

# **The Importance of Holdup in Contracting: Evidence from a Field Experiment**

Rajkamal Iyer and Antoinette Schoar<sup>\*</sup>

## **Abstract:**

This paper explores how the relationship specificity of the investment affects the ex-ante structure of contracts and the ex-post resolution of an ensuing holdup problem. We set up a field experiment in the wholesale market for pens in India where we sent entrepreneurs as auditors to procure large orders of pens from wholesale dealers. We vary the specificity of the order by buying either generic or custom-printed lots of pens. We find that ex ante contracts alleviate the risk of holdup by demanding 25% higher upfront payments on average in the case of custom-printed pens. But we do not find that wholesalers demand higher prices for custom-printed pens after controlling for the cost of the printing. We also test the ex post renegotiation of contracts. We find that wholesalers offer a higher price discount in case of custom-printed than generic pens. Furthermore, the higher the upfront payment, the lower is the discount offered by the wholesaler, which suggests that the wholesaler's bargaining power affects his willingness to renegotiate. Interestingly, in case of generic pens, we also find that wholesalers are often willing to refund the upfront paid. These findings confirm the predictions of Grossman and Hart (1986) or Hart and Moore (1990) on the importance of holdup costs in contracting. But in addition, there is large variation in contract structures which is not explained by specificity of investment and bargaining power based on outside options.

---

<sup>\*</sup> Preliminary version. University of Amsterdam; Massachusetts Institute of Technology, CEPR and NBER. We thank Bade Kucukoglu, Janina Matuszeski and especially Sandhya Kumar for outstanding research assistance. We thank Sendhil Mullainathan, Morten Sorenson, Chris Woodruff for many helpful comments. The Institute for Financial Markets Research in Chennai, India provided financial support. All errors are our own.

## 1. Introduction

Incomplete contracts theories have been a central building block for models in finance and economics for more than two decades, starting with Grossman and Hart (1986) and Hart and Moore (1990). These theories build on the idea that when state contingencies cannot be perfectly observed, contracted upon or enforced, contracting parties are often left to settle contractual issues via ex post (re)negotiation which can lead to ex post holdup of the party that has made more relationship specific investments. In a world of forward looking actors the threat of ex post expropriation can preclude parties from making relationship specific investments or exerting effort upfront.

Despite their widespread appeal and use within corporate finance there are almost no empirical papers that directly test the importance and extent to which holdup plays a prominent role in actual contracting situations. For example, there is only very limited evidence on how and whether expectations about ex post holdup affect the types of contracts that parties write, the ex ante tools that contracting parties have to mitigate the risk of holdup and whether it affects parties' incentives to engage in a contracting relationship in the first place. Moreover, we do not have reliable data on whether parties indeed resort to holdup when the opportunity arises. While there is some limited evidence to corroborate that asset re-deployability affects the sale value and price of assets, see for example Pulvino (1998), Benmelech and Bergman (2008), there is no reliable evidence about the extent of holdup in contracting situations where parties make relationship specific investments.

The empirical challenge, in particular, is to cleanly identify situations where one or both parties have to make relationship specific investments and to get detailed information about these contracting situations and their outcomes. Even if detailed contract information is available the type of investment that is observed is usually an endogenous function of the relationship that both parties have and thus does not allow us to test the causal effect of asset specificity on contracting outcomes.

Our study aims to analyze whether and how expectations about potential holdup affect contracting behavior upfront and how it shapes the ex post renegotiation of contracts. In particular, we ask whether contracting situations that require greater relationship specific investments are prone to more holdup and how parties mitigate these risks. For this purpose we conducted a field study in the South Indian city of Chennai that explicitly tests the role of holdup in incomplete contracts when parties have to make relationship specific investments. We randomly assign auditors (also called shoppers hereafter) to visit wholesalers and negotiate a bulk order for pens. The order either consists of generic pens that are easy to resell in the market (we will call those plain pens) or customized pen orders where we ask the wholesaler to print a specific logo on the pens that cannot be removed once it is printed (we will call these printed pens going forward). The idea is that printed pens require more relationship specific investment from the wholesaler, since once the pens are printed the wholesaler cannot use them in any other sale. Therefore, ex post the shopper has more bargaining power to renegotiate the price of the order.

We chose the wholesale market for pens in Chennai as the venue for our audit study for a number of reasons: First pens are an item that is relatively standardized in its quality but

can easily be changed in order size and specificity of the order (such as printing something on it). Second, this market has a large set of wholesale stores that are comparable in size and customer base which allows us to conduct a valid experiment. Third, India is an ideal test case for incomplete contracting situations since the Indian court system is notoriously difficult to access and therefore any breach in a contract is difficult to enforce ex post. And finally, we are able to hire local entrepreneurs to act as auditors so that they are aware of the intricacies of negotiating business deals in the Indian context. However, we made sure that these auditors are not from the same industry as the stationary wholesalers to avoid any familiarity between the shoppers and the wholesalers.

In a first step, we focus on the upfront contracting between shoppers and wholesalers to compare the case of plain versus printed pens. Wholesalers have to make an investment in the relationship by ordering the pens from a countrywide distributor and paying for the order upfront (and in the case of printed pens they also have bear the printing cost). The two dimensions that are of most interest in the negotiation is the price per pen that is charged for the order and the upfront payment that the wholesaler requires to process the order. We find that the demanded upfront payment is higher in the case of printed pens than plain pens, which suggests that indeed wholesalers fear the possibility of being held up ex post when their outside options are low. It is interesting to note that in the case of printed pens not only do the wholesalers start by asking for a significantly higher fraction of upfront payment than in the case of plain pens (58% versus 19%). But they are also less willing to be bargained down in the case of printed pens than in plain pens.

In contrast, when we look at the prices that are charged for the pens, we do not find a significant difference between printed and plain pens once we deduct the actual cost of the printing from the price of printed pens. This result is interesting since it suggests that wholesalers do not use a higher price for printed pens as a means to insure themselves against possible ex post losses due to lower resale value of printed pens.

These findings provide clear evidence that the specificity of the investment affects the structure of contracts ex ante to mitigate future holdup, i.e. the required level of upfront payments. But the overall level of the upfront payments is relatively small on average. Even in the case of printed pens the final contracted payments are only 25% of the total sales price. Obviously shoppers would not agree to pay 100% upfront, since this would eliminate the wholesalers' incentives to deliver in time (or deliver at all). It is, however, surprising to see that the wholesalers are asking such a low upfront payment even when transacting with shoppers that are first time clients. This finding suggests that wholesalers are confident that even relatively low levels of upfront payment on average ensure that shoppers will not renege on the contract. Moreover, these results support the idea that wholesalers demand the upfront payment to avoid strategic behavior by shoppers, i.e. holdup, rather than protecting the wholesaler against random default risk by shoppers. We know from exit interviews with wholesalers that the resale value of printed pens is virtually close to zero and therefore the average upfront payment of 25% does not cover the cost in case of default.

In a second step, we then conducted ex post renegotiations of the contracts, where a shopper calls up the wholesaler to announce that he is unable to honor the contract in full

since the shopper's own client has terminated the order with him. Instead the shopper asks to renegotiate the contract to a lower price. We chose to frame the renegotiation in this less direct display of holdup to avoid any personal threats between the shoppers and the wholesalers. However, it is clear that the wholesalers understand that they are being held up since they are asking the shoppers that they want to personally speak to their client or to provide evidence that the client is canceling the order.

