ABC information, fairness perceptions, and interfirm negotiations

Stijn Masschelein
The University of Western Australia
Department of Accounting and Finance
35 Stirling Highway, Crawley WA 6009, Australia
Tel: +61 08 6488 3764 -- Fax: +61 08 6488 1047
E-mail: stijn.masschelein@uwa.edu.au

Eddy Cardinaels
Tilburg University
Department of Accountancy
P.O.Box 90153, 5000 LE Tilburg, The Netherlands
Tel: +31 13 466 8231 -- Fax: +31 13 466 8001
E-mail: e.cardinaels@uvt.nl

Alexandra Van den Abbeele
Katholieke Universiteit Leuven
Department of Accounting, Finance & Insurance
Naamsestraat 69, 3000 Leuven, Belgium
Tel: +32 16 32 69 36 -- Fax: +32 16 32 67 32.
E-mail: alexandra.vandenabbeele@econ.kuleuven.be

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ABSTRACT

We examine the effect of more precise cost information on contract renegotiations between supply chain parties. Specifically, we experimentally investigate the benefits of activity-based costing (ABC) information to address common supply chain inefficiencies that are caused by the buyer or the seller, but have the same underlying costs. Results suggest that the impact of more precise cost information depends crucially on the cause of the inefficiency that parties need to address during the negotiation. ABC information increases the total joint profit in the supply chain. However, ABC information increases the seller's perceptions of the fairness of the buyer's arguments for contract changes only when the buyer causes the inefficiency but not when the seller causes the inefficiency. The combined effect of ABC information on joint profit and fairness perceptions thus increases the buyer's profit only when buyer causes the inefficiency but not when the seller causes the inefficiency.

Keywords: *Interfirm negotiations, profitability, ABC information, fairness and cooperation.*

Data Availability: *Data are available from the first author upon request.*

I. INTRODUCTION

Many encounters between supply chain parties occur when the buyer experiences significant problems or a low return on assets (Ittner et. al. 1999). Such problems could arise from supply chain inefficiencies, such as low quality products, late delivery, a mismatch between the buyer's and seller's processes, or a lack of post-sales services (Ittner et al. 1999; Anderson and Dekker 2005). In such cases, buyers rely largely on negotiations to resolve inefficiencies (Anderson and Dekker 2005; Ittner et al. 1999).

Exchange of activity-based costing (ABC) information has the potential to facilitate interfirm contract negotiations and improve supply chain performance (Baiman and Rajan 2002a; Ellram 1994). Relative to price and cost information generated by traditional cost systems, ABC information offers more precise information on overhead activities (Wouters et al. 2005). However, sharing more precise information may put a firm at a disadvantage if the receiving firm can exploit the information to its advantage (Baiman and Rajan 2002a). Willingness to exchange ABC information is lower when parties already have significant profits (Drake and Haka 2008), when the setting lacks the appropriate incentives (Baiman and Rajan 2002a, 2002b) or when negotiators have sufficient negotiation power (Van den Abbeele et al. 2009).

However, when buyers experience significant inefficiencies or poor performance, they exchange more information with their seller (Ittner et al. 1999). Poor performance often motivates buyers to share their cost information with their sellers, to argue for favorable concessions from the seller that can improve the buyer's profit (Ittner et al. 1999). It is not clear how sellers react when buyers make use of more precise information to argue for more favorable contracts. We expect a seller to react differently to the buyer's use of precise information when the buyer causes the inefficiency relative to when the seller causes the inefficiency.

We conduct a two-by-two between-subjects experiment in which buyer-seller dyads negotiate a new delivery contract that affects both parties' profit. Buyers start the negotiation without a profit while the sellers start with a large profit to reflect a common bargaining context where buyers experience a need to share information to obtain concessions from their seller to realize a profit. We investigate whether the seller's fairness assessment of the buyer's arguments affects the financial benefit that buyers derive from sharing precise cost information. We examine two different causal explanations for the value chain inefficiency that leads to a low profit for the buyer: an inefficiency that is caused by the buyer, and an inefficiency that is caused by the seller. We further manipulate the precision of the buyer's cost information by providing buyers with quantified cost information either on all purchasing activities (ABC information) or on a limited set of activities (traditional cost information).

We hypothesize and find that more precise information only improves the buyer's profit when the buyer causes the inefficiency; buyers do not obtain more profit with precise information when the inefficiency is caused by the seller. In our experimental setting, buyers can improve their profit when sellers sacrifice part of their profit. The use of more precise ABC information helps the buyer improve his or her profits by identifying joint profit improvements and strengthening the seller's fairness perceptions of the buyer's arguments (Kadous et al. 2005) only when the buyer causes the inefficiency. When the seller causes the inefficiency, the seller reacts negatively to the buyer's arguments because he or she perceives the buyer's arguments as unfair criticism. Further analyses show that when the seller causes the inefficiency, sellers are less willing to offer better contract terms over the specific activity that is causing the low profit for the buyer.

Our results contribute to the literature in several ways. First, previous studies often take the benefits of sharing non-exploitable cost information for granted (Baiman and Rajan 2002a; Drake and Haka 2008; Van den Abbeele et al. 2009). In practice, however, negotiators can be confronted with a variety of problems (Gibbins et al. 2001) that can reduce the benefits derived from sharing cost information.

Second, we extend the work of Drake and Haka (2008) in two important ways. First, Drake and Haka (2008) focus on the willingness to share ABC information when both parties have equal profits or losses. They find that supply chain parties are less willing to share ABC information when both parties have already realized a positive profit. In order to study the seller's fairness perceptions of different buyer arguments for contract changes and the effect of such fairness perceptions on the buyer's profit, we introduce a bargaining setting where sellers have a strong position. Sellers cannot improve their profit but can decide to sacrifice part of their initial profit for fairness reasons to improve the efficiency of the supply chain and in turn the buyer's profit. Second, in contrast to Drake and Haka (2008), the participants with traditional cost information in our study also receive qualitative data on overhead costs. This is consistent with the idea that managers understand the behavior of overhead costs without knowing the precise size of these costs (Cooper and Kaplan 1988). Using this design allows us to attribute the benefits of ABC explicitly to the precision of cost information.

Finally, little evidence exists on the conditions under which fairness perceptions can influence negotiating parties' profit gains. Kachelmeier and Towry (2002) show that negotiators are willing to forgo profits in transfer pricing negotiations for fairness reasons when they negotiate face-to-face rather than over a computer network. We add to this literature by exploring the combined effects of cost information (ABC versus traditional cost information) and an important situational factor (cause of inefficiency).

Section II develops the hypotheses. Section III describes the experimental design. Results are presented in Section IV. Section V offers a concluding discussion.

II. HYPOTHESES

Figure 1 summarizes our theoretical model. A buyer can increase his or her profit if (1) the buyer and the seller find efficiency gains that improve the joint profit and (2) the seller perceives the buyer's

arguments for changing the contract as fair and hence accepts contract clauses that benefit the buyer. Below we develop our hypotheses on how precision of cost information and cause of inefficiency influence joint profit, the seller's perception of the fairness of the buyer's arguments and in turn the buyer's profit.

[Insert Figure 1 here]

Joint profit

Van den Abbeele et al. (2009) find that problem solving tactics are more successful with precise cost information. Similarly, Kulp (2002) reports survey evidence that vendors more efficiently manage their retailers' inventories when the retailers share precise accounting information. Consistent with these findings, prior research further suggests that precise cost information allows supply chain parties to identify new contractual arrangements that increase efficiency (Fisher et al. 2000; Pruitt and Carnevale 1993), and in turn the profit of the supply chain (Baiman and Rajan 2002a; Van den Abbeele et al. 2009), by identifying beneficial trade-offs between contract clauses (Kulp 2002; Wouters et al. 2005). Based on these arguments, we expect more precise cost information to have a positive effect on the joint profit. More formally:

H1: The joint profit is higher with more precise cost information than with less precise cost information.

