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DOES FACT-FINDING PROMOTE SETTLEMENT?

THEORY AND A TEST

by

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DOES FACT-FINDING PROMOTE SETTLEMENT?

THEORY AND A TEST

David L. Dickinson and Lynn Hunnicutt

ABSTRACT

Some labor negotiations include a break in which a non-binding recommendation is made by a fact-finder as an intermediate dispute resolution procedure. There is some uncertainty, however, as to whether this fact-finding increases or reduces the likelihood of settlement. Inasmuch as fact-finding reduces uncertainty about the outcome, it may “chill” bargaining and increase the need for additional dispute resolution procedures. On the other hand, the fact-finder’s recommendation may give the parties a focal point around which they are able to craft an agreement, thus reducing the incidence of disputes. Which of these effects dominates is a question that we consider using both a theoretical model and data from a controlled experimental bargaining environment.

JEL Codes: C78, C92, J52

JEL key words: bargaining, experiments, dispute resolution, arbitration

DOES FACT-FINDING PROMOTE SETTLEMENT: THEORY AND A TEST*

1. Introduction

Dispute resolution is of interest in a variety of bargaining environments, from labor relations to insurance. Commonly used forms of dispute resolution include mediation and arbitration. While a mediator imposes no binding settlement, an arbitrator imposes a settlement that is typically binding and non-appealable. Fact-finding falls somewhere in between these two by allowing the fact-finder to issue a non-binding formal recommendation that may guide and/or pressure disputants as to what a mandated settlement might look like. For example, Hebdon (2001) reports that a chief aim of the public policy change in New York state in 1991 was to “give more weight to the fact-finder recommendations” (p. 74). Here, we ask whether non-binding recommendations, such as those issued by fact-finders, significantly affect dispute rates and/or bargaining outcomes. We offer a simple theoretical extension from existing research as well as empirical data generated in a controlled laboratory bargaining environment to explore relevant issues.¹

Farber and Katz (1979) study bargainer incentives under conventional arbitration and show that uncertainty about the arbitrator’s notion of a fair settlement is a key variable that increases the bargainers’ contract zone (i.e., the region of outcomes mutually preferred to the disputants’ reservation values or threat points).² To the extent that fact-finding decreases

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¹Ashenfelter et al. (1992) examine incentives under “tri-offer” arbitration, where an arbitrator is constrained to choose as a settlement either one of the disputant’s final offers or the recommendation of a fact-finder. We examine a fundamentally different issue by considering arbitrators who place positive *fixed* weight on the fact-finder recommendation in determining an otherwise unconstrained final settlement. Hebdon (2001) highlights that there are currently no theoretical models of fact-finding.

²Conventional arbitration refers to the set of arbitration rules that allow the arbitrator to craft any settlement seen as appropriate. This is in contrast to what is referred to as final-offer arbitration, where the arbitrator is constrained to choose one of the disputants’ final offers as the binding settlement. For an analysis of final offer arbitration, see Farber (1980). For an early article relating uncertainty to settlement rates, and for the development of the rules for final offer arbitration, see Stevens (1966).

uncertainty, their results suggest that fact-finding is *counterproductive* towards good-faith bargaining because decreased uncertainty also decreases the size of the contract zone.³ An alternative view of fact-finding is that the formal recommendation creates a focal point for the disputants, a settlement that suggests itself as a likely and reasonable outcome of the bargaining process, and therefore makes agreement more likely.⁴ Which of these effects may dominate is the key subject of this paper.

We model fact-finding as an intermediate step in negotiations prior to conventional arbitration.⁵ Fact-finders issue an unbiased nonbinding recommendation for settlement. The final stage arbitrator forms his own notion of a fair settlement and crafts a final binding settlement as a (common knowledge) weighted average of his own notion and the fact-finder recommendation. This framework allows us to consider scenarios in which an arbitrator or final decision maker places little or much weight on the recommendation, and we model the effects of such weighting on the contract zone both before and after the fact-finder recommendation.⁶

³Researchers are not unanimous in the belief that a larger contract zone makes negotiated settlements more likely (Crawford (1982), Farber and Bazerman (1987)). However, there is a fair amount of theoretical and empirical research showing that larger (smaller) contract zones generate more (less) efficient bargaining (e.g., Tracy (1986, 1987), Crampton (1992), Ashenfelter et al (1992), Babcock et al (1995), and Farber, Neale and Bazerman (1990)).

⁴There is a large literature on focal points in game theory. The seminal work for focal points in bargaining environments are Schelling (1957, 1960). For theoretical treatment of focal points (also known as salience) in coordination games, see Sugden (1995), Bacharach (1993), and Janssen (2001).

⁵Given our particular framework, our results are not completely comparable with empirical results from statutes that settle public sector disputes with fact-finding *or* arbitration (but would not use both should fact-finding fail).

⁶For example, the 1960's Taylor Law for public sector employees in New York State includes formal fact-finding in dispute resolution, with the fact-finder recommendation being presented at final resolution of the dispute should the recommendation itself not produce a settlement (see Pegnetter (1971)). Karper (1994) notes that public sector fact-finding includes examples in which the fact-finder is influential and non-influential. McKelvey (1969) notes that fact finding may be used to economize on legislators' time (i.e., *influential* fact finding). However, McKelvey also predicts that legislative bodies in New York would largely ignore recommendations as they grew in sophistication, and Karper (1994) finds evidence that this did occur in at least some government sectors (e.g., *non-influential* fact

We find that, contrary to the uncertainty hypothesis of Farber and Katz (1979), fact-finding reduces the likelihood of dispute. That is, our experimental subjects negotiate their own settlements more frequently when a fact-finding break is included than they do when dispute resolution is with binding arbitration but no fact-finding. This lends support to our focal point hypothesis - that the fact-finder's recommendation makes a particular outcome "salient" and gives the parties some basis for agreement. Additional support for the focal point hypothesis is found by examining "extreme" recommendations; our evidence suggests that even when a non-influential fact-finder makes an extreme recommendation it is likely that negotiated settlement will be near the recommendation.

