2003

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February 2003
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Arbitration is a growing method of resolving disputes in varied settings. While two specific arbitration rules dominate in practice, other procedures have been hypothesized to better promote voluntary settlement. Such hypotheses require theoretical assumptions of identical bargainer expectations even though divergent expectations or optimism is considered prevalent in naturally occurring negotiations. This article examines disputant behavior in a controlled laboratory setting where point-estimates of disputant expectations are captured, thus allowing one to test the “chilling effect” hypotheses of optimism on both dispute rates and final-offer divergence. The extent of the dual chilling effect is examined for both commonly used arbitration procedures as well as for an innovative procedure that, while not used in practice, is theoretically predicted to induce final-offer convergence when expectations are unbiased. The results show that optimism is prevalent in the data, extra information does not fully de-bias the disputants, and optimism increases both dispute rates and final-offer divergence. The degree to which a final offer plays a strategic role in the arbitration institution is an important determinant of this final chilling effect result. Lastly, once the effects of optimism are considered, the innovative arbitration procedure actually generates the highest dispute rates, contrary to its theoretical claim.
1. Introduction

Arbitration is currently used to resolve disputes in a variety of arenas. Labor disputes, commercial contract disputes, lemon-law disputes, environmental disputes, and securities industry disputes, among others, all utilize arbitration to generate binding settlements. The Supreme Court also ruled in 2001 that employers can require workers to arbitrate job-related disputes as a condition of employment, and so the impetus of the U.S. legal system is to increase the use of arbitration and selectively use it as a replacement for traditional litigation.\(^1\) Two forms of arbitration rules dominate in practice: Conventional arbitration (CA) allows the arbitrator to impose any settlement on the disputants, whereas in final-offer arbitration (FOA) the arbitrator is constrained to choose one of the disputant's final offers as the binding settlement. Bargaining outcomes are likely to be affected by which arbitration institution is utilized. Additionally, disputant expectations play a key role in the likelihood of voluntary versus arbitrated settlements. Optimistic expectations about the likely outcomes generated by arbitration will lower the perceived "price" of arbitrated settlements and likely increase the quantity demanded of arbitrated settlements (i.e., the dispute rate).

This article examines the effects of disputant expectations on distinct arbitration institutions. The institutional comparison is conducted in a controlled laboratory setting.

\(^*\)The research was supported by National Science Foundation grant SES-0133231, for which the author is grateful. Partial support was also provided by the Utah State University Agricultural Experiment Station. Valuable comments were provided by XXXXXXXXXXXX. The author is grateful to Kamalakar Thota, Pablo F. Rego Barros, Jianlin Cheng, Lujun Zhang, and Stacie Gomm for their programming services in creating the computerized bargaining environment. The author also thanks Nitesh Saha for his valuable research support.

\(^1\)The case is Circuit City Stores v. Adams, 99-1379.
Bargaining outcomes are examined in the context of CA, FOA, and an innovative procedure called “combined arbitration” (CombA). CombA is developed in Brams and Merrill (1986) and it combines the rules of CA and FOA in a way that produces theoretically convergent final offers. Basically, the rules of FOA are used if the arbitrator’s notion of a fair settlement lies between the disputants’ final offers, but CA rules are used otherwise. Though not used in practice, the theoretical property of convergent final offers in CombA is more attractive than the final offer predictions for either CA or FOA, and the laboratory offers an ideal setting to compare this innovative arbitration procedure with the commonly used CA and FOA procedures. Biased expectations of likely arbitration awards may, however, alter final offer and/or dispute rate predictions, and so a key contribution of the article is the point-estimates of disputant expectations that are elicited in the bargaining experiments. Such expectations estimates allow disputant optimism to be documented and their potentially distinct effects across arbitration institutions measured. Given that optimism (or self-serving bias, divergent expectations, etc.) is considered prevalent in many bargaining contexts, this connection between optimism and bargaining outcomes under different dispute resolution institutions is key to our ability to interpret field data on arbitration and suggest likely avenues to improve bargaining outcomes under increasingly used arbitration.

The results indicate that optimism is prevalent in the data, not easily eliminated, and it significantly increases the probability of dispute as well as the divergence between disputants’ final bargaining positions (i.e., final offers). Optimism’s effect on final offers is also a function of the degree to which the final offers play a strategic role in the arbitration institution. When arbitration explicitly utilizes final offers in the decision rule, then optimism “chills” bargaining to a greater degree. This is important because if the arbitration rules constrain the arbitrator to
choose one of the disputant’s final offers, then increasingly divergent final offers implies more divergent arbitrated outcomes, which may reduce the acceptability of the arbitration institution. Also, holding expectations constant, dispute rates are actually highest in CombA, perhaps contrary to the intuition of the convergent final offers theoretical prediction, which is a principle argument in support of the innovative procedure. Implications are discussed in the concluding section of the article.

