

How communication affects flexibility: An experimental study of formal and informal contracting

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November 22, 2011

Abstract: Informal contracts play a vital role in successful economic relationships. They are particularly valuable when formal contracts are unavoidably incomplete. However, informal contracts can themselves be incomplete, because trading partners may have difficulty (mutually) identifying the relevant events on which they should contract. A contract - be it formal *or* informal - requires a 'meeting of minds' and minds may well fail to meet. We demonstrate how informal contracting can rescue flexible (formal) contracting in an environment with free-form communication. In our baseline no-communication treatment, we find that performance and profitability are similar for rigid and flexible contracts. Overall, we find that buyers earn 54 percent more in the communication treatment, sellers earn 167 percent more, and the overall earnings are more than twice as high. Communication succeeds in ameliorating potential problems of misunderstanding/violated expectations with flexible contracts

* The authors thank Christina Rott for very skillful research assistance and Hector Solaz for running the experiments for us at the LINEEX lab of the University of Valencia.

1. Introduction

Informal contracts play a vital role in successful economic relationships. They are particularly valuable when formal contracts are unavoidably incomplete. However, informal contracts can themselves be incomplete, because trading partners may have difficulty (mutually) identifying the relevant events on which they should contract. A contract - be it formal *or* informal - requires a 'meeting of minds' and minds may well fail to meet. Communication is key. When communication is limited, it can be wise for traders to lower the burden that they place on informal contracts. We suggest that traders may bias towards complete formal contracts in contexts where communication difficulties oblige informal contracts to be less complete. Concretely, formal contracts that are incomplete (in the sense of giving one side considerable discretion) can lead to serious disagreements as to what is appropriate at the informal level.

A critical issue in contractual relationships is how best to combine formal contracts and informal contracts. In principle, complete and formal contracts would seem to be optimal, particularly with standard preferences. However, given that it is often impossible to achieve complete contracting and the abundant evidence of non-standard preferences, less formal and more flexible contracting arrangements may be more effective. Labor contracts typically allow workers a great deal of discretion over their effort and sellers may have control over the quality of an item supplied to a purchaser. In these cases, it can be useful to facilitate loyalty and cooperative attitudes, even though these are irrelevant under complete contracting.

However, informal and unenforceable contracts may lead to misunderstandings, negative emotions, and the inevitable frictions and conflict that misunderstandings bring in their wake. People may form expectations that are violated, leading to uncooperative behavior or punishment (or even sabotage), with the concomitant poor performance one might well expect. Hart and

Moore (2008) provide a sharp and clear theoretical formalization of this idea, with the linchpin of their model being the assumption that contracts induce *reference* points; these reference points lead to expectations about one's entitlement. Their model also presumes that each party assesses the eventual outcome relative to the best that could be received with the existing contract. According to this view, the disappointment or annoyance at not receiving this reference point may well lead to a dysfunctional (uncooperative) relationship and unattractive outcomes.

Thus, there is an implicit trade-off between contractual flexibility and rigidity. The advantage of rigid contracts is that they pin down the outcomes from the outset. Accordingly, there is little scope for negative emotions, since every contracting party knows exactly what to expect. Of course, the downside of rigid contracts is that they do not allow the parties to adjust the contract terms to the eventual realized state of nature. Flexible contracts, in contrast, enable the parties to refine the contract terms and thereby guarantee trade; however, the downside is the negative emotions that may be engendered, making efficiency losses much more likely.

The previous experimental work in this area (Fehr, Hart, and Zehnder 2009, 2011) only considers formal contracts. Since the Hart and Moore (2008) theory is based on traders' senses of entitlement, we believe it is vital to consider informal contracts as well as formal ones. On this basis, we develop novel predictions and test them in a simple new experimental context. Our fundamental point is that agreements need not be formal to determine expectations, so that informal agreements may get around non-contractibilities and lower the risk of costly misunderstandings, disagreements and conflicts (aggrievances and recriminations) otherwise associated with flexible contracting. Loosely, we conclude that ambiguity is the problem, rather than flexibility *per se*; communication helps to resolve these ambiguities, while preserving the benefits of flexibility.

Fehr, Hart, and Zehnder (2011) find that rigid contracts can induce better outcomes than flexible contracts in an environment where there is uncertainty concerning a potential cost shock and competition between two potential sellers; the buyer determines the type of contract (rigid or flexible) and the sellers compete over the price that will be charged to the buyer. Once there is an agreement on the price, the state of nature is realized and the seller chooses a quality level. Their main results are that the buyer's average profit is higher with rigid contracts (although the seller's profit is lower, so that the total earnings are almost the same in both cases), and that flexible contracts lead to lower quality, controlling for the price.¹ Hart and Moore (2008) and Fehr, Hart, and Zehnder (2011) present the psychological phenomena of self-serving beliefs as the fundamental problem of flexibility.

However, we feel that the picture painted is substantially less gloomy than previously reported, and strongly suspect that these results will not hold more generally. In our study we test experimentally the empirical relevance of the behavioral forces suggested. We point to the possibility of correction through informal agreements, since expectations adapt to prior agreements. We are interested in determining whether non-binding, free-form communication (*cheap talk*), which is ubiquitous in the field environment, can improve upon the less-than-optimal state of affairs in which there are inefficient rigid contracts. In a sense, we believe that the counter-intuitive Hart and Moore (2008) and Fehr, Hart, and Zehnder (2011) results showing that flexible contracts are artifacts of a design that is not externally valid due to these studies ignoring the typical environment where communication is a regular feature. We use a rich message space in our communication and we permit a two-way flow of information across the roles of buyer and seller. In addition, we allow the final mover (the seller) to observe the choices

¹ Moreover, Fehr, Hart, and Zehnder (2009) respond to concerns that competition between sellers is the driving force behind this result and indeed find that buyer's profits are slightly (but not significantly) lower with rigid contracts and that the quality level is unaffected by the type of contract.

made by the first mover (the buyer) subsequent to the communication before choosing a response (quality level). In effect, this permits punishment and reward in part based on the perceived adherence to the buyer's claims.

We demonstrate (both theoretically and empirically) how informal contracting can rescue flexible (formal) contracting in an environment with free-form communication. In our baseline no-communication treatment, we find that performance and profitability are similar for rigid and flexible contracts. Buyers earn 11 percent more with rigid contracts than with flexible contracts,² while sellers earn 12 percent less; rigid contracts are chosen 25 percent more frequently than are flexible contracts. However, the results are quite different in our communication treatment. Buyers on average earn 35 percent more with flexible contracts than with rigid contracts and sellers earn 13 percent more. Overall, we find that buyers earn 54 percent more in the communication treatment, sellers earn 167 percent more, and the overall earnings are more than twice as high; these results stem from particular patterns identified in the communication process. In addition, the price paid is 130 percent higher with communication; this goes hand in hand with the fact that the flexible contract is chosen thrice as frequently as is the rigid contract in the no-communication treatment, and this proportion grows with time, reaching 84 percent.

The remainder of this paper is structured as follows. We review the existing literature in section 2 and present our experimental design and implementation in section 3. We derive the predictions based on our theory and experimental design in section 4, and describe experimental results in section 5. Section 6 offers a discussion of our findings, and we conclude in section 7.

² Thus, it does not appear to be the case that *ex-ante* competition is a necessary condition for formal contracting to affect cooperation, since buyers are better off with rigid contracts, despite the lack of competition.

2. Related literature

A large body of research has shown that people in both the laboratory and the field exhibit some form of social preferences. The first study to demonstrate this in the laboratory was the seminal Güth, Schmittberger, and Schwarze (1982) paper on the ultimatum game. People reject unfair offers, with a variety of studies (e.g., Blount, 1995, Charness, 2004, and Charness and Rabin, 2002) suggesting that this response stems from the negative reciprocity induced by the anger or annoyance felt towards the proposer by the responder. The *gift-exchange game*, first described by Fehr, Kirchsteiger, and Riedl (1993) and examined in at least hundreds of subsequent studies, provides evidence that there is a strong positive relationship between experimental wages and costly effort, despite the fact that standard preferences predicts no such relationship, with minimum effort and therefore the lowest possible wage chosen in all cases with this incomplete contract. Charness and Kuhn (forthcoming) provide a rather exhaustive review of the literature on labor experiments in the laboratory, with detailed discussion of many papers in the area of social preferences.³

One element of the gift-exchange game is that only the wage is specified, with the effort discretionary on the part of the responder; thus, this is an incomplete contract. Fehr, Klein, and Schmidt (2007) find that unenforceable bonus contracts lead to superior performance in comparison to explicit incentive contracts when there is imperfect monitoring. In their gift-exchange design, the firm chooses a wage. This information is conveyed to the worker, who then chooses a level of costly effort (the minimum effort has no cost). In one treatment, the firm

³ There is also a small experimental and theoretical literature on the interaction of optimal contracting with social preferences. For example, Cabrales and Charness (forthcoming) show experimentally that the theoretical optimal contract is less effective and less profitable than more generous contracts, with the behaviorally-effective contract dependent on the payoffs when one rejects a contract proposal; von Siemens (2010) presents a theoretical discussion of optimal contracts, finding that social preferences “can have strong effects ... in a competitive labor market.”

can either demand an effort level and invest in a verification technology (imposing a fine for non-compliance) or instead choose to offer an unconditional wage and request an effort level.

In a second treatment, the firm could select either the verification technology or instead offer an unconditional wage and a bonus if the worker puts forth at least the requested effort level. A control treatment changes the framing from a firm and a worker to a buyer and a seller, but is otherwise isomorphic to the second treatment. In the first treatment, the incentive-verification contract does much better than the trust contract and is the overwhelming choice by the end of the sessions. However, the bonus contract turns out to be considerably more profitable and prevalent in comparison with the incentive-verification contract. People do pay bonuses and the result is substantially better outcomes. In this case, we see that an incomplete contract, in which a bonus is promised and can be paid *ex post*, does best of all. In this case, a combination of a flexible contract with a promise is quite effective.