We again find strong evidence that the specificity of the asset affects the bargaining position of the wholesaler. In the case of printed pen orders we find that the wholesalers are willing to renegotiate the order at a significantly higher frequency than in the case of plain pens, where wholesalers are more likely to insist that the upfront contract has to be honored. In addition the discount that is offered in these cases when the contract is renegotiated is much higher for printed than plain pens. In fact, plain pens are never renegotiated below the cost price of the pens. In contrast, a significant fraction of printed pen orders are renegotiated below the cost price of the pens. These results suggest that the wholesalers clearly take into account the difference in the outside value of the pens when deciding how to respond to a holdup situation.

We also find that the level of the upfront payment that was provided initially affects the willingness of the wholesaler to renegotiate the deal. The higher the upfront payment, the lower is the discount that the wholesaler is willing to accept, especially in the case of printed pen orders. This suggests that the wholesalers do take into account their bargaining position when deciding how to renegotiate a contract.

However, as in the upfront bargaining situation we see that there is a significant subset of wholesalers who do not use their power to holdup the shopper when they have the possibility to. In 15 out of 40 plain pen contracts the wholesaler in fact agrees to return the upfront payment to the shopper in full. This violates the assumption of the theory that either party will renegotiate the contract in order to extract the full rents from the relationship. In this case, wholesalers should keep the upfront payment and not deliver the pens, since the shopper is breaking the contract and it would be impossible for the shopper to sue the wholesaler for the money in an Indian court.

Overall this experiment suggests that there is strong evidence that relationship specific investments affect the contract negotiation between the parties and the upfront contract structure that is agreed upon, i.e. the level of upfront payment required. Our results provide direct support for incomplete contract theories a la Grossman and Hart (1986) or Hart and Moore (1990). Interestingly in this market higher relationship specific investments do not lead to higher prices for the good itself nor a reluctance of the wholesaler to engage in the transaction in the first place, which suggests that on average the advance payments are a sufficient method to ensure repayment. Similarly, we see that the ex post renegotiation of contracts is significantly affected by the relationship specificity of the investment. Yet the results of this study also highlight that there is a lot of contract variation that is not explained by assets specificity and the bargaining power that contracting parties have based on their outside options. In fact, a much larger fraction of variation in the data explained by shopper and wholesaler fixed effects than by assets specificity.

The remainder of the paper proceeds as follows. Section 2 places our paper in the context of the existing literature, section 3 describes the experimental set up and the randomization approach. Section 4 describes the data. Section 5 discusses the results of the upfront contracting results and section 6 summarizes the results from the ex post renegotiation. Finally section 7 concludes.

## 2. Literature Review

Our study is related to a number of different strands of the literature. First our paper contributes to the existing theories that explore the role of contract incompleteness. Grossman and Hart (1986) and Hart and Moore (1990) develop the property right theory of the firm where ownership of the asset helps reduce the holdup problem and increase the incentive of parties to make non-contractible relationship-specific investments. Aghion and Bolton (1992) and Bolton and Scharfstein (1996) develop a theory of capital structure based on control right allocation with the main ingredient being incompleteness of financial contracts.

Our paper also contributes to the existing literature that explores the importance of asset liquidation values in contracting. Williamson (1988) and Shleifer and Vishny (1992) highlight the role of asset redeployability in determination of debt capacity. On the empirical front, Benmelech and Bergman (2008) find that airlines renegotiate their lease obligation downwards when their financial position is poor and their fleet liquidation value is low. Similarly, Acharya et al. (2007) find that creditors of defaulted firms recover less if industry is in distress and non-defaulting firms in the industry are illiquid. Furthermore, they find the effect to be pronounced if debt is collateralized by specific assets that are not easily redeployable.

A growing empirical literature tests the roll of reputation and trust for contract completeness. Crocker and Reynolds (1993) investigate the procurement contracts used by the U.S military and find that higher reputation and complexity lead to drafting a more incomplete contract. Banerjee and Duflo (2000) show that contracts written between firms are associated with reputation level of the firms. McMillan and Woodruff (1999) find that inter-firm trade credit is more likely when the delivering firm trusts the client. Kaplan and Stromberg (2002) find that a central feature of venture capital contracts is the allocation of control rights between venture capitalist and entrepreneur suggesting that contracts are inherently incomplete.

Finally, our approach builds on the existing literature of audit studies to test differences in behaviors across and within groups. We draw on some of the methodological suggestion in the following studies even though their context and the questions differ completely from the current study. Moreover we expand the approach of audit studies by engaging in real purchase transactions to test contracting and renegotiation. Ayres and Siegelman (1995) examine the negotiation of new car purchase using an audit study and finds that dealers quote higher prices to black and female testers as compared to white male testers. For the purpose of his study, auditors from different ethnic groups are randomly assigned to shop at different dealerships. Similarly Newmark et al., (1996) finds evidence of gender discrimination in restaurant hiring using an audit study. Bertrand and Mullainathan (2004) use a field experiment to study discrimination against

African-Americans in the labor market. They find that résumés with white names received 50% more calls for interviews than résumés with black names.

### 3. Description of Experimental Set Up

#### 3.1. Market Structure and Intervention

The field experiment was conducted in Chennai, a city in Tamil Nadu, a state in the South of India. Chennai is the largest city in Tamil Nadu with over 4.5 million inhabitants. For the purpose of the study, we hired auditors to purchase large orders of pens in bulk from wholesalers. To test the differences in the bargaining outcomes for goods of different degree of relationship specificity we chose a single industry, pen and stationary wholesalers, to conduct our transactions. These are wholesale traders in pens and stationary items, not small stationary shops. The choice of this industry was driven by a number of different factors: (a) We were looking for an industry with a large number of similar sized establishments in a given location. Pen and stationary wholesalers provided such an opportunity, since there are more than 100 wholesalers in the Chennai area. Moreover, there is distinct cluster of wholesalers in a particular neighborhood, called Paris market. The benefit of such an arrangement is that it minimizes the amount of firm specific shocks. (b) We wanted to ensure that the type of commodity we conduct our experiment with is relatively standardized which in turn facilitates comparisons of deal terms offered by different wholesalers. But at the same time we wanted to make sure that the type of good provides opportunities to include customized featured which will allow us to vary the potential threat of holdup between the buyer and the trader. The pen industry offers a great opportunity since we will be able to customized pens by printing customer specific logos on the pens. (c) Finally, the pen industry provides us with a cost-effective product of entering into bulk deals.

To implement the actual audit study, we hired auditors who themselves are entrepreneurs so that they are familiar with the process of bargaining for supplies and services. But we verified the entrepreneurs we hired are not affiliated with the pen industry to avoid any familiarity between the wholesalers and the buyers. Instead we looked for traders from similar types of businesses such as grocery store owners, small manufacturers etc. Once the auditors were hired, they were provided training to explain the set up of the experiment, the details of the pen industry and their particular assignment. The auditors were told that they are part of a study to understand contract terms in the pen industry. However, auditors (hence forth referred to as buyers) were not told what the expected outcome of the study is in order to avoid any “demand effects” in their behavior. We also provided buyers with a specific identity such as the type of firm they run. Most of these business profiles that the buyers were assigned were firms like advertising companies, event management firms etc. which justify why the buyer is placing a bulk order for pens. Buyers are given the name of the firm they operate, the name and logo of the client for whom they are placing the bulk order and a business card with the associated information to credibly signal to the trader that they run a legitimate business.

We divide the pen purchase by the buyers into two types. In half the cases the buyers are either assigned to buy plain and in the other half they are assigned to order printed pens.

A printed pen has a firm name or message embossed on it (hence forth referred to as printed pens). In the case of plain pens no changes are done to the pen and it is a generic commodity (plain pens). We also insured that the auditors are ordering only the most common types of pens so that there are no differences in the resale possibilities for the plain pens. The distinction between the plain and the printed pen is that the printing on the pen cannot be easily removed and thus destroys its marketability (also it takes on average 3 days for the wholesaler to get the printing done).

