

Private Selection and Arbitration Neutrality*

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Abstract

This paper examines the effects that the private selection of arbitrators have over arbitrators' incentives in deciding the cases before them and over the arbitrators' implied bias. These effects have important implications for the design of Arbitration rules by Arbitration and Dispute Resolution providers, as well as by other organizations that rely on arbitration for the resolution of disputes among their members. We show that private selection of arbitrators might adversely affect the accuracy of arbitrators' decisions because arbitrators might want to make an incorrect decision when a correct decision would carry the inference that they are biased. We compare the accuracy of arbitrators' decisions under different arbitrator selection procedures.

1 Introduction

An important distinction between private and public dispute resolution mechanisms is due to the manner in which the relevant decision maker – arbitrator or adjudicator – is selected. Whereas litigants have little influence over the assignment of a judge to their lawsuit, in arbitration their approval of the arbitrator is often necessary. This paper examines the effect that the private selection of arbitrators has over arbitrators' incentives to decide the cases before them in a neutral and unbiased manner.

Basic intuition suggests that allowing both litigants to veto arbitrators they believe to be unfavorable to them implies that those arbitrators who are selected would be impartial and unbiased. We call this the *selection* effect. Market forces would then drive arbitrators to perform better because they would want to maintain a favorable reputation and increase their prospects of being selected to arbitrate future disputes. We call arbitrators' wish to be selected in the future, the *incentive* effect of private selection. Arguably, private selection of

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arbitrators should improve the neutrality and accuracy of arbitration, compared with other alternatives that leave the parties with no influence over the choice of adjudicator.¹

In this paper we suggest that the incentive effect of private selection may in fact undermine the accuracy of arbitrators' decisions. As we show, arbitrators who seek to establish reputation for being impartial and independent may bias their decision against a party whom they would seem to favor otherwise. Although some of the arbitrators who behave in this way would be vetoed by litigants, others may not. Thus, the private selection of arbitrators and its implied reputational concerns might undermine the attractiveness of the institution of arbitration.

To put things more concretely, when litigants can be classified into well specified and identifiable groups, they might be subject to arbitrators' bias. Group identification may be due to the side taken in a dispute (e.g., employers vs. employees, consumers or suppliers vs. sellers, etc.) or to some other group characteristic such as ethnic origin (Fizel, 1996) or gender (Bemmels, 1988). Since most arbitration decisions are confidential it is difficult to verify their accuracy. The best information that a party may learn about an arbitrator's past performance would often be restricted to the arbitrator's past Win/Loss decisions with respect to the relevant identifiable groups. In such settings, the only way arbitrators can establish reputation for being impartial is to avoid a series of decisions that might seem biased against specific groups.

Consequently, arbitrators might want to make an incorrect decision when a correct decision would carry the inference that they are biased. For example, an arbitrator in employment disputes would not want to make too many decisions in favor of employers, because he would then be perceived as prejudiced against employees who would veto him in the future. The arbitrator therefore has an incentive to decide some cases against employers, even if he knows these decisions to be wrong.

Rational litigants understand these reputational concerns, and take them into account when they select an arbitrator. This has two important implications: First, litigants would prefer experienced arbitrators who have already established a reputation for being unbiased. These arbitrators' reputation would be less affected by any single decision they make, and therefore they would be less likely to bias their decisions due to reputational concerns. Second, inexperienced arbitrators who are perceived to be biased in favor of a specific litigant group may be vetoed by litigants of this same group because they might expect such arbitrators to decide against them just to appear unbiased. The interplay between arbitrators' and litigants' strategic considerations is analyzed in this paper.

The dynamics that is considered in this paper is not unique to arbitration. Prior literature has recognized the adverse effects of potential *bad reputation* when only the agents' **actions** (but not the 'the state of the world') can be publicly observed. In such environments agents may take actions contrary to their best judgment in order to avoid adverse inference about

¹Clearly, this is not true if the arbitrator is chosen by one of the parties. In such cases, the arbitrator would obviously be biased in favor of that party, both because of the selection and incentive effects.

their true types, especially when such inference would be followed by future social and economic sanctions. This dynamics may constrain free speech and distort expert advice if it is considered politically incorrect (Loury, 1994; Morris, 2001). It may also distort the actions taken by professionals and experts such as lawyers, doctors or car mechanics, who may avoid taking actions that promote their private interests, even if those actions are best for their clients (Ely and Välimäki, 2003). In all such circumstances, the agent may paradoxically deviate from the action that maximizes both his client's and his own welfare, only to demonstrate his commitment to pursue the client's interests over his own. This dynamics might even result in the collapse of specific markets, as both good and bad types' service and advice may prove useless.

This paper applies the idea of *bad reputation* to arbitration. Unlike in other contexts, here the expert- the arbitrator, has two principals - the litigants, with conflicting interests. This implies that an arbitrator who biases its decision in one direction becomes more attractive for one party but less attractive to the other party. Since either party may veto the arbitrator, this dynamics may drive out of the market not only those arbitrators who are perceived to be strongly biased in favor of one of the parties, but also those arbitrators who have a strong reputation for being unbiased but are nevertheless expected to *counter-bias* their decision in order to avoid adverse reputation.

Our findings have important implications for the design of Arbitration rules by Arbitration and Dispute Resolution providers, as well as by other organizations that rely on arbitration for the resolution of disputes among their members. As we demonstrate, Arbitration providers vary in their arbitrator selection rules and in the information they provide about their arbitrators and about those arbitrators' past decisions. This paper's framework allows for comparison of the effects of different combinations of selection rules and information available about arbitrators' past performance over the expected neutrality and accuracy of arbitrators.

The paper proceeds as follows: Section 2 reviews the current literature on arbitration selection and incentives. Section 3 reviews current arbitration selections procedures practiced by major dispute resolution providers, their requirements for arbitrator neutrality, and the information available for parties when they select their arbitrator. Section 4 presents our model for the behavior of arbitrators who want to establish reputation for not being biased and analyzes arbitrator selection and behavior under alternative selection regimes. Section 5 explores the effects of Appeal over arbitrators' decisions and their neutrality. Section 6 compares the expected accuracy of arbitrators under the alternative selection regimes, and therefore their respective attractiveness for prospective litigants. Section 7 concludes. All proofs are relegated to the appendix.

2 Literature Review

Arbitrator bias presents a significant handicap for the effectiveness of arbitration as a dispute resolution mechanism. Therefore, a large part of the economic literature on arbitration has focused on the fairness and neutrality of arbitration outcomes in contexts such as employment arbitration (Sherwyn, Estreicher and Heise, 2005), securities brokerage dispute arbitration (Choi, Fisch and Pritchard, 2008), investment treaty arbitrations (Franck, 2009), Consumer arbitration (Searle Report, 2009), and Major Baseball League arbitration (Scully 1978).

Generally, the literature has tried to measure arbitration bias by analyzing either arbitration awards or arbitrations win-loss rates.² These were studied in two types of cases: one where one litigant is a repeated player while the other is a one shot player,³ and the other where either both litigants are repeat or or one-shot players.

In contexts where only one of the litigants is a repeat player it is expected that arbitrators would tend to decide in favor of the repeat player, in order to be selected again to arbitrate future disputes. Indeed, Tullock (1980) asserts that private selection would motivate arbitrators to “choose a decision which is most likely to lead to his being selected for arbitration in the future”.⁴ He conjectures that this may lead arbitrators to bias their decisions in contexts such as consumer arbitration, where one of the parties (the retailer) uses arbitration more often and has better information about potential arbitrators. This conjecture finds some support in empirical research.⁵

When both players are one shot players, arbitrators are expected to try to avoid being perceived as biased in favor of one of the parties. Thus, Ashenfelter and Bloom (1984) and Ashenfelter (1987) report that arbitrator decisions exhibit no consistent bias. They explain that arbitrators tend to avoid extreme decisions and decide disputes based on their prediction of how other arbitrators would have decided the case.⁶

Other authors have speculated that arbitrators would tend to “split the difference” and award each party a partial victory. As Posner (2005) suggests “this will make it difficult for the parties on either side of the class of suits in question to infer a pattern of favoritism”.⁷

²Note, thought, that under Final Offer Arbitration, win-loss rates may be misleading. They may be biased due to more conservative offers by one party as compared to the other. See Scully, 1986; Ashenfelter & Bloom, 1983.