Fehr, Hart, and Zehnder (2010) forthcoming) consider a contracting environment in which two potential buyers are matched with two potential sellers (with random re-matching in each of the 15 periods); each seller has two units to sell and each buyer can purchase at most one unit. The buyer can choose a rigid or a flexible contract, contract offers can be rejected and in fact they often are, since there never any gains-from-trade in the bad state of the world. The level of the fixed price is within an exogenously-restricted interval, while the lower bound of the flexible price is within this same exogenously-restricted interval. After the contract types are chosen, sellers bid in prices for the sale. The state of nature (the cost shock) is then determined. If a flexible contract has been chosen, the buyer can adjust to an unfavorable realized state by unilaterally increasing the price to be paid. After learning the final price, the seller chooses a quality level, normal or low/sabotage. The choice of low/sabotage is costly to the seller, but is

even more costly to the buyer. With the parameters chosen for the experiment, the results show that the average profit for the buyer is 13 percent (9.0 units) higher with rigid contracts; this is the result of the substantially lower average quality chosen with flexible contracts. On the other hand, the seller earns 50 percent (9.1 units) more with flexible contracts, so that rigid contracts are only better from the standpoint of the buyer. Rigid contracts are chosen 50 percent of the time.

Fehr, Hart, and Zehnder (2009) change the above design to eliminate the competition between sellers; the primary change is that instead of having sellers bid in prices for the sale, a computer sets the “basis price” (from the same interval as in the previous paper) for each buyer separately. The main experimental result is that rigid contracts are no longer better for the buyers. The average profit for the buyer is three percent (2.4 units) higher for the buyers and 66 percent (10.7 units) higher for the sellers. The rigid contract is chosen 82 percent of the time. There is little difference across contract types in terms of the quality level, in contrast to the earlier study; the contrast is that here low quality is chosen more than five times as frequently with rigid contracts than in Fehr, Hart, and Zehnder (forthcoming). Thus, the authors conclude that these contracts no longer provide reference points for entitlements when the terms are not negotiated in a competitive market.

Communication is a mechanism that works in different contexts for different reasons. Cheap talk has been shown to improve cooperation or coordination between two parties. For example, Cooper, DeJong, Forsythe, and Ross (1992) find that non-binding pre-play communication is effective in improving the rate of the Pareto-superior (but risk-dominated) outcome. Charness (2000) shows a very high rate of coordination on the payoff-dominant equilibrium in a Stag Hunt, despite the issue of the credibility of the signal pointed out in

Aumann (1990). More recently, Charness and Dufwenberg (2006) and Charness and Dufwenberg (2011) demonstrate that free-form communication can be very effective in steering behavior towards optimal social outcomes when there is hidden action or hidden information. Promises (statements of intent) are the key driving force in this process, as they help to align expectations and improve the credibility of the signals.

Charness and Dufwenberg (2006) consider hidden action; a principal chooses whether or not to contract with an agent, but effort, which is costly for the agent, is not observable. If the agent provides effort, the principal has a strong chance of a good outcome, but a slight chance of a bad outcome; if the agent does not provide effort the outcome is always bad for the principal. On the assumption of selfish preferences, no agent should exert effort; knowing this, no principal should contract with any agent. However, the expected payoffs are twice as high for each party with effort provision, so that the socially-optimal outcome involves a contract and effort. In fact, when the agent makes a promise to the principal, the probability that a contract will be offered is 92 percent and the likelihood that the agent provides effort is 75 percent; thus, the socially-optimal outcome occurs 67 of the time with promises compared to less than 25 percent without communication.⁴ The authors explain this result in terms of guilt aversion, whereby one feels guilt (and lowers one's utility) for a selfish action in proportion to the extent that one believes that the other party is instead expecting a favorable response. Indeed, there is a strong correlation between the agent's effort choice and his or her second-order belief.

Charness and Dufwenberg (forthcoming) test for the effects of communication in a hidden-information environment in which the two types of agents have different ability, but effort is contractible. An agent knows his or her own type, but the principal does not know the

⁴ There is little difference in behavior for the non-communication treatment and for non-promises in the communication treatment.

agent's type. There are two main payoff calibrations, which vary whether the low-ability agent can participate in an outcome that is a Pareto-improvement over the principal's outside option, by selecting into a lower-paying 'clerical' job. In the second payoff calibration, no clerical position is available, so that the low-ability agent can either decline the contract offer or choose the managerial position. The results show that communication is completely ineffective in the second case, but is quite effective when a Pareto-improvement is feasible for low-ability agents. This result is driven by the possibility for low-ability agents to confess that they have low ability, but to nonetheless promise that they will choose the clerical position. After receiving such a promise, principals offer a contract 93 percent of the time and the low-ability agent *always* honors his or her promise. The authors interpret the results in the light of explanations involving either a fixed cost of lying or belief-dependent *guilt-from-blame*.

Brandts and Cooper (2007) consider Leontief production in a team of four workers. With no communication or management, Brandts and Cooper show that such games almost always converge on co-ordination failure, with all agents supplying low effort levels. The authors then assign a manager to each such team, who can either increase the rate of pay received by each team member for an extra unit of team output or communicate with the workers by sending unstructured messages to the group. The results show that a simple communication strategy of the manager is very effective: Specifically request high effort and point out the mutual benefits of high effort.

Ellman and Pezanis-Christou (2011) examine whether the structure of the decision-making process (horizontal or vertical) and/or communication affect the extent to which a 'firm' chooses to maximize own profits at the expense of a helpless third party. Two people comprise a firm; the authors vary whether the organizational structure is horizontal or vertical (unilateral

choice of output, or consensus between the two parties), and whether communication by written messages is possible or not. The firm chooses the output level; the higher the output level (up to a point), the lower the payoffs of the third party, but the higher the firm's profits. In the data, communication makes vertical firms more ethical; this leads to far more social-surplus-maximizing choices in the vertical-chat treatment than in any of the others.

3. A new theory and its predictions

[Not done yet]

4. Experimental design and implementation

Participants play the same one-shot basic game in each of 11 periods (the first period is a trial run and does not affect actual payments). Across periods, they are re-matched and no two subjects ever play each other or observe another's choices more than once, so there is no opportunity for building a personal reputation. Since the same game is played independently in each period, we can focus our analysis on the basic game, bearing in mind that subjects may learn how to play across periods.

4.1 Details and parameters of the basic game

After a buyer and a seller have been matched, the buyer chooses a contract type (rigid or flexible) and a price P to offer to the seller (or makes no offer). The seller then accepts or rejects the offer. If no contract is agreed upon, the buyer and seller each receive outside option payments (5 each). If the seller accepts a contract offer, the seller has to provide a good (or service) to the buyer. The seller's basic cost C is subject to a shock; C is either 0 or 20 with a 50 percent probability of each outcome. Both buyer and seller observe the outcome of this cost

shock. If a rigid contract was chosen at the initial contracting stage, the price can now not be changed and remains at the initial level of P . However, if a flexible contract was chosen, the buyer can now augment the initial price of P by any amount, which we shall call Q . After observing the cost shock and any additional transfer Q from the buyer, the seller chooses the quality of the good.

We denote this quality response by x , which can take three values: $x = 0$ represents normal quality and involves no additional cost, $x = -1$ represents an inferior quality, and $x = +1$ represents superior quality. It costs the seller one unit, on top of the base cost C , for any non-zero x . Implicitly, the stage-0 trade contract gives the seller an incentive to provide a base quality good (i.e. to set $x = 0$) and any deviation, upwards or downwards, from this quality level is costly.⁵ Both upward and downward marginal deviations have low-cost implications for the seller, but first-order implications for the buyer. Indeed, the buyer's payoff from the good increases with quality x from 10 ($x = -1$) to 30 ($x = 0$) to 45 ($x = 1$). This captures a natural decreasing marginal return on quality: the buyer's gain from raising x to 0 (from inferior to basic) is higher, at 20, than the buyer's gain of 15 from raising x to 1 (from basic to superior).

In sum, the monetary payoffs of buyer and seller are five each if no contract is agreed upon and otherwise $5 + v(x) - P - Q$ for the buyer and $5 + P + Q - C - x$ for the seller, where the buyer's trade value, $v(x)$ equals 10, 30, or 45, depending on the value of x . Sample instructions are presented in Appendix A.

4.2 Timing

The exact sequence of events is defined by the following five-stage game in which both

⁵ The incentives are implicit: the seller's cost of $x = 1$ is a cost of increasing quality mitigated by any implicit quality rewards (be they contractual or reputational), whereas the seller's cost of $x = -1$ is either a cost of sabotage (providing inferior quality via careful distortions that still satisfy the letter of the contract) or a cost from loss of reputation or rewards, mitigated by any effort reduction.

parties always learn what happened in all preceding stages:

Stage 1: Buyer B chooses whether to offer the seller S a rigid or flexible contract; in each case, the buyer sets the contract's initial price offer P.

Stage 2: Seller S accepts or rejects this offer.

Stage 3: The computer randomly determines the seller's base cost C (at 0 or 20 with 50 percent probability for each)

Stage 4: If the contract is flexible, buyer B sets an additional transfer Q.

Stage 5: Seller S sets quality level, $x = -1$, $x = 0$ or $x = 1$.

In the communication (or “chat”) treatment, we introduce free-form communication to allow traders to make informal agreements. The buyer and seller can send each other written messages through a chat window on the help-screen. They can send such messages at any time during a period, starting with the moment a buyer and a seller are matched for a bilateral negotiation right up until the seller sets x in the final stage (stage 5).⁶

4.3 Implementation

Our sessions were conducted in Valencia at the LINEEX laboratory. Each session involved groups of 22 people who played 10 periods (and one practice period); no one could participate in more than one session. One of the 10 non-practice periods was randomly selected for payment. Each payoff unit was worth one euro (1€), and participants received an 8€ show-up fee on top of their earnings.

Each participant's role (buyer or seller) was fixed for the duration of the session and (in

⁶ Screenshot X in Appendix B shows the chat window. Notice that buyer and seller can each ignore chat messages from the other by selecting the history window in place of the chat window [check!], but they could not send messages without opening the window and seeing chats from the partner. Moreover, if one party sends a message while the other is looking at a decision screen, this partner receives a notification and can immediately check the message and then switch back to the decision screen.

the payoff periods) no participant was ever matched twice with any other participant; this was all common information. Instructions and a careful explanation were read aloud at the start of each session. A help screen, always immediately available, enabled each person to compute (privately) the payoff implications for self and current partner of any set of choices he or she wishes to consider. There were four sessions without communication and four sessions with online chat between the buyer and the seller. Thus, in all we had 176 participants in our experiment. Average earnings were approximately 17€ for no-communication sessions that lasted about 60 minutes, and 23€ for the chat sessions that lasted about 90 minutes.