2. Background

The increasing use of arbitration to resolve disputes is part of a broader move to utilize alternative dispute resolution (ADR) procedures, such as mediation, arbitration, and fact-finding, to help resolve disputes. Binding arbitration is unique in that it guarantees a settlement and so it is used primarily where continued impasse has been deemed unacceptable or undesirable. In labor disputes, for example, binding arbitration is often used as a replacement for strike rights in contract disputes for critical service industry workers (e.g., firefighters, policemen, etc.). Such disputes covering labor contract terms for large numbers of workers can involve millions of dollars. One needs look no farther than Major League Baseball salary disputes, which are settled by FOA rules, to understand that magnitude of settlement dollars handled by arbitration in just one isolated industry. Considering that arbitration is utilized in a very wide variety of industries and settings to resolve disputes, the cumulative dollars involved in a given year are significant.²

Given that millions of dollars are allocated every year through commonly used arbitration procedures, a comparison of outcomes under CA and FOA is desirable. The original argument

²Consider other more varied examples of arbitration: Arbitration was used to award “$16 million to the heirs of Abraham Zapruder for the sale to the U.S. government of Zapruder’s historic home movie...” capturing the assassination of President John F. Kennedy (Dispute Resolution Times). Also, President George Washington’s will calls for arbitration of any disputes over interpretation of his will (contained in the records of Fairfax County, Virginia). Ashenfelter et al. (1992) also notes that the death sentence of Socrates in ancient Athens was handed down using a type of arbitration similar to FOA.
behind the creation of FOA rules was that the constrained arbitrator decision-rule would create
greater outcome uncertainty and reduce the so-called "chilling" effect of arbitration (see Stevens,
1966). The theoretical research that followed showed this to not necessarily be the case as the
obvious strategic nature of final offers in FOA lead to predictions of divergent disputant final
offers (Farber, 1980; Crawford, 1979; Brams and Merrill, 1983). It is for this reason that
CombA (Brams and Merrill, 1986) seems attractive. The theoretical prediction is that final
offers converge, which seems to indicate that voluntary settlement is likely. From a theoretical
standpoint CombA seems to be an improvement upon the incentives of CA and FOA, though
biased expectations may confound a more pure test of their relative incentive effects.

Empirical research comparing outcomes under distinct arbitration institutions has
included both field research in public sector labor disputes and experimental research. There has
been mixed results in determining whether bargaining outcomes are better in CA or FOA, and
most of the research focuses on dispute rates as the metric for gauging the success of an
arbitration procedure. The early field evidence indicated that dispute rates are lower in FOA
than CA (Feuille, 1975), but it is also argued that for a given dispute rate the arbitrated
settlements in FOA will likely be of lower quality than those in CA given that FOA awards are
typically more extreme (Feigenbaum, 1975). More recent evidence from the public sector also
show lower dispute rates in FOA (Hebdon, 1996). A critique of field results is that not all
jurisdictions studied include the same rules for what may be categorized as a particular dispute
resolution procedure. Feigenbaum (1975) highlights how FOA rules can be quite different from
state to state, and commentary in Bolton and Katok (1998) emphasizes the difficulty in finding
comparable field negotiations.3

3In fact, Feigenbaum (1975) notes that the statute in Michigan makes FOA function more like med-arb,
where the arbitrator finds himself mediating to some extent as parties alter their final offers. Given that dispute rates
Mock negotiations experiments can ensure that the dispute resolution procedures are, in fact, similar. Such efforts have also shown dispute rates to be higher in CA compared to FOA (Neale and Bazerman, 1983; Grigsby and Bigoness, 1982; Notz and Starke, 1978). Though rich in context and similarity to simple field negotiations, such mock negotiation simulations fail to control the arbitrator decision-making process, which may introduce confounding effects into the data. Ashenfelter et al. (1992) models preferred arbitrator settlements as a density function to mechanize the arbitrator decision-making process and find higher dispute rates in FOA compared to CA. More recent experimental evidence in Dickinson (in press) also find higher dispute rates in FOA, and so more recent laboratory data is at odds with previous findings.4

A separate line of research has examined the role of divergent expectations as a cause of dispute. Farber and Bazerman (1989) note that it is a “...prominent explanation for disagreement in bargaining...” (p.99). Babcock and Loewenstein (1997) discuss what they call a “self-serving bias” as a cause of bargaining impasse, and they note the body of evidence in support of this rather widespread existence of this phenomenon. Further empirical evidence is found in Neale and Bazerman (1985), Loewenstein et al. (1993), Babcock et al. (1995), and Farmer at al. (2001), which all highlight the role that optimism can play in disputes. The data here seem quite consistent and in line with theoretical models of how optimism can cause bargaining failure (e.g., see Shavell, 1982; Priest and Klein, 1984).