We use the term "fact-finding" because it is a well-known form of dispute resolution that uses nonbinding recommendations as a key tool to pressure disputants towards settlement. However, our results have implications for any bargaining situation in which there is an intermediate-stage recommendation that can be given more or less weight by a final stage binding decision-maker. An example from legal proceedings is the use of a Special Master appointed by a Judge, such as in the Microsoft anti-trust case.⁷ Also, criminal cases often include the recommendation of a probation officer in the sentencing phase, and a social worker report in a juvenile case is also likely to include recommended actions.

2. Theory

The model extends Farber and Katz (1979) to include two bargaining stages, with a break in bargaining for a fact-finding process. As in their model, we consider two parties *A* and

finding). Hebdon (2001) reports general success of fact finding in New York State through the 1990's.

⁷This example was given to us by Caryn Beck-Dudley.

B bargaining over a fixed amount of money - the “pie” (\$1, say). Party A plays the role of the buyer or the firm in labor negotiations. Party B is the seller or the union in labor negotiations.

Each player’s utility depends on the fraction of the dollar she receives, as well as her risk preferences, parameterized by c_a and c_b . In particular

$$U_B = \frac{1 - \exp(-yc_b)}{1 - \exp(-c_b)} \quad \text{and} \quad U_A = \frac{1 - \exp(-zc_a)}{1 - \exp(-c_a)}$$

where y is the amount player B receives, and z is the amount that player A receives. For both players these utility functions display positive marginal utilities with respect to the size of the pie, $U(0)=0$, $U(1)=1$, and risk preferences are defined solely by $-c_i$ for $i=a,b$, the Arrow-Pratt measure of absolute risk aversion (see Farber and Katz (1979)). As such, player i is risk-averse (loving) when $c_i < (>) 0$. Notice that we may see $y < 1-z$ if the players agree on a non-Nash equilibrium division of the dollar.⁸

Bargaining proceeds as follows: each disputant is free to make any offer she likes to the other disputant at any time. Bargaining continues until agreement is reached or the disputants reach an impasse in the first stage of bargaining, at which point a fact finder makes a recommendation to the parties about a fair settlement. After some second interval, if the parties have not yet reached agreement, an arbitrator resolves the dispute by issuing a binding settlement. This binding settlement is modeled as a weighted average of the arbitrator’s notion of a fair outcome and the fact-finder recommendation, and the weights are common knowledge.

In particular, the arbitrator settles the dispute as follows:

$$y = \gamma R + (1 - \gamma) D \tag{1}$$

⁸Nash equilibrium requires that there be no money left on the table once bargaining is complete. Our experimental environment allows *only* Nash equilibrium division of the pie.

where y is the amount the arbitrator awards to player B , R is the fact-finder's recommendation about what player B should receive, γ is the weight the arbitrator puts on the fact-finder's recommendation, and D is the arbitrator's estimate of what a fair settlement for player B would be. We assume that D is a normally distributed random variable, with mean y_d and variance σ^2 . The players may have different beliefs about the arbitrator, however, so that player B (A) expects to receive y_{bd} (z_{ad}) with variance σ_b^2 (σ_a^2). Notice that the weight γ ranges between zero and one. When $\gamma = 0$, the fact-finder recommendation is completely ignored by the arbitrator, and if $\gamma = 1$, all uncertainty about the game's arbitrated outcome is resolved once the fact-finder makes his recommendation. In this case, the fact-finder is equivalent to the arbitrator. The more interesting cases occur when γ is strictly between zero and one, which is assumed from here on.⁹

2.1 The Contract Zone After Fact-Finding

There are two stages of bargaining: before the fact-finder makes his recommendation (*ex ante*) and after the fact-finder's recommendation is known but before the arbitrator's final decision (*ex post*). Straightforward calculations yield the following certainty equivalents (the least player B would accept to avoid arbitration, y_{bs} , and the most player A would give up to avoid arbitration, y_{as})

$$y_{bs} = \gamma R + (1 - \gamma) y_{bd} + \frac{1}{2} c_b (1 - \gamma)^2 \sigma_b^2$$

$$y_{as} = \gamma R + (1 - \gamma) y_{ad} - \frac{1}{2} c_a (1 - \gamma)^2 \sigma_a^2$$

Notice that ex-post uncertainty is reduced by the fact-finder's recommendation, since both players know that γR makes up part of the arbitrated settlement. In fact, as γ approaches one, uncertainty disappears once the fact-finder's recommendation is known.

⁹An interesting extension would make γ a function of the fact-finder recommendation. For example, γ could be modeled as an increasing function of the reasonableness of the recommendation to the arbitrator.

As before, $y_{aS} \neq y_{bS}$ is possible, since the parties may have different ideas about what the arbitrator's preferences are. For example, if both players are optimistic, then they expect to obtain more than the arbitrator is actually willing to give them. In this case, we would see $y_{bd} > y > y_{ad}$, which (depending on risk attitudes) could lead to $y_{bS} > y > y_{aS}$.

