

The Unintended Consequences of Headquarters' Involvement in Decentralized Transfer Price Negotiations: Experimental Evidence

Abstract

This study investigates how headquarters involvement affects the efficiency of decentralized transfer price negotiations. Prior research assumes that decentralized managers negotiate transfer prices autonomously. However, evidence suggests that headquarters can become involved in transfer price negotiations, particularly after negotiation failure. While the intention of headquarters involvement is to overcome inefficiencies arising from decentralized managers' inability to agree on a transfer price, we suggest that such involvement is likely to have the unintended consequences of further *reducing* both agreement frequency and the efficiency of negotiated transfer pricing. Reduced agreement is likely to occur because decentralized managers are likely to feel less responsible for the negotiation outcome and may be overly optimistic about headquarters' decision. Reduced efficiency is likely to result because overconfidence is likely to make headquarters underestimate its informational disadvantage compared to decentralized managers and, consequently, induces inefficient transfer decisions. For the same reasons, inefficiency is likely to be the larger, the more decision authority headquarters takes over after negotiation failure. In an experiment, we manipulate whether headquarters involvement is absent vs. present. Nested within headquarters involvement present are two conditions: one where, after negotiation failure, headquarters suggests a transfer price that either decentralized manager can reject (weak involvement) and one where it can impose a price at which they must trade (strong involvement). Consistent with our predictions, we find that headquarters involvement reduces the frequency of negotiation agreement and the efficiency of transfer pricing. Additionally, we find that efficiency is reduced more when headquarters involvement is strong rather than weak. We contribute to the literature on negotiated transfer pricing by providing evidence about headquarters' biased perceptions of negotiation impasse and the unintended consequences of its involvement. Additionally, our study informs organizations about the benefits of committing to non-involvement in decentralized transfer price negotiations.

Keywords: Transfer price, negotiations, delegation, autonomy

JEL Classification: C90; D22; D82; M41

Data availability: Data are available from the authors upon request.

[T]he group president of the Computer Group explained how divisions in his group purchased semiconductors from divisions in two other groups: Prices for these semiconductors are derived by negotiation, essentially on an arm's-length basis between the selling division and the buying division, with a little push here and there from us [the group general managers] if necessary.

Eccles and White (1988, p. 42)

Determination of transfer-price: [...] Each MPC [Mini Profit Center] has independent discretion in their negotiations. [...] Nevertheless, when no settlement is reached through independent negotiation, their boss will intervene and arbitrate a final determination.

Monden (2012, p. 470, about the transfer pricing system at Kyocera)

I. INTRODUCTION

In decentralized organizations, decision-making authority is delegated to decentralized units. To measure their performance, organizations must establish transfer prices for the exchange of goods from one division to another (Dikolli and Vaysman 2006, Ronen and McKinney 1970). However, in large decentralized organizations, information asymmetries often exist between central headquarters and decentralized divisions and, therefore, headquarters may not have adequate information to set transfer prices that lead decentralized managers to make production, investment and purchasing decisions in the organizations best interest (Milgrom and Roberts 1992, Zimmerman 2014). An alternate approach to centrally established prices are transfer prices that are negotiated between divisions. An advantage of this method is that, in many cases, decentralized managers' nearness to local markets provides them with information about prices of inputs and outputs, giving them superior knowledge for setting transfer prices and opening up the possibility for more efficient production and purchasing decisions in the firm (Dikolli and Vaysman 2006).

Prior research on negotiated transfer pricing has assumed that decentralized managers negotiate transfer prices autonomously (e.g., Luft and Libby 1997; Kachelmeier and Towry 2002). However, as illustrated by our introductory statements and suggested in the literature (e.g., Drury 2004; Hansen and Mowen 2006), headquarters can become involved in transfer price negotiations, particularly after they have failed. This study investigates the effects of such

headquarters involvement. Specifically, we investigate how headquarters involvement affects the agreement frequency and the efficiency of negotiated transfer pricing.

In a setting where inter-divisional transfers can be either profitable or unprofitable for the firm and headquarters *cannot* become involved, decentralized managers have financial incentives to always reach agreement in the case of a profitable transfer because the transfer would maximize their respective division profits. However, prior evidence indicates that managers' biased fairness perceptions can lead to negotiation failure even if agreement was beneficial for the firm (Kachelmeier and Towry 2002; Arnold, Gillenkirch and Hannan 2016). Thus, the intention of headquarters involvement is to overcome these inefficiencies arising from decentralized managers' inability to agree on a transfer price.

We suggest, however, that headquarters involvement is likely to have the unintended consequences of further reducing both agreement frequency and the efficiency of negotiated transfer pricing. Agreement frequency is likely to decrease for two non-mutually exclusive reasons. First, either buyer or seller or both may feel that headquarters involvement will result in an outcome that is more favorable than a negotiated outcome and, therefore, may be reluctant to make concessions during negotiations (Starke and Notz 1981; Farber and Bazerman 1987). Second, headquarters involvement is likely to reduce decentralized managers' perceived responsibility for the negotiation outcome (Magenau 1983; Neale and Bazerman 1983).

Furthermore, we predict that headquarters involvement is likely to reduce the efficiency of negotiated transfer pricing and more so, the more decision authority headquarters resumes after a negotiation failure. The reason for this prediction is that, owing to its overconfidence, headquarters may over-attribute negotiation failure to the managers' unwillingness to agree on a

transfer price rather than to the unprofitability of the transfer.¹ Additionally, headquarters is likely to underestimate information asymmetries with respect to the profitability of the transfer and to overestimate its own decision making abilities. As a consequence, headquarters is likely to systematically make inefficient decisions when it becomes involved after negotiation failure. Moreover, as the negative consequences of headquarters' decisions increase, the more decision authority headquarters takes over after negotiation failure, inefficiencies are likely to increase even further when the degree of headquarters involvement increases.

We test our hypotheses in an experiment. We use a setting in which buyers and sellers, representing decentralized division managers, negotiate over the price of an intermediate good that has no external market. The seller, representing the production division, produces the intermediate good and sells it to the buyer representing the sales division. The buyer processes the good and sells the final good externally at the market price. Sellers have private information regarding the cost of the good while buyers have private information about the market price of the good. Headquarters knows neither the actual cost nor the actual market price. Transfers are profitable on average, but there are instances in which the actual production costs exceed the actual price of the good. In these cases, exchange of the good would result in a loss to the firm. If buyer and seller reach agreement on a transfer price, the transfer takes place at that price. If they fail to reach agreement, headquarters may become involved. Before headquarters chooses to intervene it receives information about the negotiation.