Fairness of arguments

A buyer can improve his or her profit if the seller agrees to new contract terms that decrease the buyer's costs. Buyers can use precise cost information to argue for changes in the supply chain (Dekker 2003). We posit that a seller is more likely to agree to a buyer's requests when he or she perceives the buyer's arguments to be fair. Research on persuasion suggests that negotiators incorporate the fairness of arguments into their decisions (Friestad and Wright 1994). Arguments that negotiators perceive to be

unfair violate their expectations of appropriate behavior during the negotiations (Jewell and Barone 2007). Precise cost information can improve the persuasiveness of the buyer's arguments but it can also induce a critical reaction to the arguments presented (Kadous et al. 2005). The relative strength of these two effects is likely to be moderated by the cause of the inefficiency.

When the buyer is the cause of the inefficiency, the buyer's arguments for resolving the inefficiency focus on problems in his or her own firm and not on the seller's firm. Precise cost information increases the perceived fairness of the arguments because it increases the credibility of the buyer's arguments (Friestad and Wright 1994). Kadous et al. (2005) further show that proposals with quantified components increase the perceived competence of the proposal's preparer and the perceived likelihood that the proposed actions will lead to a favorable outcome. Accordingly, we expect that precise cost information increases the seller's perceptions of the fairness of the buyer's arguments when the inefficiency is due to the buyer.

In contrast, when the seller causes the inefficiency, buyers with a low profit focus more on the seller, arguing that the seller is not meeting the buyer's expectations because of the seller's inefficiency. The buyer's focus on the failure of the seller to meet expectations can have two opposing effects on the seller's perceptions of the fairness of the buyer's arguments. First, it can trigger an initial reaction to adapt to the buyer's expectations (Cotte et al. 2005, Kluger and DeNisi 1996), as the immediate reaction of the seller is to accept the seller inefficiency arguments as a fair basis for improved contract terms (Shiv et al. 1997). However, after processing the buyer's arguments, the seller can perceive the arguments as unfair (Jewell and Barone 2007; Shiv et al. 1997) because they focus on what the seller has done wrong. Prior research shows that faced with negative criticism, individuals and firms tend to minimize or reject their own responsibility to preserve their image (Homburg and Fürst 2007), which may lead sellers to perceive the arguments for contract renegotiation as unfair (Leung et al. 2001; Shiv et al. 1997).

Thus, compared to buyer inefficiency, seller inefficiency can have both a positive and a negative effect on the perceptions of the fairness of the buyer's arguments. We predict that with precise cost information the negative effect is larger than with less precise information. More precise information allows the seller to assess the buyer's arguments in more detail, which increases the negative fairness effect. As a result, when buyers use more precise cost information to argue for contract changes and the inefficiency is caused by the seller, the relative importance of this negative fairness effect increases. We therefore expect that precise cost information increases the seller's perception of the fairness of the buyer's arguments less when the inefficiency is caused by the seller. More formally:

H2: The seller's perception of the fairness of the buyer's arguments increase to a greater extent with precise cost information (relative to less precise cost information) when the buyer is the cause of inefficiency compared to when the seller is the cause of inefficiency.

Buyer profit

When the joint profit increases due to more precise information (H1), buyers can potentially gain more profit (Baiman and Rajan 2002a; Drake and Haka 2008). Moreover, the seller may have to expend costs to improve the joint profit, which can potentially decrease his or her profit and thus increase the buyer's gain from an increase in joint profit. Because the seller perceives the buyer's arguments based on more precise information to be more fair when the buyer causes the inefficiency (H2), the seller is likely to exert greater effort to increase the buyer's profit (Leung et al. 2001; Libby 1999). Similarly, a seller is not inclined to help a buyer who uses, in the seller's perception, unfair arguments (Homburg and Fürst 2007). Consequently a seller is likely to agree to new contract terms that increase the buyer's profit when the seller perceives the arguments as fair (Eckel and Grossman 1996; Ruffle 1998).

Taken together, the above arguments suggest that the buyer's profit is higher only when the buyer uses ABC information and when the inefficiency is caused by the buyer. In this case a buyer reaps the benefits of the increased joint profit derived from the more precise information because the seller perceives the buyer's arguments for contract changes to be fair. When the seller causes the inefficiency, however, the joint profit may increase as a result of ABC information but the buyer is not likely to profit from the increase in joint profit because the seller perceives the buyer's arguments to be less fair and hence is less likely to agree to contract changes that favor the buyer. The buyer's profit is also expected to be lower when buyers receive less precise cost information, because of lower joint profits associated with less precise cost information. This leads to the following hypothesis:

H3: The buyer's profit is higher with precise cost information and a buyer inefficiency than with precise cost information and a seller inefficiency or with less precise cost information, regardless of the cause of the inefficiency.

III. EXPERIMENTAL DESIGN

We use a two-by-two experimental design with information precision (ABC information vs. traditional cost information) and cause of inefficiency (buyer inefficiency vs. seller inefficiency) as the between-subject factors. We test our hypotheses by focusing on the following three dependent variables: the joint profit (H1), the seller's perceptions of the fairness of the buyer's arguments (H2) and the buyer's profit (H3). This section describes the experiment's participants, the experimental task and procedures, the manipulations, and the test variables.

Participants

The experiment's participants were 192 students at a large Western European university. These students (average age: 22) were enrolled in a management accounting course and were in the final year of their Master's degree program. We organized participants into 96 buyer-seller dyads[1]. Instructions at the beginning of the experiment explained that participants would enter into a lottery system whereby their chances of winning one of fifteen €10 gift vouchers would increase with their profit result.[2]

Experimental task and procedures

Similar to the negotiation game developed by Drake and Haka (2008), the participants conducted a face-to-face negotiation over the sale of casings. During the negotiations participants were allowed to speak freely. At the end of the negotiation process each participant drafted a copy of the final agreement. The casings required further processing by the buyer and fetched a fixed market price of €285. The negotiators were required to agree on one of three possible options for six contract clauses related to the delivery of the casings (e.g., storage, testing, delivery). These contract clauses affected the processing and handling costs of both the seller and the buyer. The game allowed participants to identify efficiency-increasing trade-offs; for example, the costs that the seller saved by not assembling

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[1] Initially, 101 dyads participated in the experiment. The analyses are based on 96 dyads, however, because in one dyad the seller and the buyer reported different outcomes for the contract clauses that they agreed on and in four dyads at least one of the participants did not complete the experimental questionnaire.

[2] Participants were not aware of the exact details of the payout. After the experiment, the winners of the vouchers were drawn as follows. Each participant's weight in the lottery depended on the profit he or she had realized. For participants with a profit below zero, the weight was zero. For the others, the weight was the square of their profit. The lottery itself consisted of two phases. In the first phase a random draw determined which cell and which role would receive a voucher. Every participant in the chosen group was then assigned a range of winning numbers. The size of the range equaled the participant's weight. Subsequently, a number between zero and the total weight sum was randomly drawn. The winning participant was the one for whom the number drawn was within the range they had been assigned. This procedure was repeated 15 times.

the casings did not necessarily equal the buyer's increased assembly costs. Consequently, participants could identify improvements to the joint profit. Participants could not renegotiate the wholesale price between the seller and the buyer, which had been fixed by a long-term contract at €155. Table 1 reports the buyer's and seller's underlying cost structures. Note that buyers did not always receive the full cost structure, as will be explained in the section on the experimental manipulations.

[Insert Table 1 here]

Each participant (buyer or seller) was provided a role description (see the Appendix). Besides the cost of the three options for every contract clause, the description also contained a financial overview of the preceding year for the participant's firm; the buyers made zero profit while the sellers earned €50. As the negotiation game allowed for efficiency-increasing solutions, the joint profit could increase up to €75.[3] The starting values served as a reference point against which participants could compare their counterparts' proposals. Buyers had an unfavorable starting position (zero profit) to encourage them to share cost information. To investigate whether sellers' perceptions of the fairness of the buyer's arguments influence their willingness to improve the buyer's profit, sellers could sacrifice part of their initial profit. The set-up resembles an ultimatum game as the sellers could either stay at their current profit level or sacrifice a portion of their initial earnings to improve the profit of the buyers.[4]

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[3] Three theoretical distributions of the maximum joint profit are possible: the buyer earns €70 and the seller €5, the buyer earns €50 and the seller €25 or the buyer earns €60 and the seller €15. None of the dyads played the first two outcomes. The latter outcome (buyer €60, seller €15) only occurred two times. The minimum obtainable joint profit is -€5, where the seller earns €45 and the buyer realizes a loss of €50. No dyad obtained this outcome. The lowest joint profit realized by one dyad was €35 (€50 for the seller and -€15 for the buyer). As discussed later, most of the new agreements involved outcomes in which the joint profit increased and, depending on the cause of inefficiency and the precision of cost information, sellers sacrificed a small part of their initial profit to increase the profit of the buyers.