Equation (2) gives the ex post contract zone, Δ_{ffep} .

$$\begin{aligned}\Delta_{ffep} &= y_{aS} - y_{bS} \\ &= (1-\gamma)(y_{ad} - y_{bd}) - \frac{1}{2}(1-\gamma)^2(c_b\sigma_b^2 + c_a\sigma_a^2)\end{aligned}\quad (2)$$

There are two determinants of the contract zone: (1) the bargainers' beliefs about the arbitrator (given by $y_{ad} - y_{bd}$, σ_a^2 and σ_b^2), and the bargainer's attitudes toward risk (given by c_a and c_b). Farber and Katz (1979) demonstrate the contract zone without a fact-finder (equivalent to $\gamma = 0$) is given by $\Delta = y_{ad} - y_{bd} - \frac{1}{2}(c_b\sigma_b^2 + c_a\sigma_a^2)$. The presence of a fact-finder, given risk-averse bargainers, makes the ex post contract zone smaller than the no fact-finder contract zone, as the effect of bargainer beliefs about the arbitrator and of risk aversion are reduced by $1 - \gamma$ and $(1 - \gamma)^2$, respectively. This result is intuitive, since the fact-finder gives the parties some knowledge of what the arbitrator's decision will be.

Furthermore, the more weight the arbitrator puts on the fact-finder's recommendation (i.e., the larger is γ), the more the size of the contract zone is reduced after the fact-finder's recommendation. In particular,

$$\Delta - \Delta_{ffep} = \gamma(y_{ad} - y_{bd}) - \frac{1}{2}\gamma(2-\gamma)(c_b\sigma_b^2 + c_a\sigma_a^2).$$

If the parties have the same beliefs about the arbitrator (i.e., $y_{bd} = y_{ad}$ and $\sigma_a^2 = \sigma_b^2 = \sigma^2$), we may write this difference as $\Delta - \Delta_{ffep} = -\gamma(2-\gamma)\sigma^2(c_b + c_a)/2$, which is positive (negative) as

the parties are jointly risk-averse (loving). That is, the presence of a fact-finder reduces the size of the ex post contract zone as long as the parties are jointly risk-averse ($c_b + c_a < 0$).

2.2 The Contract Zone Before Fact-Finding

We next examine the ex ante contract zone, Δ_{ffea} , and see how it compares to Δ_{ffep} and Δ . Suppose that (as Hebdon (2001) suggests) the fact-finder comes from the same pool of candidates as the arbitrator, but their decisions are independent. We may then assume that R (the fact-finder's recommendation) has the same mean and variance as D , that is y_{ad} and σ_a^2 for bargainer A , and y_{bd} and σ_b^2 for player B . Straightforward calculation yields the following certainty equivalents:

$$y_{bS} = y_{bd} + \frac{1}{2} c_b \sigma_b^2 \{\gamma^2 + (1-\gamma)^2\} \quad y_{aS} = y_{ad} - \frac{1}{2} c_a \sigma_a^2 \{\gamma^2 + (1-\gamma)^2\}$$

As before, we know that player A would be willing to give up y_{aS} to avoid bargaining, so that the contract zone is given by $y_{aS} - y_{bS}$. Thus, we see that

$$\Delta_{ffea} = (y_{ad} - y_{bd}) - \frac{1}{2} (c_b \sigma_b^2 + c_a \sigma_a^2) (\gamma^2 + (1-\gamma)^2) \quad (3)$$

By comparing the ex ante and ex post contract zones we find

$$\Delta_{ffea} - \Delta_{ffep} = \gamma (y_{ad} - y_{bd}) - \frac{1}{2} \gamma^2 (c_b \sigma_b^2 + c_a \sigma_a^2) \quad (4)$$

which depends both on the parties' beliefs about the fact-finder ($y_{ad} - y_{bd}$) and on their degree of risk aversion (c_b, c_a). Assuming identical beliefs about the distribution of fact-finder preferences (i.e., $y_{bd} = y_{ad}$ and $\sigma_a^2 = \sigma_b^2 = \sigma^2$), equation (4) reduces to

$$\Delta_{ffea} - \Delta_{ffep} = -\gamma^2 \sigma^2 (c_b + c_a) / 2$$

which is positive (negative) as the parties are jointly risk averse (loving). That is, the ex ante contract zone is larger (smaller) as the parties are jointly risk averse (loving). Assuming risk

aversion, as seems reasonable, we see that the added uncertainty makes the contract zone larger before the fact-finder recommendation than after.

Comparing the ex ante contract zone with the no-fact-finder contract zone, we see that

$$\begin{aligned}\Delta - \Delta_{ffea} &= \frac{1}{2}(\gamma^2 + (1-\gamma)^2 - 1)(c_b \sigma_b^2 + c_a \sigma_a^2) \\ &= \gamma(\gamma - 1)(c_b \sigma_b^2 + c_a \sigma_a^2)\end{aligned}$$

Assuming identical beliefs about the arbitrator,

$$\Delta - \Delta_{ffea} = \sigma^2 \gamma(\gamma - 1)(c_b + c_a)$$

which is positive (negative) as the parties are jointly risk averse (risk loving). If parties are jointly risk averse, fact-finding reduces the contract zone even before the recommendation. The recommendation (if it is reached) reduces the size of the contract zone even further.