It is clear that optimism contributes to bargaining failure and, therefore, higher dispute rates. What this present article contributes is a systematic examination of the effects of disputant

are uniformly higher when mediation is used it is perhaps not surprising that FOA generates such low dispute rates in this context (see also Rehmus, 1974).

4Other experimental research has included a mechanized arbitrator to resolve disputes in bargaining but these studies do not focus on comparing outcomes across different arbitration institutions (e.g., Charness, 2000; Pecorino and Van Boening, 2001; Bolton and Katok, 1998)
expectations and optimism across distinct laboratory-controlled arbitration mechanisms. While Babcock et al. (1995) argue that a context-rich experiment, such as their case study experiment, is more likely to allow optimism to manifest itself, we find evidence of optimism even in the neutral-context lab experiments studied herein. As such, one could consider the present results as a conservative measure of the likely chilling effect of optimism on bargaining. There is also presently no evidence in experimental economics on the effects of optimism in a setting that controls the arbitrator decision process. Finally, there is little if any evidence on bargaining outcomes using innovative arbitration procedures, such as CombA, and the laboratory is a natural place to dry-run a new institution like CombA at low cost (see, e.g., Smith, 1982). Dickinson (in press) is the only empirical study of bargaining outcomes under CombA, and his results suggest that optimism may be an important determinant of the dispute rate differences across arbitration institutions that he reports. This article contributes by measuring the effects of optimism across an innovative and both commonly used arbitration procedures.

3. The “Chilling Effect” Hypotheses

Our expectations-effect hypotheses examine both dispute rates and final-offer divergence of the disputants. We are clear to identify these separate effects of optimism though the literature seems to interchangeably speak of higher dispute or more divergent final offers as equivalent manifestations of the chilling effect in bargaining.

In examining dispute rates, consider that a disputant’s expected utility of impasse or dispute is given by \( \int_{-\infty}^{\infty} h(x)g(x) \, dx \), where \( h(x) \) represent the disputant’s beliefs about likely outcomes in the event of a dispute and \( g(x) \) describes a well-behaved payoff function. Here, we consider that utility is increasing in \( x \), and so this would be appropriate for analysis of our
bargainer B, the seller, expected payoffs. This expected utility framework is motivated by Farber and Katz (1979). In CA, \( h(x) = f(x) \), which is just the arbitrator settlement distribution, but in FOA or CombA, \( h(x) \) is a function of both \( f(x) \) and the arbitration rules that utilize final offer information (e.g., in FOA \( h(x) \) is a bimodal distribution with all of its mass at final offers \( x_a \) and \( x_b \)). Given this framework, optimism is simple to analyze in the sense that it reflects a more favorable \( h(x) \) distribution. This could imply an optimistic location is the distributions mean, or a self-serving perceived skewness in the shape of \( h(x) \). Either way, it implies a higher expected payoff in the event of dispute when beliefs about the uncertain outcomes possibilities of impasse are optimistic, *ceteris paribus*. Disputes are just an alternative way of achieving an outcome compared to voluntary settlement, and so a decline in the relative cost or price of a disputed outcome follows from optimism. This decline in relative price of dispute would increase the demand for disputed or arbitrated outcomes when one views disputes as a “good” as in this framework. Therefore, we have:

*Chilling Hypothesis #1:* Optimism will increase dispute rates across all arbitration procedures.

The other dimension of optimism’s potential chilling effect lies in its potential to increase the divergence between disputants’ final offers or final bargaining positions. When viewed as distinct from the dispute rate hypothesis it may seem a trivial concern, but final offers can be viewed as an indicator of how close the parties are too agreement. Additionally, since FOA and in some cases CombA constrain the arbitrator to select one of the final offers, more divergent final offers implies more extreme and potentially less acceptable arbitrated awards.

One can establish in each of the three arbitration institutions examined that optimism implies more divergent final offers than unbiased expectations. In CombA, expectations can even be optimistic to a degree while still preserving the convergence property of the procedure.
However, Brams and Merrill (1986) show that final offers will eventually diverge in CombA if expectations are optimistic enough. In FOA, Dickinson (2003) shows that optimism will cause final offers to diverge under both a naïve and a more sophisticated version of disputant beliefs. Finally, in CA, the framework of Farber (1981) shows that, if final offers are considered by the arbitrator in the final arbitrated settlement decision, then equilibrium final offers are a function of, among other things, the mean expected value of the arbitrator settlement distribution. As such, one can show that optimism implies more divergent final offers in CA as well (see Farber’s Nash equations (15) and (16) on p.75 of his article). One difference to be noted, however, is that final offers do not influence the arbitrator in the computerized version of CA. As such, it is less clear whether or not optimism would be predicted to cause more divergent final offers in our experimental CA, where final offers do not have strategic value in the arbitration institution. Though CA arbitrators in practice are certainly influenced by the facts of the case, which likely influence final offers, Ashenfelter (1987) and Ashenfelter and Bloom (1984) used field data to show that it is reasonable to model CA decisions as draws from an unbiased settlement distribution. The unintended side-effect of a computerized CA arbitrator who ignores final offers is that our data can also be used to examine the extent to which optimism’s predicted final-offer divergence effect is a function of the strategic nature of final offers in the arbitration institution. Our second hypothesis is then,