As a baseline condition in our experiment, we use a condition in which headquarters involvement is absent (no involvement – *NI*). In this condition, headquarters is a passive observer of the outcome of the negotiation. We compare this condition to two conditions in

¹ For ease of exposition, we use female pronouns for the seller, male pronouns for the buyer and neutral pronouns for headquarters.

which headquarters involvement is present because, as illustrated by the introductory statements, headquarters involvement may take on different degrees. Therefore, nested within headquarters involvement present, we implement two degrees of headquarters involvement that we label “weak involvement (*WI*)” and “strong involvement (*SI*)”. Under *WI*, headquarters may suggest a transfer price to division managers. Both managers must accept the suggested transfer price for the transfer to take place. Under *SI*, headquarters assumes full authority in the event of failed negotiations and determines whether the transfer is made or not and, if so, the price at which divisions must trade. In none of the conditions does headquarters have any information about the actual production costs and market prices. However, in the case of negotiation failure, headquarters receives information about managers’ final offers during the negotiation. Under *SI*, headquarters’ misattributions of negotiation failure and neglect of information content from the managers’ final offers, can lead headquarters to impose unprofitable transfers or fail to realize profitable transfers. Under *WI*, while *unprofitable* transfers are unlikely to be realized, the frequency of *profitable* transfers is likely to be negatively affected. Specifically, due to information asymmetries, headquarters might not be able to make transfer price suggestions that are beneficial for *both* decentralized managers, leading to the rejection of profitable transfers.

Consistent with our predictions, we find that headquarters involvement significantly reduces the frequency of agreement in negotiations, but negotiation agreement does not differ between weak and strong involvement. Additional analyses provide evidence that this reduction in agreement is driven, in part, by participants feeling less responsible for the negotiation outcome when headquarters involvement is present. We also find that biased views of buyer and seller about fair transfer prices affect negotiation agreement more strongly under headquarters involvement.

Consistent with our predictions, we also find that headquarters involvement significantly reduces the efficiency of negotiated transfer pricing and that the reduction in efficiency is greater

when headquarters imposes a transfer price on divisions (SI condition) compared to when she merely suggests a transfer price (WI condition). Additional analyses reveal that, due to overconfidence, headquarters attributes negotiation failure too often to managers' bargaining capabilities rather than to the possibility that trade would be unprofitable. This causes headquarters to become involved too often and leads to unprofitable transfers. Under WI, headquarters involvement leads to transfer price suggestions that are not always mutually beneficial and, thus, to the rejection of profitable transfers.

These findings have important implications for both theory and practice. From a theoretical perspective, our study contributes to the stream of research investigating frictions in transfer price negotiations and their causes (e.g., Luft and Libby 1997; Kachelmeier and Towry 2002; Arnold et al. 2016). Whereas prior research has focused on *decentralized managers* and the effects of their fairness preferences on negotiation failure, we provide evidence about *headquarters'* biased perceptions of the reasons for negotiation failure. Additionally, we inform theory about effects of misattribution and overconfidence as an important factor in delegated vs. centralized decision making in firms. As existing evidence suggests that organizations do not optimally delegate decisions (e.g., Coats and Rankin 2015; Gallo 2012), it is important to understand the reasons for this phenomenon. By providing evidence for suboptimal central decision making and its causes in a transfer pricing setting our study helps to build this stream of research (e.g., Wruck and Jensen 1994).

From a practical perspective, our study informs organizations about the benefits of committing to non-involvement in decentralized transfer price negotiations. If firms organize their activities in a decentralized way and delegate tasks because decentralized managers possess better information, any centralized interference by headquarters is associated with the risk of underestimating the value of delegation or overestimating its own decision making abilities (e.g.,

Wruck and Jensen 1994; Pfeffer, Cialdini, Hanna and Knopoff 1998). This is particularly important when headquarters not only interferes by making suggestions or giving advice but resumes decision authority for once delegated tasks. Our results suggest that firms using decentralized transfer pricing should commit to not interfere even in the event of failed negotiations. Such a course of action would motivate divisions to use their private information more efficiently resulting in greater firm profit.

The remainder of the paper is organized as follows. Section 2 describes the setting, reviews relevant literature and presents our hypotheses. Section 3 describes the experimental design. Section 4 presents the results of the experiment. Section 5 concludes.

II. HYPOTHESES

Setting

We explore how headquarters involvement affects the frequency of buyer and seller agreement and efficiency in the transfer pricing process where efficiency is defined as the difference between actual firm profit and optimal profit. Division managers work in an environment where their compensation is based on division profits and where the right to negotiate transfer prices is delegated to them. Rather than negotiating both price and quantity, we simplify the setting by holding quantity constant, so that divisions only negotiate over price. To further simplify the negotiation environment, there is no external market for the good.

An important feature of our environment is that the actual production cost of the good is private information of the production division and the final market price of the good is private information of the sales division. Also, the actual cost of the good can exceed the actual price of the good and, in these instances, exchange of the good results in a loss to the firm. Therefore, transfer price negotiations should help managers coordinate on a mutually beneficial price when

exchange is profitable and encourage them to not trade the good when the exchange is unprofitable. Prior studies on transfer price negotiations investigate settings where cost and price information is common knowledge (Arnold et al. 2016; Kachelmeier and Towry 2002; Luft and Libby 1997) and settings where this information is private (Ghosh 2000; Chalos and Haka 1990; Dejong *et al.* 1989). However, to our knowledge, there are no empirical studies on the behavior of headquarters and how their involvement affects the efficiency of the transfer pricing process.

We study three treatments in a nested experimental design in which headquarters involvement in the transfer pricing process is either present or absent. Nested within headquarters involvement present, involvement can be either weak (*WI*) or strong (*SI*). In the case of headquarters involvement absent (*NI*), headquarters is a passive observer of the outcome of the negotiation. In the *WI* condition, when negotiations fail, headquarters may suggest a transfer price to the two managers. If both managers accept the suggested transfer price, then the good is transferred at that price. If either manager rejects the suggested price, the transfer does not take place. In the *SI* condition, when negotiations fail, headquarters assumes the decision authority and decides whether to impose a binding transfer price for the sale of the good between divisions. In all conditions, headquarters observes the last offer of both the production division and the sales division prior to making transfer price decisions, but does not have any further information about the current production costs or market price.²

While past experimental studies on transfer pricing focus on decentralized division managers and their actions in the transfer pricing process, our study includes central headquarters and investigates how their potential involvement influences the transfer pricing process.

Headquarters involvement has some similarities to having an arbitrator or mediator whose role is

² As explained in more detail below, we ensure through our experimental procedures that the negotiating parties cannot make concessions during the negotiation but then decrease (buyer) or increase (seller) their offers towards the end of the negotiation in order to make the final offers less informative for headquarters.

to either suggest or impose an outcome when negotiation fails and, consequently, some behavioral regularities from this research apply as well in our setting. Headquarters involvement in transfer price negotiations however differs from mediation and arbitration in some important points. First, arbitration and mediation are typically initiated by the negotiators who also determine the mediator/arbitrator's role and, prior to negotiations, whether her decision will be binding or not (Farber and Bazerman 1987). In contrast, in an organizational setting, headquarters has the authority to assume the role of a third party, decides whether its decisions are binding and establishes other negotiation parameters. Second, mediators and arbitrators usually have no monetary stake in the outcome of the negotiation while headquarters is the residual claimant of the transfer decision. Finally, while the settings examined in the mediation and arbitration literature usually treat a situation in which agreement either has to be found or can only be positive for both parties (e.g., Notz and Starke 1978; Bazerman and Neale 1982; Magenau 1983; Bazerman et al. 1992), the overarching goal of transfer pricing is to achieve coordination, i.e., to make the transfer when it is profitable and to not make the transfer when it is unprofitable.

