ 5600		D	7	D	14		
	E	5400 ~ 6600		E	9	E	18		

Game 2

Low uncertainty

Supplier

	Spare parts price		Delivery time (cost)	Payments terms (cost)
	Low	High		
A	2293	~ 2307	A 1900	A 1250
B	2643	~ 2657	B 1600	B 1050
C	2993	~ 3007	C 1300	C 850
D	3343	~ 3357	D 1000	D 650
E	3693	~ 3707	E 700	E 450
F	4043	~ 4057	F 400	F 250
G	4393	~ 4407	G 100	G 50

Buyer Income = 6700

TCO info.	Spare parts price (cost)		Delivery time (cost)	Payments terms (cost)
	Low	High		
A	2293	~ 2307	A 50	A 100
B	2643	~ 2657	B 250	B 400
C	2993	~ 3007	C 450	C 700
D	3343	~ 3357	D 650	D 1000
E	3693	~ 3707	E 850	E 1300
F	4043	~ 4057	F 1050	F 1600
G	4393	~ 4407	G 1250	G 1900

Traditional info.	Spare parts price (cost)		Delivery time # weeks for delivery	Payments terms # weeks for payment
	Low	High		
A	2293	~ 2307	A 1	A 19
B	2643	~ 2657	B 5	B 16
C	2993	~ 3007	C 9	C 13
D	3343	~ 3357	D 13	D 10
E	3693	~ 3707	E 17	E 7
F	4043	~ 4057	F 21	F 4
G	4393	~ 4407	G 25	G 1

High uncertainty

Supplier

	Spare parts price		Delivery time (cost)	Payments terms (cost)
	Low	High		
A	2090	~ 2510	A 1900	A 1250
B	2440	~ 2860	B 1600	B 1050
C	2790	~ 3210	C 1300	C 850
D	3140	~ 3560	D 1000	D 650
E	3490	~ 3910	E 700	E 450
F	3840	~ 4260	F 400	F 250
G	4190	~ 4610	G 100	G 50

Buyer Income = 6700

TCO info.	Spare parts price (cost)		Delivery time (cost)	Payments terms (cost)
	Low	High		
A	2090	~ 2510	A 50	A 100
B	2440	~ 2860	B 250	B 400
C	2790	~ 3210	C 450	C 700
D	3140	~ 3560	D 650	D 1000
E	3490	~ 3910	E 850	E 1300
F	3840	~ 4260	F 1050	F 1600
G	4190	~ 4610	G 1250	G 1900

Traditional info.	Spare parts price (cost)		Delivery time # weeks for delivery	Payments terms # weeks for payment
	Low	High		
A	2090	~ 2510	A 1	A 19
B	2440	~ 2860	B 5	B 16
C	2790	~ 3210	C 9	C 13
D	3140	~ 3560	D 13	D 10
E	3490	~ 3910	E 17	E 7
F	3840	~ 4260	F 21	F 4
G	4190	~ 4610	G 25	G 1

Game (3)

Low uncertainty

Supplier

		Machine price (Income)		Maintenance (cost)		Spare parts (cost)	
		Low	High				
A		2088	~ 2112	A	2100	A	550
B		2663	~ 2687	B	1600	B	425
C		3238	~ 3262	C	1100	C	300
D		3813	~ 3837	D	600	D	175
E		4388	~ 4412	E	100	E	50

Buyer

Income = 6500

		Machine price (cost)		Maintenance (cost)		Spare parts (cost)	
		Low	High				
TCO info	A	2088	~ 2112	A	50	A	100
	B	2663	~ 2687	B	175	B	600
	C	3238	~ 3262	C	300	C	1100
	D	3813	~ 3837	D	425	D	1600
	E	4388	~ 4412	E	550	E	2100

		Machine price (cost)		Maintenance (#)		Spare parts (#)	
		Low	High				
Traditional info.	A	2088	~ 2112	A	2	A	2
	B	2663	~ 2687	B	7	B	12
	C	3238	~ 3262	C	12	C	22
	D	3813	~ 3837	D	17	D	32
	E	4388	~ 4412	E	22	E	42

High uncertainty

Supplier

		Machine price (Income)		Maintenance (cost)		Spare parts (cost)	
		Low	High				
A		1755	~ 2445	A	2100	A	550
B		2330	~ 3020	B	1600	B	425
C		2905	~ 3595	C	1100	C	300
D		3480	~ 4170	D	600	D	175
E		4055	~ 4745	E	100	E	50

Buyer

Income = 6500

		Machine price (cost)		Maintenance (cost)		Spare parts (cost)	
		Low	High				
TCO info	A	1755	~ 2445	A	50	A	100
	B	2330	~ 3020	B	175	B	600
	C	2905	~ 3595	C	300	C	1100
	D	3480	~ 4170	D	425	D	1600
	E	4055	~ 4745	E	550	E	2100

		Machine price (cost)		Maintenance (#)		Spare parts (#)	
		Low	High				
Traditional info.	A	1755	~ 2445	A	2	A	2
	B	2330	~ 3020	B	7	B	12
	C	2905	~ 3595	C	12	C	22
	D	3480	~ 4170	D	17	D	32
	E	4055	~ 4745	E	22	E	42

Appendix C – Profit Schemes for the three games

The three tables below illustrate the joint profit scheme for various contract combinations for each of the three games.