5. Experimental results

In this section, we first provide descriptive statistics and non-parametric tests on the outcomes observed in our two treatments. We focus both on the overall effect of communication and on how the presence of communication affects the comparison between rigid and flexible contracts. We then discuss the patterns observed in the chat treatment and their correspondence to the ensuing behavior. We close the section with formal regression analysis of the various factors affecting the choices made.

5.1 Descriptive statistics and non-parametric tests

We present information about the contracts chosen, prices, quality levels and earnings in the no-communication and chat treatments in Tables 1 and 2, respectively. We first describe the results and later will provide the results of statistical tests.

In Table 1, we see starting at the top that rigid contracts are chosen more frequently in the no-communication treatment while the contract rejection rate is almost the same for both forms of contract. With a cost shock total prices ($P+Q$) are slightly higher under flexible, while without

a cost shock they are slightly lower; the average Q with cost shock is slightly higher than with cost shock. Most sellers choose normal quality with either contract type, with the bulk of the rest sacrificing money to hurt the buyer; the rate of inferior quality is slightly higher with flexible contracts. Average quality is somewhat higher with rigid than with flexible contracts, both with and without a cost shock. Buyer and seller earnings are higher with rigid contracts, with and without cost shock. The bottom line is that without communication rigid contracts are somewhat better for both sides of the market.

[Tables 1 and 2 about here]

Comparing Tables 1 and 2 one can see the impact of communication. For both types of contracts, the contract rejection rate with chat is greatly reduced from the rejection rate without communication, particularly with flexible contracts (down from 33.2 percent to 3.7 percent!). In the chat treatment the flexible contract becomes the more frequent choice: the proportion of flexible contracts chosen increases from 44.6 percent in the no-communication treatment to 74.7 percent in the chat treatment. The total price paid is now higher for flexible contracts than for rigid ones, both with and without a cost shock. Note particularly that under flexible contracts the price is now 5.38 units higher (24%), when there is a cost shock than when there is none. In contrast, in the absence of communication the increase of the total price in a flexible contract when there is a cost shock is only 1.77 units (14%).

Quality is now much higher than without communication for both contract types with and without the cost shock. In addition, while in the absence of communication quality was higher with rigid contracts, it is now higher with flexible contracts. The likelihood of inferior quality is reduced from 31.1 percent to 14.3 percent with rigid contracts and from 40.5 percent to 6.3 percent with flexible contracts; we see corresponding (and even more dramatic) increases in the

likelihood of superior quality, from 3.7 percent to 49.4 percent with rigid contracts and from 3.0 percent to 74.3 percent with flexible contracts.

The next question is how the presence of communication affects earnings. Starting with buyer earnings one can see that with rigid contracts they are slightly higher without a cost shock (15.28 to 16.98), but slightly lower (12.27 to 11.87) with a cost shock. Seller earnings with rigid contracts increase substantially with and without a cost shock.

In contrast to the case with rigid contracts, with flexible contracts both buyer and seller earnings' increase substantially whether or not a cost shock occurs. In fact, total earnings increase by 128 percent across treatments with flexible contracts, compared to an increase of 58 percent with rigid contracts.

We perform non-parametric tests of the differences we have just highlighted on two levels. A conservative testing philosophy treats each session as exactly one observation, so that we only have four observations from each treatment; the data for each session is presented in Appendix C. A more powerful but less pure statistical approach is to consider the aggregate behavior and outcomes for each individual. On this basis, the Wilcoxon signed-ranks test shows that there is a marginally-significant difference at the individual level in the proportions of rigid and flexible contracts in the no-communication treatment ($Z = 1.53$, $p = 0.063$, one-tailed testing keeping with the FHZ results; at the session level, there are two sessions with more rigid contracts and two sessions with flexible contracts). On the other hand, we do find differences at both the individual and session levels in the chat treatment (the sign-ranks test gives $Z = 5.51$, $p = 0.000$, for individual data and $p = 0.062$ on the session level (there were more flexible contracts than rigid contracts in each of the four chat sessions)).⁷ We also note that there is a substantial increase in the proportion of flexible contracts proposed in the chat treatment, from

⁷ We round all p -values to the third decimal place.

60% in the first two periods to 80% in the final two periods. No trend is seen in the no-communication treatment (see Figure B1 in Appendix B)

We also see that prices paid in the chat treatment are typically considerably higher than in the no-communication treatment. The price paid with rigid contracts, the initial price with flexible contracts, and the discretionary increased price paid with flexible contracts are all significantly higher in the chat treatment at $p = 0.057$ on the session level and $p = 0.000$ on the individual level (one-tailed tests; the Z -statistics in the latter case at 5.51, 4.50, and 5.22, respectively). Comparing prices paid across accepted rigid and flexible contracts, the average respective total price paid is 15.79 and 16.63 with no communication and 25.22 and 27.39 with communication.⁸ Neither difference is significant.

Turning to seller behavior, the rejection rate is far higher without communication, 32.8 percent versus 7.3 percent. The rejection rate with rigid contracts is higher in the no-communication treatment than in the chat treatment; this difference is significant at the individual level, but not at the session level (the Wilcoxon-Mann-Whitney ranksum test gives $Z = 1.88$, $p = 0.030$, and $p = 0.343$, respectively, one-tailed tests). This difference in rejection rates is stronger and quite significant with flexible contracts; we have $Z = 5.34$, $p = 0.000$, and $p = 0.014$, one-tailed tests, for the individual-and session-level ranksum tests. Finally, in the 18 instances in the chat treatment for which there is no actual conversation, there are nine rejections (six with rigid contracts and three with flexible contracts), and only one case where the quality level is superior. So when there is a conversation there are only 23 rejections, for a rejection rate of 5.3 percent (13.9 percent with rigid contracts and 2.8 percent with flexible contracts).

Tests of average quality across treatments, measured on the individual and session levels,

⁸ We do not include contract offers that were not accepted because we cannot compare the final prices (with flexible contracts, the added price isn't determined until a contract is accepted).

gives $Z = 7.48$, $p = 0.000$ and $p = 0.014$, respectively, one-tailed ranksum tests. There is a higher rate of seller cooperation (superior quality) in each of the four chat sessions than in any of the four no-communication sessions, and the reverse is true for inferior quality. Remarkably, only two of 44 sellers provided positive average quality in the no-communication treatment, while all 44 sellers did so in the communication treatment.⁹ Furthermore, average quality is higher with rigid contracts than with flexible contracts in each session of the no communication treatment, while the order is the reverse in each session of the chat treatment.¹⁰

Comparing within individuals using seller-level data, we find that average quality is significantly lower for flexible contracts than for rigid contracts in the no-communication treatment using seller-level data, $Z = 2.10$, $p = 0.018$, while the average quality is significantly higher for flexible contracts than for rigid contracts and $Z = 3.61$, $p = 0.000$. Regarding superior quality, there are few observations in the no-communication treatment and we find no significant difference ($Z = 0.21$); however, there is a very significant difference in the chat treatment ($Z = 2.78$, $p = 0.003$, one-tailed test), with flexible contracts leading to considerably more choices for high quality. We also find that there is a higher proportion of superior quality with flexible contracts in each of the four chat sessions (giving $p = 0.062$ on a one-tailed sign-ranks test) and a lower proportion of inferior quality in three of the four cases. There is no strong pattern for either superior or inferior quality across contract type in the no-communication sessions. Finally, there is no time trend for quality in any case (see Figure B1 in Appendix B).

We next turn to earnings. Across treatments, nearly all sellers in the chat treatment had higher profits than sellers with no communication. The ranksum test with individual-level data

⁹ Table ZXY in Appendix Q shows the average quality for each contract type for each individual seller.

¹⁰ The average quality for sessions 1-4 of the no-communication treatment was -0.125, -0.310, -0.257, and -0.383, respectively with rigid contracts, compared to -0.256, -0.444, -0.429, and -0.429 with flexible contracts. The average quality for sessions 1-4 of the communication treatment was 0.250, 0.333, 0.460, and 0.133, respectively with rigid contracts, compared to 0.597, 0.713, 0.549, and 0.785 with flexible contracts.

gives $Z = 8.05$, $p = 0.000$ and gives $p = 0.014$ with session-level data. While the divergence in buyer profits across treatments is not quite as extreme, the ranksum test nevertheless finds a significant difference using both individual-level data ($Z = 5.89$, $p = 0.000$) and session-level data ($p = 0.014$). Overall profits are higher in each session of the chat treatment, than in any session of the no-communication treatment, giving $p = 0.014$, one-tailed test. There is no time trend in buyer or seller earnings (See Table B2 in Appendix B).

Are earnings higher with proposed rigid or flexible contracts? In the no-communication treatment, Table 1 suggests that earnings are slightly higher with rigid contracts for both buyers and sellers. Wilcoxon signed-ranks tests on seller-level data show that the differences are significant for buyers ($p = 0.060$), but not for sellers ($p = 0.122$). Hence, without communication buyers earn more with rigid than with flexible contracts, while for sellers rigid contracts are statistically just as good as flexible ones. Table 2 shows that, in the presence of communication, the better contract is now the flexible one. Both buyer and seller earnings are substantially higher with flexible contracts. Wilcoxon signed-ranks tests in this case show statistically-significant differences for buyers, sellers, and total payoffs, using both buyer- and seller-level individual data (the Z -statistics are 1.69 and 2.77 for buyers, 1.94 for sellers and 2.93 for buyers, and 2.15 and 3.40 for the total payoffs, with buyer-level and seller-level data, respectively, with one-tailed p -values ranging from 0.045 to 0.000).