Hypotheses

Agreement Frequency

There are several reasons why headquarters involvement in the setting of transfer prices may reduce the likelihood that the divisions reach an agreement on a price during negotiations. First, numerous studies on arbitration and mediation demonstrate that anticipation of third-party intervention has a “chilling” or “narcotic” effect on the bargaining process (Wirtz 1963, Starke and Notz 1981, Magenau 1983, Neale and Bazerman 1983). This effect can arise due to two related ways in which the potential of third-party involvement affects the expectations and behavior of negotiators. First, if either buyer or seller or both feel that headquarters involvement

will result in an outcome that is more favorable than a negotiated outcome, they may make more extreme demands and be more reluctant to make concessions during negotiations (Starke and Notz 1981, Magenau 1983, Farber and Bazerman 1987). Second, when there is a possibility that headquarters will determine the transfer price, managers may feel less responsibility for the final outcome (Bigoness 1976, Notz and Starke 1978, Starke and Notz 1981, Neale and Bazerman 1983). Reduced feeling of responsibility for the outcome of transfer pricing negotiations may also decrease the efforts of the managers to reach agreement during negotiations.

Finally, there is an informational/strategic reason why anticipation of headquarters involvement may reduce the frequency of agreement during negotiations. In the event that headquarters chooses to intervene when negotiations fail, they observe each division's last offer prior to making a transfer price decision. Hence, making concessions during negotiations is risky in the sense that it provides headquarters information regarding production costs and market prices. This may encourage managers to make more extreme initial offers or make fewer concessions during negotiations in an attempt to influence the final transfer price in their favor. These arguments lead to our first hypothesis.

H1a: Headquarters involvement in negotiated transfer pricing reduces the frequency of agreement between divisions during negotiations.

Next, we discuss division managers' potential negotiation incentives and strategies under WI and SI. Under both forms of headquarters involvement, when making concessions during negotiations, division managers must weigh the costs and benefits of reaching an agreement and failing to reach an agreement. Since headquarters observes each division's last offer, offers and counteroffers can be used both as an attempt to reach agreement and as a way to influence a suggested or imposed transfer price if an agreement is not reached. Under WI, a manager can always reject a transfer price that results in a loss. Under SI, it is possible that an imposed

transfer price creates a loss for one or both divisions. Compared to WI, this makes failure to reach an agreement riskier under SI. *Ceteris paribus*, this may lead to less agreement during negotiations under WI.

However, it is possible that managers may be more motivated to influence transfer prices under SI since headquarters can impose a price that buyer and seller are unable to reject. This could lead to managers' reluctance to make concessions during negotiations. For instance, arbitration research shows that when participants agree *ex ante* to allow an arbitrator to choose an outcome in the event of failed negotiations that negotiators tend to be biased in their views that the arbitrator chooses an outcome in their favor. Extant research demonstrates that such bias leads to less agreement during negotiations (Carnevale and Pruitt 1992).

In summary, some arguments suggest stronger motivations for division managers to reach agreement under SI compared to WI whereas other arguments suggest less willingness to make concessions or accept offers under SI than under WI. Therefore, we leave this issue as an empirical question and state Hypothesis H1b in its null form:

H1b: There will be no difference in the frequency of agreement under weak headquarters involvement and strong headquarters involvement.

Efficiency of Transfer Pricing

Next, we argue that headquarters involvement in transfer price negotiations reduces the efficiency of the transfer pricing process. As discussed above, we expect headquarters involvement to reduce the frequency that divisions reach agreement during negotiations. A reduction in the frequency of negotiation agreement and the reliance on headquarters, however, can have negative effects on efficiency because headquarters generally possesses limited information about the current costs and prices. As a consequence, headquarters suggested or imposed transfer prices are unlikely to consistently maximize firm profit. Under SI, this means

that headquarters could transfer unprofitable goods or not transfer profitable goods. Under WI, unprofitable transfers may be avoided, but if the suggested transfer price results in either division incurring a loss, it will be rejected regardless of whether it is profitable for the firm. This reduces efficiency when exchange would result in a profit for the firm.

Headquarters' overconfidence is likely to exacerbate this negative effect of information asymmetry.³ Specifically, headquarters overconfidence can affect efficiency in two ways: First, when negotiation fails, headquarters does not know if the failure is due to the fact that the cost exceeds the price or if it is attributable to the managers' bargaining behavior. Owing to headquarters' overconfidence in its own capabilities relative to the managers' (Merkle and Weber 2011), headquarters, however, likely underestimates managers' willingness to reach an agreement and likely over-attributes negotiation failure to the managers' bargaining tactics. Second, paired with headquarters' overconfidence in her ability to make good transfer decisions, headquarters generally is likely to become involved into the negotiations too often and to neglect or ignore information from the managers' bargaining behavior. This exacerbates the effect of information asymmetry. Such behavior is consistent with prior evidence of the effects of overconfidence on managers' investment decisions (e.g., Billett and Qian 2008; Malmendier and Tate 2005) and on individuals' use of information (e.g., See, Morrison, Rothman and Soll 2011; Block and Harper 1991).

These arguments suggest that information asymmetries paired with headquarters' overconfidence are likely to lead to inefficient transfer prices and transfer decisions and, therefore, are likely to decrease the efficiency of transfer price negotiations. Moreover, if headquarters is consistently overconfident in its ability to make good transfer decision, these

³ Studies in economics and psychology show that people tend to be overconfident in their beliefs and judgements in a variety of contexts (Russo and Schoemaker 1992, Camerer and Lovo 1999) leading DeBondt and Thaler (1995) to state that, "Perhaps the most robust finding in the psychology of judgment is that people are overconfident."

effects are likely to be stronger under SI than under WI because headquarters has more decision authority under SI and division managers cannot reject non-profitable transfers. That is, headquarters' overconfidence is more costly under SI than under WI. Thus, we expect that headquarters involvement decreases efficiency of negotiated transfer pricing but the reduction in efficiency is larger under strong than under weak headquarters involvement. We state these predictions formally as H2a and H2b.

H2a: Headquarters involvement in negotiated transfer pricing reduces the efficiency of the transfer pricing process.

H2b: Strong headquarters involvement in negotiated transfer pricing leads to less efficiency than weak headquarters involvement.

III. METHOD

Overview and Design

The experimental task involves a production manager (seller), a sales manager (buyer) and headquarters. Buyer-seller dyads negotiate over the price of an intermediate good.⁴ If agreement is reached, the seller transfers the good to the buyer who sells it externally at the market determined price. If buyers and sellers do not reach agreement, headquarters may become involved in the transfer of the good. As the production costs can vary between 1 and 500 and the market price can vary between 100 and 600, the transfer of the good can either be profitable (if $\text{market price} \geq \text{production costs}$) or non-profitable (if $\text{market price} < \text{production costs}$).

We use a nested experimental design in which we vary headquarters involvement in the transfer pricing process—present vs. absent. Nested within headquarter involvement present, we manipulate the degree of headquarters involvement—weak involvement (*WI*) vs. strong

⁴ In the experiment, the terms *sales manager* and *production manager* were used. For consistent exposition, we will continue to use the labels buyers and sellers.

involvement (*SI*). This design results in three experimental conditions depicted in Figure 1. A third (within participants) factor is period, as the experiment lasted six periods. At the beginning of each period, buyer and seller are re-matched such that they are not matched with the same counterpart more than once. Headquarters is also randomly re-matched to buyer and seller dyads. Participants are informed of this procedure. Our primary dependent variables are the frequency of negotiation agreement (H1a and H1b) and the efficiency of the transfer pricing process in the firm (H2a and H2b).