The buyers are asked to place a bulk order of a pre-specified order size which we randomized across buyers. The order size varies between 500-750 pens in increments of 50 pens. This range of order size was determined after conducting a number of pilot interviews with traders who confirmed that this is the modal order size in the wholesale industry. Our aim is to mimic a regular business transaction that is neither too large to draw suspicion nor too small to be negligible by the traders.

We also provided the buyers with a detailed script that specified a bargaining rule that they were asked to follow during purchases. The visit to each wholesaler can be summarized as follows. At first the entrepreneur would enter the establishment and buy some items from the wholesaler. Generally these were 20-25 pens of commonly available brands. The buyer would pay these pens with cash to establish trust between the trader and himself. At the time of making the payment, the buyer would introduce himself to the owner. After the introduction, the buyer would mention to the wholesaler that he is interested in placing a bulk order of between 500 to 750 pens and enquire about the rate. Once the wholesaler makes the first offer, the buyer would make a counter offer that is equal to the wholesale price of the pen + 0.10 Rs. The second and third offer from the buyer would be at 0.10 Rs. higher than the previous offer. The fourth offer would be 0.10 Rs. lower than the previous offer of the wholesaler. The bargaining ends at any point if the wholesaler agrees on the price or refuses to bargain anymore.

Once the wholesaler and buyer have agreed on the price, for printed pens, the buyer would enquire about the printing rate. After fixing the printing rate, the buyer would enquire about the delivery time. If the delivery time were less than a week, the buyer would agree else would negotiate for delivery in a week. After finalizing the delivery time, the buyer would negotiate about the mode of payment at delivery. The buyer would first ask for credit at the time of delivery, then propose post-dated check, then check payment and finally cash payment at delivery. After the payment terms are fixed the buyer would ask if he could return the pens in case they are defective. Finally, the buyer would tell the owner that he will come in a week to collect delivery, at that time the wholesaler would invariably ask for an advance. The buyer would then negotiate for the advance payment using the following rule: 10% of the total amount, then 25% and finally 10% lower than the wholesaler's final offer.<sup>1</sup> It is important to note that we ask buyers to complete the deal at the lowest price possible, but we did not ask them to terminate the negotiation in case a certain price is not achieved. This means our experiment does not allow movement along the extensive margin, where some deals might not be reached if the trader insists on a high price.

---

<sup>1</sup> For the visits where the contract was renegotiated the buyers were given a maximum limit of 40% for the final advance payment.

The bargaining process for non-printed pens is very similar to the printed pens on all dimensions except for the delivery time. For the delivery time, the buyer tells the wholesaler that he would like to take delivery after a week even if the wholesaler has the stock ready earlier. To detect if the buyers deviate from the script and also to check their performance, one of the visits of buyer was to a wholesaler where the wholesaler was our representative (the buyers were never informed about this). Furthermore, in some of the other visits, we also had our representatives (whom the buyer was not aware of) visit the wholesaler at the same time as the buyer and witness the bargaining process.

For the visits where the contract terms are renegotiated, the renegotiation is carried out using the following bargaining script. At the date when the delivery of pens is to be picked up, the buyer would call up the wholesaler and inform that there is a problem. The buyer would tell the wholesaler that the company on whose behalf the buyer had placed the order does not want to take delivery. The buyer also conveys to the wholesaler that he has no immediate use for the pens. Finally the buyer tells the wholesaler that the situation is problematic for both of them, so the best he can offer is to take delivery of the pens if the wholesaler offers him a discount. At first the buyer asks the wholesaler for a 30% discount of the contracted price. The second offer is for 20% discount of the contracted price. The third offer is for 10% discount of the contracted price and final the offer is for 5% discount of the contracted price. The bargaining ends at any point if the wholesaler agrees on the discount or refuses to bargain any more. If the wholesaler agrees to give a discount, the buyer informs the wholesaler that he would come later to collect the delivery at the re-contracted price. In case the wholesaler refuses to give any discount, the buyer asks the wholesaler if he can get a refund of the advance that he has paid. In case, the wholesaler refuses to refund the advance the negotiation is terminated. Note that the negotiation can also be terminated at any point by the wholesaler.<sup>2</sup>

Directly after each visit/renegotiation the buyer is asked to fill out a detailed exit survey that asks about the outcome of the negotiation. The buyer also goes back to the wholesaler to take delivery at the agreed upon time and pays the outstanding part of the bill.

### 3.2. Methodology of Randomization

The randomization involved matching 46 buyers to around 100 wholesalers and determining the characteristics of each visit for a total of around 500 individual visits. Each buyer was assigned to visit 11 different wholesalers. Each wholesaler was visited between 3 and 6 times, with the majority of wholesalers being visited 5-6 times. Most importantly, the randomization imposed that each wholesaler had half of the visits where the buyer ordered plains pens and in the remaining visits the buyer ordered printed pens. To test how the specificity of the good interacts with other dimensions of a business transaction, we randomly assign variation in the type of the order that the buyer places, such as the type of pen ordered, and the number of pens ordered. We also tried to keep

---

<sup>2</sup> Thirty minutes after the renegotiation call, the auditor called up the wholesaler and informed him that the client has reinstated the order and he would pick up delivery at the initial contracted terms. Thus the final delivery was collected after making the payment in accordance with the initial contract terms



the script for each buyer as consistent as possible across the 11 visits they made to various wholesalers.

To achieve these goals of variation in visit characteristics, while maintaining a similar script across visits for the buyers, the randomization was calculated in four main steps. First, each wholesaler and buyer were randomly assigned a profile with their “intrinsic characteristics”. Each buyer’s ethnic group was, of course, the buyer’s actual ethnic group. The other buyer characteristics were assigned randomly to create variation in the type of transactions. The main dimensions of variation are (1) the buyer’s “company type” was assigned from among four categories (event manager, advertising agency, conference organizer and marketing company). The idea was to pick four different types of firms that are very common in India and justify frequent orders of bulk orders on behalf of other companies. It was important to vary these profiles to avoid suspicion in the minds of the wholesalers in case of frequent interactions with people that have very similar profiles. Buyers were given business cards with the name and their “fictional” company that they owned. (2) The “pen type” was assigned from two different pen brands that are of very similar quality and price. Again this dimension was included to create variation in the type of orders that our buyers place. (3) The “number of pens ordered,” in one bulk order varied between 500 and 750 pens in increments of 50. This variation was included to test how differences in the size of the order affect the bargaining behavior of the wholesalers. (4) The “number of days to have pens held” is the time that the buyers request the bulk order to be ready. This dimension was varied to create heterogeneity between buyers. This dimension is only binding in the case of printed pens, since non-printed pens are usually available within a day. However, even for non-printed pens the delivery was collected at a later date even if the wholesaler had ready stock. (5) And finally, we assigned about half of the buyers to buy printed pens and the other half were asked to buy plain pens. For visits with printed pens the buyers were given different logos that the wholesaler would print on the pens.

The randomization also restricted the assignment of buyers based on the location of the wholesaler, which we will refer to as a “location group”. Wholesale establishments located near to one another so that wholesalers can see who is visiting a neighboring wholesaler were assigned the same location group number; on average a location group would contain 4-5 wholesalers. Buyers would not be assigned to other wholesalers in the same location group. The idea behind this constraint is that it might create awkward interactions for the buyers if a wholesaler who was previously visited sees the same buyer go to a neighboring wholesaler.