³For a first discussion of repeat players and one shot players in litigation see Galanter (1974).

⁴Tullock (1980), at p. 127.

⁵Choi, Fisch and Pritchard (2008) find that party control over the selection of arbitrators increases arbitrators’ incentives to cater to the interests of brokers, who are repeat players in these arbitrations. They find that investors are less able to screen among arbitrators’ bias when it is less visible (ideological bias, as compared to conflict of interests, which is visible). The latter is also supported by Kondo (2009).

⁶Choi, Fisch and Pritchard (2008) find that party control over the selection of arbitrators increases arbitrators’ incentives to cater to the interests of brokers, who are repeat players in these arbitrations. They find that investors are less able to screen among arbitrators’ bias when it is less visible (ideological bias, as compared to conflict of interests, which is visible).

⁷Posner (2005), at p. 1261. Empirical findings seem to arrive at different conclusions regarding this claim. Compare Farber (1981), showing no such tendency, with Bloom (1986), demonstrating behavior which is

Bloom (1986) demonstrates behavior which is consistent with "splitting the difference" but suggests alternative explanations for these findings. More recent empirical research finds no support for this conjecture.⁸

Apart from arbitrator bias, a number of studies have tried to examine how litigants select arbitrators. Thus, Bloom and Cavanagh (1986)⁹ examine the preferences of employers and unions in pay dispute arbitration. They show that both employers and unions preferred more experienced arbitrators, yet each had a preference for arbitrators whose win-loss tallies under final offer arbitration tended in its favor. Arbitration selection was also studied in NASD broker arbitrations by Choi, Fisch and Pritchard (2009) and Kiro (2009). Both find that broker firms' greater experience in arbitration allows them better control over the selection of arbitrators, who demonstrate bias in their favor.

3 Arbitrator Selection in Major Arbitration Organizations

Dispute resolution providers' codes and arbitration rules exhibit significant concern for arbitrator neutrality. Thus, all three largest American arbitration providers (American Arbitration Association (AAA), Judicial Arbitration and Mediation Services (JAMS), and the National Arbitration Forum (NAF)) provide in their Due Process protocols for the neutrality of selected arbitrators.¹⁰ Moreover, review of the qualifications that must be met by arbitrators on these providers' rosters,¹¹ as well as on other international institutions,¹² reveals that they all guarantee that their arbitrators are free from bias and prejudice.

Most arbitration providers allow the parties to structure their own arbitrator selection

consistent with "splitting the difference" although suggesting alternative explanations for these findings.

⁸See Keer and Naimark, 2001; Searle Civil Justice Institute, Commercial Arbitration, Preliminary report available on http://searlearbitration.org/p/full_report.pdf.

⁹For an analysis of arbitrators when their decision is not binding and may be followed by a jury trial see Wittman (2003).

¹⁰See Appendix 3, Preliminary Report: Consumer Arbitrations Before the American Arbitration Association, Searle Civil Justice Institute (2009), available at http://www.searlearbitration.org/p/full_report.pdf.

¹¹See, e.g., *Qualification Criteria for Admittance to the AAA National Roster of Arbitrators*, available on <http://www.adr.org/si.asp?id=4223>; JAMS' *Arbitrator Ethics Guidelines*, available on <http://www.jamsadr.com/arbitrators-ethics>; *NAF Code of Conduct for Arbitrators*, available at <http://www.adrforum.com/users/naf/resources/CodeOfConductForArbitrators1.pdf>.

¹²See, for example, the CPR (the International Institute for Conflict Prevention & Resolution) *The Code of Ethics for Arbitrators in Commercial Disputes*, available on <http://www.cpradr.org/ClausesRules/ArbitrationEthics/tabid/80/Default.aspx>; Articles 9-12 of the Swiss Chamber's Court of Arbitration and Mediation's *Rules of International Arbitration*, available at https://www.sccam.org/sa/download/SRIA_english.pdf; Article 5.2 of the LCIA (London Court of International Arbitration) *Rules of Arbitration*, available on http://www.lcia.org/ARB_folder/arb_english_main.htm; Article 14 of the SCC (Stockholm Chamber of Commerce) *Arbitration Rules*, available on http://www.sccinstitute.com/filearchive/3/32181/Arbitration%20Rules_2010_eng_final.pdf.

procedures instead of relying on the provider's default rule. In structuring their selection procedures the parties are not constrained to procedures that are offered by the provider, and they may also name the arbitrator that would decide their dispute in their arbitration agreement. Yet, if the agreement does not name the arbitrator or specifies a method for appointing the arbitrator then the provider's selection rules apply.¹³ Examination of arbitration organizations' rules for selecting arbitrators demonstrates much variation, as different rules allow the litigants varying degrees of control over the selection process.¹⁴ Furthermore, large arbitration organizations, most prominently the AAA, provide different arbitrator selection rules for different types of arbitrations they handle.

Some of the rules employed by arbitration providers allow the arbitration provider full discretion in selecting the arbitrator from its roster, which consists of arbitrators that satisfy the provider's requirements and have registered with it.¹⁵ Under these procedures, the parties cannot veto the arbitrator unless they show good cause for doing so.

Other selection procedures allow the parties more control over the selection of arbitrators, either by allowing them to veto an arbitrator without cause or by asking the parties to rank arbitrators according to their preferences. Thus, the provider may offer the parties a short list of arbitrators and allow each of them to veto a number of arbitrators on that list. The number of allowed vetoes may either be restricted,¹⁶ or not.¹⁷ If the number of arbitrators that survive a veto by both parties is larger than one then the arbitrator is either selected by the provider,¹⁸ or according to combined rankings provided by the parties for the arbitrators they did not veto.¹⁹ Alternatively, the parties may be required to rank the arbitrators on the short list without vetoing any of them, and the selected arbitrator would be the one whose combined rank is highest.²⁰

To allow litigants meaningful selection, arbitration providers furnish the litigants with information about potential arbitrators' education, professional experience, and qualifications.²¹ Yet, since arbitration decisions are usually confidential, and since the arbitrator is

¹³Since arbitration may be held before a single arbitrator or before a panel of (usually) three arbitrators, the selection mechanism also depends on the form of arbitration to be held. We focus on single arbitrator selection only.

¹⁴Most arbitration providers allow each party to challenge an appointed arbitrator *for cause*. Such challenge would often be decided by the arbitration provider. We focus here on the possible veto that may be exercised by each party *without cause* (and thus without being subject to any further review).

¹⁵See for example Rule 52(a) of the AAA Expedited Procedures for Commercial Finance Rules; Rule R-10 of the AAA Insurance Arbitration Rule; Article 9(3) of the ICC Rules of Arbitration; Article 5.5 of the LCIA Rules of Arbitration.

¹⁶See for example, AAA Expedited Procedures for Commercial Dispute, Rule E-4; NAF Arbitration Rules, Rule 21.

¹⁷See, for example AAA Commercial Finance Arbitration Rules, Rule 13.

¹⁸See, for example AAA Commercial Finance Arbitration Rules, Rule 13.

¹⁹See, for example AAA Construction Arbitration Rule, Rule R-14.

²⁰See, for example, AAA Internet Arbitration Rules, Rule 7; CPR Non-Administered Arbitration Rules, Rule 6.4.