--- Insert Table 1 about here ---

In the headquarter involvement absent (*NI*) condition, while there is an experimental participant in the role of headquarters, headquarters is not permitted to take any action. Therefore, in this condition, headquarters does not directly influence the negotiation or the transfer of the good between the two managers. In contrast, in the two headquarters involvement present conditions, headquarters can decide to take actions when negotiations have failed. In the *WI* condition, when headquarters is informed of failed negotiations, it may suggest a transfer price to the two managers. The suggested price can be any whole number between the minimum production cost (\$1) and the maximum market price (\$600). If both buyer and seller accept the suggested transfer price, then the good is transferred at that price. If either manager rejects the suggested price, the transfer does not take place. Note that headquarters is *not required* to suggest a transfer price. In the *SI* condition, when informed of failed negotiations, headquarters assumes the decision authority and determines whether the transfer is made or not and, if so, the price at which divisions must trade. Like in the *WI* condition, headquarters is free to decide whether it wants to set a transfer price when the negotiation fails but is not required to do so.

We did not require headquarters to suggest or set a transfer price in the *SI* and *WI* conditions in order to enable the same solution in the *SI* and *WI* conditions as in the *NI* condition.

In the NI condition, buyer and seller always have an incentive to agree to a transfer price when trade is efficient because it increases *joint* buyer and seller profit and not to trade the good when the trade is inefficient because it would decrease *joint* buyer and seller profit. If headquarters did not make any transfer price suggestions in the SI and WI conditions the situation for buyer and seller would be identical to the NI condition and, consequently, they would have incentives to always reach agreement when the transfer of the good is profitable. However, as outlined above, headquarters is unlikely to abstain from becoming involved once the negotiation fails.

The information headquarters receives regarding the negotiations between buyer and seller is the same in all three conditions. When negotiations succeed, headquarters is informed of the agreed upon transfer price and that the good is transferred. When the negotiation fails, headquarters is informed of the last offer each manager made in the course of the negotiation. Finally, headquarters is also informed of cases where either the buyer or seller does not make any offer, but there is no such case in the experiment. We implemented this design feature because it is very likely that in practice, headquarters is informed of the buyer's and seller's final offers in the negotiation when transfer price negotiations fail. The fact that headquarters receives this information was common information in the experiment.

Experimental task

Each period, buyers and sellers have three minutes (180 seconds) to negotiate the transfer price for a good. Every manager can break off the negotiation at any time. We did not include any monetary negotiation costs for the participants. This design feature represents a conservative design choice with respect to negotiation break offs and negotiation failures.

Each period, negotiation starts with the buyer making the first offer. The buyer's first offer can be any amount from the minimum production cost of 1 to the maximum market price of 600. The seller can either accept the initial offer or make a counteroffer. The seller's initial counteroffer

can be any amount from the minimum production costs of 1 to the maximum market price of 600. Until an offer is accepted or a manager ends the negotiation process, negotiations proceed with the two managers making alternating offers. Importantly, when making a new offer, the buyer is not allowed to make an offer that is less than his previous offer. Likewise, when the seller makes a new offer, it cannot be greater than her previous offer. We implement this design choice because, as explained above, headquarters receives information about the buyers' and sellers' last offers in the negotiation and buyers and sellers should not be able to strategically change their offers towards the end of the negotiation. However, either manager can always make the *same* offer as the previous offer. Similarly, either manager can end the negotiation at any time. Managers are also not required to make an initial offer if they choose not to negotiate. Participants' computer screens include a timer so that they can track the time remaining for negotiations.

As explained above, if the buyer and seller fail to reach an agreement, headquarters may become involved. Participants are informed that the firm wants managers to make decisions that will result in maximum profit for the firm and that, as an incentive to do so, division managers are paid based on their own division profit and the headquarters manager is paid based on firm profit.

The cost of the intermediate good is uniformly distributed on $\{1, 2, \dots, 500\}$ and the market price of the final good is uniformly distributed on $\{100, 101, \dots, 600\}$. Cost and price distributions are common information to buyers, sellers and headquarters. From these distributions, the theoretical frequency of a profitable transfer is 68 percent.⁵ Prior to negotiations, the seller learns the actual cost and the buyer learns the actual price. Sellers never learn the actual market price and

⁵ Prior to the experimental sessions, we randomly generated six sequences of six costs (one for each period) for the sellers and six sequences of six prices (one for each period) for the buyers. To facilitate comparisons across conditions, the same six cost and six price sequences are used in each session. The mean cost across all six periods was 245.11 and the mean price was 354.61. The actual frequency of profitable transfers in the experiment is 69.4 percent.

buyers never learn the actual production cost. Headquarters learns about the actual firm profit in the case of the transfer but never learns the actual cost or actual price. Thus, no participant could infer the exact earnings and profits of the other parties. We decided to keep up the information asymmetry after the negotiation in order to minimize any carry-over effects between periods.

At the end of the period, the computer displays whether the transfer is made or not. If the transfer is made, the computer also displays to all participants the transfer price. Regardless of the outcome, the division managers are informed about their respective division profits and the headquarters' manager is informed about the firm profit. Then the next period begins.

Compensation

In every period, buyers, sellers and headquarters receive a fixed wage of 30 points. Additionally, buyers and sellers receive 20 percent of their respective division profits and headquarters receives 10 percent of the firm's profit. Buyers' and sellers' share in their respective division profits are twice as high as headquarters' share in the firm profit because on average, division profit equals half of the firm profit. Division profits and firm profit are determined by whether the transfer is made, and if so, the negotiated transfer price. So, when the intermediate good is transferred, payoffs are summarized as follows:

$$\text{Buyer's compensation} = 30 + 20\% \times (\text{Actual Market Price} - \text{Transfer Price})$$

$$\text{Seller's compensation} = 30 + 20\% \times (\text{Transfer Price} - \text{Actual Cost})$$

$$\text{Headquarters' compensation} = 30 + 10\% \times (\text{Actual Market Price} - \text{Actual Cost})$$

If the transfer does not take place, both division profits and firm profit equal zero and each manager receives only the fixed wage of 30 points. To guarantee independence of the periods and to avoid wealth effects, one period in the experiment is randomly selected as the payment period. In case the division or firm profit is negative, the negative variable part of the

compensation is deducted from the fixed wage of 30 but the total pay from the experiment cannot become negative. Participants' cash earnings are determined by converting their experimental points from the randomly selected period into cash at the rate of \$0.50 per point.

Participants and Procedures

A total of 162 undergraduate students from a large public US university participated in the experiment. We conducted three sessions for each condition with 18 participants in each session. The number of participants in each condition is included in Figure 1. Each student participated in only one session. The mean age of the participants is 20.4 years and 46 percent of participants are female.

At the start of each session, participants were provided with written instructions and were informed of their randomly assigned role of buyer, seller or headquarters. Instructions were read aloud by one of the experimenters. To ensure that all participants understand the experiment, they were required to complete a pre-experiment quiz, and the experiment did not begin until all of them had answered all questions correctly.