[4] This is not a full ultimatum game, however, as sellers could stay at their initial level of €50 while increasing the joint profit (and thereby still allow the buyer to earn a profit). However, when sellers sacrificed part of their initial profit, they could increase the joint profit further and provide the buyer with even more profit.

Experimental manipulations

Participants were randomly assigned to one of four between-subjects conditions. Sellers always had a full cost report with cost information on each of their firm's activities (see Table 1). The report also indicated the effect of the different contract clauses on the seller's costs. We manipulated the buyers' *precision of cost information* so that half of them had precise *ABC information* and the other half had *traditional cost information*. The buyers with ABC information received a full cost report on each of their firm's activities as shown in Table 1. The buyers with traditional cost information received a cost report with full cost information only for three activities (material costs, assembly costs, and base costs). For the three overhead items (storage costs, inspection costs, and testing costs) these buyers only knew the qualitative cost changes relative to the initial scenario, as shown in Panel A1 of the Appendix. The use of overhead activities with relative information is an adaptation of Drake and Hake (2008). Participants could negotiate on the six activities in either information condition (ABC or traditional cost information). Negotiators did not have direct access to their counterpart's information but could exchange this information during negotiations.[5]

In our experiment the *cause of inefficiency* in the supply chain is related to testing costs. This inefficiency is manipulated by providing buyers with one of two different explanations for high testing costs. Half of the buyers were told that the high testing costs were due to their use of a defective software system (*buyer inefficiency*), while the other half were told that the seller's choice of casing

[5] In addition to verbal communication buyers and sellers could exchange information strips. For each contract clause, information strips were pieces of paper on which the contract clause's three options were printed. Because the buyer and seller did not know each other's profit, negotiators also had a seventh information strip at their disposal that reported the firm's prior-year financial result. Consequently, participants could share (part of) their private cost information. We registered and counted the number of information strips that dyads shared during the negotiation process. However, no meaningful observations were obtained from the collection of these information strips, presumably because most dyads exchanged information through verbal communication. Accordingly, this measure was not used in further analysis.

size was the cause of the inefficiency (*seller inefficiency*) (see also Appendix Panel A1). The seller was not informed about the specific cause of the inefficiency but was aware that the buyer faced some problems and that there were several possible explanations for this problem.

Test variables

Participants were asked to carefully read the instructions before entering into the negotiations. No time constraint was placed on these negotiations. After the negotiations, participants filled out a questionnaire in which they indicated which options they chose for each of the six contract clauses. The initial value for each of these contract clauses is 2 (middle option). Each of these clauses could be renegotiated and could take a value of 1, 2, or 3, where 1 represents a lower cost for the seller and a higher cost for the buyer compared to the initial value 2, and 3 represents a higher cost for the seller and a lower cost for the buyer compared to the initial value.

We predict that buyers increase their profit with ABC information for two reasons. First, ABC information should improve joint profit. Second, buyer arguments based on ABC information rather than traditional cost information should be perceived as more fair by the seller. We expect, however, that the use of ABC information will only increase the seller's perceptions of the fairness of the buyer's arguments and in turn the buyer's profit when the buyer is the cause of the inefficiency. We therefore consider the joint profit, the seller's perceptions of the fairness of the buyer's arguments and the buyer's profit as our main dependent variables.

We calculate *joint profit* as the sum of the seller's profit and the buyer's profit. *Buyer profit* is constructed by subtracting the wholesale product price (€155) and the buyer's total costs from the market price (€285), where total costs are the sum of the costs of the six contract clauses in the final agreement (see Table 1). We calculate *seller profit* in a similar way by subtracting the seller's total costs, based on the options chosen for the six contract clauses, from the wholesale product price (€155).

Fairness of arguments is measured as the seller's assessment of the fairness of the buyer's main arguments on a 7-point Likert scale ranging from 'not at all fair' (1) to 'extremely fair' (7).

To further control for outcome effects in additional analyses, we asked sellers to indicate the fairness of the ultimately negotiated outcome on a 7-point Likert scale ranging from 'not at all fair' (1) to 'extremely fair' (7). We refer to this measure as *outcome fairness*. To address concerns that buyers' initial profit expectations before the negotiation drive the results, we also conduct sensitivity tests to check whether our results continue to hold when we control for such expectations (Thompson and Loewenstein 1992). Specifically, before the negotiation we asked buyers to indicate (1) which profit they would find fair and (2) which profit they expected to obtain. Consistent with Kachelmeier and Towry (2002) and Luft and Libby (1997), we construct *buyer expectations* as the average of the answers given on these two questions (Cronbach's alpha = 0.75).

IV. RESULTS

Manipulation checks

Our manipulation check on precision of cost information indicates that buyers receiving ABC information judge their cost information as more relevant for information sharing than buyers receiving traditional cost information ($F = 3.20$, $p < 0.08$; $F = 5.34$, $p < 0.03$). We also asked participants to report the buyer's main arguments for initiating contract changes. We find that 70 percent of the buyers and 80 percent of the sellers indicate that the buyer's main arguments for contract changes were a cost problem or low profits.

Descriptive statistics

Panel A of Table 2 reports descriptive statistics. ABC information has a positive impact on joint profit compared to traditional cost information for both causes of the inefficiency (5.4 for buyer inefficiency and 4.5 for seller inefficiency). ABC information increases fairness of arguments under the

buyer inefficiency condition (from 4.2 to 4.9). Under the seller inefficiency condition, in contrast, fairness of arguments declines with ABC information (from 4.8 to 4.5). Finally, buyer profit is highest when the buyer receives ABC information and the buyer is the cause of the inefficiency, whereas seller profit is relatively stable across the four cells.

Panel B of Table 2 presents the correlation matrix. Consistent with the model in Figure 1, correlations between buyer profit and joint profit ($r = 0.74$, $p < 0.01$) and between buyer profit and fairness of arguments ($r = 0.34$, $p < 0.01$) are positive and significant, suggesting that buyers earn a higher profit when they can increase the joint profit or the seller's perceptions of the fairness of their arguments. Further, consistent with the bargaining set-up, sellers need to give up profit for buyers to realize a significant increase in profit. Indeed, the correlations confirm that sellers do not profit from a higher buyer profit ($r = -0.74$, $p < 0.01$) or a higher joint profit ($r = -0.18$, $p = 0.07$). We also find a positive correlation between joint profit and fairness of arguments ($r = 0.38$, $p < 0.01$).

[Insert Table 2 here]

Hypothesis tests

Recall that H1 predicts a significant main effect of the precision of cost information on joint profit, H2 predicts that more precise information has a positive effect on perceived fairness of arguments only when the buyer is the cause of inefficiency but not when the seller is the cause of inefficiency, and H3 predicts that buyers are able to increase their profit when buyers have more precise information and buyers are the cause of the inefficiency. For directional predictions we report one-tailed p-values while for the other effects we report two-tailed p-values.