5.2 Chat patterns and behavior

Given the striking improvement in prices, quality, and earnings in the chat treatment, one may well wonder what elements of the conversation help to drive the result. An independent coder classified each conversation using the following eighteen categories:

- **Q-Plan-Clarification:** Does *B* **or** *S* mention any value or values of *Q* **before** they learn the

- cost C ? Code as: 0,1.
- **Q-Discussion:** Do B and/or S discuss what value of Q should be set by B **after** they observe if the cost C is 20 or 0? Code as: 0,1.
 - **Q-values:** If any, what are the main values of QH -plan and QL -plan and DQ -plan= QH -plan - QL -plan (the difference in value) that B promises or S suggests (and B does not explicitly reject) in the chat **before** B and S learn the cost C ? Code as QH -plan=-1 if negative or code as positive number, code as QL -plan=-1 if negative, or code a positive number, code as DQ -plan=-1 if negative or code as positive number.
 - **S's-Type-preference:** Does S influence B toward choosing a contract of type $t1$ or a contract of type $t2$? Code as: 0,1,2.
 - **Friendly:** Is the conversation friendly/cordial/respectful/humorous? Code as: -1,0,1
 - **Fairness & Contract-Type:** Does either (B or S) refer to fairness as a reason for choosing $t1$ or $t2$? Code as: 0,1.
 - **Cost-risk & Contract-Type:** Does either (B or S) refer to the cost risk as a pain (or the value of insurance or sharing risk) as a reason for choosing $t1$ or $t2$? Code as: 0,1.
 - **Pressure over x:** Does B put any kind of pressure on S to set $x=1$ or at least to not set $x=-1$? Code as: 0,1.
 - **Pressure over Q:** Does S put any kind of pressure on B to set a positive value of Q (or fulfil a promise over Q)? Code as: 0,1.
 - **Promise over x:** Does S in any sense promise or ask B to trust him/her to set $x=1$ (or $x=0$)? Code as: 0,1.
 - **Promise over Q:** Does B in any sense promise or ask S to trust him/her to set some specific or positive values of Q ? Code as: 0,1.
 - **Impatience of A:** Does B show impatience with S or with external causes of delay or no impatience shown? Code as: 0,1,2.
 - **Impatience of B:** Does S show impatience with B or with external causes of delay or no impatience shown? Code as: 0,1,2.
 - **Agreement:** Do B and S roughly agree or is there some notable conflict? Code as: -1,0,1.
 - **Unity:** Does either (B or S) use the first-person plural to refer to self and current partner? Code as: 0,1.
 - **Implicit disagreement:** Does B set a P or a Q below S's final request? Code as: 0,1.
 - **Fulfilment by A:** Does B fulfil any promise (over Q)? Code as: -1,0,1.
 - **Fulfilment by B:** Does S fulfil any promise (over x)? Code as: -1,0,1.

Tables C1, C2, and C3 in Appendix C shows the overall frequencies of the categories overall and in the no-communication and chat treatments separately. Note first that the frequency of use of the categories varies widely with some extreme values being 1.7% of conversations mentioning problems of cost risk for as a reason for choosing the rigid contract and 73.2 of conversations in which the buyer pressures the seller to set high quality ($x = 1$) or at least to not set inferior quality ($x = -1$). As it turns out there is a very high degree of correlation

amongst many categories (see Table D1 in Appendix D). We now offer a general discussion of some of the chat data and then move to comparing the relations of some of the crucial categories and quality across rigid and flexible contracts.

5.2.1. General discussion of chat categories

We do not discuss all the chat categories. However, we mention that promises about quality were made about 44% of the time. There were 185 cases in which a promise was made concerning x and a contract was accepted; high quality was delivered 146 times (78.9 percent), regular quality 29 times (15.7 percent), and low quality 10 times (5.4 percent). There was considerable clarification about a choice of adding to the price in the event of a cost shock (specificity of a plan or a clarification concerning the added price occurred about 60% of the time). Q is substantially higher in the chat treatment with flexible contracts ($p = 0.062$ with session-level data and $Z = 5.66$, $p = 0.000$ with individual-level data, one-tailed tests) than in the no-communication treatment, but is sensitive to the cost shock (0 or 20) only in the chat treatment. The average Q in the no-communication treatment is actually a tiny bit greater with no cost shock, 3.41 versus 3.35; by comparison, the average Q in the chat treatment is much lower with no cost shock than with the positive cost shock, 7.25 versus 13.08.

Table 3 shows the correlations and significance levels of a number of chat categories and both the choice of contract (using buyer-level data) and average quality (using seller-level data). We choose individual-level data for our correlation tests since using all observations overstates statistical significance, while session-level data provide very little power. Since no person is ever paired with the same person twice, this approach seems relatively innocuous.

We find that a great deal of significant positive correlation between these chat categories and both the proportion of flexible contracts offered, and the quality provided with accepted

contracts. Friendly discussion, reaching an agreement, clarifying Q, having pressure over Q, and having promises over x are all highly correlated with both the proportion of flexible contracts chosen and the quality provided. However, there are also chat categories that also correlated with the proportion of flexible contracts, but are not associated with high quality levels. In particular, unity and pressure over x are associated to flexible contracts, but not to successful flexible contracts.

Observe also that having only a discussion about Q or a promise over Q is not correlated with either outcome variable. Discussing the level of Q without clarifying what it will be is not associated with flexible contracts with high quality

In line with the results in Charness and Dufwenberg (2006, 2011), sellers tend to uphold their promises (providing higher quality) and buyers who receive such promises are more likely to choose flexible contracts.^{11,12}

Table 3: Correlations between chat categories and flexible contracts or quality

Chat category	Proportion of flexible contracts	Average quality	Average quality with flexible contracts
Friendly	$\rho = 0.443, p = \mathbf{0.003}$	$\rho = 0.493, p = \mathbf{0.001}$	$\rho = 0.422, p = \mathbf{0.004}$
Agreement	$\rho = 0.539, p = \mathbf{0.000}$	$\rho = 0.551, p = \mathbf{0.000}$	$\rho = 0.559, p = \mathbf{0.000}$
Seller influence	$\rho = 0.095, p = 0.541$	$\rho = 0.300, p = \mathbf{0.048}$	$\rho = 0.299, p = \mathbf{0.049}$
Unity	$\rho = 0.420, p = \mathbf{0.004}$	$\rho = -0.158, p = 0.307$	$\rho = -0.034, p = 0.828$
Q-Discussion	$\rho = 0.287, p = 0.059$	$\rho = -0.181, p = 0.239$	$\rho = -0.247, p = 0.106$
Q-Clarification	$\rho = 0.470, p = \mathbf{0.001}$	$\rho = 0.527, p = \mathbf{0.000}$	$\rho = 0.524, p = \mathbf{0.000}$
Pressure over Q	$\rho = 0.470, p = \mathbf{0.001}$	$\rho = 0.338, p = \mathbf{0.025}$	$\rho = 0.289, p = 0.057$

¹¹ There were 185 cases in which a promise was made concerning x and a contract was accepted. High quality was delivered 146 times (78.9 percent), regular quality 29 times (15.7 percent), and low quality 10 times (5.4 percent).

¹² One might wonder if longer chats are more effective than shorter chats. It turns out that the total number of characters in a conversation (apart from when there is no conversation) is not significantly correlated with quality ($\rho = 0.039, p = 0.437$). However, not having any conversation in the chat treatment leads to rejection or poor quality. Of the 18 cases without conversation in the chat treatment, the contract offer was rejected nine times and high quality was chosen only once.

Pressure over x	$\rho = 0.387, p = \mathbf{0.010}$	$\rho = 0.226, p = 0.139$	$\rho = 0.224, p = 0.143$
Promises over Q	$\rho = 0.243, p = 0.113$	$\rho = 0.031, p = 0.843$	$\rho = 0.007, p = 0.965$
Promises over x	$\rho = 0.384, p = \mathbf{0.010}$	$\rho = 0.388, p = \mathbf{0.009}$	$\rho = 0.375, p = \mathbf{0.012}$

Note: Correlations that are significant at the 5% level (two-tailed tests) are in **bold**.

5.2.2 Chat categories, contract choice, and earnings

Simple Wilcoxon Signed-rank tests show that the chat categories “Q-clarification” “Friendly”, “Unity and “Promises over quality” all have a significant positive effect on buyer and seller earnings with a flexible contract. At the same time all four categories have no significant effect on earnings with rigid contracts. Tables C2 and C3 show the rates at which various chat categories are used with rigid and flexible contracts, respectively. There are some striking differences in these rates. For example, the rates of Q-clarification with rigid and flexible contracts are 0.109 and 0.866, respectively, and the average values of Friendly with rigid and flexible contracts are 0.119 and 0.419, respectively. The average rate of Pressure over Q is only 0.040 with rigid contracts, but 0.559 with flexible contracts; the rate of Agreement is much higher with flexible contracts, 0.597 versus 0.168.

5.3 Regression analysis

In this section, we analyze the determinants of the contracts, earnings, and quality, using formal regression analysis. Figure 1 shows the trends over time in each treatment for the choice of the contract offered. Simple probit regressions (not shown, but available by request) also show that there is a strong increasing trend towards flexible contracts in the communication treatment (reaching 84 percent at the end), but no significant trend without communication. These regressions also indicate that characteristics such as Q-clarification, Agreement, Promises

over x , and Friendly make it more likely that the flexible contract will be chosen in the communication treatment.

[Figure 1 about here]

We next investigate the determinants of the earnings received by the buyer. The factors that we consider are the type of contract chosen, the price paid, a time trend, and chat characteristics. The regressions are shown in Table 4. Specifications (1), (4), and (7) show that buyers and sellers both individually and jointly earn significantly more in the chat treatment, as seen by the significant coefficient for the Treatment dummy. In specifications (2), (5), and (8), we see that the earnings benefits from flexible contracts are wholly in the communication treatment; in fact, the coefficient for the no-communication treatment is negative in all specifications, although never significantly so.

Naturally enough, a cost shock affects earnings negatively for the seller (who bears the direct cost), but also for the buyer (who shares the burden to some extent); however, specification (3) shows that this effect is captured for the buyer's earnings through the terms involving the price paid. As seen in the R^2 for specification (3), (6), and (9), including the price paid, its square, and price interaction terms greatly adds to the explanatory power of the regressions. Interestingly, both buyer and seller earnings increase with the price paid, although the negative coefficient on the price-squared term tempers this slightly.