In a second step, buyers and wholesalers were randomly assigned to one another in a constrained manner. One wholesaler and one buyer were selected randomly from among the group of wholesalers and the group of buyers. The randomization program then checked that the buyer had not previously assigned to visit a different wholesaler in that same location group (to avoid the same buyer visiting neighboring wholesaler), and that the wholesaler did not have a previously assigned visit by a buyer of that same ethnicity or company type. If these conditions were met, then this buyer and wholesaler pair was declared a match and the buyer was assigned to visit that wholesaler. The information about the buyer and wholesaler’s assigned visits was updated to reflect the new match

and both buyer and wholesaler were returned to their respective common pools to be available for future random matches. Once a wholesaler received five visits it was removed from the pool of available wholesalers, while buyers with 11 visits were removed from the pool of buyers. The result of this randomization was that the 46 buyers were each assigned to visit 11 wholesalers, and each wholesaler had a range of buyer types assigned to visit it.

The third step in the randomization was to assign whether the visit was for a plain or a printed pen. Out of the five visits to a wholesaler, two were randomly selected to be plain pen visits, two were randomly selected to be printed pen visits, and the remaining visit was randomly selected to be either a plain or a printed visit. By assigning each visit to be either a printed or plain visit, based on a random stratification at the level of the wholesalers, each buyer ended up with a number of plain visits and a number of printed visits, typically 4-7 visits of each type. Finally, each printed pen visit was randomly assigned a logo to be printed on the pen.

A fourth step involved adjusting a few parameters randomly to avoid potential detection by wholesalers. Since the buyers were randomly assigned one pen type, one number of pens to be ordered, and one number of days for pick-up, by chance a few wholesalers had multiple buyers with similar profiles. It was determined that having three or four buyers request the same type of pen or the same number of days before the pick-up of the pens would not arouse suspicion. However, having three or four buyers request the same number of pens could arouse suspicion. Accordingly, for the wholesalers at which three or four buyers were set to ask for the same number of pens, we randomly selected one or two buyers to request 650 pens for their visits to this wholesaler only.

Throughout this randomization, all characteristics were assigned randomly, in either an unconstrained, constrained or stratified manner. The only aspect of the randomization that was not strictly randomly assigned was the relative timing of the visits, although there was still a great deal of randomly induced variation in this variable. For the most part, visits to different wholesalers by the same buyer were made in a random order, based on the randomly assigned characteristics of the visits. One additional step to the randomization was that some of the initial wholesalers that we had selected for the study stopped selling pens or shut down (even before a single visit was made to the wholesaler). Any visit that was originally scheduled to be to wholesaler no longer selling pens or no longer in business was replaced by a visit to an existing or a new wholesaler. Ideally each “bad” wholesaler would be replaced by one new wholesaler and all remaining visits that were scheduled for the “bad” wholesaler would go to the new replacement wholesaler. In practice, there were not enough new wholesalers to take the place of the “bad” wholesalers. With X new wholesalers available, we randomly selected X of the “bad” wholesalers to be replaced by a randomly selected new wholesaler. For the remaining “bad” wholesalers, for each visit, an existing wholesaler was randomly selected to have the visit go to that wholesaler, meaning this replacement wholesaler then would have 6 visits in total.

#### 4. Data Description

In total we conducted 494 audit visits to 106 different wholesalers by 46 different auditors, also called shoppers. The summary statistics in Panel A of Table 1 shows that the average wholesalers was visited 4.6 times with a minimum of 2 and maximum of 6 visits; the modal wholesaler receiving 5 separate visits by different buyers. The modal buyer completed 11 visits with a minimum of 6 and a maximum of 13 visits. We randomly assigned the order sizes of the purchase to the shoppers, these are even distributed between 500-750 with the most common lots being 550, 600, and 700. Panel 1 shows that the average size of an order is about 615 pens. The average order size for order of printed pens is 619 and for plain pens is 616.<sup>3</sup> To ensure that our random assignment was conducted successfully we also verified that other wholesaler and visit characteristics such as wholesaler location, time to delivery and ethnic background of the wholesalers and shoppers does not vary significantly between the printed versus non-printed orders. Panel B of Table 1 shows the statistics for the ex post renegotiation of orders. We randomly picked 75 of the shops and added one final visit where we renegotiated the order afterwards. We engaged 15 auditors for that exercise. However, each of these 75 stores only received 1 renegotiation visit, since we did not want to place an undue burden on the store.

In Table 2 we now report the average statistics for the different dimensions of the bargaining outcomes. The two most important dimensions of the contract are the price of the pens and the fraction of upfront payment that has to be made at the time of placing the order. In the case of printed pens there is an additional dimension, which is the cost of the printing. The descriptive statistics in Table 2 map out the negotiation process of the wholesaler visits. From Panel A we see that the fraction of printed to non-printed pens is roughly balanced, with 240 visits for printed pens and 254 visits for non-printed pens. The difference in the sample size stems from the fact that about 10 stores where we sent auditors to ask for printed pens were not able to do the printing and we had to drop these visits. The initial price that is offered by the wholesaler on average is Rs 5.3 for the printed pens and Rs 4.8 for the non-printed pens. This difference is not too surprising since the printing costs are around Rs 0.4. The final offer after bargaining is Rs 4.9 for the printed pens and Rs 4.5 for the non-printed. So on average the buyers receive about a 10% price reduction after bargaining. Again the spread between the two groups of pens stays constant verifying that the different in price is mainly a reflection of the printing costs. But there is wide variance around the price, with a minimum upfront price for printed pens of Rs 4 and a maximum upfront price of Rs 7.5. Similarly the final price ranges from Rs 4 to Rs 6.5. The variance for the plain pens is similar.

In the second part of Panel A we now compare the demanded upfront payments by the wholesaler across printed and plain pens. The wholesalers on average initially ask for an upfront payment of 59% in the case of printed pens but ultimately accept an upfront payment rate of 36%. It is interesting to see that only very few wholesalers demand a 100% upfront payment. In the case of plain pens wholesalers on average start with an upfront payment demand of 19% and ultimately accept an average upfront payment of

---

<sup>3</sup> Results are not reported but can be provided by the authors on request.

12%. Wholesalers demand a substantially higher upfront payment for printed pens than for plain ones. These differences in the upfront payment rate between printed and plain pens are statistically significant and make sense intuitively since the wholesaler faces more risk of holdup in case of printed pens. But again we see that there is wide variation around the mean.

## 5. Ex Ante Negotiation and Relationship Specific Investments

In a first step we now want to establish whether there are differences in the contractual structure that are negotiated between printed and plain pens purchases. If indeed printed pens require a bigger relationship specific investment as argued above, wholesalers should expect a higher possibility of holdup ex post and thus undertake steps to alleviate these risks. The most extreme form of holdup would be that the shopper does not return to pick up the order. Ideally wholesalers would then require an upfront payment of 100% to eliminate any risk of ex post holdup. However, this is not feasible since in this case the parties face a two sided holdup problem. For example, if the shopper was to pay the full amount upfront, the wholesaler could not deliver the goods on time or indeed not deliver at all. Due to this mutual holdup risk both parties will be exposed to some ex post renegotiation. However, it is safe to assume that the wholesaler has a higher reputation risk than the shopper.

To test how the specificity of the investment affects the upfront negotiation we look at two dimensions: (1) the fraction of upfront payment that is demanded between plain and printed pens and (2) the average price charged. Of course the difference in requested upfront payment reflects two separate forces: wholesalers' expectations whether they will be held up by a shopper and the wholesalers' expectation that sometimes shoppers go bankrupt or do not return and they are stuck with the merchandise. It is difficult to differentiate these two dimensions of the wholesalers' expectation. However, it is interesting to note that if wholesalers thought that the problem of investment specificity is an issue of the shopper's type (some are intrinsically more likely to default than others) then they should charge an average risk premium for printed pens to ensure that they are breaking even on average. However, if they feel that the problem is one of strategic behavior ex post, then the wholesaler will rely more heavily on upfront payments.