*Chilling Hypothesis #2:* When disputes occur, optimism will increase final offer divergence when final offers are strategic to the arbitration institution (FOA and CombA in the experiments).

### 4. Experimental Environment

The bargaining environment is described in more detail in Dickinson (in press). Subjects are randomly and anonymously matched to another subject for a 20-round bargaining
experiment. The experiment is context-free, and payoff tables for the object of negotiation—an abstract variable, $x$—are used to induce win-loss payoff functions on the subjects in their negotiations. Bargainer A (B) earns more cash in each round of the experiment for lower (higher) values of $x$, and offers are made by submitting proposed values of $x$ on the computer terminal—this is the only communication allowed in the experiment. If subjects have not agreed upon a value of $x$ within the 2-minute time limit of the round, one of 4 dispute resolution procedures is utilized to determine the outcome for the round after final offers are elicited (and assuming that the final offers do not converge, in which case agreement is automatic): no arbitration (NA), CA, FOA, or CombA. In NA, impasse is handled by giving both subjects a zero payoff. In the arbitration treatments, all subjects bargain for 5-rounds under each dispute resolution treatment. This is a within-subjects design that can more easily identify causal relationships in the arbitration treatments.

The computerized arbitrator is a Normal (500,60) random number distribution from which a number is drawn at bargaining impasse in any round of the CA, FOA, and CombA treatments. As such, the arbitrator’s preferred settlement distribution is completely controlled across arbitration institutions. Payoffs are such that $x=500$ splits a $2.00$ pie for both subjects, but bargaining ranges are suggested to limit mechanical split-the-pie differences somewhat.\(^5\) Bargainers are always given the opportunity to submit a final offer once the round has ended in impasse. Assuming that the disputants still do not agree based on converged or criss-crossed final offers (i.e., buyer final offer, $x_a$, greater than seller final offer, $x_b$), then the dispute resolution procedure of that treatment is invoked to settle the round. In NA, both subjects receive a zero payoff, and in CA the draw from the computer $f(x)$ distribution is the settlement

\[^5\text{Specifically, bargainer A is suggested to negotiate for values of x between 200 and 700, while bargainer B is suggested to negotiate x between 300 and 800.}\]
for that round. In FOA and CombA, the disputants’ final offers are used along with the draw from \( f(x) \) to determine the binding settlement based on the rules of each procedure. Whenever FOA rules are used, the final offer closest to \( z \) is chosen as the settlement.

Expectations elicitation occurs at the *beginning* of all CA, FOA, and CombA rounds. As such, a point estimate of the subject’s expectation of the average value drawn from \( f(z) \) is recorded whether or not arbitration is invoked by that subject-pair for that round. Subjects will form their expectations about the computerized arbitrator from the information on the computerized arbitrator in the experimental instructions. Three related protocols, called *Low Info*, *Medium Info*, and *High Info*, are used across different experimental bargaining pairs. In *Low Info*, subjects are shown a table of 100 draws from the same \( f(x) \) used in their experimental arbitration treatments. This protocol is used in Ashenfelter et al. (1992), among others, as a method considered most parallel with how real-world disputants would gather information from the field to form expectations. As we will see, this protocol is also the most likely to allow subjects to form biased expectations of arbitrator preferences. In *Medium Info*, subjects are shown the table of 100 draws, and in addition they are given a picture of the normal density function used, along with summary statistics that includes the mean of the distribution. In *High Info*, subjects are shown the table, the graph, and read aloud a brief prepared written statement by the experimenter about how subjects do not always form accurate expectations when uncertainty is involved (though the direction of the bias was not mentioned).