[Table 4 about here]

The negative coefficient on the buyer's price paid/cost shock interaction shows that increasing the price paid when there is a cost shock has a significantly less positive effect on the buyer's earnings, since this amounts to sharing the financial burden from the cost shock. Sellers

and joint earnings appear to increase over time in the less comprehensive specifications, but this is absorbed by the price-paid terms. Finally, we note the remarkably strong fit for specification (6); but this is to be expected, since a seller's earnings depends almost entirely (except for the small cost of providing low or high quality) on the price paid and whether there is a cost shock.

In Table 5, we next consider, in a series of ordered-probit regressions in Table 6, the determinants of the quality provided by the seller. One potential factor is the price paid by the buyer. In addition, our conjectures predict a role for the characteristics of *Q*-clarification, friendly, agreement, and promises over quality. We do find a sensitivity of quality to the price paid, apparently some form of reciprocal behavior. This is highly significant in all specifications, with fairly stable coefficients. Taking into account the price paid (higher with flexible contracts), flexible contracts do not affect earnings *per se*. The cost shock naturally affects quality adversely. Each of *Q*-clarification, *Agreement*, *Promises over x* (quality), and *Friendly* has a strong positive influence on quality (we do not include these regressors together, given the extremely high correlation amongst them). Such effects are diminished slightly when there is a cost shock.

[Table 5 about here]

We close this Section with a brief summary of our main results.

1. *While rigid contracts are slightly (and marginally-significantly) more common when there is no communication, flexible contracts are far more common with communication. There is also an increasing trend in favor of flexible contracts in the chat treatment.*
2. *Both buyer and seller earnings are significantly higher in the chat treatment than in the no-communication treatment.*
3. *There are far fewer cases of rejected contracts when communication is not feasible. Overall, the price paid is much higher in the chat treatment.*
4. *The quality provided by the seller is much higher in the chat treatment, with high quality nearly 60 times as frequent as in the no-communication treatment.*

5. *Flexible contracts lead to slightly lower earnings for all parties in the no-communication treatment, but substantially higher earnings for both the buyer and the seller with chat.*
6. *In line with our theory, clarity, agreement, and friendliness improve the quality provided. Promises also have a beneficial effect on quality.*

6. Discussion

A core question in contract theory, principal-agent interactions, and labor economics concerns whether formal or informal contracts are best when it is not possible to form complete contracts. There are reasons to believe that informal contracts that can take into account alternative states of the world and that harness non-standard preferences would be preferable to rigid contracts that cannot adjust to circumstances. However, since informal contracts can lead to misunderstandings, negative emotions, and poor outcomes, it may be worthwhile to eschew these in favor of formal contracts.

Fehr, Hart, and Zender (2011) find circumstances under which rigid contracts are both more common and more lucrative for the principal (in our case, the buyer), our suspicion has been that this result is not general. We conclude, in line with Hart and Moore (2008), that there is a fundamental problem with informal contracting

In fact, we find that having the ability to discuss matters before a contract is chosen and the agent (seller) responds. We also find that rigid contracts do (slightly) better when there is no communication possible, but this result changes dramatically when we permit a buyer and seller to communicate before the contract choice and the seller's quality response. With communication, people can make agreements and promises, which, though unenforceable, tend to be honored; this leads to higher prices being paid and higher quality being provided.

Table 1: Behavior in the no-communication treatment

Category	Rigid contract	Flexible contract
Frequency*	243 (55.4%)	196 (44.6%)
Rejections	79 (32.5%)	65 (33.2%)
Average P (all offers)	13.28 [0.41]	11.13 [0.37]^
Average P (accepted offers)	15.74 [0.43]	12.58 [0.46]^
Average Q with cost shock	-	3.35 [0.49]
Average Q with no cost shock	-	1.58 (0.30)^
Inferior quality	51 (31.1%)	53 (40.5%)
Normal quality	107 (62.2%)	74 (56.5%)
Superior quality	6 (3.7%)	4 (3.0%)
Avg. quality with cost shock	-0.32 [0.06]	-0.45 [0.06]
Avg. quality if no cost shock^	-0.22 [0.06]	-0.26 [0.08]
Avg. buyer earnings, cost shock	12.27 [0.58]	10.16 [1.17]
Avg. buyer earnings, no cost shock^	15.28 [1.06]	14.91 [1.26]
Overall buyer earnings	10.80 [0.58]	8.84 [1.09]
Avg. seller earnings, cost shock	0.80 [0.61]	0.27 [0.82]
Avg. seller earnings, no cost shock^	19.86 [0.62]	19.15 [0.85]
Overall seller earnings	7.81 [0.59]	7.96 [1.22]
Total earnings, cost shock	13.08 [1.14]	10.36 [1.23]
Total earnings, no cost shock	35.14 [1.14]	34.17 [1.48]
Overall total earnings	18.61 [0.88]	16.80 [0.99]

* No contract was offered on one occasion. ^We exclude one case in which the buyer received a very large negative payoff in the first period. Average buyer, seller, and total earnings with cost shock or no cost shock refer to accepted contracts. Overall buyer, seller, and total earnings refer to all offered contracts, except for “Average P (accepted offers)”. Standard errors are in brackets.

Table 2: Behavior in the chat treatment

Category	Rigid contract	Flexible contract
Frequency*	111 (25.3%)	327 (74.7%)
Rejections	20 (18.0%)	12 (3.7%)
Average P (all offers)	22.76 [0.83]	16.91 [0.37]
Average P (accepted offers)	25.22 [0.72]	17.22 [0.47]
Average Q with cost shock	-	13.08 [0.66]
Average Q with no cost shock	-	7.25 [0.66]
Inferior quality	13 (14.3%)	20 (6.3%)
Normal quality	33 (36.3%)	61 (19.4%)
Superior quality	45 (49.4%)	234 (74.3%)
Avg. quality with cost shock	0.19 [0.10]	0.63 [0.05]
Avg. quality if no cost shock	0.52 [0.11]	0.73 [0.04]
Avg. buyer earnings, cost shock	11.87 [1.75]	13.23 [0.66]
Avg. buyer earnings, no cost shock	15.28 [1.06]	21.76 [0.78]
Overall buyer earnings	12.66 [0.99]	17.02 [0.56]
Avg. seller earnings, cost shock	0.80 [0.61]	0.27 [0.82]
Avg. seller earnings, no cost shock	19.86 [0.62]	19.15 [0.85]
Overall seller earnings	16.68 [1.16]	20.95 [0.46]
Total earnings, cost shock	21.49 [1.77]	28.37 [0.79]
Total earnings, no cost shock	46.52 [1.75]	49.76 [0.73]
Overall total earnings	29.34 [1.72]	37.97 [0.84]

* No contract was offered on two occasions. Average buyer, seller, and total earnings with cost shock or no cost shock refer to accepted contracts. Overall buyer, seller, and total earnings refer to all offered contracts, except for “Average P (accepted offers)”. Standard errors are in brackets.

Table 4 - Determinants of earnings, Random-effects GLS regressions

Independent variables	(1) Buyer	(2) Buyer	(3) Buyer	(4) Seller	(5) Seller	(6) Seller	(7) Joint	(8) Joint	(9) Joint
Period	0.086 (0.112)	0.027 (0.113)	-0.047 (0.104)	0.280*** (0.094)	0.219** (0.093)	-0.012** (0.068)	0.392*** (0.150)	0.279* (0.152)	-0.062 (0.104)
Treatment	5.735*** (0.742)	1.857* (1.091)	1.309 (1.144)	13.276*** (0.572)	9.206*** (0.899)	0.170*** (0.057)	19.074*** (1.314)	12.369*** (1.721)	1.153 (1.150)
Cost shock	-0.110*** (0.033)	-0.108*** (0.033)	0.150* (0.090)	-0.559*** (0.026)	-0.566*** (0.026)	-1.029*** (0.004)	-0.704*** (0.045)	-0.704*** (0.045)	-0.879*** (0.041)
Flexible	-	-1.017 (0.919)	-0.887 (1.102)	-	-0.827 (0.726)	-0.065 (0.050)	-	-1.124 (1.418)	-0.927 (1.107)
Treatment* flexible		5.621*** (1.393)	4.845*** (1.569)	-	5.824*** (1.106)	-0.101 (0.070)	-	9.473*** (2.059)	4.725*** (1.576)
Price paid	-	-	0.879*** (0.100)	-	-	0.988*** (0.005)	-	-	1.866*** (0.101)
Price paid* flexible	-	-	-0.015 (0.069)	-	-	-0.0002 (0.003)			0.014*** (0.070)
Price paid squared	-	-	-0.019*** (0.004)	-	-	-0.0004** (0.0002)	-	-	-0.019*** (0.004)
Price paid* cost shock	-	-	-0.017*** (0.004)	-	-	0.001*** (0.0002)	-	-	-0.015*** (0.004)
Constant	10.676*** (0.846)	11.441*** (0.896)	6.149*** (0.962)	10.194*** (0.687)	10.949*** (0.741)	5.072*** (0.049)	20.997*** (1.290)	22.113*** (1.346)	11.227*** (0.966)
N	879	879	879	879	879	879	879	879	879
R ²	0.087	0.108	0.260	0.538	0.556	0.999	0.400	0.428	0.755

Standard errors are in parentheses. ***, **, and * indicate significance at $p = 0.01$, $p = 0.05$, and $p = 0.10$ (two-tailed tests), respectively. Rigid contract = 0, Flexible contract = 1. Treatment = 0 for the no- communication and treatment = 1 with chat. We exclude the one case with an extreme buyer (seller) loss (gain).