In Table 3 we first test whether there are significant differences in the prices that are charged for printed versus non-printed pens. As discussed before we would expect there to be a mechanical differences due to the cost of printing. However, beyond the cost difference it will be interesting to see if the market incorporates any potential default risk into the price, or whether wholesalers only use the upfront payment as a means to mitigate this risk. Columns (1) to (3) of Table 1 regresses the initial price that is offered by the wholesaler on a dummy for whether the visit was assigned plain or printed pens and controls for other characteristics of the visit such as quantity purchased (log quantity) and location of the store. Location can be important if some wholesalers are in more highly frequented areas and thus have different demand patterns than those in less central areas. In column (1) we estimate a significant difference between the printed and the plain pens, however the size of the coefficient is 0.4, which means the magnitude of the

differences is exactly in line with the cost of printing. We then repeat this regression in but include shopper and wholesaler fixed effects in columns (2) and (3). The results show that the magnitude of the coefficient on the printed dummy does not change when included these added controls. However, the adjusted R<sup>2</sup> go up significantly when including shopper and wholesaler fixed effects. Thus a large fraction of the variation is not explained by the specificity of the investment but is systematically related to the shopper and wholesalers.

In columns (4) to (6) we then repeat these regressions for the final price that the wholesaler and the shopper agree upon after negotiation. We again see that the coefficient on the printed dummy is 0.4 which means the price difference between printed and plain pens is equal to the cost of the printing. In fact, when we regress the percentage difference between the first and final offer price for the pens on the print dummy we do not find a significant difference. These results suggest that wholesalers do not charge a price premium for printed pens beyond the cost of the printing. In itself this is interesting since it suggest that any possible increased holdup risk from printed pens is not included in the price. In a competitive market this would make sense if there are other more efficient mechanisms for the wholesalers to protect themselves against holdup.

One of these mechanisms to limit the amount of ex post holdup that we observe in the wholesale market for pens is to increase the fraction of upfront payment that is requested from the shopper. Therefore in Table 4 we estimate the difference in the upfront payment that is demanded in the case of printed versus plain pens. The regressions in this table follow the set up in Table 3. In column (1) we use the fraction of upfront payment that is initially demanded by the wholesaler as the dependent variable and regress is on the print dummy and controls for the size of the order and the location. The estimated coefficient on the print dummy is 0.39 and strongly significant. This result is virtually unchanged if we include shopper and wholesaler fixed effects in columns (2) and (3). We then repeat these regressions for the final fraction of upfront payment that is agreed upon after bargaining between the shopper and the wholesaler, see columns (4) to (6). The coefficient on the print dummy now is a little smaller, 0.243, but still economically and statistically highly significant. In fact when we regress the difference in the upfront payment versus final payment on the printed dummy in column (7) we find that there is a marginally significant negative coefficient. This suggests that wholesalers are more likely to be bargained down on the upfront payment in the case of plain pens, but are less willing to be bargained down to a smaller upfront payment in the case of printed pens.

Finally we want to understand how the requested fraction of upfront payment and the agreed upon price relate to each other. In our bargaining script (and in the usual bargaining behavior of participants in the market) the parties first establish a price and then set the fraction of upfront payment. Therefore we investigate whether the demanded upfront payment is a function of the price that was agreed upon. In Table 5 we regress the upfront payment on the price level in the overall sample and add an interaction between printed and plain pens. We find a strong positive relationship between the price level and the fraction of upfront payment. This might not be surprising in the context of a holdup model since the shopper might have a higher likelihood to renege in a case where the

bargaining led to a very high price. So a higher upfront payment might be needed to avoid ex post holdup.

However, by itself it is difficult for us to differentiate this result from shopper and wholesaler specific fixed effects that lead to better or worse outcomes for the shopper or the wholesaler. While we are controlling for shopper and wholesaler fixed effects in these regressions, it is still possible that in some interactions between the two parties the shopper was more aggressive and thus got a better deal on all margins and in some interactions the wholesaler was in a better bargaining mood. However, we also split the sample into printed versus plain pens and repeat the regressions. What we see is that the positive relation between upfront payment and price level is only significant for the plain pens. This result is very interesting since in the case of plain pens, in general the wholesaler does not have a reason to demand higher upfront since the resale value is very high. However, the positive relationship suggests that the wholesaler knows that he is giving the shopper a bad deal but wants to minimize the likelihood that the shopper walks away from the deal ex-post.

## 6. Ex Post Re-Negotiation

We now turn to analyze the dynamics of ex post contract renegotiation. For that purpose we asked shoppers to do a final visit to 75 randomly selected wholesalers. We conducted an additional set of visits to avoid endogeneity in the upfront bargaining and the ex post renegotiation. For example, to understand the relationship between the renegotiation outcome and the upfront payment, we could not let the shopper bargain down the wholesaler and then look at the renegotiation outcome, since shopper-wholesaler pairs who have lower upfront payments up front may also have a different renegotiation interaction. Therefore in the last set of visits we gave each shopper a maximum limit for the final contracted percentage of upfront payment so that we can isolate the effect of the upfront payment in the renegotiation. Moreover we decided to conduct the renegotiation only in the last visit to a shop not to risk suspicion by the wholesaler.

After an initial visit where the shopper placed an order and agreed on a delivery date, the shoppers called up the wholesaler on the day of delivery to let him know that the shopper cannot honor the order in full. The explanation for the renegotiation was that the shopper's ultimate customer had just canceled the order and the shopper would not be able to take possession of the order. The shopper would then offer to buy the order at a reduced price. We chose this cover story rather than asking the shoppers to holdup the wholesaler outright, since we learned from focus group interviews with market participants that no one ever directly admits to this tactic but finds a "cover story" that sounds less aggressive. We wanted to avoid outright hostility by the wholesaler. We also chose to conduct this renegotiation over the phone to reduce any risk that there would be physical threats made against the shoppers.

### 6.1. Descriptive Statistics

Panel A of Table 6 shows that in 45% of the cases the price of the order is renegotiated. In the remaining 55% the wholesaler either refused to change the price or did not even agree to start a conversation about the price. In 15 out of the 41 cases that did not get renegotiated, the wholesaler hang up on the shopper and implicitly adopted a take it or leave it attitude in this case.

In Panel B we now report whether the wholesalers agreed to give back the upfront payments when hearing that the shopper cannot pick up the pens. We see that in none of the cases with printed pens did the wholesaler offer to return the upfront payment, but in 15 out of the 40 plain visits the wholesaler offered to return the upfront. In fact in 12 cases the wholesaler offered to give back the upfront in cash and in 3 cases they offered to give it back in kind, i.e. allow the shopper to buy something else for the equivalent amount of the upfront payment.

Finally, the first two rows of Panel C show the price difference that is achieved across all renegotiation visits including those where the renegotiation failed. In the case of a failed renegotiation we code the price change as 0. This is a strong assumption since it presumes that in case of failed renegotiation the shopper will pay the full price for the goods, which of course is not guaranteed. In fact this assumption clearly understates the size of the loss that a wholesaler would have to bear in a real world context since the likelihood of the shopper returning to pick up the goods is much lower in the case of the printed goods. But in that case the wholesalers' resale value of the pens is close to zero, while in the case of the plain pens the resale value is unaffected.