²¹See, for example, JAMS' list of neutrals on

<http://www.jamsadr.com/professionals/xpqProfResults.aspx?xpST=ProfessionalResults>

not required to explain or justify her decision, litigants have little information concerning the arbitrator's prior decisions. Moreover, arbitration usually takes one of two types – conventional arbitration, in which the arbitrator decides the case as she sees fit, and final offer arbitration, in which each party submits an offer to the arbitrator who must then select one of these offers. Clearly, the arbitrator's decision in final offer arbitration provides no information beyond the offer chosen.

Still, by inquiring with prior litigants and attorneys, litigants can obtain information regarding an arbitrator's prior decisions. Furthermore, in some types of final offer arbitrations, there is publicly available data on prior arbitration decisions.²² Recently, one major arbitration provider, the CPR, has even started collecting information over arbitrators' past performance and providing it to its clients.²³

To simplify the analysis we divide the current institutional arrangements of arbitrator selection rules and information regarding proposed arbitrators into three categories: In the first category, which we refer to as 'No Veto', arbitrators are randomly selected by the arbitration provider. In the second category, which we refer to as 'Veto + Unobservable Information', arbitrators are selected by litigants who do not have access to information about the arbitrators' past decisions. Finally, in the third category, which we refer to as 'Veto + Observable Information', arbitrators are selected by litigants and litigants have access to information about the arbitrators' past decisions. We examine the effects of private selection and arbitrator reputation over the expected bias of the chosen arbitrator and her incentives in a stationary equilibrium in each of these three possible institutional categories.

4 A Model of Arbitrator Incentives and Bias

A dispute involves two litigants. For convenience, litigants are identified as Plaintiff and Defendant. In practice, the important identification of parties may be independent of their procedural roles as plaintiff or defendant as, for example, in the case of disputes between Employers and Employees, where the suit may be filed by either side. We therefore use the plaintiff–defendant identification for convenience only.

Each litigant believes itself to be right with subjective probability $p > 1/2$ in the dispute in which it is involved. That is, each litigant believes that if the arbitrator were to decide correctly, then it would decide in its favor with probability p .²⁴ But in any other dispute, each

²²Notably, section 1281.96 of the California Code of Civil Procedure requires any private arbitration company that administers or is otherwise involved in a consumer arbitration to collect and publish information about each consumer arbitration it handled in the preceding five years. Major Baseball League's final offer arbitration outcomes are also publicly available, and so are arbitration outcomes in some federal government sectors. ****check***

²³See <http://www.cpradr.org/CPRNeutrals/NEWPositivelyNeutralEvaluations/tabid/434/Default.aspx>

²⁴This assumption corresponds to 'over-optimism' which underlies the basic model of litigation and settlement (see, e.g. Posner, 1973) and has been substantiated by empirical and experimental findings (see ****). Note, however, that over-optimism only requires that the sum of the plaintiff's and defendant's estimates

litigant believes that the plaintiff and defendant are equally likely to be right, independently across different disputes. Each litigant obtains a payoff of 1 if it wins the dispute, and -1 if it loses. Payoffs are discounted at a rate $\delta < 1$ in each selection round.

An arbitrator can be either biased in favor of the defendant (pro-defendant), biased in favor of the plaintiff (pro-plaintiff), or unbiased. A pro-defendant arbitrator always decides in favor of the defendant and a pro-plaintiff arbitrator always decides in favor of the plaintiff. An unbiased arbitrator obtains a payoff of 1 if it decides correctly in favor of the right party, and a payoff of 0 if it decides incorrectly in favor of the wrong party. We assume for simplicity that unbiased arbitrators get an accurate signal about the correct decision in the case before them. An unbiased arbitrator also discounts its future payoffs at the rate $\delta < 1$. We assume that δ is large enough so that an unbiased arbitrator prefers to make one wrong decision followed by two correct decisions than just one correct decision. This is equivalent to assuming that $\delta + \delta^2 \geq 1$. As we show below, this assumption implies that under a ‘Veto + Observable Information’ regime, reputational effects are sufficiently strong to affect the behavior of unbiased arbitrators.

Each arbitrator is characterized by a prior belief that the disputing parties hold about the direction of its bias. For simplicity, we assume that an arbitrator is either believed to be pro-defendant with probability β_D and unbiased with the complimentary probability $1 - \beta_D$, or pro-plaintiff with probability β_P and unbiased with probability $1 - \beta_P$. We refer to β_D or β_P as the arbitrator’s type. We further assume that the distribution F from which the arbitrators’ types are chosen is symmetric over β_D and β_P .²⁵

We focus on symmetric (over β_D and β_P) stationary pure strategy perfect Bayesian equilibria of this game in which the probability that arbitrators are employed is maximal, and in which, when indifferent, arbitrators employ strategies that maximize the likelihood that they would be employed again both on and off the equilibrium path. In these *maximal equilibria*, unbiased arbitrators refrain from using weakly dominated “silly strategies,” such as always deciding in favor of one party regardless of their type, that would have them vetoed. And, arbitrators who do not expect to be employed in equilibrium still adopt strategies that maximize the likelihood that they would be employed again if they are employed by mistake. For simplicity, we refer to such ‘symmetric stationary maximal perfect Bayesian equilibria’ simply as ‘equilibria’ below.

4.1 No Veto

Consider first the simple regime where litigants are offered an arbitrator who is randomly chosen from the roster of arbitrators. Thus, a plaintiff-defendant pair is assigned an arbitrator whose type and experience are drawn from a symmetric distribution \widehat{F} over arbitrators’

of their probabilities to prevail in trial be greater than 1. For simplicity, we make the more restrictive assumption that both probabilities are symmetric and greater than $1/2$.

²⁵Our results would continue to hold as long as the distribution of arbitrators’ types is not too asymmetric.

types.²⁶ Neither litigant can veto the proposed arbitrator. This regime is practiced by public courts, as well as by a number of arbitration providers who specialize in the resolution of international disputes.

Under this regime, biased arbitrators decide according to their bias, and unbiased arbitrators decide correctly, since they have nothing to gain from deciding otherwise.

4.2 Veto with Unobservable Arbitrators' Decisions

In this subsection, we consider the following game. A plaintiff-defendant pair is offered an arbitrator whose type and experience are drawn from a distribution \widehat{F} . If at least one of the litigants vetoes the arbitrator, then the litigants are offered another arbitrator whose type is drawn from \widehat{F} , and another one, until neither of them vetoes the arbitrator. If an arbitrator is not vetoed then he decides the case. Then another plaintiff-defendant pair is assigned an arbitrator from the same distribution \widehat{F} and so on.

In this game, biased arbitrators decide according to their bias, and unbiased arbitrators decide correctly because the fact that their decisions are unobservable implies that, once they are employed, arbitrators have nothing to gain from deciding otherwise.

A stationary equilibrium and a distribution of arbitrators' types and experience, \widehat{F} , induce expected discounted payoffs for the plaintiff and defendant if they veto the arbitrator that is offered to them and proceed to play according to their equilibrium strategies. We denote these payoffs by d_P and d_D , for the plaintiff and the defendant, respectively. Denote by $u_P(\beta)$ and $u_D(\beta)$ the expected payoff to the plaintiff and defendant, respectively, if they employ arbitrator β . Then, the expected discounted payoffs d_P and d_D have to satisfy the following two equations (where the uncertainty is over the arbitrator's type β):

$$d_P = \Pr(\text{arbitrator } \beta \text{ is not vetoed}) E[u_P(\beta) \mid \text{arbitrator } \beta \text{ is not vetoed}] \\ + \Pr(\text{arbitrator } \beta \text{ is vetoed}) \delta d_P$$

and

$$d_D = \Pr(\text{arbitrator } \beta \text{ is not vetoed}) E[u_D(\beta) \mid \text{arbitrator } \beta \text{ is not vetoed}] \\ + \Pr(\text{arbitrator } \beta \text{ is vetoed}) \delta d_D.$$

The fact that litigants can repeatedly veto any arbitrator who is offered to them implies that $d_P, d_D \geq 0$ in equilibrium. Since we focus on symmetric equilibria, $d_P = d_D \equiv d$.