Panel A of Table 3 presents the results of an ANOVA analysis in which precision of cost information and cause of inefficiency are the independent variables and joint profit is the dependent variable. The analysis shows a main effect for precision of cost information: ABC information significantly increases

joint profit ($F = 10.61$; one-tailed $p < 0.01$). This finding is consistent with H1 and indicates that ABC information helps increase total efficiency in buyer-seller negotiations. Results also show that joint profit is higher when the buyer causes the inefficiency than when the seller causes the inefficiency ($F = 4.35$; $p = 0.04$). This finding suggests that improving the joint profit is more problematic when the seller is the cause of the inefficiency (see mean values in Table 2). It may indicate that sellers are less willing to change the contract terms when the buyer argues that the seller is responsible for the inefficiency.[6]

Panel B of Table 3 shows the results of the ANOVA analysis in which precision of cost information and cause of inefficiency are the independent variables and fairness of arguments is the dependent variable. We find evidence of a significant interaction effect of precision of cost information and cause of inefficiency ($F = 4.08$; one-tailed $p = 0.02$). This result is consistent with H2, which posits that the effect of ABC information compared to traditional cost information on fairness of arguments depends on the cause of inefficiency. Only under the buyer inefficiency condition does the seller perceive the buyer's arguments for contract changes to be more fair in the presence of ABC information. Under the seller inefficiency condition, perceived fairness of arguments decreases, consistent with our theory that

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[6] An additional explanation for the main effect of cause of inefficiency on joint profit might follow from the sellers' role description. While the possibility of software problems and electricity prices are briefly suggested to all sellers as potential causes of the problem under both conditions, the exact cause of the inefficiency need to be inferred from the description of the set-up/testing cost that buyers receive and the arguments that the buyers use during the negotiation. The sellers may have been reluctant to improve the joint profit, when the buyer uses more unexpected arguments. This might be the case under the seller inefficiency, where sellers' casings appear to be the cause of the problem. We thank an anonymous reviewer for this suggestion. However, this explanation is unlikely to account for the interaction effect between precision of information and cause of inefficiency on fairness of arguments, since such an unexpected effect should have the same impact with or without precise cost information. The use of unexpected arguments would then suggest an overall reduction in fairness under the seller inefficiency condition. However, this does not seem to hold as fairness is relatively high under traditional cost information under the seller inefficiency condition.

sellers evaluate buyers' arguments for contract changes more negatively in the presence of ABC information.

Panel C of Table 3 tests H3 using contrast coding (Buckless and Ravenscroft 1990). To test H3, which posits that buyers will achieve higher profits only under the buyer inefficiency and ABC information condition, we use a contrast weight of 3 for the ABC/buyer inefficiency condition and a weight of -1 for the ABC/seller inefficiency, traditional/buyer inefficiency and traditional/seller inefficiency conditions. Results reveal that buyers' profits follow the predicted pattern ($F = 4.16$; one-tailed $p = 0.02$). Thus, consistent with H3, buyers appear to profit from ABC information only when the buyer's firm is the cause of the inefficiency.

As an additional analysis, we perform a set of t-tests where we assess the effect of ABC information in comparison to traditional cost information by cause of inefficiency. If our predictions hold, ABC information should improve the buyer's profit only when the buyer is the cause of inefficiency in which case we expect information to have a significant positive impact on fairness of arguments and joint profit. In contrast, when the seller is the cause of the inefficiency, we do not expect to find any effect of cost information on fairness of arguments and buyer profit. Although the joint profit may increase when the seller is the cause of inefficiency, buyer arguments based on ABC information would not be perceived as more fair by the seller compared to buyer arguments based on traditional cost information. Results presented in Panel D of Table 3 are in line with these predictions: under the buyer inefficiency condition we observe significant effects on all three variables, while under the seller inefficiency condition a positive effect obtains only on joint profit. When the seller is the cause of the inefficiency, the seller's perception of fairness of arguments is lower when ABC information is used than when traditional information is used, and hence buyers gain less from the increase in joint profit, presumably because the contract options that benefit the buyer are less likely to be included in the final agreement.

We present detailed evidence in support of this inference in the subsection entitled 'Contract patterns across conditions'.

[Insert Table 3 here]

Path model

The previous section reports results of tests for our three hypotheses, but does not offer an overall assessment of the entire model as shown in Figure 1. Similar to Barton and Mercer (2005), we perform a path analysis to simultaneously test the three relations in our model: (1) the effect of precision of cost information and cause of inefficiency on joint profit, (2) the interaction of precision of cost information and cause of inefficiency on fairness of arguments and (3) the effect of joint profit and fairness of arguments on buyer profit. Similar to Barton and Mercer (2005), we conduct an iterated General Least Squares procedure which converges to the Full Information Maximum Likelihood estimation to take the correlations between the error terms in the three estimations into account (Henningsen and Hamann 2007). To make regression results comparable to the ANOVA results, precision of cost information is coded as -1 for traditional cost information and 1 for ABC information, and cause of inefficiency is coded as -1 for seller inefficiency and 1 for buyer inefficiency.

Figure 2 displays the results. The figure only shows the path coefficients significant at the 0.10 level or less. McElroy's R^2 of 0.33 indicates the goodness of fit of the whole system; this measure is similar to the adjusted R^2 for an OLS regression. We find that this analysis supports H1 and H2. Consistent with H1, the main effect of precision of cost information on joint profit ($t = 3.31$; one-tailed $p < 0.01$) is significant. Similar to the ANOVA results discussed above, joint profit is also significantly higher under the buyer inefficiency condition than under the seller inefficiency condition ($t = 2.18$, $p = 0.03$). Further, consistent with H2, the path suggesting an interaction effect of cause of inefficiency and precision of cost information on fairness of arguments is significant ($t = 2.15$, one-tailed $p<0.02$; main

effects not significant). For the third link in our model, we find a significant positive effect of joint profit ($t = 6.56$; $p = 0.01$) and fairness of arguments ($t = 5.45$; $p < 0.01$) on buyer profit. In sum, the path analysis shows that the effect of precision of cost information on buyer profit in negotiations is determined by the effect on the joint profit and perceived fairness of arguments. The latter relation is contingent on the cause of the inefficiency discussed in the negotiation.

[Insert Figure 2 here]

To test whether the link between fairness of arguments and buyer profit is driven by the seller's assessment of the negotiation outcome, we rerun the path analysis including the seller's perception of outcome fairness as a control variable.[7] Untabulated results show a significant effect of outcome fairness on fairness of arguments ($t = 5.80$; $p < 0.01$) and buyer profit ($t = -2.68$; $p < 0.01$). However, the hypothesized effects on fairness of arguments remain unchanged. After controlling for outcome fairness, the interaction effect of precision of cost information and cause of inefficiency on fairness of arguments remains significant ($t = 2.25$; one-tailed $p = 0.01$) and the effect of fairness of arguments on buyer profit remains significant ($t = 5.27$, $p < 0.01$). These results show that the seller's assessment of the fairness of the negotiation outcome is associated with his or her assessment of the fairness of the buyer's arguments. However, this has no impact on the predicted relations. These results offer further support to the view that the cause of inefficiency moderates the effect of more precise information on the buyer's profit through the seller's perceptions of the fairness of the buyer's arguments.

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[7] The means of outcome fairness indicate that there is little difference between conditions. In particular, the untabulated means are 5.15 for ABC/buyer inefficiency, 5.00 for ABC/seller inefficiency, 4.85 for traditional/buyer inefficiency and 4.92 for traditional/seller inefficiency. ANOVA analysis shows no significant main effect or interaction effect for precision of cost information and cause of inefficiency.

Contract patterns across conditions

In this section we perform cluster analysis on the six contract clauses to analyze patterns in the new contracts that parties agree upon and how these patterns vary with our manipulations. This analysis provides insights into the negotiation process because, as discussed in Section III, one can realize increases in joint profit and different profit distributions between seller and buyer by trading off changes in different contract clauses. However, it is important to keep in mind that a limitation of cluster analysis is that it is an explorative technique.[8]

The analysis results in six clusters. Panel A of Table 4 presents these six clusters and displays the medians of the clauses for every cluster. We add the means of buyer profit, seller profit, joint profit, and fairness of arguments to clarify interpretation of the clusters. The three profit variables differ significantly across the different clusters ($p < 0.01$) and perceived fairness of arguments differs marginally ($p = 0.11$). Based on the median clauses and the profit measures (joint profit, buyer profit, and seller profit), we identify three major patterns of new contracts in Panel B of Table 4.