Then, the six periods of the experiment started. As explained above, buyers, sellers and headquarters were randomly re-matched each period. Participants were separated by partitions and interacted anonymously through a computer network. The experiment was programmed with z-tree experimental economics software (Fischbacher 2007). At the conclusion of the six periods, participants completed a post-experiment questionnaire. They received their cash payments and were dismissed. Experimental sessions lasted approximately 80 minutes. Participants, on average, earned \$25 from the experiment.

Measures

Our primary dependent variable to test H1a and H1b is the frequency of agreement, *FREQAGREE*, between buyer and seller. *FREQAGREE* is an indicator variable that is equal to 1 when the two parties reach agreement during the negotiation and 0 when the negotiation fail.

Our dependent variable for H2a and H2b is the efficiency of transfers made in the firm. We use two measures to capture our theoretical construct. First, we use the frequency of efficient transfer decisions, *FREQEFF*. *FREQEFF* is an indicator variable equal to 1 when the transfer decision is efficient, i.e., when the transfer is made in the case of a profitable trade (market price \geq production cost) or when the transfer is *not* made in the case of a non-profitable trade (market price $<$ production cost). *FREQEFF* is equal to 0 when the transfer decision is inefficient, i.e., when the transfer is *not* made in the case of a profitable transfer or when the transfer *is made* in the case of a non-profitable transfer.

Additionally, we analyze the efficiency loss to the firm, *EFFLOSS*. *EFFLOSS* measures by how much the current firm profit deviates from the optimal firm profit in the current period. That means, *EFFLOSS* is equal to zero when the transfer decision is efficient. In contrast, when the transfer would be profitable but no transfer is made, *EFFLOSS* equals the value of the exchange for the firm (Market Price – Production Costs) as this profit was not realized. Similarly, if the transfer is non-profitable but was made, *EFFLOSS* equals the loss for the firm implied by this transfer (Production Costs – Market Price). Thus, in contrast to *FREQEFF*, *EFFLOSS* also captures the magnitude of inefficient transfer decisions.

To understand why headquarters involvement may decrease the efficiency of transfer price negotiations it is also important to understand how headquarters reacts in the case of negotiation failure and how successful they are in their decisions. Therefore, for the two conditions with potential headquarter involvement, we calculate the frequency with which headquarters becomes involved after negotiation failure, *FREQ_INVOLVE*. Additionally, to measure the efficiency of

involvement, we also calculate the frequencies of transfers after negotiation failure both in the case of *profitable* transfers (FREQTRANS_VAL) and in the case on *non-profitable* transfers (FREQTRANS_NONVAL).

IV. RESULTS

Descriptive Statistics

Panel A of Table 1 reports descriptive statistics for our primary dependent variables. First, it shows that the buyers and sellers reach agreement less often when headquarters is potentially involved in the negotiation. Specifically, the frequency of agreement, FREQAGREE, decreases from 67.59 percent in the headquarters involvement absent condition to 47.22 percent in the headquarter involvement present conditions. This finding represents initial evidence in favor of H1a predicting that buyers and sellers find less agreement in the negotiation when headquarters may potentially be involved in the negotiation. Additionally, Table 1 shows that within headquarters involvement present conditions, the differences in FREQAGREE between the WI and the SI conditions are small (WI: 50.00 percent vs. SI: 44.44 percent). Obviously, the degree of headquarter involvement does not seem to strongly affect agreement in transfer price negotiations. Consequently, H1b about the differences in negotiation agreement between WI and SI stated in its null form is unlikely to be rejected.

--- *Insert Table 1 about here* ---

Turning to the efficiency of transfers, Table 1 shows that, consistent with the prediction of H2a, efficiency decreases in the headquarters involvement present conditions. Specifically, the frequency of efficient trade, FREQEFF, decreases from 85.19 percent when headquarters involvement is absent to 74.07 percent when headquarters involvement is present. Moreover, the mean efficiency loss, EFFLOSS, increases from 18.01 when headquarters involvement is absent

to 34.48 when headquarters involvement is present. These findings provide first evidence in favor of H2a.

When comparing transfer efficiency in the two headquarters involvement present conditions, Table 1 shows that efficiency is lower when headquarters involvement is strong than when it is weak. First, FREQEFF decreases from 79.63 percent when involvement is weak (WI) to 68.52 percent when involvement is strong (SI). Second, EFFLOSS increases from 25.07 in the WI condition to 43.89 in the SI condition. Both findings are in line with H2b.

Additionally, Panel B of Table 1 provides initial evidence about the sources of inefficiencies in the headquarters involvement present conditions. First, it shows that headquarters becomes involved and makes transfer price suggestions in the majority of the cases after negotiation failure (FREQINVOLVE). In the WI condition, headquarters makes a transfer price suggestion in all but one case (FREQINVOLVE = 98.14 percent). In the SI condition, headquarters determines a transfer price (combined with a transfer of the good) in 61.67 percent of the cases. This finding is consistent with our underlying reasoning for H1a that headquarters is unlikely to abstain from becoming involved in the case of negotiation failure. Panel B also provides evidence of the reasons why the efficiency is lower in the SI condition than in the WI condition. While in the case of *profitable* transfers, the frequency of transfers in both conditions is similar (FREQTRANS_VAL, WI = 50.00 percent vs. SI = 60.00 percent) the frequency of transfers is much lower in the WI than in the SI condition when transfers are *non-profitable* for the firm (FREQTRANS_NONVAL, WI = 3.85 percent vs. SI = 63.33 percent). These findings illustrate that in the SI condition, headquarters seems to overestimate their decision quality in the cases of negotiation failure but—as illustrated by similar values for FREQTRANS_VAL (60 percent) and FREQTRANS_NONVAL (63 percent)—are in fact unable to distinguish between a profitable and non-profitable transfers. In contrast, in the WI condition, headquarters

involvement is less risky as buyer and seller can still reject the suggested transfer price. But, simultaneously, the fact that after negotiation failure, transfers that would be profitable for the firm occur with a frequency of only 50 percent ($FREQEFF_VAL = 50$ percent) suggests that headquarters may have had problems suggesting a mutually beneficial transfer price.

Hypotheses Tests

For our hypotheses tests, we use mean observations per participant over all periods. That is, instead of treating multiple observations per participant as independent observations, we calculate means for the relevant variables for each participant and use this observation. This procedure yields 18 observations per condition.

H1a predicts that agreement frequency is lower when headquarters can become involved. H1b is stated in its null form and predicts no effect of the degree of headquarters involvement on agreement frequency. We test H1a and H1b jointly in a regression analysis. The dependent variable is $FREQAGREE$. The independent variables are involvement (coded as 1 in both conditions where headquarters involvement was present and -2 when headquarters involvement was absent) and strong involvement | involvement (coded as 1 in the SI condition, as -1 in the WI condition and as 0 in the NI condition) nested in involvement. These variables correspond to the contrast weights implied by a nested ANOVA (Field 2013, chap. 11). We use a regression instead of an ANOVA as a Levene test indicates a violation of the assumption of homogeneity in variances between conditions. To control for heteroscedasticity, we use the Huber-White estimator in the regression. The results are reported as Model 1 in Table 2.