The arbitrators' behavior in equilibrium is the same as under the 'No Veto' regime. Since litigants have no information about arbitrators' past decisions, these cannot affect arbitrators' prospects of being chosen to arbitrate future disputes. Thus, unbiased arbitrators always decide correctly.

²⁶In a stationary equilibrium, a symmetric distribution F over arbitrators' types induces a stationary distribution \widehat{F} over arbitrators' types and experience.

The next proposition describes the equilibrium behavior of litigants. Denote by \bar{I} the highest prior β_D or β_P above which an arbitrator would be vetoed by the plaintiff or defendant, respectively. As shown below, \bar{I} is given by the expression

$$\bar{I} \equiv \frac{2p - 1 - \delta d}{2p}.$$

Proposition 1. *Under the ‘Veto+Unobservable Information’ regime, in any equilibrium of the game $\bar{I} > 0$ and an arbitrator with type β_D or β_P is employed if and only if*

$$0 \leq \beta_D, \beta_P \leq \bar{I}.$$

Equilibrium behavior is described in Figure 1 below.

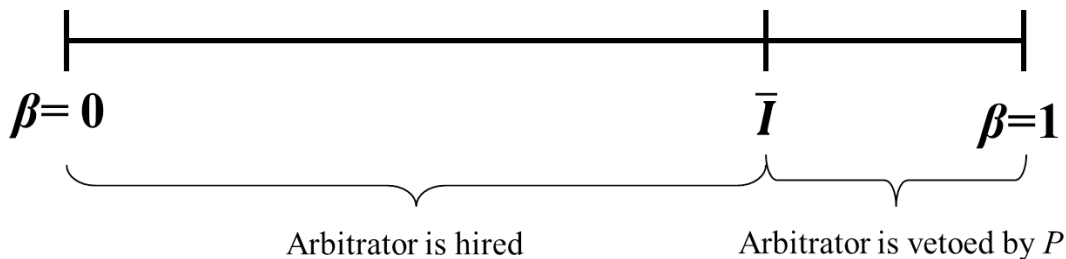


Figure 1: Equilibrium Behavior in the case of No Veto

Intuitively, any arbitrator who is believed to be too biased in either direction is vetoed by one of the litigants while arbitrators who are believed to be sufficiently unbiased are employed. The cut-off belief \bar{I} is determined by the trade-off between the expected benefit of employing the arbitrator of type β that is proposed to the litigants and by the discounted expected payoff from vetoing arbitrator β and being offered another arbitrator from the distribution F . Since the arbitrators’ decisions are unobservable, reputational considerations play no role in equilibrium.

4.3 Veto with Observable Arbitrators’ Decisions

In this subsection, we consider the following game. A plaintiff-defendant pair is offered an arbitrator whose type and experience are drawn from a distribution \hat{F} . If at least one of the litigants vetoes the arbitrator, then the litigants are offered another arbitrator whose type is drawn from \hat{F} , and another one, until neither of them vetoes the arbitrator. If an arbitrator is not vetoed then he decides the case, and his decision becomes public. Yet, *no one can tell whether the arbitrator’s decision was correct or not*. The arbitrator is then offered to decide

another dispute, until he decides three disputes or until he is vetoed. We focus on stationary equilibria in which once an arbitrator is vetoed, it will be vetoed by all future litigants.

In equilibrium, an unbiased arbitrator renders a correct decision in the third time in which it is employed because this is its last decision and so it has nothing to gain from deciding otherwise. It also renders a correct decision in the second time in which it is employed because, by assumption, the payoff to the arbitrator from making just one correct decision is larger than the sum of payoffs from making an incorrect decision in the current period followed by a correct decision in the next period. We thus have the following proposition.

Proposition 2. *In any equilibrium of the game, an unbiased arbitrator renders a correct decision in the second and third times in which it is employed.*

Proposition 2 shows that an *experienced* arbitrator does not take her reputation into account when making a decision: if she is unbiased then she makes what she believes to be the correct decision. This is because the effect of any single decision on the reputation of an experienced arbitrator (good or bad) is relatively small and so it is ignored by the arbitrator. Thus, as far as incentive effects go, experienced arbitrators behave the same under all regimes. As we show below, this is not the case for *inexperienced* arbitrators, whose reputation is more sensitive to the type of decisions they make.

As in the case of veto and unobservable information, a stationary equilibrium and a distribution of arbitrators' types and experience, \hat{F} , induce expected discounted payoffs for the plaintiff and defendant if they veto the arbitrator that is offered to them and proceed to play according to their equilibrium strategies. We denote these payoffs by d_P and d_D , for the plaintiff and the defendant, respectively. Again, as in the case of veto and unobservable information, $d_P, d_D \geq 0$ and $d_P = d_D \equiv d$ in equilibrium.

Proposition 2 describes the behavior of experienced arbitrators in equilibrium. The next proposition describes the behavior of litigants who are faced with an experienced arbitrator. Denote by \bar{I}_{ex} the highest prior β_D or β_P above which an experienced arbitrator would be vetoed by the plaintiff or defendant, respectively. As shown below, $\bar{I}_{ex} = \bar{I}$.

Proposition 3. *Under the 'Veto+Observable Information' regime, in any equilibrium $\bar{I}_{ex} = \bar{I} > 0$, and an experienced arbitrator with type β_D or β_P is employed if and only if*

$$0 \leq \beta_D, \beta_P \leq \bar{I}.$$

The proof of Proposition 3 is similar to the proof of Proposition 1, because by Proposition 2, experienced unbiased arbitrators decide correctly, just like in the 'Veto + Unobservable Information' regime.

Propositions 2 and 3 describe the equilibrium behavior of experienced (unbiased) arbitrators and the litigants who face them (the behavior of biased arbitrators is fixed). Experienced unbiased arbitrators who are not perceived as too biased in favor of one of the litigants are not vetoed. They decide cases correctly, and ignore reputational considerations. However, experienced arbitrators who are perceived as too biased are vetoed.

The fact that experienced arbitrators who are perceived as too biased are vetoed implies that inexperienced unbiased arbitrators seek to avoid developing such a reputation. Next we analyze the behavior and selection of inexperienced unbiased arbitrators in equilibrium.

The equilibrium behavior of inexperienced (unbiased) arbitrators who have never been employed before depends on an endogenously determined threshold, which we denote by $\bar{\beta}$. As shown below, any inexperienced unbiased arbitrator whose type is $\beta_D, \beta_P > \bar{\beta}$ decides *against* the party it is suspected to favor (namely, in favor of the plaintiff or defendant, respectively). The unbiased arbitrator decides this way in an attempt to improve its reputation. Inexperienced unbiased arbitrators whose type are $\beta_D, \beta_P \leq \bar{\beta}$ decide the dispute correctly.

As shown in the Appendix, $\bar{\beta}$ is given by the expression

$$\bar{\beta} \equiv \frac{2p - 1 - \delta d}{2p + 1 + \delta d}.$$

Proposition 4. *Under the ‘Veto+Observable Information’ regime, in equilibrium, inexperienced unbiased arbitrators decide the case correctly if $\beta_D, \beta_P \leq \bar{\beta}$, and decide in favor of the plaintiff and defendant, respectively, if $\beta_D, \beta_P > \bar{\beta}$. Inexperienced arbitrators are employed if and only if $\beta_D, \beta_P \leq \bar{\beta}$.²⁷*

Equilibrium behavior when inexperienced arbitrators are proposed to decide a dispute is described in Figure 2 below.