A monetary incentive was provided to help generate subjects’ true expectations. Subjects were informed that they would be paid an additional $2 on top of other experimental earnings for an expectation within ten \( x \)-units above or below the true average \( f(x) \)-value. They were also informed that one of their expectations would be drawn randomly at the end of the experiment to
determine their qualification for the extra expectation incentive. Though not a large monetary incentive, the data shown later in this article indicate that these point estimates of expectations increase in accuracy in the higher information protocols. This is what one would expect if the expectations data from this experimental procedure are a reasonable proxy for subjects' true expectations.\(^6\)

5. Results

Experiments were conducted on a total of 126 bargaining pairs (i.e., 252 total subjects). Subjects were primarily undergraduate students and payoffs averaged about $20 for a 1.5 hour experiment, which is a considerably higher hourly wage rate than jobs on campus. Each of the three distinct arbitrator information protocols were use on approximately equal numbers of bargaining pairs (45, 41, and 40 pairs for the Low, Medium, and High Info protocols, respectively). Figure 1 shows the frequency of subject expectations in each of the three information protocols for buyers and sellers separately. Two items are apparent from Figure 1. First, subjects were optimistic on average (see also Table 1). This is evidenced by the fact that expectations of the mean of \(f(x)\) tend to be lower (higher) than the true mean for buyers (sellers). Each side of the bargaining table expects relatively more favorable settlement draws from the arbitrator than will actually occur on average.

The second item to note is that the Medium and High Info protocols were only partially effective at de-biasing the subjects. This does not pose any problem for the \(ex\ post\) data analysis since expectations can be more fully controlled in the econometric analysis, but it does indicate that optimism is not easily removed. Recall that in both Medium and High Info subjects are

\[^6\] Additionally, the fact that only one random round is selected for compensation for accurate expectations makes it unlikely that any subject would creatively use this to diversify payoff risk (e.g., submit a low expectation but then a high final offer). The data show that expectations and final offers are positively not negatively correlated.
actually given the exact value of the mean of \( f(x) \), and yet only about 50% of the subjects in \( High Info \) had unbiased expectations. One possible explanation is that some subjects did not understand the information given on the computerized arbitrator, but others have found similar difficulty in attempting to de-bias optimistic subjects (e.g., Babcock et al., 1997; Fischhoff, 1977). As such, it seems likely that some subjects are simply not easily swayed in their beliefs, which presents a challenge in attempting to convey an accurate assessment of likely impasse outcomes to individuals in naturally occurring bargaining contexts.\(^7\)

Additional summary statistics are shown in Table 1. As with Figure 1, optimism is apparent for the average experimental subject. The dispute rate summary statistics are somewhat less clear in their interpretation from Table 1. It is clear that arbitration of any sort increases dispute rates over the NA treatment where zero payoffs follow impasse. What is less clear is how expectations interact with the distinct arbitration institutions. More precise information, as is given in \( Medium \) and \( High Info \) seems to lower dispute rates in CA and CombA, but it actually increases them in FOA. Given that optimism still exists even in \( High Info \), we turn to an econometric analysis that explicitly controls for the expectations of a given bargaining pair in a given round as best approach for uncovering the effects of expectations on dispute rates.

Table 2 shows results from the empirical estimation equations that shed light on the chilling effect hypotheses. Optimism is measured here as pairwise optimism, or seller expectations minus buyer expectations at the beginning of the bargaining round. Pairwise optimism (pessimism) exists when seller expectations are greater (less) than buyer expectations.

\(^7\)Representatives, such as lawyers, may play a key role here in their ability to more objectively assess outcome probabilities and advise clients. Lawyers are, of course, potentially subject to the self-serving bias as well (Babcock et al. (1993), but likely to a lesser degree in terms of their client's trial outcome given that the objective function of the lawyer may or may not be similar to that of the client. Evidence from the experiments also shows that optimism persists over time. Optimism seems just as likely in later experimental rounds as in earlier ones. These results are available upon request.
Though this approach of measuring expectations is appropriate given that this sort of divergence in expectations is what drives the chilling effect, this approach makes it possible to have two pessimistic expectations that are labeled as pairwise optimism (e.g., if seller expectation=480 and buyer expectation=460). This occurs in a minority of the cases, however, as average expectations at the individual level are optimistic (Figure 1 and Table 1).

The first column estimates the probability of dispute as a function of the arbitration treatment effects (NA is the omitted reference treatment), pairwise expectations in each arbitration treatment (Exp interacted with each arbitration treatment), and the information protocol used in the experiment (Low Info is the reference protocol). So, HiInfo*FOA gives the incremental effect of High Info on dispute rates in FOA compared to the Low Info protocol, which is given by the marginal effect reported on FOA at the top of the column. The model correctly predicts 66% of the outcomes in the 2520 total subject pair rounds. Random effects are used to model the heterogeneity in disputes rates across subject pairs and the possible non-independence in observations within a subject-pair but across bargaining rounds.