The next two rows of Panel C we describe the difference in price between the printed versus non printed pens. Printed and plain pens on average have a mean price after renegotiation of Rs. 4.5 each. However, this masks a serious difference since the cost of printing in the printed pens is about Rs 0.4 per pen – so in fact the printed pens get renegotiated to a much lower price than the plain ones. These results suggest that the bargaining position of the wholesaler and his outside options are much lower in the case of printed pens. In fact the wholesalers themselves mention in the renegotiation that they cannot use the printed pens for anything now that they have been customized. This result is also supported by the fact that the minimum renegotiated price for the plain pen does not fall below the minimum price that we observed at the contracting stage. However, the minimum price for printed pens that wholesalers agree to at the renegotiation stage is much below the minimum price that is agreed upon in the first stage negotiation. This suggests that wholesalers are prepared to make a nominal loss on the pens, since they understand that the outside option is nearly zero.<sup>4</sup>

## 6.2. Renegotiation Outcomes

To test these results on renegotiation more rigorously in column (1) of Table 7 we regress the renegotiation percentage on the printed pen dummy and shopper fixed effects. We do not include wholesaler fixed effects in these regressions since we only have one visit to

---

<sup>4</sup> We also find that the time spent in renegotiation is higher in case of printed pens. Refer to appendix A for the table.

each of the wholesalers. The coefficient on the printed dummy is economically and statistically highly significant. In the renegotiation of printed pens shoppers get a 3 percentage point higher discount on average relative to plain pens. This result confirms that wholesalers are well aware of the outside option they can charge for the goods and once the pens have been printed, their outside value is very low.

In column (2) of Table 7 we also include observable characteristics of the deal such as the upfront payment that was made at the time of contract negotiation and the price at which the deal was contracted. The coefficient on Final Upfront % is negative and significant, suggesting that wholesalers are less willing to renegotiate when they might feel that they have more bargaining power since the shopper already has paid down a large fraction of the money. In contrast the coefficient on Price contracted (the price that was negotiated upfront) is positive, which suggests that wholesalers are more likely to give a discount if the original price left them with a higher profit margin. We can infer from this result that the wholesaler's bargaining power is higher in situations where he has charged a higher upfront payment.

In columns (3) and (4) of Table 7 we now break out the sample into the renegotiations for printed versus plain visits. It is interesting to see that the coefficient on the upfront payment is negative and significant in the case of printed pens (-0.195) but is not significant and close to zero in the case of the plain pens (-0.054). If we believe that the amount of upfront payment affects the shopper's ex post bargaining power, we should expect that there is less renegotiation in cases where the shopper has a higher upfront payment since the shopper now has less "room" to holdup the wholesaler. It is interesting to see that this logic holds exactly in the case of printed pens, however, there is no effect in the case of plain pens. This suggests that the wholesalers perceive their bargaining power unaffected by the shoppers demand in the case of plain pens, since their outside option is very high.

A second dimension that might affect the renegotiation is the price that was contracted upfront. In columns (3) and (4) of Table 7 we find a significant and positive relation between the percentage discount that the wholesaler agrees to in the renegotiation and the price that is contracted upfront. However, this positive relation only holds for the sample of plain pens but is not significant in the sample of printed pens. This implies that wholesalers are only willing to renegotiate the price ex post if they were able to charge a high price for the plain pens upfront. So they might be willing to reduce the profit margin only if they are starting from a high margin. The same is not true for printed pens which implies that the wholesalers' willingness to reduce the price is independent of the upfront price. It suggests that the wholesaler understand that his bargaining power is very low since he is willing to renegotiate the price across all deals and not only those that start with a high profit margin.

### 6.3. Reverse Holdup

The last two columns of Table 7 focus on the likelihood that the shopper will get the upfront payment back during the renegotiation. As we saw before in the descriptive



statistics in Table 6 this is only offered in case of non-printed pens but it occurs in 15 out of 40 deals. Therefore we only focus on the set of plain pen renegotiations. This is a very interesting result since it suggests that a large fraction of wholesalers choose not to holdup the shopper (by withholding the upfront payment) when they have the chance (and the right) to do so.

In Columns (5) and (6) we regress a dummy for whether the wholesaler offered to refund the upfront payment on the deal characteristics, such as Final upfront %, Price contracted, Quantity of pens and Pen brand. In the regression in Column (5) we only include cases where the wholesaler did not offer to change the price. We find a strong negative correlation with the amount of upfront payment and a somewhat weaker but negative coefficient with the price that was contracted upfront. These results again suggest that the wholesaler is less willing to hold the shopper up if he has more bargaining power.

In Column (6) we repeat this regression for the sample of all plain deals. We now code those situations where the wholesaler was willing to reduce the upfront price as a zero, i.e. the shopper did not get the upfront payment back. The idea is that the wholesaler rather accepts a lower margin than letting the deal go altogether. We find the results with this sample are equivalent to those in column (5).

## 7. Conclusion

This paper uses an audit study methodology to understand how relationship specific investments affect the ex ante contract structure and ex-post resolution of the ensuing holdup problem. We randomly assign buyers to enter into contracts with wholesalers in the pen industry in India. To vary the specificity of the order, the buyers either purchase pens that are generic in nature (plain pens) or custom-printed pens (buyer asks the wholesaler to print a specific logo on the pens). We find that wholesalers use upfront payment as a mechanism to alleviate the risk of ex-post holdup. Therefore, the upfront payment acts as a way of allocating bargaining power between contracting parties. We also find that there is a lot of variation in the contract structure that is not explained by the relationship specificity of the investment.

When looking at the ex post contract renegotiation, we find that the prices are more likely to be renegotiated for printed pen purchases as compared to plain pens. Furthermore, wholesalers offer a higher discount in case of printed pens. The upfront payment that was made when entering the contract also plays an important role in the renegotiation process. Wholesalers offer a lower discount if they have received a higher upfront payment, especially in case of printed pens. Interestingly we also find that wholesalers are often willing to refund the upfront paid in cash in case of generic pens. This result is surprising since it suggests that wholesalers in a large fraction of cases do not holdup the shopper even when they have the opportunity (or even the right) to do so.

The results highlight the importance of holdup costs in contracting. While the findings confirm the predictions of models of Grossman and Hart (1988) and Hart and Moore (1990), they also raise several interesting issues. The finding that wholesalers often

refund the advance back in cash suggests that market participants do not fully exploit their bargaining power even when they have the opportunity (or even the right) to do so. Furthermore the average upfront payment demanded is low, which might imply that holdup maybe less prevalent than theory would predict. The question arises naturally whether these results reflect that even small upfront payments are an effective means to avoid holdup in most cases, or whether in general market participants rarely resort to holdup in business transaction. A natural next step in our research agenda is therefore to explore in which situation parties resort to holdup and which other factors mitigate the risk of holdup.