Figure 1 summarizes the relationship between Δ , Δ_{ffea} , and Δ_{ffep} as functions of γ for the identical expectations case assuming joint risk aversion ($c_a + c_b < 0$). In addition to the relative sizes of the contract zones it is also the case that the ex ante contract zone is symmetric about $\gamma = 1/2$ with the least uncertainty, and hence the smallest contract zone, at $\gamma = 1/2$.¹⁰ It is actually quite intuitive that this is the case because the bargainers have the most diversified portfolio in terms of expected ex ante outcomes when $\gamma = 1/2$, since neither the arbitrator nor the fact-finder draw is more heavily weighted.

Figure 1 about here

3. The Experimental Environment

The experimental environment uses a computer interface to randomly and anonymously match subjects - disputant A (the buyer) and disputant B (the seller) - with a counterpart for

¹⁰Note that in the identical expectations case $d\Delta_{ffea} / d\gamma = (1 - 2\gamma)\sigma^2(c_b + c_a)$, which is zero at $\gamma = 1/2$.

twenty 3-minute rounds, with subjects bargaining over the value of a variable, x .¹¹ Disputant A is given a payoff sheet that shows cash experimental earnings increasing as x decreases, whereas disputant B's payoffs increase in x . Each subject is aware that counterpart earnings move opposite his/her own earnings, but the subjects are unaware of the level of counterpart payoffs for different values of x . Thus, subjects are aware that their own gain is their counterpart's loss, but payoff levels are private information to simulate the real world asymmetry that exists in assessing the value your bargaining counterpart places on the object of negotiations. Given this, our environment is one in which the exact size of the contract zone is uncertain.¹² The disputants bargain in each round over a \$2.00 pie which (unknown to the disputants) would be equally split at $x=500$. Each one-unit increase in x increases (disputant B) or decreases (disputant A) payoffs by one-half cent.

Communication is not allowed during the experiment other than the numeric messages transmitted through the subjects' computer terminals. Disputants are free to exchange numeric offers any way they desire. There is no stipulation that offers must "improve" upon previous offers or wait for counteroffers. The standing (most recent) offer of either disputant is displayed at the top of the offer queue, and either disputant can accept his/her counterpart's standing offer.

¹¹ The experimental environment is motivated by the design of Ashenfelter et al (1992), and is an extension of the bargaining-with-arbitration application used in Dickinson (2001).

¹² Additionally, subjects may not make offers outside of their bargaining range. Disputant A is instructed to bargain for $x \in [200, 700]$, and disputant B for $x \in [300, 800]$. The theoretical predictions are silent as to the effects of this detail, but it is meant to improve the validity of the data since real-world bargainers would likely not have full information on their counterpart's target range. Further, asymmetric ranges should help avoid a simple 50-50 split outcome (an issue mentioned in Ashenfelter et al. (1992), though they deal with it in a different way).

Subjects proceed at their own pace through on-screen instructions that explain in detail all aspects of the experimental bargaining environment. Sample bargaining screens are displayed to the subjects in the general instructions to highlight these important details.

There are 4 distinct treatments (5 rounds of each) that the subjects face across their 20 bargaining rounds.¹³ In one treatment subjects are allowed to bargain for the entire 3-minute round and, should they reach the end of the round without agreeing on the size of x , payoffs to both disputants are zero. We call this treatment NA (no arbitration), and it serves as a useful benchmark for treatments in which arbitration and or fact-finding is utilized at impasse.

In the CA (conventional arbitration) treatment without fact-finding, impasse is handled at the end of the bargaining round by making a draw from a $N(500,60)$ distribution of potential arbitrator settlements (see Ashenfelter et al (1992) for a use and justification of the form of controlling the arbitrator decision-making process for experimental purposes). The draw determines the x -settlement and therefore the payoff of the disputants in that round. Subjects are given information in the CA specific instructions as to what likely settlements would be should they invoke the computerized arbitrator ("decision-maker" to the subjects). Specifically, subjects are shown a table of 100 numbers drawn from the arbitrator distribution. Additionally, the subjects are shown a graph of the arbitrator distribution along with summary statistics describing its central tendencies. While the table of 100 numbers provides subjects with data as they might gather them in the field, there is concern that the subjects might not process the data similarly (see Dickinson (2001), Babcock & Olson (1992), Farber & Bazerman (1987)). The additional

¹³Subjects were unaware that 5 rounds of each treatment would be completed, which helps control for strategic play across multiple rounds. Also the specific ordering of the treatments varied for different bargaining pairs (although each treatment consisted of five consecutive rounds) - this was to control for potential ordering effects.

graph and summary statistics are meant to increase the likelihood that subjects have a common perception of the arbitrator settlement distribution as is assumed by the theory.

We also include two fact-finding treatments, which vary the amount of weight that the end-of-the-round arbitrator places on the fact-finder recommendation (referred to as the “computer suggestion” to the subjects). At the end of 1.5 minutes of the 3-minute bargaining round, the round is interrupted and subjects are shown a recommendation from the computerized fact-finder. Subjects are aware that the suggestion is not binding but will be incorporated into an end-of-round final settlement should negotiations fail for the remainder of the round. Bargaining then resumes for the final 1.5 minutes of the round as usual. In one treatment, FF(20%), a 20% weight is placed on the recommendation and an 80% on the computer’s own draw from the arbitrator settlement distribution. The final treatment, FF(80%), proceeds similarly except with an 80% weight on the fact-finding recommendation and a 20% weight on the computerized arbitrator. The process is explained thoroughly and with numeric examples in the on-screen instructions prior to a set of fact-finder treatment rounds, and the weight to be placed on any fact-finder recommendation should negotiations fail is common knowledge prior to negotiations.