Profit scheme for contract combinations in the 1st game

Contract	Average Joint profit	Sup. Av.	Buy. Av.	Low uncertainty interval	High uncertainty interval
C-A-E*	4800	2400	2400	4780 ~ 4820	4200 ~ 5400
B-A-E	4800	1400	3400	4780 ~ 4820	4200 ~ 5400
D-A-E	4800	3400	1400	4780 ~ 4820	4200 ~ 5400
A-A-E	4800	400	4400	4780 ~ 4820	4200 ~ 5400
E-A-E	4800	4400	400	4780 ~ 4820	4200 ~ 5400
D-C-B	3800	2500	1300	3780 ~ 3820	3200 ~ 4400
A-A-A	4000	-1600	5600	3980 ~ 4020	3400 ~ 4600
B-B-B	4000	200	3800	3980 ~ 4020	3400 ~ 4600
C-C-C	4000	2000	2000	3980 ~ 4020	3400 ~ 4600
D-D-D	4000	3800	200	3980 ~ 4020	3400 ~ 4600
E-E-E	4000	5600	-1600	3980 ~ 4020	3400 ~ 4600
D-B-B	4000	2200	1800	3980 ~ 4020	3400 ~ 4600
D-A-B	4200	1900	2300	4180 ~ 4220	3600 ~ 4800
B-C-E	4400	2000	2400	4380 ~ 4420	3800 ~ 5000
C-E-A	3200	1600	1600	3180 ~ 3220	2600 ~ 3800

* Cooperative optimal joint profit for both supplier and buyer. Note that some combinations including A-E (maintenance and spare parts) yield the same expected joint profit (€4800), but with asymmetric division over negotiators.

Profit scheme for contract combinations in the 2nd game

Contract	Average Joint profit	Sup. Av.	Buy. Av.	Low uncertainty interval		High uncertainty interval	
D-G-A[♠]	4000	2000	2000	3993	~ 4007	3790	~ 4210
A-G-A	4000	950	3050	3993	~ 4007	3790	~ 4210
B-G-A	4000	1300	2700	3993	~ 4007	3790	~ 4210
C-G-A	4000	1650	2350	3993	~ 4007	3790	~ 4210
E-G-A	4000	2350	1650	3993	~ 4007	3790	~ 4210
F-G-A	4000	2700	1300	3993	~ 4007	3790	~ 4210
G-G-A	4000	3050	950	3993	~ 4007	3790	~ 4210
A-A-A	3400	-850	4250	3393	~ 3407	3190	~ 3610
B-B-B	3400	0	3400	3393	~ 3407	3190	~ 3610
C-C-C	3400	850	2550	3393	~ 3407	3190	~ 3610
D-D-D	3400	1700	1700	3393	~ 3407	3190	~ 3610
E-E-E	3400	2550	850	3393	~ 3407	3190	~ 3610
F-F-F	3400	3400	0	3393	~ 3407	3190	~ 3610
G-G-G	3400	4250	-850	3393	~ 3407	3190	~ 3610
D-B-B	3400	700	2700	3393	~ 3407	3190	~ 3610
D-C-B	3500	1000	2500	3493	~ 3507	3290	~ 3710
F-A-B	3300	1100	2200	3293	~ 3307	3090	~ 3510
C-D-F	3200	1750	1450	3193	~ 3207	2990	~ 3410
D-A-G	2800	1400	1400	2793	~ 2807	2590	~ 3010

♠ Cooperative optimal joint profit for both supplier and buyer. Note that some combinations including G-A (delivery time and payment term) yield the same expected joint profit (€4000), but with asymmetric division over negotiators.