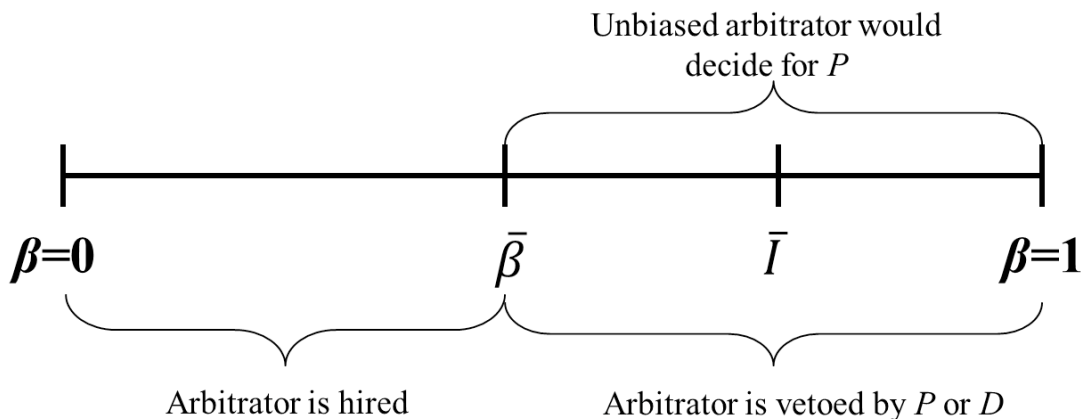


Figure 2: Equilibrium Behavior in the case of Veto with Observable Arbitrators’ Decisions

²⁷ZN: verify that proof shows that with $\lambda = 0$, $\min\{\bar{\beta}, \bar{I}_{ex}\} = \bar{\beta}$...

Proposition 4 demonstrates the consequences of inexperienced arbitrators' reputational concerns. Inexperienced unbiased arbitrators whose type β_D is above $\bar{\beta}$ would decide in favor of plaintiffs, irrespective of the correct outcome, only to establish their reputation as unbiased.²⁸ Similarly, inexperienced unbiased arbitrators whose type is β_P would decide in favor of defendants. Unbiased inexperienced arbitrators behave in this way even though they realize that this makes them less attractive to the party they are suspected to favor. In fact, that party would veto them if the probability they are biased in her favor is not sufficiently high. Once this probability is sufficiently high, then they would, of course, be vetoed by the other party. Consequently, inexperienced arbitrators whose type β_D or β_P is between $\bar{\beta}$ and \bar{I}_{ex} or higher are vetoed in equilibrium.

5 Appeal

We now assume that a proportion $\lambda > 0$ of all disputes are appealed so that the correct decision is ultimately made in them. The possibility of appeal is taken into account by the litigants and by unbiased arbitrators. This assumption may be interpreted also as if an arbitrator is bound by ethical or any other internal constraints to make the correct decision with probability λ , assuming that the litigants cannot observe such arbitrator's inclination by the time they make their selection decision.

In the case of 'No Veto', the possibility of appeal obviously does not affect the behavior of litigants or arbitrators (beyond, of course, the fact that arbitrators are constrained to make the correct decision with probability λ as explained above).

As shown in Proposition 5 below, in the case of 'Veto + Unobservable Information' about arbitrators' decisions, the possibility of appeal shifts up the veto threshold \bar{I} , but does not otherwise change equilibrium behavior, which remains qualitatively similar to the behavior that is described in Proposition 1. The reason for the change in the value of the threshold \bar{I} is that the possibility of appeal implies that litigants need not be as concerned about possible arbitrator bias.

Denote by $\bar{I}(\lambda)$ the highest prior β_D or β_P above which an arbitrator would be vetoed by the plaintiff or defendant, respectively, when arbitrators are constrained to make the correct decision with probability $\lambda \geq 0$. As shown below, $\bar{I}(\lambda)$ is given by the expression

$$\bar{I}(\lambda) \equiv \frac{2p - 1 - \delta d}{2p(1 - \lambda)}.$$

Proposition 5. *Under the 'Veto+Unobservable Information' regime, in any equilibrium of the game $\bar{I}(\lambda) > 0$ for any probability of appeal $\lambda \geq 0$ and an arbitrator with type β_D or β_P is employed if and only if*

$$0 \leq \beta_D, \beta_P \leq \bar{I}(\lambda).$$

²⁸Although such arbitrators are not employed in equilibrium, they still adopt strategies that maximize the likelihood that they would be employed again in the event that they are employed (out of equilibrium).

However, as shown in Proposition 6 below, under the ‘Veto + Observable Arbitrators’ regime, the possibility of appeal also has a qualitative effect on the equilibrium behavior that is described in Proposition 4.

If litigants may appeal arbitrators’ decisions then in addition to $\bar{\beta}$, which now depends on λ and is given by the expression

$$\bar{\beta}(\lambda) \equiv \frac{2p - 1 - \delta d}{2p + 1 - 4\lambda p + \delta d}.$$

the equilibrium behavior of inexperienced (unbiased) arbitrators who have never been employed before also depends on two other endogenously determined thresholds. The threshold denoted $\bar{I}_{in}(\lambda)$ describes the highest prior β_D or β_P above which an inexperienced arbitrator would be vetoed by the plaintiff if unbiased inexperienced arbitrators are believed to decide in favor of the plaintiff, or by the defendant if unbiased inexperienced arbitrators are believed to decide in favor of the defendant. As shown below, $\bar{I}_{in}(\lambda)$ is given by the expression

$$\bar{I}_{in}(\lambda) \equiv \frac{1 - 2\lambda(1 - p) - \delta d}{2 - 2\lambda}.$$

The threshold denoted $\underline{I}_{in}(\lambda)$ describes the lowest prior β_D or β_P below which an inexperienced arbitrator would be vetoed by the defendant if unbiased inexperienced arbitrators are believed to decide in favor of the plaintiff, or by the plaintiff if unbiased inexperienced arbitrators are believed to decide in favor of the defendant. As shown below, $\underline{I}_{in}(\lambda)$ is given by the expression

$$\underline{I}_{in}(\lambda) \equiv \frac{1 - 2p\lambda + \delta d}{2 - 2p\lambda}.$$

Proposition 5 implies that $\bar{I}(\lambda) > 0$ and hence that $\delta d < 2p - 1$. As shown below, $\underline{I}_{in}(\lambda) \leq \bar{I}_{in}(\lambda)$ for all values of $p \geq 1/2$ and $\lambda < 1$ provided that $\delta d < \lambda(2p - 1)$.

Proposition 6. *Under the ‘Veto+Unobservable Information’ regime, if litigants may appeal arbitrators’ decisions ($\lambda > 0$), then in equilibrium inexperienced unbiased arbitrators who are employed decide the case correctly if $\beta_D, \beta_P \leq \bar{\beta}(\lambda)$, and decide in favor of the plaintiff and defendant, respectively, if $\beta_D, \beta_P > \bar{\beta}(\lambda)$. The equilibrium behavior of litigants depends on the relationship among the values $\min\{\bar{\beta}(\lambda), \bar{I}(\lambda)\}$, $\underline{I}_{in}(\lambda)$, and $\bar{I}_{in}(\lambda)$, as follows:*

- If $\min\{\bar{\beta}, \bar{I}(\lambda)\} \leq \underline{I}_{in}(\lambda) \leq \bar{I}_{in}(\lambda)$, then an inexperienced arbitrator β_D or β_P is employed if and only if $\beta_D, \beta_P \leq \min\{\bar{\beta}, \bar{I}(\lambda)\}$ or $\underline{I}_{in}(\lambda) \leq \beta_D, \beta_P \leq \bar{I}_{in}(\lambda)$, respectively.
- If $\underline{I}_{in}(\lambda) \leq \min\{\bar{\beta}, \bar{I}(\lambda)\} \leq \bar{I}_{in}(\lambda)$, then an inexperienced arbitrator β_D or β_P is employed if and only if $\beta_D, \beta_P \leq \bar{I}_{in}(\lambda)$, respectively, and
- if $\underline{I}_{in}(\lambda) \leq \bar{I}_{in}(\lambda) \leq \bar{\beta}(\lambda)$, then an inexperienced arbitrator β_D or β_P is employed if and only if $\beta_D, \beta_P \leq \min\{\bar{\beta}(\lambda), \bar{I}(\lambda)\}$, respectively. Finally,

- if $\underline{I}_{in}(\lambda) > \bar{I}_{in}(\lambda)$, then an inexperienced arbitrator β_D or β_P is employed if and only if $\beta_D, \beta_P \leq \min\{\bar{\beta}(\lambda), \bar{I}(\lambda)\}$, respectively.