It should be noted that while real-world negotiations are usually face-to-face, we have described anonymous, no-communication experiments. Our reasoning is that face-to-face communication would imply a loss of control over the bargaining environment.

“...[U]ncontrolled aspects of social interaction” (Roth (1995)) are a concern in such face-to-face negotiations as they cannot be as easily quantified as other demographic variables. As such, we have chosen to remove these potentially confounding factors from the experimental

environment.¹⁴ The external validity of experimental data may also be a concern. There is, however, some support for the use of simple lab negotiation data towards a broader purpose of understanding naturally-occurring bargaining environments (see Bolton and Katok (1998) and Roth et al. (1988), e.g.) when such experiments involve economically motivated subjects.

3.1 Testable Hypothesis in the Experimental Environment

Farber and Katz (1979) suggest that reduced uncertainty makes sincere bargaining more difficult and would likely increase dispute rates.¹⁵ Since the fact-finder reduces uncertainty about the arbitrated outcome, negotiated settlements should occur less frequently after the fact-finder's recommendation is known than before. Additionally, since the presence of a fact-finder reduces even the size of the *ex ante* contract zone, negotiated settlements should be less frequent when conventional arbitration includes a fact-finding break than when it does not. These two predictions suggest that the proportion of negotiated outcomes should be smaller for rounds which include a fact-finding break, and that where a fact-finding break is included most agreements should occur *before* the fact-finder recommendation. In effect, fact-finding reduces the likelihood of settlement.

On the other hand, the literature on focal points (see especially Schelling (1957)) suggests that the recommendation gives the parties a point of reference in coordinating their actions, and that negotiated outcomes should be near the recommendation, if one is received. While focal

¹⁴Repeated bargaining with the same individual implies that we have created a dynamic experiment to test a static theory. Experimental economists frequently use repetition of the environment to improve the chances of generating high quality experimental data, as subjects may require some learning of the environment, with the understanding that the data analysis must correct for potential non-independence of outcomes across rounds.

¹⁵Some might argue that a high weight on the fact-finder recommendation "forces" agreement (Crawford, 1979). This implies that instead of "chilling" bargaining, a smaller contract zone "warms" it, and we would expect to see more voluntary settlements the higher the weight on the fact-finder recommendation. As we will see, the data do not support this hypothesis.

points may exist prior to the recommendation, our claim is that the recommended outcome is more salient than other (possibly pre-existing) focal points. If the recommendation does indeed enhance salience, then we expect to see a higher settlement rate under fact-finding treatments than under those that end in conventional arbitration without fact-finding.

The parameters for the three treatments involving arbitration (FF(20%), FF(80%), and CA) are highlighted in Figure 1. The level of detail in subject instructions about the fact-finder distribution of recommendations (and arbitration settlement distribution) are meant to create the identical expectations that we assume in Figure 1. This provides us with the following testable hypotheses. Both of these hypotheses are based on the assumption of joint risk-aversion.¹⁶

Hypothesis 1 (Uncertainty): Disputes will occur more frequently with fact-finding than without it (i.e., “chilled” negotiations). Bargaining is most chilled after the fact-finding recommendation is issued, so that within the fact-finding treatments, most agreements will be reached before the recommendation.

Hypothesis 2 (Focal Point): The issuance of a non-binding recommendation, creates a salient outcome for bargaining, thus decreasing the likelihood of dispute, and increasing the likelihood of settlement near the recommendation, independent of the weight the recommendation receives.

As is apparent in Figure 1, the uncertainty hypothesis is a statement reflecting the size of the contract zone, since the hypothesis is based on the result that lesser uncertainty reduces the size of the contract zone (and hence decreases the likelihood of settlement). The focal point hypothesis notes the value of fact-finding in making the recommendation salient, in which case

¹⁶We consider joint risk aversion a reasonable assumption in general. While we elicit risk preference data from our experimental subjects that support the assumption of risk aversion (i.e., subjects responding to an end-of-the-experiment hypothetical question were indifferent, on average, between \$10 with certainty and a 50-50 gamble over \$0 and \$30), this question created considerable confusion among the subjects and is omitted from the data analysis. However, Holt and Laury (2002) find that subjects responding to non-hypothetical lottery questions are typically risk averse, even over “normal” laboratory payoffs.

agreement is more likely *independent* of the weight the arbitrator places on the recommendation. If dispute rates are less likely under fact-finding but depend on the weight placed on the recommendation or occur most often before the fact-finder recommendation, then this would be evidence that *both* the size of the contract zone and the presence of a focal point are important.

4. Results

We report results from 104 university student subjects who participated in this 20-round experimental bargaining environment. Total observation at the bargaining pair level are $N=1038$ (52 pairs at 20 rounds each minus two rounds of data removed due to computer file errors during the experiment). The experiments lasted an average of about 1 hour and 20 minutes, with subject earnings averaging \$19.17 (a high of \$30.75 and a low of \$7.50). Monetary incentives were therefore quite significant relative to the opportunity cost of most students' time.

Summary statistics from the experiments are shown in Table 1. Our sample is fairly well divided between male and female subjects. Dispute rates can be seen to vary substantially by dispute resolution mechanism, and disputes are least likely when subjects earn nothing if they fail to agree. Among the procedures ending in binding arbitration, disputes are *least* likely under fact-finding and most likely under conventional arbitration with no fact-finding. This lends support to the focal point hypothesis outlined in the previous section. Interestingly, the gender composition of the bargaining pairs appears to affect dispute rates in the fact-finding treatments. While we have no *a priori* hypothesis as to why males and females respond distinctly to a recommendation, we explore the possibility of gender effects in our statistical analysis below.