--- Insert Table 2 about here ---

As displayed in Table 2 (Model 1), the effect of headquarters involvement on the frequency of negotiation agreement, $FREQAGREE$, is significantly negative ($-0.0679, p <$

0.001).⁶ This result supports H1a. In contrast, the table also shows that the degree of involvement (weak or strong) does not have a significant effect on FREQAGREE ($-0.0278, p = 0.372$). Thus, we are unable to reject H1b. These results suggest that the main driver of negotiation failure in transfer price negotiations is headquarters involvement per se but the degree of headquarter involvement only seems to have minor effects.

H2a predicts that the efficiency of the outcome of transfer price negotiations decreases with headquarters involvement. Furthermore, H2b predicts that the decrease in efficiency is stronger under SI than under WI. We test our hypotheses in two regressions using the frequency of efficient trades, FREQEFF, and the efficiency loss, EFFLOSS, as the two alternative dependent variables to measure the (in-)efficiency of negotiation outcomes. Again, we use involvement and strong involvement | involvement as the independent variables. The results are reported as Model 2 (FREQEFF) and Model 3 (EFFLOSS) in Table 2.

As reported in Model 2, the effect of headquarters involvement on the frequency of efficient trades, FREQEFF, is significantly negative ($-0.0370, p = 0.004$). Additionally, the effect under SI is significantly stronger than under WI ($-0.0556, p = 0.012$). Similarly, Model 3 reports that the effect of headquarters involvement on the efficiency loss, EFFLOSS, is significantly positive ($5.4907, p = 0.013$) and that the effect on EFFLOSS is again stronger under SI than under WI ($9.4074, p = 0.022$). These results support both H2a and H2b.⁷

Supplemental Analyses

Responsibility for Negotiation Result and Biased Expectations about Negotiation Outcome

⁶ We use one-tailed p-levels for directional predictions and two-tailed p-levels otherwise.

⁷ We reran the regression analyses (EFFLOSS: Tobit regression, FRQAGREE and FREQEFF: Logit regressions) using disaggregated data rather than mean observations per participant. To control for multiple observations within participant we cluster the standard error on the participant level. Additionally, we include a period variable to control for time effects. All statistical inferences with respect to our hypotheses tests remain the same. Additionally, we find a significantly positive time effect on negotiation efficiency. However, this time the effect seems to be driven by low efficiency in period 1. Removing this period and rerunning the regression analyses removes any significant time effect but, again, all statistical inferences with respect to our hypotheses remain the same.

In the hypothesis development of H1a and H1b, we argued that headquarters involvement is likely to decrease managers' perceived responsibility for the negotiation outcome. The post-experiment questionnaire asked participants how responsible they felt with respect to (i) negotiation agreement and (ii) the transfer of the good (on a 7-point Likert scale from 1 (not at all) to 7 (very much)). Results show that perceived responsibility is significantly lower in the conditions with headquarters involvement present than in the condition with headquarters involvement absent (negotiation agreement: 4.74 vs. 5.44, Wilcoxon, $p = 0.009$; transfer of the good: 4.56 vs. 5.11, Wilcoxon, $p = 0.026$, both one-tailed). In contrast, perceived responsibility is not significantly different between the WI and SI conditions (negotiation agreement: 4.86 vs. 4.61, Wilcoxon, $p = 0.552$; transfer of the good: 4.64 vs. 4.47, Wilcoxon, $p = 0.678$). These results provide evidence for the theory underlying H1a and H1b and are consistent with our findings on *FREQAGREE* in the tests of H1a and H1b.

Additionally, we argued that buyer or seller may be biased in their views that headquarters involvement will result in an outcome that is more favorable than a negotiated outcome. To examine managers' biases, we asked buyer and seller on the post-experiment questionnaire to indicate the fair transfer price when production costs are 1 and the market price is 400. If buyers and sellers expect headquarters to include fairness criteria in their final judgment, their responses likely reflect biased expectations about headquarters' decision. As expected, we find that sellers' on average perceive a slightly higher transfer price to be fair than the buyers (212.15 vs. 202.64). For each negotiation dyad, we calculate the difference between seller's and buyer's indicated transfer price. The larger this difference, the more biased are buyer's and seller's views on the transfer price and the larger may be the conflict in the negotiation. We then regress negotiation agreement (1/0) on this variable separately for headquarters involvement absent and present. Consistent with our theory, we find that the negative effect of the difference in indicated transfer

prices is stronger in the headquarters involvement present conditions ($\beta = -0.0051, p = 0.02$, one-tailed) than in the NI condition ($\beta = -0.0012, p = 0.23$, one-tailed). When combining all conditions in one regression, the interaction between the difference in indicated transfer prices and an indicator variable for involvement (equal to 1 when headquarters involvement is present) is marginally significantly negative ($\beta = -0.0038, p = 0.10$, one-tailed). These results show that biased views on transfer prices have a stronger effect on negotiation agreement when headquarters involvement is present than when it is absent.

Headquarters Involvement and Success of Involvement

In the theory development, we argued that headquarters is likely to become involved in the negotiation instead of accepting the negotiation outcome because, due to overconfidence, it is likely to make false attributions of negotiation failure. As reported above, we find that in the WI condition, the frequency of headquarters involvement after negotiation failure (FREQINVOLVE) is 98 percent, and in the SI condition, headquarters determines a transfer price in 62 percent of the cases of negotiation failures. Consistent with our conjecture that headquarters makes wrong attributions of negotiation failure, both frequencies are significantly higher than the frequency of profitable projects in the case of negotiation failure (52 percent in the WI condition, $\chi^2 = 46.07, p < 0.001$; 50 percent in the SI condition, $\chi^2 = 3.72, p = 0.036$, both p 's one-tailed). However, as buyer and seller can still reject the transfer price suggestion, headquarters involvement is less risky in the WI condition.

This decreased risk is illustrated by the following result. When the transfer is *unprofitable*, the transfer is made in only one out of 26 cases (FREQTRANS_NONVAL = 0.0385) in the WI condition but in 19 out of 30 cases (FREQTRANS_NONVAL = 0.6333) in the SI condition. This difference is highly significant ($\chi^2 = 21.47, p < 0.001$).

Analyzing the frequency of efficient transfers after negotiation failure when the transfer would be *profitable* for the firm (FREQTRANS_VAL), however, reveals that headquarters involvement in the *WI* condition is also not without costs. Specifically, FREQTRANS_VAL only amounts to 50 percent, half of the optimum frequency of 100 percent. This relatively low frequency is due to headquarters' inability to suggest transfer prices that are mutually beneficial. Specifically, when the project is profitable for the firm, the transfer price suggestions from headquarters is not beneficial for one of the two parties in 46.43 percent of the cases, and consequently, the good is not transferred. Moreover, consistent with our conjecture that headquarters' overconfidence inhibits headquarters' successful involvement, we also find that the likelihood of making a mutually beneficial transfer price suggestion in the *WI* condition decreases in our measure of headquarters' overconfidence ($\beta = -0.085$, $p = 0.036$, one-tailed).⁸

The difficulty for headquarters in suggesting a mutually beneficial transfer price can also explain differences between the *NI* condition and the *WI* condition. When testing the differences of our overall efficiency measures between the *NI* and the *WI* conditions in a Tobit regression analysis, the comparison is directionally consistent with the prediction of lower efficiency in the condition with involvement but not statistically significant at conventional levels (FREQEFF: $\beta = -0.44$, $p = 0.135$, one-tailed; EFFLOSS: $\beta = 44.29$, $p = 0.149$, one-tailed). However, when splitting the profitable transfer along the median into high and low profit transfers and re-running the regression analysis separately, we find that efficiency is significantly lower in the *WI* condition than in the *NI* condition for low profit transfers (FREQEFF: $\beta = -0.81$, $p = 0.070$, one-tailed; EFFLOSS: $\beta = 54.51$, $p = 0.068$, one-tailed), but not significantly different for high profit transfers (FREQEFF: $\beta = -0.51$, $p = 0.135$, one-tailed; EFFLOSS: $\beta = 93.09$, $p = 0.318$, one-

⁸ This measure will be explained in detail in the next section.

tailed). Clearly, the closer cost is to price, the more difficult it is for headquarters to make transfer price suggestions that are mutually beneficial.