Equilibrium behavior is described graphically in Figure 3 below. Notice that arbitrators behave in the same way they do with no possibility appeal (Proposition 4). Namely, biased arbitrators decide according to their bias, and unbiased arbitrators decide correctly if the probability they are believed to be biased is small, but decide against the party they are believed to favor if the probability they are believed to be biased is above a threshold $\bar{\beta}(\lambda)$.

Litigants veto arbitrators whom they believe to be biased with a high probability, and employ arbitrators whom they believe to be biased with a small probability. However, unlike in the case where there is no possibility of appeal, in the first and second cases described in Proposition 6, some inexperienced arbitrators are employed in equilibrium even if they are expected to render biased decisions: if they are biased, then they decide in favor of whoever they are biased for; and if they are unbiased, then they decide against whoever they are suspected of being biased for.

Notice also that the litigants' veto decision need not be monotone in their beliefs: they may employ an arbitrator who is believed to be biased with a small probability; veto an arbitrator who is believed to be biased with a higher probability, and employ an arbitrator who is believed to be biased with a yet higher probability. The reason for this behavior is that the defendant, say, would veto an arbitrator who is believed to decide correctly if unbiased but may be pro-plaintiff; but would not object to an arbitrator who is believed to be pro-plaintiff with a higher probability but who decides in favor of the defendant if unbiased.

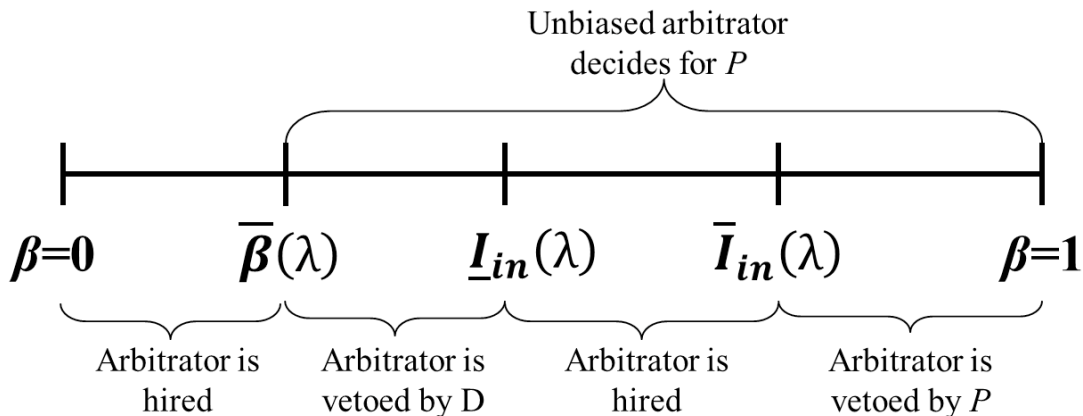


Figure 3: Nonmonotone Equilibrium Behavior in the case of Veto with Observable Arbitrators' Decisions with the Possibility of Appeal

6 The Optimal Arbitrator Selection Regime

We can now compare the alternative selection regimes. After the dispute breaks the parties' interests are not aligned, because each would like to prevail in the dispute. The problem ceases to be one of creating efficient incentives to perform the contract, and becomes one of a purely distributive character.²⁹ If arbitrators may be biased in favor of one party or the other then each party would like the arbitrator to be as biased in his favor, since this would increase his chances of prevailing. If arbitrators can only be biased in favor of one of the parties, then that party would want an arbitrator who is most biased in his favor, whereas his counterparty would want to choose the least biased arbitrator. Either way, the parties' interests with respect to the arbitrator's bias would conflict.

However, at the time of contracting, before the dispute, parties share an interest in guaranteeing adequate performance of the contract.³⁰ If they could write a complete contract, then they would specify the preferred outcome for each future state of the world, and would like an arbitrator to implement this outcome. If a complete contract is not feasible, then they would like the arbitrator to implement the outcome they would have preferred, had they been able to write it in advance. In both cases, contracting parties share the same interests in the accuracy and neutrality of the arbitrator. Neither one of them wants the arbitrator to be biased, even if such bias is in her favor, because this would imply different performance incentives than the ones both parties seek to implement. If for whatever reason the parties do want the outcome to be biased in favor of one of them, then they would specify the substantive terms of the contract accordingly, but want those terms to be applied with the highest possible accuracy.³¹ Therefore, assuming all other costs of contracting and disputes are kept constant, the pre-dispute welfare of a contracting party is increasing in the probability that the arbitrator makes a correct decision. We compare the three regimes according to this welfare criterion.

When there is no appeal all unbiased arbitrators who are not vetoed render a correct decision. Therefore, we can focus on the *selection* of arbitrators under the three regimes. Under the 'No Veto' regime no arbitrator is vetoed, so there is no selection. Under the 'Veto+ Unobservable Information' regime arbitrators whose probability of being biased is greater than \bar{I} are vetoed. Thus, this regime pareto dominates the 'No Veto' regime.

Comparison of the 'Veto+Observable Information' and the 'Veto+Unobservable Infor-

²⁹The parties may have non-distributive concerns in minimizing their litigation costs. This is the reason why they would prefer to settle their dispute than litigate it.

³⁰The discussion here follows Tullock (1980), at 127-129, among others.

³¹There are cases where contracting parties would prefer arbitrators' decisions to be less accurate. Generally, this would be the case whenever the performance incentives generated by a more accurate decision would not justify the costs of such higher accuracy. For example, if the parties cannot determine at the time of contracting nor at the time of performance the exact harm from a breach, then accurately determining this harm after the dispute would not change the incentives to breach. It would therefore be wasteful, and the parties would prefer a less accurate arbitrator, if his costs would be lower. The value of accuracy of dispute resolution has been extensively analyzed by Kaplow (1994), Kaplow and Shavell (1994, 1996).

mation' regimes is more complicated. Litigants employ the same veto threshold, \bar{I} , for experienced arbitrators, under both regimes. Yet, since under the 'Veto+Observable Information' regime the posterior over an arbitrator's bias is updated after each decision it makes, some experienced arbitrators are vetoed based on their past decision, whereas they would not be vetoed under the 'Veto+Observable Information' regime.

As for inexperienced arbitrators, their selection is tighter under the 'Veto+Observable Information' regime as they are vetoed if their type is greater than $\bar{\beta} < \bar{I}$. This selection effect is far from being obvious. Litigants' information about inexperienced arbitrators is the same under both regimes, so one would expect their selection also to be identical. The reason why selection is tighter under the 'Veto+Observable Information' regime is that arbitrators are vetoed by litigants who they seem to favor. The reputational concerns of these arbitrators motivate them to decide against the litigants they seem to favor, and therefore it is those same litigants who veto them.

Overall, absent appeal the three regimes can be pareto ranked according to their expected probability of screening out biased arbitrators and rendering a correct decision. Since incentive effects are never pronounced in equilibrium, or, put differently, since unbiased arbitrators who are not vetoed in equilibrium always decide correctly, the 'Veto+Observable Information' regime pareto dominates the 'Veto+Unobservable Information' regime, which, in turn, dominates the 'No Veto' regime.