Profit scheme for contract combinations in the 3rd game

Contract	Average Joint profit	Sup. Av.	Buy. Av.	Low uncertainty interval		High uncertainty interval	
C-E-A[♠]	5200	2600	2600	5188	~ 5212	4855	~ 5545
B-E-A	5200	2025	3175	5188	~ 5212	4855	~ 5545
D-E-A	5200	3175	2025	5188	~ 5212	4855	~ 5545
A-E-A	5200	1450	3750	5188	~ 5212	4855	~ 5545
E-E-A	5200	3750	1450	5188	~ 5212	4855	~ 5545
D-C-B	4075	2300	1775	4063	~ 4087	3730	~ 4420
A-A-A	3700	-550	4250	3688	~ 3712	3355	~ 4045
B-B-B	3700	650	3050	3688	~ 3712	3355	~ 4045
C-C-C	3700	1850	1850	3688	~ 3712	3355	~ 4045
D-D-D	3700	3050	650	3688	~ 3712	3355	~ 4045
E-E-E	3700	4250	-550	3688	~ 3712	3355	~ 4045
D-B-B	3700	1800	1900	3688	~ 3712	3355	~ 4045
D-A-B	3325	1300	2025	3313	~ 3337	2980	~ 3670
B-C-E	2950	1525	1425	2938	~ 2962	2605	~ 3295
C-A-E	2200	1100	1100	2188	~ 2212	1855	~ 2545

♠ Cooperative optimal joint profit for both supplier and buyer. Note that some combinations including E-A (maintenance and spare parts) yield the same expected joint profit (€5.200), but with asymmetric division over negotiators.

Appendix D - Negotiation tactics

Category	Explanation and Examples
	Integrative tactics
Numerical information exchange (NIE)	A statement in which a negotiator reveals any numerical values for each of the issues to be negotiated.
Priority information exchange (PIE)	A statement in which a negotiator reveals only the relative importance (nonnumeric values) for any of the issues to be negotiated.
Rewards (REW)	A statement by a negotiator which creates pleasant consequences for the exchange partner (e.g., I'm pleased with the compromise made thus far).
Positive normative appeals (PNA)	A statement in which a negotiator indicates that the exchange partner's tactics are or will be in conformity with social norms (e.g., your offer is fair and reasonable).
Request for cooperation (RC)	A statement in which a negotiator asks the exchange partner to cooperate (e.g., let us cooperate).
Promise (PR)	A statement in which a negotiator indicates the intention to provide the exchange partner with a reinforcing consequence, which the negotiator anticipates the exchange partner will evaluate as pleasant, positive, or rewarding (e.g., accept our offer, next time we will accept your offer).
Recommendation (RE)	A statement in which a negotiator indicates he/she will help his/her exchange partner on a certain issue if the exchange partner in return will accept the negotiator's position on another issue (e.g., considering that I am agreeing with your D spare parts contract, I think the maintenance contract should be B).
Request for information (RI)	A statement in which a negotiator asks for information in a cooperative way (e.g., to find a compromise, can you tell me about your costs of both maintenance and spare parts).
Self-disclosure (SD)	A statement in which a negotiator reveals information about himself, which is necessary for problem-solving (e.g., the middle way would logically be "DDD"; I think for the payment term contract "D" is reasonable as well).
Proposal to compromise (PC)	A statement in which a negotiator asks the exchange partner to forgo some of his or her aims in return for a mutually acceptable agreement (e.g., I can offer you the most favorable payment term of 4 weeks, in exchange for a better delivery time).
	Distributive tactics
Lies (LI)	A statement in which a negotiator deliberately provides the exchange partner with wrong information (e.g., accepting this offer will result in a big loss for me).
Warnings (WA)	A statement in which a negotiator predicts that the exchange partner may face an unpleasant consequence (e.g., first you will have to compromise with respect to spare parts, and only then will we talk about the machine price).

Persuasive arguments (PA)	A statement in which a negotiator aims to convince the exchange partner to accept a proposal (e.g., our offer is very good, and apart from that you can expect perfect service from us).
Threats (TH)	A statement in which a negotiator indicates the intention to provide the exchange partner with a reinforcing consequence that is thought to be noxious, unpleasant, or punishing (e.g., if you don't give me a better offer, I will leave and buy from another supplier).
Punishment (PU)	A statement by a negotiator that is thought to create unpleasant consequences for the exchange partner (e.g., your offer is completely unreasonable and unworthy of consideration).
Commitment (CO)	A statement by a negotiator that its future offers will not go below or above a certain level (e.g., this is the lowest I can go; unfortunately I cannot go any lower).
Putdowns (PD)	A statement by a negotiator indicating a negative affective reaction aimed at obtaining a better position (e.g., I don't accept that offer; you have to come up with something better).
Negative normative appeals (NNA)	A statement in which a negotiator indicates that the exchange partner's tactics are or will be in violation with social norms (e.g., I am disappointed by your previous offer, please try to be more reasonable).
Question (QU)	A statement in which a negotiator asks the exchange partner to find out about his or her utility function (e.g., let me know the margins on the different parts; can you inform me about your cost structure?).
Refuse to share information (RS)	A statement in which a negotiator refuses to respond to a request for information (e.g., you don't have to know about my costs).