The main results are in support of the Chilling Hypothesis #1. The marginal effects of the random effects probit estimation are shown and pairwise optimism is estimated to significantly increase dispute rates in each arbitration treatment. This is consistent with existing research examining the self-serving bias or optimism in other contexts (Loewenstein et al., 1993; Neale and Bazerman, 1985). The magnitude of the marginal effects is such that a divergence in expectations of 100 x-units—about 1 2/3 standard deviations of the actual computer f(x) distribution—increases dispute rate by 8-9%, depending on the arbitration treatment. The effect of optimism on dispute rates appears to be quite uniform across arbitration treatment. What is less clear is how subjects respond to the different information protocols. The High Info protocol
significantly increases dispute rates by 15.5% in FOA, whereas the Medium Info protocol decreases dispute rates by 11% in CombA. These are estimated pure protocol effects that are distinct from the chilling effect estimates of optimism on dispute rates. It is not clear why the different information protocol would affect subjects differently across arbitration institutions, but these different protocols are not likely to apply in practice, thus highlighting the need to separate their effects from the incentive effects of optimism itself.

Once the effects of expectations are measured, the residual effects of the arbitration treatments themselves are shown in the marginal effects estimates of CA, FOA, and CombA. The use of arbitration significantly increases the probability of dispute compared to the NA treatment, not surprisingly. What is perhaps more interesting is that the use of CombA is predicted to marginally increase dispute rates above NA by the highest amount among the arbitration treatments considered (greater than CA (p=.04) and FOA (p=.00) using the chi-squared test). The marginal increase in dispute rates is statistically no different in CA and FOA (p=.23 for the chi-squared test). This is evidence at odds with the idea that CombA might produce lower dispute rates, ceteris paribus, given its final offer convergence predictions. More on this will be said in the next section.

The second column of Table 2 examines the effects of divergent expectations on final-offer differences (*Chilling Hypothesis #2*). The results of a random effect model are shown for the subset of the pooled data where a dispute resolution procedure is invoked (N=1228). Though the treatment effects, expectations variables, and information protocol variables do not explain much of the variation in the final-offer differences (adjusted $R^2=.10$), the significance of the coefficients on the expectations variables is of interest. Firstly, final offers are significantly more divergent in the Low Info protocol under CA than in NA, FOA, or CombA, ceteris paribus. The
higher information protocols mitigate this effect for CA. In terms of evaluating the Chilling 
Hypothesis #2, the coefficients on Exp*CA, Exp*FOA, and Exp*CombA indicate that optimism 
increases the divergence of final offers. Also given that optimism’s effects are largest in FOA 
and smallest (insignificantly different from zero) in CA, this is evidence that the chilling effect of 
optimism on final-offer divergence is a function of the degree to which final offers play a 
strategic role in the arbitration institution. While final offers are strategic in both FOA and 
CombA, they are somewhat less so in CombA given that CA rules are used for CombA when the 
arbitrator’s notion of a fair settlement lies outside the disputants’ final offers. As such, there are 
combinations of final offers and expected arbitrator settlement preferences for which the final 
offers will not constrain the arbitrated settlement.

Figure 2 shows a graphical representation of the chilling effect predictions on CA, FOA, 
and CombA as implied by the estimated coefficients in Table 2 for the more externally valid Low 
Info protocol. The forecast values of the final-offer difference are shown over the range of 
effects differences from -100 (pairwise pessimism) to 400 (extreme pairwise optimism), 
which is the range containing over 98% of the experimental data. What figure 2 highlights is 
that, at least for the range of data containing average levels of optimism, CombA is estimated to 
produce the most convergent final offers. What is different from the theoretical predictions of 
CombA is that not only are final offers not completely convergent, but the relatively greater 
convergence in CombA relative to CA and FOA is only statistically significant for optimistic 
disputants—the theoretical convergence results for CombA are for unbiased disputants (Brams 
and Merrill, 1986). It is a more important finding, however, that the estimated chilling effect on 
final offers seems dependent on the importance on the final offers themselves in the arbitration
institution, especially if disputants tend to be optimistically biased in naturally occurring bargaining situations that utilize formal dispute resolution procedures.

6. Discussion

This research seeks to gain a greater understanding of how disputant optimism manifests itself in bargaining outcomes that utilize arbitration. The controlled laboratory environment allows precise measurement of disputants' expectations of arbitrated settlement possibilities, and it also guarantees comparability across arbitration institutions. Outcomes in both commonly used forms of arbitration as well as an innovative procedure called “Combined Arbitration” are examined within the context of optimism. The theoretical properties of CombA seem more attractive than those for CA or FOA, and so a laboratory analysis of this institution is a logical way to generate initial data on the procedure.