With appeal, the ordering of the three regimes according to their selection effects remains qualitatively unchanged, although the veto threshold depends on the probability of appeal. However, comparison of the three regimes has to account also for the incentive effect over unbiased arbitrators, which is pronounced under the 'Veto+Observable Information' regime. As Proposition 6 demonstrates, inexperienced unbiased arbitrators whose type belongs to an intermediate range are employed in equilibrium and bias their decision against the party they are suspected to favor. Thus, the overall probability of a correct decision under the 'Veto+Observable Information' regime may therefore be either higher or lower than the two other regimes, depending on the distribution of arbitrator types. If this distribution is concentrated on the range in which unbiased arbitrators decide correctly, then the 'Veto+Observable Information' regime is superior to the other two in terms of the expected probability of the correct decision being made, but if this distribution is concentrated on the range in which unbiased arbitrators decide against the party they are suspected to favor, then the 'Veto+Observable Information' regime may be inferior to the other two regimes.

[Put here example that illustrates that the welfare comparison between 'Veto+Unobservable Information' and 'Veto+Observable Information' regimes can go either way ...]

Appeal is costly. The merit of appeal under the 'Veto+Observable Information' regime depends on the relative magnitude of three different effects: (1) Appeal corrects some inaccurate decision; (2) as shown above, appeal improves selection; and (3) as shown above, appeal may undermine the incentive to decide correctly for some types of arbitrators.

Moreover, the analysis of appeal demonstrates a broader concern with providing infor-

mation about arbitrators' past decisions. Although such information improves the selection of arbitrators, it may come at the cost of some of those arbitrators who are not vetoed rendering incorrect decisions only to avoid reputation for being biased. Whether this effect is significant depends, as explained above, on the distribution of arbitrators' types. When it is, providing no information may prove better for prospective litigants.

7 Conclusion

If arbitration decisions were public and subject to appeal, their accuracy would be easily evaluated by future litigants. They would then select arbitrators who are perceived to be unbiased, and this, in turn, would motivate unbiased arbitrators to be as accurate as possible. Yet, arbitration decisions are often concise and undetailed. The only public information available about past decisions, if at all, concerns the final judgment. As we showed, such truncated information, combined with private selection of arbitrators may drive arbitrators to decide for one side only to avoid reputation as being biased in favor of the other. This tendency would be stronger for less experienced arbitrators whose reputation as unbiased has not yet been established.

Our analysis suggests few testable predictions. First, we expect inexperienced arbitrators' decisions to depend on their past decisions. Second, we predict that such dependency would feature a tendency to 'even up' the win/loss rate of decisions rendered by each arbitrator. Third, we expect parties to veto not only arbitrators who, based on their individual characteristics and past performance, feature a strong bias against them, but also to veto those who feature a medium bias *for* them. Finally, we suggest that these predictions would prove less significant as arbitrators become more experienced and establish longer history of prior decisions. It should be emphasized that both measures of arbitrator neutrality - awards and win-loss rates - have been mostly studied aggregatively, for certain types of arbitrations, and not for individual arbitrators. We suggest that these measures should be studied on an individual arbitrator level.

Future research may compare arbitration outcomes between different arbitration providers and different arbitration contexts. It would be interesting to examine how does performance of arbitrators compare across arbitration providers, and relate it to their selection mechanisms. Our findings may also prove significant when comparing private arbitration with public adjudication. Indeed, various recent empirical studies demonstrate that arbitration is often considered inefficient and undesirable among equally positioned and informed parties, at the time of contracting.³² Whether that has to do with the incentive effects of private selection of arbitrators is yet to be examined.

³²See, e.g., Eisenberg and Miller (2007) who have examined over 2800 contracts filed with the Securities Exchange Commission in 2002 by public firms. ***Reference to Hanseman****

Appendix (still need to finish some proofs ...)

Proof of Proposition 1. In a perfect Bayesian equilibrium, an unbiased arbitrator β_D decides correctly once employed, and so would not be vetoed by the defendant if and only if

$$\beta_D(1 - \lambda + \lambda(2p - 1)) + (1 - \beta_D)(2p - 1) \geq \delta d_D.$$

Note that a pro-defendant arbitrator decides in favor of the defendant with probability 1. Its decision is appealed with probability λ , and in this case, the defendant believes it would still prevail with probability p , and so would obtain the expected payoff $p(1) + (1 - p)(-1) = 2p - 1$. The same argument implies that the expected payoff to the defendant if the arbitrator is unbiased and decides correctly is also $2p - 1$.

Similarly, an unbiased arbitrator β_D would not be vetoed by the plaintiff if and only if

$$\beta_D(-(1 - \lambda) + \lambda(2p - 1)) + (1 - \beta_D)(2p - 1) \geq \delta d_P.$$

Rearrangement of these two inequalities implies that an arbitrator β_D would be employed by the litigants if and only if

$$\underline{I} \equiv \frac{1 - 2p + \delta d_D}{2(1 - \lambda)(1 - p)} \leq \beta_D \leq \frac{2p - 1 - \delta d_P}{2p(1 - \lambda)} \equiv \bar{I}.$$

The argument for β_P is similar.

The interval $[\underline{I}, \bar{I}]$ is nonempty because if it were empty, then arbitrators would not have been employed in equilibrium. This implies that the litigants' payoffs in equilibrium d_P and d_D would have had to be equal zero. Inspection of the definitions of \underline{I} and \bar{I} reveals that this implies that $\underline{I} < 0 < \bar{I}$. A contradiction.

Finally, $\underline{I} \leq 0$ because arbitrators can be either pro-defendant or pro-plaintiff and the distribution of pro-defendant types is the mirror image of the distribution of pro-plaintiff types. Suppose that $\underline{I} > 0$. This means that the defendant vetoes any arbitrator who is not sufficiently biased in its favor, or such that β_D is not larger than or equal to \underline{I} , and also any arbitrator who is believed to be pro-plaintiff because such an arbitrator is even worse from her perspective. By symmetry, the plaintiff would also veto any arbitrator that is such that $\beta_P < \underline{I}$ and any arbitrator who is believed to be pro-defendant or is even known to be unbiased. It follows that no arbitrator can be employed in equilibrium and so that the expected payoffs to the litigants, d_P and d_D , must be zero. As shown above, this implies a contradiction. ■

Proof of Proposition 2. In the third period it is employed, the arbitrator has no future and so maximizes its payoff by rendering the correct decision. In the second period it is employed, the arbitrator realizes that the most it can achieve by distorting its decision is to increase the probability it would be employed again from zero to one. Thus, its maximal

payoff if it makes an incorrect decision in the second period is $0 + \delta = \delta$, which is smaller than its payoff if it makes the correct decision in the second period, which is 1. ■

Proof of Proposition 3. An experienced unbiased arbitrator β_D is believed to decide correctly (by Proposition 2). The rest of the proof follows in the same way as the proof of Proposition 1. Notice that the interval $[\underline{I}_{ex}, \bar{I}_{ex}]$ is nonempty because if it were empty, then experienced arbitrators would not have been employed in equilibrium. This means that inexperienced unbiased arbitrators would have had no reason to care about their reputation and so would also have decided correctly in the first period in which they are employed. But then the fact that the interval $[\underline{I}_{ex}, \bar{I}_{ex}]$ is empty implies that they too would not have been employed in equilibrium, which implies that the litigants payoffs in equilibrium d_P and d_D would have had to be equal zero. A contradiction. ■

Proof of Proposition 4. If the litigants cannot appeal the arbitrator's decision then unbiased inexperienced arbitrators cannot bias their decisions and still hope to be employed in equilibrium because they would surely be vetoed by at least one of the litigants. This implies that unbiased arbitrators must decide correctly, if employed, in equilibrium.