Appendix E- Post-experiment questionnaire

Two questions were asked after each game:

- 1- What do you believe is the likelihood that your business partner seeks to cooperate with you?
Very unlikely 1 2 3 4 5 6 7 Very likely
- 2- How would you characterize the negotiation process with your business partner: as competitive or cooperative?
Competitive 1 2 3 4 5 6 7 Cooperative

After concluding the last game, the following questions were asked

- 1- What do you think of this experiment?
Boring 1 2 3 4 5 6 7 Interesting
- 2- What do you think of the instructions of the experiment?
Unclear 1 2 3 4 5 6 7 Clear
- 3- Were you motivated to participate in this experiment?
Not at all 1 2 3 4 5 6 7 Very motivated
- 4- How much time do you believe you needed to negotiate with your partner?
Not much time 1 2 3 4 5 6 7 A lot of time
- 5- How successful were you as negotiator in this game?
Not successful 1 2 3 4 5 6 7 Very successful
- 6- Are you satisfied with the profit you obtained?
Dissatisfied 1 2 3 4 5 6 7 Satisfied
- 7- Does the final contract agreement meet your expectations at the beginning of the game?
Not at all 1 2 3 4 5 6 7 Completely
- 8- Are you satisfied with the way you have negotiated?
Dissatisfied 1 2 3 4 5 6 7 Satisfied
- 9- Are you satisfied with the agreement you have made with your exchange partner?
Dissatisfied 1 2 3 4 5 6 7 Satisfied
- 10- What was your bargaining strategy?
Keeping information 1 2 3 4 5 6 7 Giving information
- 11- What was the bargaining strategy of your exchange partner?
Keeping information 1 2 3 4 5 6 7 Giving information
- 12- How much influence did you have on your exchange partner during the negotiation?
Little influence 1 2 3 4 5 6 7 Much influence
- 13- What do you think about the cost information that you received for the negotiations?
Useless 1 2 3 4 5 6 7 Useful
- 14- What do you think of your cost information when compared to that of your exchange partner?
Less useful 1 2 3 4 5 6 7 More useful

15- How did you experience the negotiations about the contract price?

Easy 1 2 3 4 5 6 7 Complex

16- In the tables that you received, an interval was included for the price of the machine and spare parts. Which value in this interval did you focus on during the negotiations (tick the value closest to what you had in mind when trying to reach an agreement)?

- a- the minimum price of the interval.
- b- the maximum price of the interval.
- c- the mean price of the interval.

17- How did you experience the negotiations about maintenance and delivery time?

Easy 1 2 3 4 5 6 7 Complex

18- To what extent do you agree with the following statement: I tried to convince my exchange partner about the benefits of my offer.

Totally disagree 1 2 3 4 5 6 7 Totally agree

19- To what extent do you agree with the following statement: I tried to convince my exchange partner to accept my offer.

Totally disagree 1 2 3 4 5 6 7 Totally agree

20- To what extent do you agree with the following statement: I tried to find a compromise with my exchange partner.

Totally disagree 1 2 3 4 5 6 7 Totally agree

21- In which way did you try to realize your returns from the negotiations?

Individually 1 2 3 4 5 6 7 Together

22- How did you look at the outcomes of the negotiation?

Individual results 1 2 3 4 5 6 7 Joint results

23- Did you ever participate in an experiment before?

Yes: which experiment

NO

24- Consider the following choices:

(i) A fixed payment of €5000,

OR

(ii) A lottery in which there is a probability that you win €10000 and a probability that you win nothing

Select from the following lotteries which you would prefer over the fixed payment of €5000 (multiple responses possible):

- a- 70% chance of winning €10000, 30% chance of winning nothing.
- b- 60% chance of winning €10000, 40% chance of winning nothing.
- c- 50% chance of winning €10000, 50% chance of winning nothing.
- d- 40% chance of winning €10000, 60% chance of winning nothing.
- e- 30% chance of winning €10000, 70% chance of winning nothing.

25- What is your gender?

- Man
- Woman

26- Were you during the negotiations more interested in your own position or more interested in searching for a joint solution?

Own position 1 2 3 4 5 6 7 Joint solution

27- Describe the bargaining strategies that you have used:

a- Winning 1 2 3 4 5 6 7 Adjusting to the other

b- Deceptive 1 2 3 4 5 6 7 Honest

c –Biased information 1 2 3 4 5 6 7 Objective information

28- Was to your impression your exchange partner more interested in his/her self- interest or in finding a joint solution?

Self interest 1 2 3 4 5 6 7 Joint solution

29- Describe the bargaining strategies that your exchange partner has used

a- Winning 1 2 3 4 5 6 7 Adjusting to the other

b- Deceptive 1 2 3 4 5 6 7 Honest

c –Biased information 1 2 3 4 5 6 7 Objective information