To further examine the focal point hypothesis, we examine only the subsample of rounds in which the parties received a recommendation and subsequently agreed, and look to see how far

the agreed-upon value of x was from the recommendation. If the fact-finder recommendation is a focal point of bargaining, then we expect that most agreements will occur at or near the recommendation. Figures 2 and 3 show the distance between the negotiated outcome and the fact-finder recommendation for the $\gamma=0.2$ and $\gamma=0.8$ fact finder treatments. It is clear that a large proportion of agreements occur within one standard deviation of the fact-finder's recommendation. In fact, for $\gamma=0.2$, 69% all agreements (106 out of 154 observations) are within 60 points of the fact-finder's recommendation. For $\gamma=0.8$, 64% of all agreements (76 out of 118 observations) are within 60 points of the fact-finder's recommendation.

This support for the focal point hypothesis could be refuted by noting that most of these agreements occurred before the recommendation was given (see discussion below) and were close to the center of the range of possible negotiated outcomes. Since we cannot rule out the possibility that the middle of the agreement range or the expected recommendation and arbitrator decision are focal points, especially before the recommendation is made, our first figures offer only limited support of our focal point hypothesis.

To further test the focal point hypothesis, we examine agreements made after an unusually small (or large) recommendation. Specifically, we examine the proximity of negotiated settlements to fact-finder recommendations that are at least 60 points (one standard deviation) away from the expected arbitrator decision. Figures 4 and 5 present these results for $\gamma=0.2$ and $\gamma=0.8$ respectively. Not surprisingly, when the recommendation is unusually high (or low), agreements tended to be further away from the recommendation. That said, it is interesting to note that when $\gamma=0.8$, over half of all agreements (22 of 42 observations) are less than 60 points from these extreme recommendations (see figure 5). Notice that these agreements *cannot*

equal the expected arbitration decision (500), which is at least 60 points away. When $\gamma=0.2$, just over one-third (18 of 48 observations) of agreements are less than 60 points from extreme fact-finder recommendations. As the focal point hypothesis suggests, extreme recommendations appear to pull negotiated settlements towards the recommendation, even when the fact-finder is known to be non-influential.

Table 2 presents the results of a random effects probit estimation of treatment and pair-specific variables on a dummy variable indicating whether a pair disputed (i.e., did not settle voluntarily) or not. The random effects estimation controls for the pair-specific heterogeneity in the dispute propensity of our sample by assuming that the pair-specific constant terms in the regression equation are randomly distributed across all bargaining pairs. That is, we assume that our sampled pairs were drawn from a large population of bargaining pairs. The results in Table 2 show three distinct estimations: the first column is a treatment effects only estimation, the second column includes gender composition variables that are interacted with the treatment, and the third column includes additional pair-specific and descriptive variables as regressors. None of these additional variables are statistically significant and so their results are omitted for space considerations.¹⁷ The marginal effects of the variables and their p-values are reported in Table 2.

From Table 2 we highlight the following results. First, the probability of dispute increases by 25 percentage points under conventional arbitration (CA) versus destruction of the pie in the NA treatment. The use of a nonbinding suggestion in the fact-finding treatments increases the probability of disputes by a lesser amount than in the CA treatments. This is

¹⁷Full results are available from the authors upon request. The extra variables in the estimation of column 3 of Table 2 are descriptors of the pair's gender composition (*not* interacted with treatment variables) college major composition, religious composition, employment status, history of trial or arbitration experience, history of union affiliation, round of the experiment, and cumulative rounds of dispute within the experiment.

evidence in support of the focal point hypothesis 2. The fact that FF(80%) increases the likelihood of dispute relative to FF(20%) is evidence in favor of the uncertainty hypothesis since disputes are more likely when the *ex post* contract zone is smallest.¹⁸ These results suggest that while reduced uncertainty may chill negotiations (compare FF(80%) to FF(20%)), the focal point value of a nonbinding suggestion outweighs this effect (compare CA to both FF treatments).¹⁹

When gender interaction variables are included (column 2) we find some suggestive results of how gender composition may influence how effective nonbinding suggestion are in resolving disputes. Specifically, females in the bargaining pair seem to react favorably to nonbinding suggestions that are heavily weighted. We see this by noting that when the bargaining pair includes one or two females, the fact-finder recommendation decreases the probability of dispute by 15 and 25 percentage points, respectively, relative to an all male bargaining pair under FF(80%). This is a noteworthy result, as it says that dispute rates fall to close to that of no arbitration when the bargaining pair is all female and the fact-finder recommendation is heavily weighted. Such a result is likely due to innate gender differences in bargaining, since gender is anonymous in the experimental design. Column 3 includes the addition of pair-specific variables that are all insignificant determinants of the probability of dispute. In all cases, the probit models correctly predict just over 70% of the actual outcomes.

We can summarize the comparison between arbitration with and without fact-finding by saying that a fact-finding stage appears to lessen the likelihood of dispute relative to arbitration

¹⁸While it is true that FF(80%) increases the likelihood of disputes by more than does FF(20%), the difference may not be precisely measured. A Wald test on the restriction of the coefficient of FF(80%) equaling the coefficient on FF(20%) fails to reject the null hypothesis of equality ($p=.17$)

¹⁹The uncertainty results are consistent with previous studies (e.g., Ashenfelter et al. (1992), Babcock and Taylor (1996)) that show lower dispute rates when the variance of arbitrator draws is higher (i.e., larger contract zone).

with no fact-finding, and this effect is more pronounced with female disputants. This implies that focal points are important. However, the comparison between the two fact-finding treatments and our analysis of pre- and post-recommendation settlement rates implies that the size of the contract zone is also likely an important determinant of dispute rates, though to a lesser extent than the recommendation focal point.