## References

- Acharya, V., Bharath, S., Srinivasan, A., 2007. "Does Industry-wide Distress Affect Defaulted Firms? - Evidence from Creditor Recoveries," *Journal of Financial Economics*, 85, 787-821
- Aghion, P., and Bolton, P., 1992. "An Incomplete Contracts Approach to Financial Contracting," *Review of Economic Studies*, 59, 473-494.
- Ayres, I. and Siegelman, P., 1994 "Race and Gender Discrimination in Negotiation for the Purchase of a New Car", *American Economic Review*, 85, 304-321.
- Banarjee, A., Duflo, E., 2000. "Reputation Effects and the Limits of Contracting: a study of the Indian Software Industry," *Quarterly Journal of Economics*, 115, 989-1017.
- Benmelech, E., Bergman, N., 2008. "Liquidation Values and the Credibility of Financial Contract Renegotiation: Evidence from U.S. Airlines", *Quarterly Journal of Economics*, Forthcoming.
- Bertrand, M., Mullainathan, S., 2004. "Are Emily and Greg More Employable than Lakisha and Jamal? A Field Experiment on Labor Market Discrimination" *American Economic Review*, 991-101.
- Bolton, P., and Scharfstein, D., 1996. "Optimal Debt Structure with Multiple Creditors," *Journal of Political Economy*, 104, 1-26.
- Crocker, K. J., Reynolds, K. J., 1993. "The Efficiency of Incomplete Contracts: An Empirical Analysis of Air Force Engine Procurement," *Rand Journal of Economics*, 24, 126-146.
- Grossman, S., Hart, O., 1986. "The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration," *Journal of Political Economy*, 94, 691-719.
- Hart, O., Moore, J., 1990. "Property Rights and the Nature of the Firm," *Journal of Political Economy*, 98, 1119-1158.
- Kaplan, S. N., Stromberg, P., 2003. "Financial Contracting Theory Meets the Real World: An Empirical Analysis of Venture Capital Contracts," *Review of Economic Studies*, 70, 281-315.
- McMillan, J., Woodruff, C., 1999. "Interfirm Relationships and Informal Credit in Vietnam," *Quarterly Journal of Economics*, 114, 1285-1320.
- Newmark, D., Bank, R.J., and Van Nort, K.D., 1996. "Sex Discrimination in Restaurant Hiring: An Audit Study", *The Quarterly Journal of Economics*, 111, 915-941.

Pulvino, T. C., 1998. "Effects of Bankruptcy Court Protection on Asset Sales," *Journal of Financial Economics*, 52, 151-86.

Shleifer, A., Vishny, R.W., 1992. "Liquidation Values and Debt Capacity: A Market Equilibrium Approach," *Journal of Finance*, 47, 143-66.

Williamson, O., 1988, Corporate Finance and Corporate Governance, *Journal of Finance*, 43, 567-592.

Table 1: This table presents the summary statistics of the visits. Panel A reports the summary statistics of no of visits to each wholesaler and by each shopper. Average order size per visit is the average no of pens purchased per visit. Panel B presents the summary statistics for visits of where the contract was renegotiated ex-post.

<b>Panel A</b>	Obs	Avg no of visits	Median no of visits	Std. Dev	Min no of visits	Max no of visits	Average order size per visit
Wholesalers	107	4.61	5	1.05	2	6	615
Shoppers	46	10.73	11	0.90	6	13	617

  

<b>Panel B (Renegotiation sample)</b>	Obs	Avg no of visits	Median no of visits	Std. Dev	Min no of visits	Max no of visits	Average order size per visit
Wholesalers	75	1	1	0	1	1	689
Shoppers	15	5.4	5	1.585	3	9	686

Table 2: This table presents the summary statistics of the price and the upfront payment % demanded during the visits. Initial offer is the initial price per pen (Rs.) offered by the trader. Printed pen refers to pen on which a buyer gets a customized message printed. Final rate is the final contracted rate per pen (including printing costs if any). Initial upfront % is the initial advance payment demanded by the trader as a fraction of total costs. Final upfront % is the final advance paid as a fraction of total costs. Panel B presents the summary statistics for visits of where the contract was renegotiated ex-post.

**Panel A**

<b>Price</b>	Obs	Mean	Median	Std. Dev	Min	Max
Initial offer-Printed pen	240	5.33	5.22	0.772	4.0	7.5
Final rate-Printed pen	240	4.93	4.82	0.582	4.0	6.75
Initial offer-Non-printed pen	254	4.90	4.8	0.665	3.8	6.5
Final rate- Non-Printed pen	254	4.53	4.45	0.465	3.8	6
<b>Upfront payment</b>						
Initial upfront %- printed pen	240	0.588	0.5	0.299	0	1
Final upfront %-printed pen	240	0.360	0.32	0.223	0	1
Initial upfront %-Non-printed pen	254	0.192	0	0.286	0	1
Final upfront % -non printed pen	254	0.117	0	0.202	0	1

**Panel B (Renegotiation sample)**

<b>Price</b>	Obs	Mean	Median	Std. Dev	Min	Max
Initial offer-Printed pen	35	5.15	5.25	0.606	4.0	6.5
Final rate-Printed pen	35	4.83	4.9	0.438	4.0	5.9
Initial offer-Non-printed pen	40	4.75	4.65	0.627	3.85	6.0
Final rate- Non-Printed pen	40	4.42	4.30	0.410	3.8	5.25
<b>Upfront payment</b>						
Initial upfront %- printed pen	35	0.526	0.5	0.269	0	1
Final upfront % -printed pen	35	0.232	0.24	0.087	0.08	0.41
Initial upfront %- Non-printed pen	40	0.230	0.15	0.284	0	1
Final upfront % -non printed pen	40	0.091	0.06	0.068	0	0.27

Table 3: Regressions of Initial price offered and Final price contracted

This table reports the results of OLS regressions. The dependent variables are Initial price offered per pen, Final contracted rate per pen (including printing costs if any) and Price diff where Price diff is defined as (Initial price offered –final price contracted)/ Initial price offered. Print is a dummy variable that takes the value of 1 if customized printing was done on the pen. Quantity is the log of the size of order. Location is a dummy variable that takes the value of one for wholesalers that are not located in the main street. Shopper fixed effects refer to fixed effects for each individual buyer. Shop fixed effects refer to fixed effects for each individual wholesaler. White heteroskedasticity consistent standard errors are reported in parentheses. The symbols \*\*\*, \*\*, \* indicate significance levels of 1%, 5%, and 10% respectively.

	Initial price offered			Final price contracted			Price diff
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Print	0.423*** (0.064)	0.414*** (0.064)	0.396*** (0.037)	0.403*** (0.047)	0.405*** (0.048)	0.393*** (0.027)	-0.004 (0.004)
Quantity				-0.222 (0.159)			
Location				0.176** (0.089)			
Constant	4.747*** (1.468)	4.911*** (0.041)	4.675*** (0.190)	5.765*** (1.031)	4.531*** (0.029)	4.234*** (0.158)	0.086*** (0.022)
Shopper fixed effect	no	yes	yes	no	yes	yes	yes
Shop fixed effect	no	no	yes	no	no	yes	yes
N	494	494	494	494	494	494	494
Adj-R2	0.086	0.160	0.741	0.141	0.178	0.776	0.300

Table 4: Regressions of Initial upfront offered and Final upfront contracted

This table reports the results of OLS regressions. The dependent variables are Initial upfront % offered as a fraction of total final cost of the order, Final upfront payment contracted as a fraction of the total final cost of the order and Upfront diff where Upfront diff is defined as (Initial upfront % offered –final upfront % contracted)/ Initial upfront % offered. Print is a dummy variable that takes the value of 1 if customized printing was done on the pen. Quantity is the log of the size of order. Location is a dummy variable that takes the value of one for wholesalers that are not located in the main street. Shopper fixed effects refer to fixed effects for each individual buyer. Shop fixed effects refer to fixed effects for each individual wholesaler. White heteroskedasticity consistent standard errors are reported in parentheses. The symbols \*\*\*, \*\*, \* indicate significance levels of 1%, 5%, and 10% respectively.