Table 5 - Determinants of quality, Ordered-probit regressions (clustered by individual)

Independent variables	(1) No-chat	(2) Chat	(3) Chat	(4) Chat	(5) Chat	(6) Chat
Period	-0.030 (0.031)	0.023 (0.019)	0.016 (0.021)	0.006 (0.023)	0.013 (0.021)	0.006 (0.022)
Price paid	0.079** (0.018)	0.085*** (0.022)	0.084*** (0.018)	0.070*** (0.018)	0.083*** (0.019)	0.072*** (0.019)
Price paid* flexible	0.008 (0.024)	0.005 (0.029)	0.009 (0.027)	0.016 (0.024)	0.007 (0.027)	0.012 (0.025)
Flexible	-0.315 (0.418)	0.222 (0.761)	0.093 (0.723)	-0.160 (0.643)	0.153 (0.716)	-0.047 (0.649)
Cost shock	-0.022** (0.010)	-0.039*** (0.010)	-0.035*** (0.010)	-0.039*** (0.011)	-0.038*** (0.010)	-0.039*** (0.010)
Q-clarification	-	-	0.156*** (0.040)	-	-	-
Cost shock* Q-clarification	-	-	-0.012** (0.005)	-	-	-
Agreement	-	-	-	0.278*** (0.088)	-	-
Cost shock* Agreement	-	-	-	-0.009 (0.007)	-	-
Promises over x	-	-	-	-	0.175*** (0.043)	-
Cost shock* Promises over x	-	-	-	-	-0.012*** (0.005)	-
Friendly	-	-	-	-	-	0.246*** (0.069)
Cost shock* Friendly	-	-	-	-	-	-0.007 (0.007)
N	294	406	406	406	406	406
LL	-204.0	-283.2	-276.7	-267.0	-276.1	-270.2

Standard errors are in parentheses. ***, **, and * indicate significance at $p = 0.01$, $p = 0.05$, and $p = 0.10$ (two-tailed tests), respectively. Rigid contract = 0, Flexible contract = 1. Treatment = 0 with no-communication, treatment = 1 with chat. We exclude case where no contract was accepted.

Appendix C: Session-level data

Table C1: Behavior in session 1 of the no-communication treatment

Category	Rigid contract	Flexible contract
Frequency*	53 (48.6%)	56 (51.4%)
Rejections	13 (24.5%)	13 (23.2%)
Average P	15.15 [1.00]	13.00 [0.83]
Average Q	-	2.44 [0.58]
Inferior quality	10 (25.0%)	12 (27.9%)
Normal quality	25 (62.5%)	30 (69.8%)
Superior quality	5 (12.5%)	1 (2.3%)
Average buyer earnings	12.08 [1.41]	11.00 [1.20]
Average seller earnings	9.62 [1.48]	9.21 [1.42]
Average total earnings	21.70 [1.83]	20.21 [1.82]

* No contract was offered on one occasion. Standard errors are in brackets.

Table C2: Behavior in session 2 of the no-communication treatment

Category	Rigid contract	Flexible contract
Frequency*	66 (60.0%)	44 (40.0%)
Rejections	24 (36.4%)	26 (59.1%)
Average P	14.18 [0.61]	10.00 [0.55]
Average Q	-	1.78 [0.83]
Inferior quality	14 (33.3%)	8 (44.4%)
Normal quality	27 (64.3%)	10 (55.6%)
Superior quality	1 (2.4%)	0 (0.0%)
Average buyer earnings	9.86 [1.07]	8.55 [1.32]
Average seller earnings	8.92 [1.12]	4.00 [0.92]
Average total earnings	18.79 [1.74]	12.55 [1.45]

Standard errors are in brackets.

Table C3: Behavior in session 3 of the no-communication treatment

Category	Rigid contract	Flexible contract
Frequency	46 (41.8%)	64 (58.2%)
Rejections	11 (23.9%)	15 (23.4%)
Average P	12.93 [0.88]	10.66 [0.48]
Average Q	-	2.78 [0.54]
Inferior quality	9 (25.7%)	22 (44.9%)
Normal quality	26 (74.3%)	26 (53.1%)
Superior quality	0 (0.0%)	1 (2.0%)
Average buyer earnings	12.61 [1.35]	10.34 [1.19]
Average seller earnings	7.41 [1.32]	6.88 [1.20]
Average total earnings	20.02 [2.13]	17.22 [1.86]

Standard errors are in brackets.

Table C4: Behavior in session 4 of the no-communication treatment

Category	Rigid contract	Flexible contract
Frequency	78 (70.9%)	32 (29.1%)
Rejections	31 (39.7%)	11 (34.4%)
Average P	11.45 [0.76]	13.16 [3.03]
Average Q	-	8.05 [4.65]
Inferior quality	18 (38.3%)	11 (52.4%)
Normal quality	29 (61.7%)	8 (38.1%)
Superior quality	0 (0.0%)	2 (9.5%)
Average buyer earnings [^]	9.65 [0.95]	7.84 [1.28]
Average seller earnings [^]	5.88 [0.92]	7.23 [1.89]
Average total earnings [^]	15.54 [1.47]	15.06 [2.82]

[^]We exclude one case in which the buyer received a very large negative payoff in the first period. Standard errors are in brackets.

Table C5: Behavior in session 1 of the chat treatment

Category	Rigid contract	Flexible contract
Frequency*	29 (26.4%)	81 (73.6%)
Rejections	9 (23.7%)	4 (4.7%)
Average P	19.41 [1.76]	17.37 [0.84]
Average Q	-	9.29 [0.86]
Inferior quality	6 (30.0%)	8 (10.4%)
Normal quality	3 (15.0%)	15 (19.5%)
Superior quality	11 (55.0%)	54 (70.1%)
Average buyer earnings	10.83 [0.58]	15.59 [1.45]
Average seller earnings	16.00 [2.03]	21.54 [0.93]
Average total earnings	26.83 [3.62]	37.14 [1.94]

Standard errors are in brackets.

Table C6: Behavior in session 2 of the chat treatment

Category	Rigid contract	Flexible contract
Frequency*	12 (11.1%)	96 (88.9%)
Rejections	6 (50.0%)	2 (2.0%)
Average P	13.42 [2.28]	10.92 [0.97]
Average Q	-	15.74 [1.02]
Inferior quality	0 (0.0%)	5 (5.3%)
Normal quality	4 (66.7%)	17 (18.1%)
Superior quality	2 (33.3%)	72 (76.6%)
Average buyer earnings	14.42 [3.63]	18.39 [0.79]
Average seller earnings	7.92 [3.78]	20.81 [0.95]
Average total earnings	22.33 [4.51]	39.20 [1.44]

* No contract was offered on two occasions. Standard errors are in brackets.

Table C7: Behavior in session 3 of the no-communication treatment

Category	Rigid contract	Flexible contract
Frequency	53 (48.2%)	57 (51.8%)
Rejections	3 (5.7%)	6 (10.5%)
Average P	25.91 [0.85]	19.23 [1.04]
Average Q	-	7.92 [1.17]
Inferior quality	3 (6.0%)	4 (7.8%)
Normal quality	21 (42.0%)	15 (29.4%)
Superior quality	26 (52.0%)	32 (62.8%)
Average buyer earnings	14.47 [1.24]	13.86 [1.41]
Average seller earnings	18.94 [1.69]	19.19 [1.23]
Average total earnings	33.42 [2.37]	33.05 [2.19]

Standard errors are in brackets.

Table C8: Behavior in session 4 of the chat treatment

Category	Rigid contract	Flexible contract
Frequency	17 (15.4%)	93 (84.6%)
Rejections	2 (11.8%)	0 (0.0%)
Average P	25.24 [2.08]	21.30 [0.32]
Average Q	-	6.51 [0.58]
Inferior quality	4 (26.7%)	3 (3.2%)
Normal quality	5 (33.3%)	14 (15.1%)
Superior quality	6 (40.0%)	76 (81.7%)
Average buyer earnings	8.88 [2.59]	18.80 [0.86]
Average seller earnings	17.00 [1.16]	21.65 [2.80]
Average total earnings	25.88 [4.39]	40.44 [1.27]

Standard errors are in brackets.

Table D1: Correlations in chat categories

	qclarif~n	qdiscu~n	specif~h	specif~l	specif~n	somesp~n	comple~n
qclarifica~n	1.0000						
qdiscussion	0.9107	1.0000					
specificit~h	0.9838	0.8847	1.0000				
specificit~l	0.9843	0.8834	0.9984	1.0000			
specificit~n	0.9833	0.8837	0.9995	0.9989	1.0000		
somespecif~n	0.9847	0.8844	0.9989	0.9995	0.9984	1.0000	
completesp~n	0.9833	0.8837	0.9995	0.9989	1.0000	0.9984	1.0000
influenceb	0.8426	0.8127	0.8360	0.8352	0.8367	0.8345	0.8367
friendly	0.8927	0.8605	0.8884	0.8881	0.8876	0.8889	0.8876
fairnes~1bya	0.9354	0.9409	0.9304	0.9306	0.9303	0.9307	0.9303
fairnes~1byb	0.9368	0.9393	0.9318	0.9319	0.9317	0.9320	0.9317
fairnes~2bya	0.9421	0.8928	0.9411	0.9420	0.9403	0.9429	0.9403
fairnes~2byb	0.9412	0.9027	0.9376	0.9375	0.9378	0.9374	0.9378
costris~1bya	0.9460	0.9460	0.9402	0.9404	0.9401	0.9405	0.9401
costris~1byb	0.9214	0.9266	0.9168	0.9169	0.9168	0.9170	0.9168
costris~2bya	0.9504	0.9454	0.9436	0.9437	0.9435	0.9439	0.9435
costris~2byb	0.9428	0.9436	0.9317	0.9318	0.9316	0.9319	0.9316
pressureov~r	0.9304	0.9199	0.9248	0.9252	0.9244	0.9256	0.9244
pressureov~q	0.9384	0.9288	0.9288	0.9273	0.9280	0.9280	0.9280
promisesov~r	0.9160	0.9104	0.9010	0.9029	0.9014	0.9025	0.9014
promisesov~q	0.9423	0.9388	0.9359	0.9359	0.9358	0.9360	0.9358
impatience~a	0.8740	0.8649	0.8717	0.8715	0.8718	0.8714	0.8718
impatience~b	0.8671	0.8630	0.8635	0.8633	0.8636	0.8631	0.8636
agreement	0.8857	0.8363	0.8791	0.8797	0.8785	0.8803	0.8785
unity	0.9326	0.9205	0.9213	0.9217	0.9208	0.9222	0.9208
implicitdi~t	0.9236	0.9346	0.9201	0.9201	0.9200	0.9202	0.9200
fulfillmen~a	0.9420	0.9376	0.9349	0.9350	0.9349	0.9351	0.9349
fulfillmen~b	0.8791	0.8692	0.8624	0.8644	0.8626	0.8643	0.8626
	influe~b	friendly	fai~1bya	fai~1byb	fai~2bya	fai~2byb	cos~1bya
influenceb	1.0000						
friendly	0.7988	1.0000					
fairnes~1bya	0.8395	0.9075	1.0000				
fairnes~1byb	0.8399	0.9085	0.9843	1.0000			
fairnes~2bya	0.7912	0.8867	0.9343	0.9341	1.0000		
fairnes~2byb	0.8734	0.8953	0.9401	0.9423	0.9192	1.0000	
costris~1bya	0.8411	0.9123	0.9864	0.9870	0.9390	0.9489	1.0000
costris~1byb	0.8255	0.8963	0.9736	0.9810	0.9296	0.9261	0.9808
costris~2bya	0.8401	0.9089	0.9850	0.9870	0.9457	0.9496	0.9903
costris~2byb	0.8464	0.8987	0.9752	0.9746	0.9245	0.9367	0.9796
pressureov~r	0.8006	0.9029	0.9525	0.9479	0.9297	0.9139	0.9576
pressureov~q	0.8643	0.8633	0.9273	0.9284	0.8902	0.9335	0.9354
promisesov~r	0.8354	0.8851	0.9345	0.9357	0.8901	0.9139	0.9391
promisesov~q	0.8226	0.8963	0.9680	0.9687	0.9249	0.9308	0.9740
impatience~a	0.7677	0.8479	0.8948	0.8957	0.8682	0.8657	0.9020
impatience~b	0.7681	0.8370	0.8921	0.8942	0.8540	0.8640	0.8970
agreement	0.7642	0.9127	0.9014	0.8991	0.8745	0.8813	0.9020
unity	0.8180	0.9044	0.9478	0.9469	0.9262	0.9235	0.9513
implicitdi~t	0.8250	0.8572	0.9666	0.9660	0.9129	0.9281	0.9714
fulfillmen~a	0.8236	0.8961	0.9676	0.9683	0.9269	0.9321	0.9734
fulfillmen~b	0.7965	0.8787	0.9027	0.9085	0.8633	0.8920	0.9102