While not a part of our formal model, timing of settlements appears in many others in the literature (Crampton (1992), Roth et al (1988)). We can examine the subset of fact-finder rounds to see if most agreements occurred before or after the recommendation in our data. Our results appear at the bottom of Table 1 and in Figure 6. Of the 520 total FF(80%) rounds, agreement occurred most often before the recommendation was issued ($n=230$). In fact, if the parties went beyond the recommendation, they were less likely to agree ($n=118$) than to disagree ($n=172$). The parties remained most likely to agree before the recommendation in FF(20%) ($n=210$). However, they were marginally more likely to agree after the recommendation ($n=158$) than to disagree ($n=150$). These results are consistent with the uncertainty hypothesis. When most of the uncertainty regarding the arbitrator's decision is resolved ($\gamma=0.8$), disputants have little incentive to agree, and more frequently wait for the arbitrator's decision. If the recommendation resolves little of the uncertainty regarding the arbitrator's decision ($\gamma=0.2$), incentives to sincerely bargain are higher and parties are more likely to agree than to invoke arbitration.

We can further examine the timing of settlements by focusing on Figure 6, which shows the cumulative settlement frequencies, separated by treatment, for negotiated (not arbitrated) settlements. We measure the time of settlement within the 3-minute round on the horizontal axis and note the point at which a recommendation is issued in the fact-finding treatments. From

Figure 6 we can see that there are significant deadline effects in negotiations (see Roth et al. (1988)) as is evidenced by the upward spikes in the cumulative settlement distributions at the end of the 3-minute bargaining round. The issuance of a fact-finding recommendation in two of the treatments creates an additional deadline effect just prior to the recommendation. Overall, we see that negotiations are “chilled” until an 11th hour settlement most significantly in NA, and the earliest settlements are most likely under CA.

When a fact-finder recommendation is used, a more heavily weighted recommendation induces quicker settlements. While quickest settlements are most likely under CA, in the later stages of bargaining, but prior to the deadline effect, the heavily weighted fact-finder induces the highest percentage of negotiated settlements. However, we cannot conclude that the *size* of the contract zone drives the timing of negotiated settlements, since our model is silent with respect to precise settlement timing (see Figure 1). We should also note that while the pattern of settlement frequencies in Figure 6 is suggestive of significant treatment effects, the only significant differences are between NA and the other dispute resolution mechanisms.²⁰

5. Conclusion

The purpose of this paper has been to explore the role that nonbinding suggestions play in dispute resolution. We show that the presence of a fact-finder as an intermediate step before binding arbitration decreases the uncertainty of a potential arbitrated settlement and therefore decreases the size of the contract zone. While Farber and Katz (1979) suggest that reduced

²⁰Results from a Kolmogorov-Smirnov nonparametric full distribution test fail to reject the null hypothesis that the distributions of CA, FF(20%), and FF(80%) are significantly distinct from one another. This test assumes that the distributions are mutually independent, which may not be the case, but the results are consistent with the estimation results of a bi-variate probit equation which looks at the probability of settling the dispute early versus late contingent upon *not* disputing. None of the marginal effects estimates of the treatment effects on the probability of early settlement were statistically significant. Results of this estimation are available upon request.

uncertainty (as would be created by a fact-finding process) chills negotiations and is counterproductive to voluntarily negotiated settlements, Schelling (1957) suggests that the creation of a significant focal point for negotiations would do just the opposite. Whether or not fact-finding increases voluntary settlement rates is tantamount to asking whether the creation of a focal point or the chilling of bargaining due to reduced uncertainty will dominate. To examine this question, we generate data from a controlled laboratory experiment.

Our main result shows that fact-finding increases the rate of negotiated settlements relative to the use of binding arbitration without fact-finding. Though there is some evidence that placing more weight on the recommendation may chill negotiations (i.e., the uncertainty hypothesis), this effect appears to be dominated by the significance of non-binding recommendations as a focal point for bargaining. This is an important result that applies whether the final stage decision-maker is an arbitrator, a state legislative body or a court of law, and the result also has implications beyond formal fact-finding. Specifically, any bargaining environment including a nonbinding suggestion prior to a mandated outcome is likely to promote more voluntary settlements. In some sense, this is evidence in support of mediation as a dispute resolution step prior to arbitration, though our results suggest that a *formal* recommendation – typically not the domain of a mediator – is the important ingredient leading to settlement.

We also find that the disputants' gender may be an important determinant in identifying the potential success of nonbinding recommendations. Female disputants were even more likely to achieve a voluntary settlement under fact-finding than were all-male pairs. Also, though a more heavily weighted fact-finder recommendation, on average, was less effective in reducing disputes than a less heavily weighted recommendation, the opposite was the case with female

disputants. Such a result suggests that a useful avenue for further research may be the investigation of whether there are systematic gender differences in how disputants respond to the size of the bargaining contract zone.

As arbitration continues to be viewed as a viable alternative to litigation, these results suggest that an intermediate step that includes a recommended settlement is likely to be effective in increasing voluntary settlement rates. Though outcome uncertainty still appears to be a necessary ingredient in promoting good-faith or sincere negotiations, the value of a focal point for negotiations is evident in our results. Voluntary settlements are usually considered preferred to mandated settlements, and so the generation of credible focal points may be as useful way to improve any existing method of alternative dispute resolution.