Headquarters' Use of the Information Content of Final Negotiation Offers

Finally, in the theory development of H2b, we argued that under SI, headquarters' overconfidence prevents them from using information from the negotiation efficiently and makes them attribute negotiation failure to incorrect causes, leading to inefficient transfer decisions. Evidence reported above about the relation between *FREQINVOLVE* and the frequency of profitable transfers in the case of negotiation failure (62 percent vs. 50 percent) provided initial evidence that this is the case. Similarly, the result that headquarters involvement is slightly less when transfers are *profitable* (*FREQTRANS_VAL* = 0.60) than when they are *unprofitable* (*FREQTRANS_NONVAL* = 0.63) shows that headquarters overestimated its decision abilities. To further support our theory, we will now analyze the information content of the final negotiation offers and headquarters' use of it in the SI condition.

First, we investigate whether the final negotiation offers that were reported to headquarters in the case of negotiation failure are informative about whether the transfer is profitable or not. Specifically, we analyze whether the likelihood of a profitable transfer increases as the difference between the final seller and buyer offers narrows. Therefore, we regress an indicator variable *VALUE* (equal to 1 when the transfer is profitable and 0 when the transfer is non-profitable) on the difference between the last seller and buyer offers. We use a probit model and include period fixed effects to control for time effects. We cluster standard errors to account for multiple observations within participant. The results are included in Table 3 (Model 1). As reported in the table, we find a significantly negative effect of the difference between the last seller and buyer offers on *VALUE* ($\beta = -0.0058, p = 0.001$, two-tailed). Thus, the smaller the distance between the last offers, the greater was the likelihood of a profitable transfer.

--- Insert Table 3 about here ---

Second, we analyze whether headquarters included this information into their decision to become involved and to make the transfer in the SI condition by regressing an indicator variable INVOLVE (equal to 1 when headquarters decided to become involved after negotiation failure and 0 when it decided not to become involved) on the difference between the last offers. Results are included in Table 3 (Model 2). As shown in the table, we do not find any significant relationship between the two variables ($\beta = -0.0008$, $p = 0.568$, two-tailed). Thus, headquarters did *not* effectively include the information from the last offers into their decisions about the transfer. This result provides further evidence consistent with the theory underlying H2b.

Third, to analyze the effect of headquarters' overconfidence in more detail, we use a measure from our post-experiment questionnaire. On the questionnaire, we asked participants which rank they thought they would have (from 1 to 18) if we ranked all participants in the room with respect to the average number of points they reached in all periods. Then, we subtract this indicated rank from their actual rank. The more positive this measure, the higher is participants' overconfidence about their ability to make good judgments and decisions in the experiment (Dunning, Meyerowitz and Holzberg 1989). We find that, on average, headquarters participants are overconfident (mean overconfidence = 1.37, median overconfidence = 2) in their ability to gain a high profit from the experiment. We use this measure to construct an indicator variable HIGH_OVERCONF based on a median split of the participants (HIGH_OVERCONF equal to 1 when overconfidence is larger than or equal to 2 and 0 when overconfidence is smaller than 2). Then, we regress INVOLVE on HIGH_OVERCONF on the difference between final offers and the interaction between both variables. The results are reported in Table 3 (Model 3). Our underlying theory suggests that headquarters participants who are *more* overconfident (HIGH_OVERCONF equal to 1) will use the information implied by difference between the

final buyer and seller offers less than participants who are *less* overconfident (HIGH_OVERCONF equal to 0). This relation would imply a positive interaction coefficient. As reported in Table 3, we find that the interaction term is positive and significant ($\beta = 0.0056$, $p = 0.005$, one-tailed), consistent with our theory. The coefficient of the difference between final seller and buyer offers, reflecting the coefficient for the low overconfidence group, is significantly negative ($\beta = -0.0031$, $p = 0.096$, two-tailed). This result implies that the subgroup of low overconfidence participants seems to have used the information implied by the difference in final offers in the right direction. However, the coefficient is still only about half as strong as the coefficient in Model 1 indicating the information content. In contrast, a χ^2 -test subsequent to the regression indicates that the high overconfidence group reacts to the difference in last offers even in the *wrong* direction ($-0.0031 + 0.0056 = 0.0025$, $\chi^2 = 3.74$, $p = 0.053$, two-tailed).

Finally, we test whether, as a consequence, the efficiency of the transfer decreases in headquarters' overconfidence. Therefore, we regress FREQEFF and EFFLOSS on HIGH_OVERCONF in the cases of negotiation failure. In both cases, we find a significant effect on efficiency (FREQEFF: $\beta = -0.8677$, $p = 0.019$, one-tailed; EFFLOSS: $\beta = 72.38$, $p = 0.078$, one-tailed). Together, these results provide evidence for our theory underlying H2b.

V. CONCLUSION

Our study investigates whether headquarters involvement in decentralized transfer price negotiations reduces the frequency of negotiation agreement and the efficiency of the transfer pricing process. While prior literature has assumed that decentralized managers negotiate transfer prices autonomously and has focused on effects of fairness preferences on transfer price

negotiations (e.g., Luft and Libby 1997; Kachelmeier and Towry 2002), we focus on headquarters' potential involvement when negotiations fail and their perceptions of negotiation failure.

We investigate our research questions in an experiment. In our setting, buyers and sellers, representing decentralized division managers, negotiate over the price of an intermediate good without an external market. Sellers have private information regarding the production cost of the good while buyers have private information about the market value of the good. Headquarters knows neither the actual cost nor the actual market price. Transfers are profitable on average, but there are instances in which the actual costs exceed the actual price of the good. It would thus be desirable for the firm to transfer the good whenever it is profitable and to not transfer the good when it is unprofitable. If buyer and seller reach agreement on a transfer price, the transfer takes place at that price. If they fail to reach agreement, headquarters may become involved.

We study three conditions in a nested design. As a baseline setting, we use a condition in which headquarters involvement is absent, i.e., headquarters is a passive observer of the outcome of the negotiation. We compare this condition to two conditions with headquarters involvement present but different degrees of involvement labeled “weak involvement (WI)” and “strong involvement (SI)”. Under WI, headquarters may suggest a transfer price to division managers. Both managers must accept the suggested transfer price for the transfer to take place. Under SI, headquarters assumes full authority in the event of failed negotiations and determines whether the transfer is made or not and, if so, the price at which divisions must trade.