	cos~1byb	cos~2bya	cos~2byb	pressu~r	pressu~q	promis~r	promis~q
costris~1byb	1.0000						
costris~2bya	0.9753	1.0000					
costris~2byb	0.9674	0.9782	1.0000				
pressureov~r	0.9384	0.9557	0.9433	1.0000			
pressureov~q	0.9133	0.9368	0.9395	0.9016	1.0000		
promisesov~r	0.9264	0.9404	0.9344	0.9246	0.9103	1.0000	
promisesov~q	0.9584	0.9738	0.9630	0.9458	0.9373	0.9369	1.0000
impatience~a	0.8863	0.9026	0.8952	0.8743	0.8553	0.8522	0.8896
impatience~b	0.8808	0.8988	0.8909	0.8581	0.8655	0.8547	0.8862
agreement	0.8800	0.9007	0.8846	0.8894	0.8440	0.8722	0.8859
unity	0.9418	0.9507	0.9404	0.9350	0.9087	0.9151	0.9337
implicitdi~t	0.9580	0.9698	0.9587	0.9267	0.9272	0.9110	0.9548
fulfillmen~a	0.9583	0.9733	0.9601	0.9482	0.9351	0.9372	0.9921
fulfillmen~b	0.8983	0.9095	0.8977	0.8896	0.8603	0.9271	0.8930
	impati~a	impati~b	agreem~t	unity	implic~t	fulfil~a	fulfil~b
impatience~a	1.0000						
impatience~b	0.9232	1.0000					
agreement	0.8146	0.8180	1.0000				
unity	0.8714	0.8654	0.8851	1.0000			
implicitdi~t	0.8834	0.8787	0.8376	0.9245	1.0000		
fulfillmen~a	0.8884	0.8829	0.8869	0.9382	0.9523	1.0000	
fulfillmen~b	0.8250	0.8100	0.8709	0.8861	0.8662	0.8968	1.0000

Figures 1-4: Patterns over time

Figure 1: Proportion of flexible contracts over time

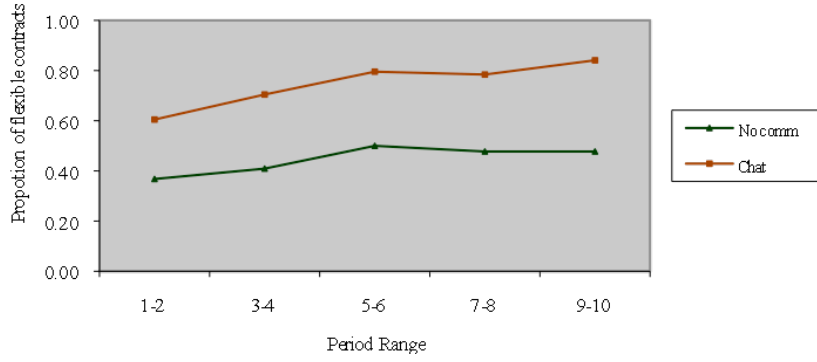


Figure 2: Average quality over time

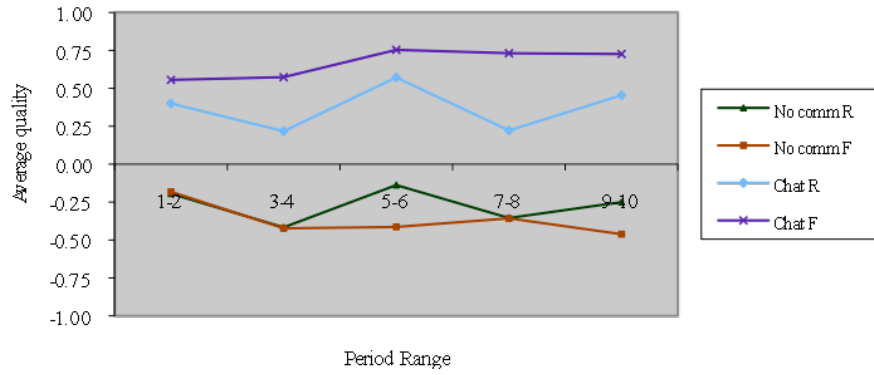
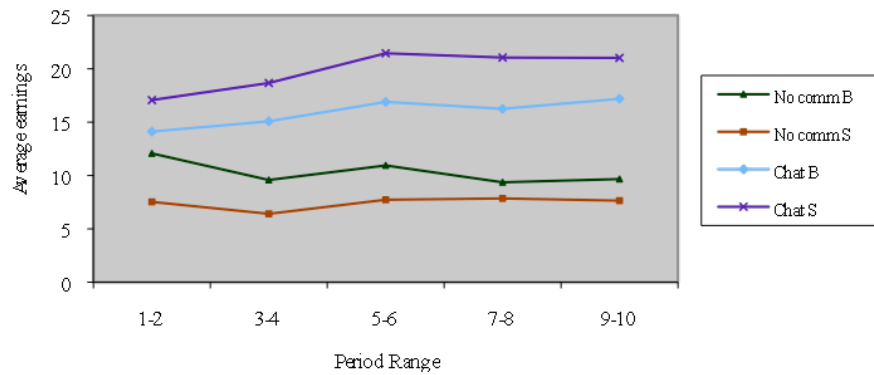


Figure 3: Average earnings over time



Appendix C: Chat categories and distribution

Table C1: Chat classifications and values (Offered contracts, overall)

Category	Values and Frequency				Average value
	-1	0	1	2	
Q-Plan-Clarification		133	288		0.684
Q-Discussion		314	107		0.254
Influence by seller		206	54	160	0.652
Friendly	38	199	184		0.347
Fairness rigid contract (buyers)		406	15		0.036
Fairness rigid contract (sellers)		407	14		0.033
Fairness flexible contract (buyers)		277	144		0.342
Fairness flexible contract (sellers)		319	102		0.242
Cost-risk rigid contract (buyers)		414	7		0.017
Cost-risk rigid contract (sellers)		388	33		0.078
Cost-risk flexible contract (buyers)		413	8		0.019
Cost-risk flexible contract (sellers)		394	27		0.064
Pressure over x		112	309		0.734
Pressure over Q		238	183		0.435
Promises over x		234	187		0.444
Promises over Q		385	36		0.086
Impatience buyer		362	16	43	0.242
Impatience seller		353	22	46	0.271
Agreement	58	97	266		0.494
Unity		126	295		0.701
Implicit disagreement		364	57		0.135
Buyer fulfillment	3	386	32		0.069
Seller fulfillment	38	234	149		0.263

Table C2: Chat classifications and values (Offered rigid contracts)

Category	Values and Frequency				Average value
	-1	0	1	2	
Q-Plan-Clarification		90	11		0.109
Q-Discussion		111	0		0.000
Influence by seller		56	37	8	0.525
Friendly	18	53	30		0.119
Fairness rigid contract (buyers)		88	13		0.129
Fairness rigid contract (sellers)		89	12		0.119
Fairness flexible contract (buyers)		93	8		0.079
Fairness flexible contract (sellers)		98	3		0.030
Cost-risk rigid contract (buyers)		94	7		0.069
Cost-risk rigid contract (sellers)		76	25		0.248
Cost-risk flexible contract (buyers)		100	1		0.010
Cost-risk flexible contract (sellers)		97	4		0.040
Pressure over x		42	59		0.584
Pressure over Q		97	4		0.040
Promises over x		31	70		0.307
Promises over Q		101	0		0.000
Impatience buyer		92	3	6	0.149
Impatience seller		91	4	6	0.158
Agreement	30	24	47		0.168
Unity		46	55		0.545
Implicit disagreement		75	26		0.137
Buyer fulfillment		101			0.000
Seller fulfillment	7	70	24		0.168

Table C3: Chat classifications and values (Offered flexible contracts)