[Insert Table 4 here]

Panel A first shows that in clusters 3 and 4, participants chose the clause with the lowest joint costs and the lowest buyer costs with respect to the inefficiency, namely, the testing costs (the median is 3,

[8] A cluster analysis groups the new contracts of all dyads into a limited set of characteristic types based on the clauses that were agreed upon. We derive the clusters following the two-step procedure of Ketchen and Shook (1996). Specifically, we first run the hierarchical Ward method. Each negotiated contract starts as its own cluster and two contracts are combined to form a new cluster so that the ratio of between-cluster variation to within-cluster variation is maximized. This iteration is repeated until all negotiation outcomes are assigned to the same cluster. The R^2, pseudo F-statistic, and Cubic Clustering Criterion suggest that six clusters yield a reasonable cluster solution. Next, we use a K-means non-hierarchical cluster to assign contracts to one of the six clusters, where the means of the six clusters based on the Ward method are used as seeds. Each negotiated contract is put in the temporary cluster with the nearest seed. Means are calculated for each cluster and used as new seeds. The negotiation outcomes are reassigned to clusters to minimize within-cluster variation. This procedure is iterated until the solution converges (Ittner et al. 1999).

indicating lower costs for the buyer). For many other contract options, participants chose efficient options in terms of joint costs. In particular, the dyads in cluster 3 negotiated the clause with the lowest joint costs for five out of six costs. Compared to the other clusters buyers enjoy the highest profit in clusters 3 and 4 (17.89 and 16.38).

In clusters 1 and 5, participants improved the joint profit relative to the initial position of €50. Nevertheless, in these clusters the median testing cost is 2, indicating a status quo (compared to the initial position) for the clause related to the inefficiency experienced by the buyer. The trade-offs focus on other contract clauses: joint profit is still improved, but buyer profit in clusters 1 and 5 (15.00 and 15.22) is lower than in clusters 3 and 4.

Finally, in clusters 2 and 6 participants agreed to inefficient contracts as the final joint profit is lower than the initial position of €50. In cluster 6 only one overhead clause is efficient in terms of joint cost minimization, and in cluster 2 buyers appear to gain from the testing costs at the expense of the seller (only seven dyads are in this cluster).

Panel B of Table 4 provides an overview of the distribution of the different clusters across experimental conditions. The patterns are consistent with our predictions. In line with H1, the use of ABC information in comparison to traditional cost information leads to a decrease in the inefficient contract clusters (sum of clusters 2 and 6), indicating that ABC information helps increase joint profits. Under the buyer inefficiency condition, buyers with ABC information secure concessions from the seller on testing costs more often than buyers with traditional cost information (sum of clusters 3 and 4 rises from 43 percent to 50 percent). By contrast, under the seller inefficiency condition, contracts in which the seller offers concessions related to the cause of the inefficiency decrease as a result of ABC information (sum of clusters 3 and 4 goes from 43 percent to 34 percent). Consistent with H2, getting concessions from the seller seems to be more problematic when the buyer uses ABC information to

argue that the inefficiency is caused by the seller than when the buyer uses ABC information to argue that the inefficiency is caused by the buyer. Under the seller inefficiency condition, the contract changes mainly involve clauses other than the one associated with the problem that the buyer faces (testing costs). The sum of clusters 1 and 5 rises from 12 percent to 61 percent as a result of using ABC. Profits for the buyer are also lower for these clusters compared to clusters 3 and 4 (15.22 and 15.00).[9] Overall, these findings indicate that under the buyer inefficiency condition negotiations on the contract clause with the manipulated cause of inefficiency function more smoothly than under the seller inefficiency condition. As a result, the terms that dyads agree upon are more beneficial to the buyer. These findings provide an additional explanation for the profit result that we document in support of H3.

Sensitivity analysis

An alternative theory for H2 and H3 is that the cause of the inefficiency may change the way the buyer approaches the seller. When the buyer is the cause of the inefficiency the buyer may approach the seller in a humble manner, suggesting that he or she wants to find solutions. The negotiation problem is then framed as cooperative (Neale and Bazerman 1985), which can positively influence the seller's perceptions of the fairness of the buyer's arguments (H2). ABC information could thus provide buyer-seller dyads with better opportunities to identify higher joint profits and concessions that can improve the buyer's profit (H3). In contrast, when the seller is the cause of the inefficiency the buyer may approach the seller in an accusatory manner, insisting that the seller accommodates the buyer's demands for improved contract terms. More precise ABC information could offer the buyer a basis for

[9] Note that for contracts in cluster 5, which are especially prevalent in the case of seller inefficiency and ABC information (39 percent, or an increase of 35 percent relative to traditional cost information), the fairness of arguments is rather low (4.36).

such an insisting approach which may also increase the buyer's initial profit expectations before negotiations (Thompson and Loewenstein 1992). This can ultimately exacerbate the accusatory nature of the negotiation (Neale and Bazerman 1985) and lead the seller to perceive the buyer's arguments as less fair (H2), which would translate into lower profit for the buyer (H3).[10]

We analyze buyer expectations (i.e., the average of what the buyer deems to be a fair profit and the profit he or she expects to achieve before the negotiation) as a proxy for how insistent the buyer approaches the seller (Thompson and Loewenstein 1992). The analyses, however, do not support the view that the buyer's approach explains our results. First, buyers who experience a seller inefficiency do not increase profit expectations as a result of ABC information. On the contrary, Panel A of Table 5 shows that there is an interaction effect of precision of cost information and cause of inefficiency ($F = 3.97$; $p = 0.05$) on buyer expectations and the means for the seller inefficiency condition even show a decrease in the buyer's initial profit expectations when the buyer uses ABC information.[11] Second, buyer expectations do not influence the seller's perceptions of the fairness of the buyer's arguments (H2) or the buyer's profit (H3). Pearson correlations show no significant association between buyer expectations and fairness of arguments ($r = 0.07$; $p = 0.34$). In addition, the ANCOVA analysis in Panel B of Table 5 on fairness of arguments controlling for buyer expectations shows that the predicted interaction effect of precision of cost information and cause of inefficiency (H2) remains significant ($F = 3.33$; $p = 0.04$ one-tailed), while the covariate buyer expectations is not significant ($F = 0.51$; $p = 0.48$). These results suggest that the seller's perception of fairness is not influenced by the buyer's

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[10] We thank an anonymous referee for this suggestion.

[11] The means show that buyer expectations follow a pattern similar to fairness of arguments, with high buyer expectations in the ABC/buyer inefficiency (M = 60.19) and traditional/seller inefficiency (M = 58.67) conditions, and low buyer expectations in the traditional/buyer inefficiency (M = 47.00) and ABC/seller inefficiency (M = 45.12) conditions.

approach, but rather by the arguments that the buyer uses during negotiation. With regard to H3, Pearson correlations indicate no significant association between buyer expectations and buyer profit ($r = 0.11$; $p = 0.18$). Panel C of Table 5 further shows that the contrast for H3 remains significant for buyer profit when we control for buyer expectations ($F = 3.42$; $p = 0.03$ one-tailed), while the covariate buyer expectations is again insignificant ($F = 1.73$; $p = 0.19$).

V. DISCUSSION

This paper examines how buyers can benefit from more precise cost information (i.e., ABC information) when they need to solve different causes of inefficiencies in the supply chain. The results show that precise cost information improves the joint profit independent of the cause of the inefficiency. However, only when the buyer is the cause of the inefficiency does precise information have a positive impact on the seller's perceptions of the fairness of the buyer's arguments and in turn on the buyer's profit. When the seller is the cause of the inefficiency, precise information does not enhance the seller's perceptions of the fairness of the buyer's arguments and buyers are unable to profit from the increase in joint profit. In such cases, more precise information does not help the buyer to improve profits. Additional analyses reveal that these findings cannot be explained by the initial expectations of the buyer or by the seller's perception of outcome fairness. Rather, they appear to be driven by the arguments that the buyer uses during the negotiation. In particular, sellers appear to react more negatively to buyer arguments based on precise cost information when buyers argue that sellers are responsible for the inefficiency.