As has been shown in existing research, disputants tend to be optimistic and the optimism is not easily removed. One cannot claim that this optimism is an artifact of the student-subject pool that generated this data because others have uncovered similar optimistic beliefs even among experienced adult negotiators (Babcock et al., 1993; Babcock et al., 1996). The importance of optimism is in its ability to introduce inefficiencies on multiple dimensions—both higher dispute rates and more divergent final offers result from optimism. Dispute rates rise with the optimism of the bargaining pair across all arbitration institutions studied, and so if self-determined outcomes are considered desirable then there is a significant public interest in mitigating optimism. As noted in Babcock et al. (1997), certain procedures deemed reasonably successful at mitigating optimism in practice, such as forcing disputants to think about the weaknesses in their own bargaining positions, could be easily integrated into existing alternative
dispute resolution procedures to increase voluntary settlement rates.\footnote{While such a procedure has been found successful in role-playing experiments, a similar procedure was not possible in this article's abstract bargaining experiments.} It is also possible that the use of more objective representatives and/or lawyers may help de-bias the disputants. Though such individuals are also subject to a self-serving bias (Babcock et al., 1995), they are likely not as affected as the disputants themselves. An interesting implication is that legal representation, though contributing to the formality and cost of arbitration hearings, may offset these higher costs in terms of improving disputant expectations, which could improve outcomes for both disputants.

Final offers are also found more divergent for those institutions that utilize final offers explicitly in their settlement rules. This is the case for both FOA and CombA, but not CA, in our experiments. The commonly used FOA procedure constrains the arbitrator to choose one of the final offers as the binding settlement, but we find evidence that such rules interact in a way that worsens the effects of optimism. Specifically, optimistic disputants submit more divergent final offers (i.e., final bargaining positions) than unbiased disputants. This may seem trivial since impasse results whether final offers diverge little or much. When one realizes that these final offers determine the arbitrated settlement possibilities, then more divergent final offers imply a greater variance in arbitrated settlements. Others have argued how FOA may produce less desirable or equitable outcomes given the all-or-nothing nature of the settlements it generates (Feigenbaum, 1975), and so optimism would make the FOA institution even less acceptable. Acceptability of FOA outcomes are likely quite important in practice as some state jurisdictions' have chosen to use FOA rules that allow the arbitrator to select among disputant final offers issue-by-issue for labor contract disputes. Though such issue-by-issue FOA rules may increase FOA's acceptability, the trade-off is that FOA is no longer the same FOA institution envisioned
by Stevens (1966) to reduce arbitration's chilling effect. Absent a concerted effort to mitigate disputant optimism, such compromise rules for FOA may be a second-best solution, though FOA then becomes transformed into a more CA-like institution.

Once the effects of optimism are removed from the data, the prediction is that dispute rates will be highest in CombA (see also Dickinson, in press) and statistical similar dispute rates in CA and FOA. It appears that the higher dispute rates in FOA versus CA in Ashenfelter et al. (1992) and Dickinson (in press) may be the result of optimism. Since optimism is also present in naturally occurring negotiations where FOA often generates lower dispute rates, there are clearly other factors to be considered in identifying the determinants of dispute rate differences in CA and FOA found in field data, such as historical practices, type of dispute settle by arbitration, or procedural differences within CA and/or FOA institutions.

Though the theoretical predictions of Brams and Merrill (1986) examine disputant final offers, the authors view is that this will decrease dispute rates, and this is inconsistent with the observed higher dispute rates in CombA. Two alternative sources of impasse are possible: asymmetric information and risk preferences. The experimental environment provided identical information on the arbitration settlement distribution to bargainers A and B. Private payoff tables and suggested bargaining ranges are a source of asymmetric information, but this source was identical across dispute resolution procedures. It therefore seems unlikely that asymmetric information is the cause of higher dispute rates in CombA relative to CA or FOA.

Risk preferences are another potential source of impasse. Though a trustworthy measure of subject risk preferences is not generated in these experiments, Holt and Laury (2002) report data from typical student-subject pools indicating that such subjects are, on average, risk averse. Unfortunately, this may raise more questions than it answers because Dickinson (in press) argues
that risk aversion would imply lower dispute rates in CombA. Higher dispute rates in CombA would be consistent with risk loving behavior, but there is no supporting evidence that this is driving the dispute rate results. One possibility, yet to be explored, is that disputants A and B frame the bargaining environment differently. Babcock et al. (1995) find evidence in that trial lawyers as well as student subjects may frame settlement outcomes as a gain or loss when assigned to a plaintiff or defendant role, respectively. Since our subjects negotiate over the value of x, it is possible that disputants A frame this decision task as a “loss” given that higher values of x imply lower payoffs to disputant A. The prospect theory work of Kahneman and Tversky (1979) may then imply that disputants A will behave in a risk-loving manner, while disputants B would behave in a risk-averse manner. This is pure speculation for the present paper, but it offers one potentially fruitful avenue for further exploration of the cause of higher dispute rates in CombA.