	Initial upfront % offered			Final upfront % contracted			upfront diff
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Print	0.395*** (0.026)	0.385*** (0.026)	0.375*** (0.026)	0.243*** (0.019)	0.244*** (0.017)	0.231*** (0.017)	-0.059* (0.033)
Quantity	-0.054 (0.091)			-0.061 (0.063)			
Location	-0.003 (0.047)			-0.017 (0.031)			
Constant	0.545 (0.591)	0.197*** (0.017)	0.385** (0.158)	0.528 (0.413)	0.116*** (0.012)	0.394*** (0.147)	0.220** (0.110)
Shopper fixed effect	no	yes	yes	no	yes	yes	yes
Shop fixed effect	no	no	yes	no	no	yes	yes
N	494	494	494	494	494	494	343
Adj-R2	0.314	0.418	0.511	0.249	0.392	0.526	0.190



Table 5: Regressions of Initial upfront % offered and Final upfront % contracted on Final price contracted

This table reports the results of OLS regressions. The dependent variables are Initial upfront % offered as a fraction of total final cost of the order, Final upfront % contracted as a fraction of the total final cost of the order. Print is a dummy variable that takes the value of 1 if customized printing was done on the pen. Price contracted is the final contracted price per pen (including printing costs if any). Shopper fixed effects refer to fixed effects for each individual buyer. Shop fixed effects refer to fixed effects for each individual wholesaler. White heteroskedasticity consistent standard errors are reported in parentheses. The symbols \*\*\*, \*\*, \* indicate significance levels of 1%, 5%, and 10% respectively.

	Initial upfront % offered			Final upfront % contracted			Final upfront % contracted	
	(1)	(2)	(3)	(4)	(5)	(6)	Printed sub-sample (7)	Non-printed sample (8)
Print	0.813*** (0.247)	0.931*** (0.235)	1.216*** (0.236)	0.338* (0.199)	0.449*** (0.174)	0.671*** (0.167)		
Price contracted	0.172*** (0.041)	0.183*** (0.038)	0.253*** (0.065)	0.114*** (0.032)	0.115*** (0.028)	0.173*** (0.048)	0.036 (0.074)	0.213* (0.108)
Print*Price contracted	-0.098* (0.053)	-0.125*** (0.050)	-0.190*** (0.050)	-0.028 (0.043)	-0.051 (0.037)	-0.103*** (0.036)		
Constant	-0.588*** (0.184)	-0.635*** (0.172)	-0.700** (0.323)	-0.402*** (0.143)	-0.406*** (0.128)	-0.349 (0.262)	0.467 (0.373)	-0.401 (0.488)
Shopper fixed effect	no	yes	yes	no	yes	yes	yes	yes
Shop fixed effect	no	no	yes	no	no	yes	yes	yes
N	494	494	494	494	494	494	240	254
Adj-R2	0.347	0.441	0.533	0.292	0.423	0.545	0.472	0.274

Table 6: This table presents the summary statistics of the visits where the contract was renegotiated ex-post. Panel A, decomposes the number of visits where the renegotiation succeeded (price was reduced) versus visits where renegotiation failed (the price was not changed) by printed/non-printed. Renegotiation Abruptly terminated refers to visits where the wholesaler abruptly ended the negotiation with the shopper (wholesaler abruptly hung-up the phone). Panel B decomposes the number of visits where renegotiation failed (the price was not changed) by whether the wholesaler agreed/refused to refund the upfront paid. Also, it reports in case of refund, whether the refund was in cash or in kind (in form of purchase of other items. Panel C reports the summary statistics of Renegotiation percentage by type of visit (printed/non-printed). Renegotiation percentage is defined as the (final contracted price per pen-price per pen after renegotiation)/ final contracted price per pen (note that final contracted price per pen is the price per pen that was agreed before renegotiation). Panel C also presents the price per pen after renegotiation for the sub-sample where the renegotiation succeeded. Printed pen refers to pen on which a buyer gets a customized message printed.

Panel A

	Obs	Renegotiation Succeeded	Renegotiation Failed	Renegotiation Abruptly terminated	Fraction Renegotiated
Printed pens	35	21	14	8	0.6
Non-printed pens	40	13	27	7	0.32
Total visits	75	34	41	15	0.45

Panel B

	No of Failed renegotiation visits	Upfront refunded (in case of renegotiation failure)	Refund in cash	Refund in kind
Printed pens	14	0	0	0
Non-printed pens	25	15	12	3

Panel C

<b>Renegotiation percentage</b>	Obs	Mean	Median	Std. Dev	Min	Max
Printed pens (including printing costs)	35	0.041	0.030	0.048	0.00	0.216
Non-printed pens	40	0.012	0.000	0.020	0.00	0.061

  

<b>Price after renegotiation</b>	Obs	Mean	Median	Std. Dev	Min	Max
Printed pens (including printing costs)	21	4.49	4.5	0.383	3.8	5.2
Non-printed pens	13	4.50	4.5	0.352	4.0	5.1

Table 7: Regressions of the magnitude of renegotiation percentage and Likelihood of getting the Upfront paid refunded

This table reports the results of OLS regressions in column 1-4. The dependent variable is Renegotiation percentage where renegotiation percentage is defined as the (final contracted price per pen-price per pen after renegotiation)/ final contracted price per pen (note that final contracted price per pen is the price per pen that was agreed before renegotiation). Column 5-6 report results of a probit (the co-efficient reported are marginal effects). The dependent variable is Upfront refund dummy which takes the value of one if the wholesaler agrees to refund the Upfront paid and zero otherwise Column 5 reports the results for the sample where the price renegotiation failed. Column 6 reports the results for the entire sample. Print is a dummy variable that takes the value of 1 if customized printing was done on the pen. Final upfront % is the final advance paid as a fraction of total cost. Price contracted is the final contracted price per pen (including printing costs if any). Quantity is the log of the size of order. Brand is a dummy for the type of pen (we have 2 brands of pen that we purchase). Shopper fixed effects refer to fixed effects for each individual buyer. White heteroskedasticity consistent standard errors are reported in parentheses. The symbols \*\*\*, \*\*, \* indicate significance levels of 1%, 5%, and 10% respectively.

	Renegotiation percentage				Upfront Refund Dummy	
	(1)	(2)	Printed sample (3)	Non-printed sample (4)	Failed Renegotiation sample (5)	(6)
Print	0.028*** (0.008)	0.029** (0.012)				
Final Upfront %		-0.134** (0.063)	-0.195** (0.079)	-0.052 (0.039)	-3.852*** (1.789)	-3.275** (1.578)
Price contracted		0.020** (0.010)	0.022 (0.018)	0.028*** (0.007)	-0.575* (0.333)	-0.808*** (0.243)
Quantity		-0.036 (0.127)	0.139 (0.154)	0.094* (0.054)	0.018 (2.367)	-0.657 (1.615)
Pen brand		-0.042 (0.060)	-0.001 (0.061)	0.035 (0.022)	-0.071 (1.030)	-0.290 (0.590)
Constant	0.012*** (0.003)	0.183 (0.863)	-0.935 (1.081)	-0.734** (0.359)		
Shopper Fixed effect	no	yes	no	no	no	no
N	75	75	35	40	25	37
Adj/Pseudo-R2	0.135	0.207	0.230	0.341	0.306	0.341

### Appendix A: Regressions of the amount of time spent in renegotiation

This table reports the results of OLS regressions. The dependent variable is Renegotiation Duration where renegotiation duration is defined as the number of minutes spent in renegotiation. Print is a dummy variable that takes the value of 1 if customized printing was done on the pen. Shopper fixed effects refer to fixed effects for each individual buyer. White heteroskedasticity consistent standard errors are reported in parentheses. The symbols \*\*\*, \*\*, \* indicate significance levels of 1%, 5%, and 10% respectively.

	Renegotiation Duration	
	(1)	(2)
Print	1.628*** (0.571)	1.718*** (0.594)
Constant	3.200*** (0.275)	3.157*** (0.341)
Shopper Fixed effect	No	Yes
N	75	75
Adj-R2	0.106	0.137