Our results add a new dimension to the existing literature on the reluctance of buyers to share ABC-based information (Baiman and Rajan 2002a; Drake and Haka 2008; Van den Abbeele et al. 2009). In particular, our focus on the seller's perceptions of the fairness of the buyer's arguments allows us to distinguish conditions under which precise ABC information can improve or impair negotiations in the

supply chain. More specifically, our findings identify conditions under which more precise cost information does not help communicate and address supply chain inefficiencies.

Our results also contribute to the literature on fairness in negotiations (Kachelmeier and Towry 2002). Our study is the first to offer evidence that the precision of cost information together with the cause of inefficiency are important determinants of perceived fairness in face-to-face negotiations. To examine the influence of fairness perceptions on outcomes, we use a setting in which the seller has a strong bargaining position. For buyers to improve their profit, the seller is required to make concessions that increase the buyer's profit without any direct economic benefit to the seller. Our evidence shows that the seller may respond favorably to more precise ABC information but that such a response depends crucially on the arguments buyers use when demanding changes to contract terms.

Our study is subject to some limitations. Our results primarily apply to situations in which the bargaining parties face an inefficiency for the first time. Such problems often occur in the early stages of procurement or in existing supply chain relationships, where supply chain parties renegotiate contract terms when the buyer experiences a low profit (Anderson and Dekker 2005; Ittner et al. 1999). However, further research is needed to determine whether our results continue to hold in settings where parties have a longer negotiation history.

A second limitation is that we do not measure fairness of arguments as a construct variable with multiple items. It may therefore be difficult to assess whether our measure captures the perceived fairness of the buyers' arguments or whether participants answered this question consistent with their negotiation behavior during the experiment. However, while reliability is difficult to assess, our tests consistently show a significant effect of our manipulations on fairness of arguments and buyer's profit even after we control for other potential covariates such as the buyer's initial expectations and the seller's perception of outcome fairness. A cluster analysis of the resulting contracts further offers robust

evidence that under the seller inefficiency condition, buyers with precise ABC information experience more difficulty arguing for contract changes, suggesting that sellers perceive the buyer's arguments to be less fair. Additional results suggest that the buyer's negotiation approach may account in part for the seller's fairness perception, but sensitivity tests do not support this explanation and hence indicate that further research is needed to examine this theory in more detail.

Finally, our setting does not allow for trust building and learning, which would typically occur in multiple rounds of bargaining. In repeated interactions increased trust may decrease defensive reactions on the part of the seller. On the other hand, fairness considerations and a limited level of cooperation when the seller is the cause of the inefficiency might prevent trust from developing. Which of these effects dominates would be an interesting topic for future research.

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FIGURE 1
Theoretical Model of Predictions on Buyer Profit

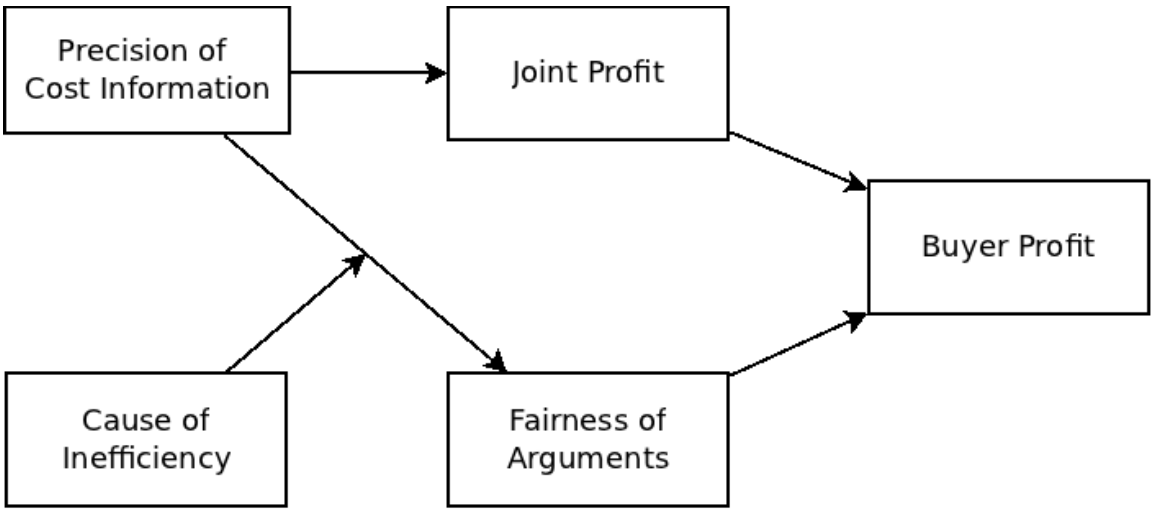

Figure 1 depicts the theoretical model. We hypothesize that precision of cost information affects buyer profit in two ways. First, more precise cost information helps increase the efficiency and hence joint profit of the supply chain (H1). Second, more precise cost information may also increase the seller's perceptions of the fairness of the buyer's arguments. We expect this effect to be larger under the buyer inefficiency condition than under the seller inefficiency condition (H2). We also expect that an increase in both the joint profit and the seller's perceptions of the fairness of the buyer's arguments are required to improve the buyer's profit (H3).

FIGURE 2
Empirical Test of Theoretical Model

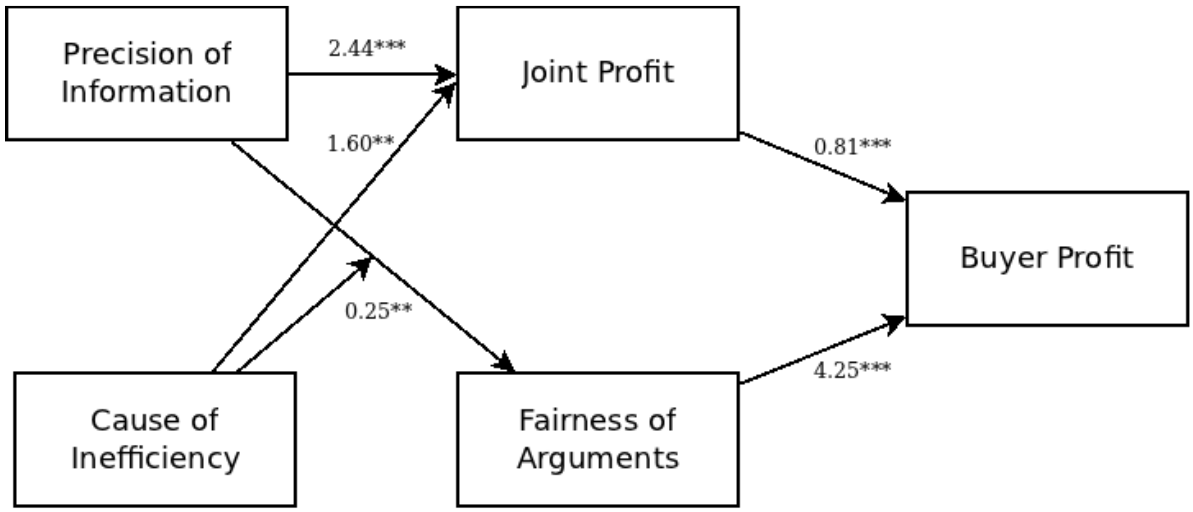

Figure 2 depicts the results of our empirical test. The figure only shows path coefficients significant at the 10% (*), 5% (**) and 1% (***) level. Precision of cost information is coded 1 for ABC information and -1 for traditional cost information, and cause of inefficiency is coded 1 for buyer inefficiency and -1 for seller inefficiency. Consistent with H1, precision of cost information is positively related to joint profit. We also find that the joint profit is higher under the buyer inefficiency condition than under the seller inefficiency condition. Consistent with H2, the interaction effect of precision of cost information and cause of inefficiency on fairness of arguments is significant. Finally, consistent which H3, this model provides evidence that an increase in both joint profit and fairness of arguments leads to a higher buyer profit.