It seems clear that there are incentive effects of distinct dispute resolution institutions that have not been fully identified. Nevertheless, there is a strong and consistent message in the optimism results from the data. In fact, the optimism results seem to strengthen the argument that dispute resolution can be significantly improved within existing dispute resolution institutions by addressing the issue of divergent expectations. Efforts can be expended to improve the structure and settlement incentives of arbitration institutions themselves, but there does not seem a consistency of evidence indicating that certain arbitration rules are better than others. Improving the accuracy of disputant expectations offers an avenue for predictably improving outcomes across a variety of procedures and is likely a key to limiting inefficiencies in dispute resolution institutions.
References


Table 1: Summary Statistics
Expectations and Dispute Rates

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Low Information Protocol</th>
<th>Medium Information Protocol</th>
<th>High Information Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Buyer</td>
<td>Seller</td>
<td>Buyer</td>
</tr>
<tr>
<td>Pooled data</td>
<td>Expectations</td>
<td>468.5</td>
<td>525.6</td>
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<tr>
<td></td>
<td>Dispute rate</td>
<td>52%</td>
<td>47%</td>
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<tr>
<td>NA treatment</td>
<td>Expectations</td>
<td>---</td>
<td>---</td>
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<tr>
<td></td>
<td>Dispute rate</td>
<td>20%</td>
<td>16%</td>
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<tr>
<td>CA treatment</td>
<td>Expectations</td>
<td>468.0</td>
<td>523.7</td>
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<tr>
<td></td>
<td>Dispute rate</td>
<td>63%</td>
<td>58%</td>
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<tr>
<td>FOA treatment</td>
<td>Expectations</td>
<td>467.8</td>
<td>525.5</td>
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<tr>
<td></td>
<td>Dispute rate</td>
<td>57%</td>
<td>60%</td>
</tr>
<tr>
<td>CombA treatment</td>
<td>Expectations</td>
<td>469.6</td>
<td>527.6</td>
</tr>
<tr>
<td></td>
<td>Dispute rate</td>
<td>69%</td>
<td>54%</td>
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</table>

Computerized Arbitrator ~ Normal (μ=500,σ=60)
Table 2: Empirical Estimations

<table>
<thead>
<tr>
<th>Variable</th>
<th>Marginal Effect (p-value)</th>
<th>Coefficient (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-.38 (.00)***</td>
<td>80.41 (.00)***</td>
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<tr>
<td>CA</td>
<td>.42 (.00)***</td>
<td>62.69 (.00)***</td>
</tr>
<tr>
<td>FOA</td>
<td>.38 (.00)***</td>
<td>17.65 (.18)</td>
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<tr>
<td>CombA</td>
<td>.50 (.00)***</td>
<td>6.04 (.64)</td>
</tr>
<tr>
<td>Exp*CA</td>
<td>.0009 (.00)***</td>
<td>.077 (.16)</td>
</tr>
<tr>
<td>Exp*FOA</td>
<td>.0008 (.01)***</td>
<td>.36 (.00)***</td>
</tr>
<tr>
<td>Exp*CombA</td>
<td>.0008 (.00)***</td>
<td>.23 (.00)***</td>
</tr>
<tr>
<td>MedInfo*CA</td>
<td>.009 (.88)</td>
<td>-.3980 (.01)***</td>
</tr>
<tr>
<td>HiInfo*CA</td>
<td>.014 (.81)</td>
<td>-53.91 (.00)***</td>
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<tr>
<td>MedInfo*FOA</td>
<td>.069 (.28)</td>
<td>16.61 (.26)</td>
</tr>
<tr>
<td>HiInfo*FOA</td>
<td>.155 (.00)***</td>
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<tr>
<td>MedInfo*CombA</td>
<td>-.114 (.05)**</td>
<td>22.25 (.13)</td>
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<tr>
<td>HiInfo*CombA</td>
<td>-.066 (.25)</td>
<td>-9.80 (.50)</td>
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</tbody>
</table>

N=2520
Log Likelihood function
= -1402.188
R²=.10

***,*** show significance at the .10, .05, and .01 levels, respectively, for the two-tailed test.
FIGURE 1: Disputant Expectations By Information Treatment

Bargainer A (BUYER) Expectations of mean arbitrator settlement choice

- Low Info average=468.5
- Med Info average=477.8
- High Info average=484.4

Bargainer B (SELLER) Expectations of mean arbitrator settlement choice

- Low Info average=525.6
- Med Info average=520.9
- High Info average=516.3
FIGURE 2: Predicted Chilling effect of optimism on final offers (low info protocol)
(subset of data in which final offers are given at end of round)