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TABLE 1
Summary Statistics

	Participants %	Male=55	Female=45	
	NA	CA	FF(20%)	FF(80%)
Dispute Rates	16%	40%	29%	33%
Negotiated X values (standard deviation)	489.0 (96.2)	504.3 (128.8)	497.7 (97.3)	484.5 (98.6)
Dispute Rates by pair composition	2 males	1 female (buyer)	1 female (seller)	2 females
NA	14.1	12.3	20.0	18.3
CA	41.2	29.2	46.0	46.7
FF(20%)	35.7	27.7	30.0	20.0
FF(80%)	45.9	24.6	36.0	21.7
Agreement Frequency (FF treatments)	No Agreement	Agreement before Recommend	Agreement after Recommend	
$\gamma=0.8$ (520 obs)	172	230	118	
$\gamma=0.2$ (518 obs)	150	210	158	

TABLE 2
Random effects probit estimation of dispute rates
 (dependent variable Dispute=1,0)

Independent variable	column 1 marginal effects (p-value)	column 2 marginal effects (p-value)	column 3 marginal effects (p-value)
Constant Term	-.339 (.00)***	-.339 (.00)***	-.376 (.29)
CA	.254 (.00)***	.270 (.00)***	.329 (.00)***
FF(20%)	.151 (.00)***	.226 (.00)***	.286 (.00)***
FF(80%)	.189 (.00)***	.311 (.00)***	.342 (.00)***
1 female*CA	---	-.049 (.47)	-.062 (.57)
2 females*CA	---	.025 (.81)	-.018 (.93)
1 female*FF(20%)	---	-.080 (.32)	-.104 (.38)
2 females*FF(20%)	---	-.180 (.11)	-.199 (.22)
1 female*FF(80%)	---	-.154 (.02)**	-.165 (.10)*
2 females*FF(80%)	---	-.250 (.01)**	-.288 (.13)
Additional explanatory variables	---	---	all insignificant
% correctly predicted	70.4%	70.4%	72.1%
Chi-squared log-likelihood	83.7 (.00)*** -567.39	81.3 (.00)*** -560.27	9.81 (.00)*** -552.28

***, **, * indicate significance at the p=.01, p=.05, and p=.10 level, respectively

FIGURE 1 **Figure 2**

Agreement Proximity to Recommendation
Gamma = 0.2 All Observations

Figure 3
Agreement Proximity to Recommendation
Gamma = 0.8 All Observations

Figure 4
Agreement Proximity to Recommendation
Gamma = 0.2, Recommendations Greater than 560 or Less than 440

Figure 5**Agreement Proximity to Recommendation****Gamma = 0.8, Recommendations Greater than 560 or Less than 440** **FIGURE 6****Cumulative Settlement Frequencies**

Does Fact-Finding Promote Settlement? Theory and a Test

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ABSTRACT

Some labor negotiations include a break in which a non-binding recommendation is made by a fact-finder as an intermediate dispute resolution procedure. There is some uncertainty, however, as to whether this fact finding increases or reduces the likelihood of settlement. Inasmuch as fact-finding reduces uncertainty about the outcome, it may “chill” bargaining and increase the need for additional dispute resolution procedures. On the other hand, the fact-finder’s recommendation may give the parties a focal point around which they are able to craft an agreement, thus reducing the incidence of disputes. Which of these effects dominates is a question that we consider using both a theoretical model and data from a controlled experimental bargaining environment.

JEL Key Words: Bargaining, Experiments, Dispute Resolution, Arbitration

JEL Codes: C78, C92, J52

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1. Introduction

Dispute resolution is of interest in a variety of bargaining environments, from labor relations to insurance. Commonly used forms of dispute resolution include mediation and arbitration. While a mediator imposes no binding settlement, an arbitrator imposes a settlement that is typically binding and non-appealable. Fact-finding falls somewhere in between these two by allowing the fact-finder to issue a non-binding formal recommendation that may guide and/or pressure disputants as to what a mandated settlement might look like. For example, Hebdon (2001) reports that a chief aim of the public policy change in New York state in 1991 was to “give more weight to the fact-finder recommendations” (p.74). Here, we ask whether nonbinding recommendations, such as those issued by fact-finders, significantly affect dispute rates and/or bargaining outcomes. We offer a simple theoretical extension from existing research as well as empirical data generated in a controlled laboratory bargaining environment to explore relevant issues.¹

Farber and Katz (1979) study bargainer incentives under conventional arbitration and show that uncertainty about the arbitrator’s notion of a fair settlement is a key variable that increases the bargainers’ contract zone (i.e., the region of outcomes mutually preferred to the disputants’ reservation values or threat points).² To the extent that fact-finding decreases

¹Ashenfelter et al (1992) examine incentives under “tri-offer” arbitration, where an arbitrator is constrained to choose as a settlement either one of the disputant’s final offers or the recommendation of a fact-finder. We examine a fundamentally different issue by considering arbitrators who place positive *fixed* weight on the fact-finder recommendation in determining an otherwise unconstrained final settlement. Hebdon (2001) highlights that there are currently no theoretical models of fact-finding.

²Conventional arbitration refers to the set of arbitration rules that allow the arbitrator to craft any settlement seen as appropriate. This is in contrast to what is referred to as final-offer arbitration, where the arbitrator is constrained to choose one of the disputants’ final offers as the binding settlement. For an analysis of final offer arbitration, see Farber (1980). For an early article relating uncertainty to settlement rates, and for the development of the rules for