TABLE 1
Buyer and Seller Cost Structures

	Buyer	Seller	Joint [c]		Buyer	Seller	Joint [c]
1. Material costs				**4. Storage costs – Supervision costs** [b]			
If casing blocks are RED	€25	€10	**€35**	If casings are made in THREE weeks	€35	€10	€45
If casing blocks are YELLOW [a]	*€15*	*€20*	***€35***	*If casings are made in TWO weeks* [a]	*€20*	*€15*	*€35*
If casing blocks are BLUE	€5	€35	€40	If casings are made in ONE week	€5	€25	**€30**
2. Assembly costs				**5. Inspection costs – Handling costs** [b]			
If casings are UNASSEMBLED	€35	€10	€45	If casings are UNBAGGED	€25	€10	**€35**
If casings are PARTIALLY ASSEMBLED [a]	*€20*	*€15*	*€35*	*If casings are SINGLE-BAGGED* [a]	*€15*	*€20*	***€35***
If casings are FULLY ASSEMBLED	€5	€25	**€30**	If casings are DOUBLE BAGGED	€5	€35	€40
3. Base costs				**6. Testing costs – Set-up costs** [b]			
If base is made of TIN	€45	€10	€55	If casings are made of LARGE bocks	€55	€10	€65
If base is made of PLASTIC [a]	*€25*	*€15*	*€40*	*If casings are made of MEDIUM blocks* [a]	*€35*	*€20*	*€55*
If base is made of STEEL	€5	€25	**€30**	If casings are made of SMALL blocks	€15	€35	**€50**

[a] The clauses in italics represent the initial position (i.e., the clauses in the pre-negotiation contract).

[b] The first and second activity names refer, respectively, to the buyer's and the seller's cost report.

[c] The clauses in bold are the most efficient choices from a joint perspective.

TABLE 2
Summary Statistics

Panel A: Dependent Variables: Means and Standard Deviations [a]

	Buyer Inefficiency		Seller Inefficiency	
Variable	Traditional Cost Information (n=21)	ABC Information (n=26)	Traditional Cost Information (n=26)	ABC Information (n=23)
Joint Profit [b]	57.1 (8.2)	62.5 (5.5)	54.4 (9.4)	58.9 (5.6)
Fairness of Arguments [c]	4.2 (1.3)	4.9 (1.1)	4.8 (1.2)	4.5 (1.3)
Buyer Profit [d]	10.7 (15.2)	18.1 (9.3)	11.3 (15.1)	14.1 (10.9)
Seller Profit [e]	46.4 (10.4)	44.4 (7.1)	43.1 (10.1)	44.8 (8.1)

Panel B: Pearson Correlation Matrix (n=96 dyads)

	Variable	**1**	**2**	**3**	**4**
1	Joint Profit [b]	1			
2	Fairness of Arguments [c]	0.38***	1		
3	Buyer Profit [d]	0.74***	0.34***	1	
4	Seller Profit [e]	-0.18*	-0.15	-0.80***	1

***, ** and * indicate significance at, respectively, the 1%, 5% and 10% level (two-tailed).

[a] Means; standard deviations are displayed in parentheses.

[b] The sum of the buyer's individual profit and the seller's individual profit at the end of the negotiation game.

[c] The seller's perceptions of the fairness of the buyer's main arguments (measured on 7-point Likert scale).

[d] The buyer's individual profit at the end of the negotiation game (€285 - €155 - costs of negotiated contract as provided in Table 1).

[e] The seller's individual profit at the end of the negotiation game (€155 - costs of negotiated contract as provided in Table 1). This variable is not a key variable but it is used in the additional tests.

TABLE 3
Hypothesis Tests

Panel A: ANOVA on Joint Profit [a]

	Sum of Squares	Df	Mean Square	F-statistic	p-value
Precision of Cost Information	577.11	1	577.11	10.61	0.001***
Cause of Inefficiency	236.73	1	236.73	4.35	0.040**
Precision of Cost Information x Cause of Inefficiency	4.48	1	4.48	0.08	0.774
Error	5005.24	92	54.40		

Panel B: ANOVA on Fairness of Arguments [b]

	Sum of Squares	Df	Mean Square	F-statistic	p-value
Precision of Cost Information	0.77	1	0.77	0.52	0.473
Cause of Inefficiency	0.25	1	0.25	0.17	0.680
Precision of Cost Information x Cause of Inefficiency	6.06	1	6.06	4.08	0.023**
Error	136.78	92	1.49		

Panel C: Contrast Analysis of Buyer Profit [c]

	Sum of Squares	Df	Mean Square	F-statistic	p-value
Contrast [d]	684.11	1	684.11	4.16	0.022**
Residual Variance [e]	149.50	2	74.75	0.47	0.628
Error	15128.63	92	164.44		

Panel D: Subset Analyses of Information per Cause of Inefficiency [f]

	Buyer Inefficiency					Seller Inefficiency				
	Trad	ABC	Expectation effect ABC	t-value	p-value	Trad	ABC	Expectation effect ABC	t-value	p-value
Joint Profit	57.1	62.5	+	2.68	0.01***	54.4	58.9	+	1.99	0.05**
Fairness of Arguments	4.2	4.9	+	1.96	0.06*	4.8	4.5	Ns	-0.91	0.39
Buyer Profit	10.7	18.1	+	2.05	0.05**	11.3	14.1	Ns	0.73	0.47

***, ** and * indicate significance at, respectively, the 1%, 5% and 10% level (two-tailed).

[a] The sum of the buyer's individual profit and the seller's individual profit at the end of the negotiation game.

[b] The seller's perceptions of the fairness of the buyer's main arguments (measured on 7-point Likert scale).

[c] The buyer's individual profit at the end of the negotiation game (€285 - €155 - costs of negotiated contract as provided in Table 1).

[d] The model contrast tests examine whether the buyer's profit follows the pattern as predicted. The contrast codes used to perform the contrast test are {3, -1, -1, -1} for, respectively, the ABC/buyer inefficiency, ABC/seller inefficiency, traditional/buyer inefficiency, and traditional/seller inefficiency conditions.

[e] The residual sum of squares is the variance between the conditions that are not explained by the contrast. An insignificant p-value indicates that the model contrast explains all of the between-group variance.

[f] Based on ANOVA analyses by cause of inefficiency.

TABLE 4
Cluster Analysis on Negotiated Contracts

Panel A: Median of Contract Variables across Clusters of Contract Outcomes [a]

Contract clause	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6	ANOVA F (sign)
Number of observations	23	7	19	22	11	14	
Material costs	**1**	**1**	**1**	**1**	**1**	**1.5**	3.66 (<0.01)
Assembly costs	2	2	**3**	1	**3**	**3**	42.32 (<0.01)
Base costs	**3**	**3**	**3**	**3**	2	**3**	31.38 (<0.01)
Storage costs	**3**	1	2	2	**3**	1	32.03 (<0.01)
Inspection costs	**1**	**2**	**1**	**1**	**1**	**2**	12.16 (<0.01)
Testing costs	2	**3**	**3**	**3**	2	1	42.49 (<0.01)
Buyer Profit [c]	15.22	14.29	17.89	16.36	15.00	0.00	4.50 (<0.01)
Seller Profit [d]	46.96	34.29	44.74	42.50	44.55	48.93	3.49 (<0.01)
Joint Profit [f]	62.17	48.57	62.63	58.86	59.55	48.93	14.39 (<0.01)
Fairness of Arguments [e]	5.13	4.14	4.95	4.55	4.36	4.14	1.87 (0.11)

Panel B: Distribution of Clusters across Experimental Cells [b]

	Buyer Inefficiency		Seller Inefficiency	
	Traditional	ABC	Traditional	ABC
Joint profit improvement with seller concession to buyer problem				
Cluster 3	24%	8%	31%	17%
Cluster 4	19%	42%	12%	17%
Sum	43%	50%	43%	34%
Joint profit improvement without seller concession to buyer problem				
Cluster 1	29%	38%	8%	22%
Cluster 5	0%	4%	4%	39%
Sum	29%	42%	12%	61%
No joint profit improvement (inefficient clusters)				
Cluster 2	0%	4%	19%	4%
Cluster 6	29%	4%	27%	0%
Sum	29%	8%	46%	4%

[a] Panel A shows the median contract clauses for the different clusters . Each contract clause can take a value of 1, 2 or 3, where 1 indicates a lower cost for the seller and a higher cost for the buyer compared to the initial value of 2, and 3 indicates a higher cost for the seller and a lower cost for the buyer compared to the initial value 2. The medians in bold indicate an efficient option with the lowest joint costs for the contract clause (see also Table 1).