Consistent with our theory, we find that headquarters involvement reduces the frequency of agreement in negotiations but that negotiation agreement does not differ between weak and strong involvement. Additionally, we find that involvement reduces the efficiency of the transfer pricing mechanism. Moreover, we predict and find that the reduction in efficiency is greater when headquarters imposes a transfer price on divisions (strong involvement) compared to when

headquarters merely suggests a transfer price (weak involvement). Supplemental analyses reveal that, due to overconfidence, headquarters attributes negotiation failure too often to managers' bargaining capabilities rather than to the possibility that trade would be unprofitable. This causes headquarters to become involved too often and leads to unprofitable exchanges. Moreover, under WI, headquarters involvement leads to transfer price suggestions that are not always mutually beneficial and, thus, to the rejection of profitable transfers.

Our findings have important implications for both theory and practice. From a theoretical perspective, our study contributes to the stream of research investigating frictions in transfer price negotiations and their causes (e.g., Luft and Libby 1997; Kachelmeier and Towry 2002; Arnold et al. 2016) by informing it about the role and perceptions of headquarters as an important player in transfer pricing. Moreover, we add to the research on delegated vs. centralized decision making in firms (e.g., Coats and Rankin 2015; Gallo 2012) by providing evidence about the influence of overconfidence on suboptimal central decision making.

From a practical perspective, our study informs organizations of the benefits of committing to non-involvement into decentralized transfer price negotiations. Our results suggest that if organizations organize their activities in a decentralized way and delegate tasks because decentralized managers possess better information, organizations should commit to not interfere even in the event of failed negotiations. Such course of action would motivate divisions to use their private information more efficiently, resulting in greater firm profit.

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FIGURE 1

Experimental Design and Number of Participants

Headquarters involvement absent (NI)	Headquarters involvement present	
	Weak involvement (WI)	Strong involvement (SI)
n = 54	n = 54	n = 54

Note: n = number of participants.

TABLE 1
Mean, *Standard Deviation* (Number of Observations) for Key Measures
and Number of Observations by Treatment

	Headquarters involvement absent (NI)	Headquarters involvement present Total involvement	Weak involvement (WI)	Strong involvement (SI)
Panel A: Agreement and Efficiency Measures				
FREQAGREE	.6759	.4722	.5000	.4444
	.4702	.5004	.5023	.4992
	(108)	(216)	(108)	(108)
FREQEFF	.8519	.7407	.7963	.6852
	.3569	.4392	.4046	.4666
	(108)	(216)	(108)	(108)
EFFLOSS	18.01	34.48	25.07	43.89
	53.65	69.85	60.64	77.12
	(108)	(216)	(108)	(108)
Panel B: Headquarter involvement after negotiation failure				
FREQINVOLVE	N/A	.7895	.9814	.6167
	N/A	.4095	.1361	.4903
	N/A	(114)	(54)	(60)
FREQTRANS_VAL	N/A	.5517	.5000	.6000
	N/A	.5017	.5092	.4983
	N/A	(58)	(28)	(30)
FREQTRANS_NONVAL	N/A	.3571	.0385	.6333
	N/A	.4835	.1961	.4901
	N/A	(56)	(26)	(30)

Notes: Every cell displays the mean, *standard deviation* and (number of observations) for the corresponding measure.

FREQAGREE is the frequency of negotiation agreement.

FREQEFF is the frequency of efficient transfer decisions. A transfer decision is efficient when the transfer was made in the case of a profitable transfer (market price \geq production cost) or when the transfer was *not* made in the case of a *non*-profitable transfer (market price < production cost).

EFFLOSS measures by how much the current firm profit deviates from the optimal firm profit.

FREQINVOLVE is the frequency of headquarters involvement.

FREQTRANS_VAL is the frequency of transfers after negotiation failure in the case of profitable transfers.

FREQTRANS_NONVAL is the frequency of transfers after negotiation failure in the case of non-profitable transfers.

TABLE 2
Effects of Headquarters Involvement of the Frequency of Agreement,
the Frequency of Efficient Trade and the Efficiency Loss

Coefficient (p-level)	Model 1 FREQAGREE	Model 2 FREQEFF	Model 3 EFFLOSS
Constant	0.5401 (<0.001)***	0.7778 (<0.001)***	28.9907 (<0.001)***
Involvement	-0.0679 (<0.001)***	-0.0370 (0.004)***	5.4907 (0.013)**
Strong involvement Involvement	-0.0278 (0.372)	-0.0556 (0.012)**	9.4074 (0.022)**
R ²	0.2633	0.2029	0.1565
N	54	54	54

Notes: N indicates the number of observations. The regressions use mean observations per participant over all periods. To control for heteroscedasticity, standard errors are estimated using the Huber-White estimator. p-values are one-tailed for directional predictions and two-tailed otherwise.

*, **, and *** represent significance levels of 10 percent, 5 percent, and 1 percent, respectively.

Involvement is coded as 1 in both conditions where headquarters involvement was present (WI and SI) and -2 when headquarters involvement was absent). Strong involvement | involvement is coded as 1 in the SI condition, as -1 in the WI condition and as 0 in the NI condition. These contrast weights applied in the two variables correspond to the contrast weights implied by a nested ANOVA.

FREQAGREE is the frequency of negotiation agreement.

FREQEFF is the frequency of efficient transfer decisions. A transfer decision is efficient when the transfer was made in the case of a profitable transfer (market price \geq production cost) or when the transfer was *not* made in the case of a *non*-profitable transfer (market price < production cost).

EFFLOSS measures by how much the current firm profit deviates from the optimal firm profit.

TABLE 3

Information Content of Final Seller and Buyer Offers and Headquarters' Use of it

Coefficient (p-level)	Model 1 VALUE (0/1)	Model 2 INVOLVE (0/1)	Model 3 INVOLVE (0/1)
Constant	.5926 (.180)	0.5234 (0.161)	1.1302 (0.014)**
Difference between last buyer and seller offers	-0.0059 (0.001)***	-0.0008 (0.568)	-0.0031 (0.096)*
HIGH_OVERCONF			-1.1263 (0.082)*
Difference between last buyer and seller offers *HIGH_OVERCONF			0.0056 (0.005)***
Period fixed effects	<i>Included</i>	<i>Included</i>	<i>Included</i>
Pseudo R ²	0.2318	0.0070	0.0839
N	60	60	60

Notes: N indicates the number of observations. The probit regressions use only observations from the strong involvement (SI) condition in which negotiations failed. The regressions use standard errors clustered at the participant level to control for multiple observations within participant and include period fixed effects to control for time effects (not reported). p-values are one-tailed for directional predictions and two-tailed otherwise.

*, **, and *** represent significance levels of 10 percent, 5 percent, and 1 percent, respectively.

VALUE is an indicator variable equal to 1 when the transfer is profitable and 0 when the transfer is non-profitable.

INVOLVE is an indicator variable equal to 1 when headquarters decided to become involved after negotiation failure and 0 when it decided not to become involved.

Difference between last buyer and seller offers is the difference between the final offers made by buyer and seller during the negotiation in case negotiation failed.

HIGH_OVERCONF is an indicator variable equal to 1 when overconfidence is larger than or equal to 2 and 0 when overconfidence is smaller than 2