Category	Values and Frequency				Average value
	-1	0	1	2	
Q-Plan-Clarification		43	277		0.866
Q-Discussion		217	107		0.334
Influence by seller		150	17	152	1.006
Friendly	20	146	154		0.419
Fairness rigid contract (buyers)		318	2		0.006
Fairness rigid contract (sellers)		318	2		0.033
Fairness flexible contract (buyers)		184	136		0.425
Fairness flexible contract (sellers)		221	99		0.309
Cost-risk rigid contract (buyers)		320	0		0.000
Cost-risk rigid contract (sellers)		312	8		0.025
Cost-risk flexible contract (buyers)		313	7		0.219
Cost-risk flexible contract (sellers)		297	23		0.072
Pressure over x		70	250		0.781
Pressure over Q		141	179		0.559
Promises over x		164	156		0.488
Promises over Q		284	36		0.112
Impatience buyer		270	13	37	0.272
Impatience seller		262	18	40	0.306
Agreement	28	73	219		0.597
Unity		80	240		0.750
Implicit disagreement		364	58		0.137
Buyer fulfillment	3	285	32		0.091
Seller fulfillment	31	164	125		0.294

Appendix D: Correlations between chat categories

Table D1: Correlations in chat categories

	qclarif~n	qdiscu~n	specif~h	specif~l	specif~n	somesp~n	comple~n
qclarifica~n	1.0000						
qdiscussion	0.9107	1.0000					
specificit~h	0.9838	0.8847	1.0000				
specificit~l	0.9843	0.8834	0.9984	1.0000			
specificit~n	0.9833	0.8837	0.9995	0.9989	1.0000		
somespecif~n	0.9847	0.8844	0.9989	0.9995	0.9984	1.0000	
completesp~n	0.9833	0.8837	0.9995	0.9989	1.0000	0.9984	1.0000
influenceb	0.8426	0.8127	0.8360	0.8352	0.8367	0.8345	0.8367
friendly	0.8927	0.8605	0.8884	0.8881	0.8876	0.8889	0.8876
fairnes~1bya	0.9354	0.9409	0.9304	0.9306	0.9303	0.9307	0.9303
fairnes~1byb	0.9368	0.9393	0.9318	0.9319	0.9317	0.9320	0.9317
fairnes~2bya	0.9421	0.8928	0.9411	0.9420	0.9403	0.9429	0.9403
fairnes~2byb	0.9412	0.9027	0.9376	0.9375	0.9378	0.9374	0.9378
costris~1bya	0.9460	0.9460	0.9402	0.9404	0.9401	0.9405	0.9401
costris~1byb	0.9214	0.9266	0.9168	0.9169	0.9168	0.9170	0.9168
costris~2bya	0.9504	0.9454	0.9436	0.9437	0.9435	0.9439	0.9435
costris~2byb	0.9428	0.9436	0.9317	0.9318	0.9316	0.9319	0.9316
pressureov~r	0.9304	0.9199	0.9248	0.9252	0.9244	0.9256	0.9244
pressureov~q	0.9384	0.9288	0.9288	0.9273	0.9280	0.9280	0.9280
promisesov~r	0.9160	0.9104	0.9010	0.9029	0.9014	0.9025	0.9014
promisesov~q	0.9423	0.9388	0.9359	0.9359	0.9358	0.9360	0.9358
impatience~a	0.8740	0.8649	0.8717	0.8715	0.8718	0.8714	0.8718
impatience~b	0.8671	0.8630	0.8635	0.8633	0.8636	0.8631	0.8636
agreement	0.8857	0.8363	0.8791	0.8797	0.8785	0.8803	0.8785
unity	0.9326	0.9205	0.9213	0.9217	0.9208	0.9222	0.9208
implicitdi~t	0.9236	0.9346	0.9201	0.9201	0.9200	0.9202	0.9200
fulfillmen~a	0.9420	0.9376	0.9349	0.9350	0.9349	0.9351	0.9349
fulfillmen~b	0.8791	0.8692	0.8624	0.8644	0.8626	0.8643	0.8626
	influe~b	friendly	fai~1bya	fai~1byb	fai~2bya	fai~2byb	cos~1bya
influenceb	1.0000						
friendly	0.7988	1.0000					
fairnes~1bya	0.8395	0.9075	1.0000				
fairnes~1byb	0.8399	0.9085	0.9843	1.0000			
fairnes~2bya	0.7912	0.8867	0.9343	0.9341	1.0000		
fairnes~2byb	0.8734	0.8953	0.9401	0.9423	0.9192	1.0000	
costris~1bya	0.8411	0.9123	0.9864	0.9870	0.9390	0.9489	1.0000
costris~1byb	0.8255	0.8963	0.9736	0.9810	0.9296	0.9261	0.9808
costris~2bya	0.8401	0.9089	0.9850	0.9870	0.9457	0.9496	0.9903
costris~2byb	0.8464	0.8987	0.9752	0.9746	0.9245	0.9367	0.9796
pressureov~r	0.8006	0.9029	0.9525	0.9479	0.9297	0.9139	0.9576
pressureov~q	0.8643	0.8633	0.9273	0.9284	0.8902	0.9335	0.9354
promisesov~r	0.8354	0.8851	0.9345	0.9357	0.8901	0.9139	0.9391
promisesov~q	0.8226	0.8963	0.9680	0.9687	0.9249	0.9308	0.9740
impatience~a	0.7677	0.8479	0.8948	0.8957	0.8682	0.8657	0.9020
impatience~b	0.7681	0.8370	0.8921	0.8942	0.8540	0.8640	0.8970
agreement	0.7642	0.9127	0.9014	0.8991	0.8745	0.8813	0.9020
unity	0.8180	0.9044	0.9478	0.9469	0.9262	0.9235	0.9513
implicitdi~t	0.8250	0.8572	0.9666	0.9660	0.9129	0.9281	0.9714
fulfillmen~a	0.8236	0.8961	0.9676	0.9683	0.9269	0.9321	0.9734
fulfillmen~b	0.7965	0.8787	0.9027	0.9085	0.8633	0.8920	0.9102

	cos~1byb	cos~2bya	cos~2byb	pressu~r	pressu~q	promis~r	promis~q
costris~1byb	1.0000						
costris~2bya	0.9753	1.0000					
costris~2byb	0.9674	0.9782	1.0000				
pressureov~r	0.9384	0.9557	0.9433	1.0000			
pressureov~q	0.9133	0.9368	0.9395	0.9016	1.0000		
promisesov~r	0.9264	0.9404	0.9344	0.9246	0.9103	1.0000	
promisesov~q	0.9584	0.9738	0.9630	0.9458	0.9373	0.9369	1.0000
impatience~a	0.8863	0.9026	0.8952	0.8743	0.8553	0.8522	0.8896
impatience~b	0.8808	0.8988	0.8909	0.8581	0.8655	0.8547	0.8862
agreement	0.8800	0.9007	0.8846	0.8894	0.8440	0.8722	0.8859
unity	0.9418	0.9507	0.9404	0.9350	0.9087	0.9151	0.9337
implicitdi~t	0.9580	0.9698	0.9587	0.9267	0.9272	0.9110	0.9548
fulfillmen~a	0.9583	0.9733	0.9601	0.9482	0.9351	0.9372	0.9921
fulfillmen~b	0.8983	0.9095	0.8977	0.8896	0.8603	0.9271	0.8930
	impati~a	impati~b	agreem~t	unity	implic~t	fulfil~a	fulfil~b
impatience~a	1.0000						
impatience~b	0.9232	1.0000					
agreement	0.8146	0.8180	1.0000				
unity	0.8714	0.8654	0.8851	1.0000			
implicitdi~t	0.8834	0.8787	0.8376	0.9245	1.0000		
fulfillmen~a	0.8884	0.8829	0.8869	0.9382	0.9523	1.0000	
fulfillmen~b	0.8250	0.8100	0.8709	0.8861	0.8662	0.8968	1.0000

Appendix Q

Average quality in the no-communication treatment, by individual seller

Average x rigid	Average x flex	Average x overall
-0.250	-0.333	-0.300
0.000	0.000	0.000
0.000	-0.400	-0.333
-1.000	-0.800	-0.875
0.000	0.000	0.000
-0.250	-1.000	-0.625
0.000	-0.167	-0.100
-0.250	0.000	-0.125
0.000	0.000	0.000
-0.500	-1.000	-0.857
-0.400	-1.000	-0.625
0.000	0.000	0.000
-0.250	-1.000	-0.400
-0.250	0.000	-0.200
-0.125	0.000	-0.100
-0.750	0.000	-0.500
-0.750	-1.000	-0.833
0.000	-0.667	-0.286
-0.500	-1.000	-0.625
-0.800	-0.500	-0.714
-0.500	0.000	-0.200
-0.200	-1.000	-0.333
-0.667	-0.600	-0.625
-0.250	-0.167	-0.200
0.750	0.000	0.429
0.000	-0.250	-0.125
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.250	0.000	0.143
0.000	-0.500	-0.250
-0.833	-0.750	-0.800
-0.333	-0.333	-0.333
-0.833	-1.000	-0.857
0.000		0.000
-0.200	-0.667	-0.375
-0.714	0.000	-0.556
-0.200	-0.500	-0.286
0.000	0.000	0.000
	-1.000	-1.000
0.000		0.000
-0.200	-0.400	-0.300
0.000	0.000	0.000
0.000	-	0.000

Average quality in the communication treatment, by individual seller

Average x rigid	Average x flex	Average x overall
0.500	0.400	0.429
1.000	0.400	0.625
0.000	0.857	0.667
0.250	0.500	0.400
-0.333	0.500	0.222
1.000	0.667	0.700
1.000	0.429	0.500
-1.000	0.714	0.333
0.000	0.750	0.667
	0.625	0.625
1.000	0.556	0.600
1.000	0.429	0.500
0.000	0.667	0.571
0.000	0.571	0.500
0.000	0.625	0.556
1.000	0.857	0.875
	0.900	0.900
0.000	0.667	0.600
	0.700	0.700
	0.700	0.700
	0.700	0.700
	0.900	0.900
0.000	0.500	0.222
0.200	0.333	0.250
0.500	0.400	0.444
0.250	0.400	0.333
0.667	0.500	0.600
1.000	0.800	0.875
0.667	0.833	0.778
0.429	0.667	0.500
0.600	0.800	0.700
0.500	0.600	0.556
0.500	0.167	0.300
0.750	0.750	0.750
0.000	0.750	0.600
0.333	0.571	0.500
0.000	0.778	0.700
-1.000	0.444	0.300
	0.800	0.800
	0.800	0.800
0.000	0.889	0.800
-1.000	1.000	0.800
0.000	0.875	0.700
	0.900	0.900