[b] Panel B reports the distribution of the different clusters across experimental conditions.

[c] The buyer's individual profit at the end of the negotiation game (€285 - €155 - costs of negotiated contract as provided in Table 1).

[d] The seller's individual profit at the end of the negotiation game (€155 - costs of negotiated contract as provided in Table 1).

[e] The seller's perceptions of the fairness of the buyer's main arguments (measured on 7-point Likert scale).

[f] The sum of the buyer's individual profit and the seller's individual profit at the end of the negotiation game.

TABLE 5
Buyer Expectations

Panel A: ANOVA on Buyer Expectations [a]

	Sum of Squares	Df	Mean Square	F-statistic	p-value
Precision of Cost Information	0.41	1	0.41	0.00	0.965
Cause of Inefficiency	64.89	1	64.89	0.06	0.768
Precision of Cost Information x Cause of Inefficiency	4226.36	1	4226.36	3.97	0.049**
Error	97907.42	92	1064.21		

Panel B: ANCOVA on Fairness of Arguments [b]

	Sum of Squares	Df	Mean Square	F-statistic	p-value
Precision of Cost Information	0.77	1	0.77	0.52	0.473
Cause of Inefficiency	0.27	1	0.27	0.19	0.668
Precision of Cost Information x Cause of Inefficiency	4.98	1	4.98	3.33	0.071*
Buyer Expectations	0.77	1	0.77	0.51	0.475
Error	136.01	91	1.49		

Panel C: Contrast Analysis of Buyer Profit [c]

	Sum of Squares	Df	Mean Square	F-statistic	p-value
Contrast [d]	557.98	1	557.98	3.42	0.068*
Buyer Expectations	282.36	1	282.36	1.55	0.192
Residual Variance	149.50	2	74.75	0.46	0.634
Error [e]	14846.26	91	163.15		

[a] The average of the buyer's answers before the negotiation started to the questions 'on what would be a fair buyer's profit' and 'what would be his or her expected profit' after the negotiation.

[b] The seller's perceptions of the fairness of the buyer's main arguments (measured on 7-point Likert scale).

[c] The buyer's individual profit at the end of the negotiation game (€285 - €155 - costs of negotiated contract as provided in Table 1).

[d] The model contrast tests examine whether the buyer's profit follows the pattern as predicted. The contrast codes used to perform the contrast tests are {3, -1, -1, -1} for, respectively, the ABC/buyer inefficiency, ABC/seller inefficiency, traditional/buyer inefficiency, and traditional/seller inefficiency conditions.

[e] The residual sum of squares is the variance between the conditions that are not explained by the contrast. An insignificant p-value indicates that the model contrast explains all of the between-group variance.

APPENDIX
ROLE DESCRIPTION

Panel A1: Buyer (Traditional Cost Information, Buyer Inefficiency)

You are a purchaser at a firm that buys, finishes and then sells casings. You buy casings for € 155, which have to be further manufactured. You have a long term contract over the price of the purchased casings. Certain clauses have to be renegotiated, however. A study of the accountancy department revealed that your products are not profitable (profit = 0) under the current clauses. Below, you can see the financial results of last year. The first cost is the purchasing price. In addition, you have extra costs depending on the color of the raw materials chosen by the seller, depending on the level of assembly and the material of the casings' base. The number of weeks between two deliveries determines your storage costs. The better the casings are bagged, the less you have to inspect the casings. Finally, larger raw material blocks lead to larger testing costs.

Material:	Purchasing price	155	Selling Price	285
	Yellow Blocks	15		
Labor:	Partially Assembled	20		
	Plastic base	25		
Overhead (***)		70		
Profit		0		

In a first phase the accountancy department found two possible reasons for the disappointing result. The electricity price increased and there were problems with the newly bought software. Further investigation of the production and the accountancy department has shown that the most important reason for the bad result is the extra cost caused by the problems with the internal software system (*). Especially in the technically complex phase of testing the cost was remarkable. These costs are half of the overhead costs.
The production department had sufficiently taken into account the increased electricity price en had successfully introduced energy saving measures.
Both the purchasing price and the selling price are fixed by respectively the long term contract and the market. You have to convince your seller to manufacture or deliver the intermediate product in another way to make up for your extra costs. You can consult the cost report below. The present clauses are printed in italic.
You do not have exact figures for your overhead costs. You know it consists of three components: storage, inspection and testing. The storage costs decrease if your seller delivers faster. In that situation, you do not have to keep your supplies in storage for a long time. The inspection cost decreases if the casings are well bagged. Then they are well protected. When they are unbagged, you have to inspect them in detail. Finally, the larger the casings, the worse they are handled by the testing machine. The latter cost is half of the overhead costs.

Material costs		**Storage costs (**)**	
€ 25	Red blocks	More expensive than the current level	Delivery after three weeks
€15	*Yellow blocks*	*The current level*	*Delivery after two weeks*
€ 5	Blue blocks	Less expensive than the current level	Delivery after one week
Assembly costs		**Inspection costs (**)**	
€ 35	Unassembled	More expensive than the current level	Unbagged
€ *20*	*Partially assembled*	*The current level*	*Single-bagged*
€ 5	Fully assembled	Less expensive than the current level	Double-bagged
Casing's base		**Testing Costs (**)**	
€ 45	Tin	More expensive than the current level	Large blocks
€ 25	*Plastic*	*The current level*	*Medium blocks*
€ 5	Steel	Less expensive than the current level	Small blocks

(*) The internal software problem refers to the buyer inefficiency. With seller inefficiency, this sentence was replaced by "the size of blocks the seller wants to deliver".
(**) In the traditional information conditions, only an indication of the relative costs of these activities is provided to the buyer. The costs of these activities are aggregated in the overhead figure (***). In the ABC conditions, these relative cost indications were replaced with quantified costs as indicated in Table 1 and the overhead figure was replaced with a detailed list of the three activities and their respective costs.

Panel A2: Seller (All Conditions)

You are the salesperson at a producer of casings. You are the permanent seller for a certain client. Your client buys at a fixed price of € 155. In the financial overview, you see that you obtain a profit of € 50. That is an excellent result. The client sells the manufactured casings at the market for € 285. The client had to deal with the increasing electricity price. Moreover, the client had difficulties with his or her software system. In other words, the buyer was not successful during the last year. The selling price is fixed but the client asks you to renegotiate certain clauses so that he or she can obtain a better result.

This is your financial overview.

Material:	Yellow Blocks	15	Selling price	155
Labor:	Partially Assembled	20		
	Plastic base	25		
Overhead:	Supervision costs: Two weeks	15		
	Handling costs: Single-bagged	20		
	Setup costs: Medium blocks	20		
Profit		50		

You can use the cost report below during the negotiation. The current level is printed in italic. You see that your costs are determined by the color of the raw material blocks, the assembly level of the casings and your choice for the raw material for the casing's base.

Furthermore, the supervision costs increase when you have to produce faster and deliver more regularly. The handling costs increase the better you pack the casings. The smaller the raw material blocks the more set-ups you have to perform.

Material costs

€ 10	Red blocks
€ 20	*Yellow blocks*
€ 35	Blue blocks

Supervision costs

€ 10	Delivery after three weeks
€ 15	*Delivery after two weeks*
€ 25	Delivery after one week

Assembly costs

€ 10	Unassembled
€ 15	*Partially assembled*
€ 25	Fully assembled

Handling costs

€ 10	Unbagged
€ 20	*Single-bagged*
€35	Double-bagged

Casing's base

€ 10	Tin
€ 15	*Plastic*
€ 25	Steel

Set-up Costs

€ 10	Large blocks
€ 20	*Medium blocks*
€ 35	Small blocks