If an inexperienced unbiased arbitrator decides correctly, the prior belief that the arbitrator is pro-defendant is β_D , and the arbitrator decides in favor of the defendant, then Bayesian updating implies that the posterior belief that the arbitrator is pro-defendant is

$$\frac{\beta_D}{\beta_D + (1 - \beta_D) \cdot \frac{1}{2}} = \frac{2\beta_D}{1 + \beta_D} \quad (1)$$

If the arbitrator decides in favor of the plaintiff, then the posterior belief that the arbitrator is pro-defendant is zero.

The same argument implies that if the arbitrator's type is β_P , and the arbitrator decides in favor of the plaintiff, then the posterior belief about the arbitrator is

$$\frac{2\beta_P}{1 + \beta_P}$$

If the arbitrator decides in favor of the defendant, then the posterior belief that the arbitrator is pro-plaintiff is zero.

If the posterior probability that a (formerly) inexperienced arbitrator who decides correctly is pro-defendant after a decision in favor of the defendant (1) is smaller than or equal to the threshold \bar{I}_{ex} , or if

$$\frac{2\beta_D}{1 + \beta_D} \leq \frac{2p - 1 - \delta d}{2p(1 - \lambda)}$$

or

$$\beta_D \leq \frac{2p - 1 - \delta d}{2p + 1 - 4\lambda p + \delta d} \equiv \bar{\beta},$$

then if an inexperienced unbiased arbitrator β_D decides its first dispute correctly, it follows that regardless of its decision it would not be vetoed by the plaintiff in the second time it is called to arbitrate a dispute. So in this case the arbitrator β_D cannot do better by distorting its decision, and hence would decide correctly in equilibrium and would not be vetoed. The same argument implies that an arbitrator β_P also cannot do better by distorting its decision, and hence would decide correctly in equilibrium and would not be vetoed.

If, however,

$$\beta_D > \bar{\beta},$$

and the arbitrator learns that the defendant is right, then if the arbitrator decides in favor of the defendant, this would be its last decision because it would be vetoed by the plaintiff in the next time it is called to arbitrate a dispute. But if it decides in favor of the plaintiff, then because this would reveal that the arbitrator is unbiased, the arbitrator may get to make two more decisions if it is not vetoed by the defendant. So deciding correctly cannot be part of equilibrium if such an arbitrator is employed. It therefore follows that that arbitrator $\beta_D > \min\{\bar{\beta}, \bar{I}_{ex}\}$ cannot be employed in equilibrium. If $\bar{\beta} < \beta_D$ then the arbitrator does not decide correctly and for this reason is not employed as explained above; and if $\bar{I}_{ex} < \beta_D$ then the arbitrator is not employed even if it is believed to decide correctly in equilibrium. ■

Proof of Proposition 5. To be added. ■

Proof of Proposition 6. The argument that inexperienced unbiased arbitrators who are employed decide the case correctly if $\beta_D, \beta_P \leq \bar{\beta}$, and decide in favor of the plaintiff and defendant, respectively, if $\beta_D, \beta_P > \bar{\beta}$ is the same as in the proof of Proposition 3.

Lemma. *If an inexperienced unbiased arbitrator β_D or β_P is believed to bias its decision as much as possible in favor of the plaintiff or defendant, respectively, then it would be employed if and only if*

$$\underline{I}_{in} \leq \beta_D, \beta_P \leq \bar{I}_{in}.$$

This interval is non-empty for every value of $\lambda > 0$ and $p \geq 1/2$ provided that $\delta d \leq \lambda(2p - 1)$.

Proof. Suppose that inexperienced unbiased arbitrators β_D are believed to bias their decisions in favor of the plaintiff. The defendant does not veto an inexperienced arbitrator if and only if

$$\beta_D(1 - \lambda + \lambda(p - (1 - p))) + (1 - \beta_D)(p\lambda + (1 - p\lambda)(-1)) \geq \delta d_D$$

if and only if

$$\beta_D \geq \frac{1 - 2p\lambda + \delta d_D}{2 - 2\lambda} \equiv \underline{I}_{in}.$$

The plaintiff does not veto an inexperienced arbitrator if and only if

$$\beta_D(- (1 - \lambda) + \lambda(p - (1 - p))) + (1 - \beta_D)(1 - \lambda + \lambda(p - (1 - p))) \geq \delta d_P$$

if and only if

$$\beta_D \leq \frac{1 - 2\lambda(1 - p) - \delta d_P}{2(1 - \lambda)} \equiv \bar{I}_{in}.$$

The argument for β_P is similar.

Algebraic manipulation shows that $\bar{I}_{in} \geq \underline{I}_{in}$ if and only if

$$2\lambda(2p - 1) \geq \delta d_P + \delta d_D$$

or if $d \leq \lambda(2p - 1)$. ■

The Lemma implies that if an arbitrator β_D or β_P is believed to bias its decision in favor of the plaintiff or defendant, respectively, then it would be hired if and only if

$$\underline{I}_{in} \leq \beta_D, \beta_P \leq \bar{I}_{in}.$$

Thus, the equilibrium depends on the relationship among $\min\{\bar{\beta}, \bar{I}_{ex}\}$, \underline{I}_{in} , and \bar{I}_{in} as follows:

1. If

$$\min\{\bar{\beta}, \bar{I}_{ex}\} < \underline{I}_{in},$$

then for small values of β_D or β_P ($\beta_D, \beta_P \leq \min\{\bar{\beta}, \bar{I}_{ex}\}$) the arbitrator is hired and decides correctly; for low-intermediate values of β_D or β_P ($\min\{\bar{\beta}, \bar{I}_{ex}\} < \beta_D, \beta_P \leq \underline{I}_{in}$) the arbitrator distorts as much as possible in favor of the plaintiff or defendant, respectively, and is vetoed by the defendant or plaintiff, respectively; for high-intermediate values of β_D or β_P ($\underline{I}_{in} < \beta_D, \beta_P \leq \bar{I}_{in}$) the arbitrator distorts as much as possible in favor of the plaintiff or defendant, respectively, and is hired; and for high values of β_D or β_P ($\bar{I}_{in} < \beta_D, \beta_P$) the arbitrator distorts as much as possible in favor of the plaintiff or defendant, respectively, but is still vetoed by the plaintiff or defendant, respectively.

2. If

$$\underline{I}_{in} \leq \min\{\bar{\beta}, \bar{I}_{ex}\} < \bar{I}_{in},$$

then for small values of β_D or β_P ($\beta_D, \beta_P \leq \bar{\beta}$) the arbitrator is hired and decides correctly; for intermediate values of β_D or β_P ($\bar{\beta} < \beta_D, \beta_P \leq \bar{I}_{in}$) the arbitrator distorts as much as possible in favor of the plaintiff or defendant, respectively, and is vetoed by the defendant or plaintiff, respectively; and for high values of β_D or β_P ($\bar{I}_{in} < \beta_D, \beta_P$) the arbitrator distorts as much as possible in favor of the plaintiff or defendant, respectively, but is still vetoed by the plaintiff or defendant, respectively.

3. If

$$\underline{I}_{in} \leq \bar{I}_{in} < \bar{\beta},$$

then for small values of β_D or β_P ($\beta_D, \beta_P \leq \bar{\beta}$) the arbitrator is hired and decides correctly; and for high values of β_D or β_P ($\bar{\beta} < \beta_D, \beta_P$) the arbitrator distorts as much as possible in favor of the plaintiff or defendant, respectively, but is still vetoed by the plaintiff or defendant, respectively.

4. Finally, if

$$\underline{I}_{in} > \bar{I}_{in}$$

then inexperienced unbiased arbitrators are employed in equilibrium if and only if $\beta_D, \beta_P \leq \min \{ \bar{\beta}, \bar{I}_{ex} \}$. ■

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