ADR versus Litigation: A Cost Paradox

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Abstract

We propose a model where two disputants can choose between alternative dispute resolution mechanisms (ADR) and litigation to solve their conflict. Our main assumption is that courts are associated with more costly procedures than ADR. Paradoxically enough, we show that parties may still be unwilling to use ADR, because the parties spend more costs at equilibrium in ADR than in courts. Litigation is likely to be prefered by the parties when the fixed cost differential between court and ADR is low, the compensation at stake is high and the parties are on unequal footing at the beginning.

1 Introduction

When a conflict arises, disputants generally first try to negotiate to find a solution. If bargaining fails, a litigation procedure with a judge deciding the case is the most traditional dispute-resolution process of modern civil justice systems. However, there are many other options available to facilitate "private" settlements. Neutral evaluation, mediation or conciliation - often called Alternative Dispute Resolution mechanism or ADR - are the most well-known.[1] Under these procedures, a neutral third party tries to foster negotiation between the disputants to avoid to bring their claim to court. In this paper, we focus on the choice parties may face between using ADR or litigating to solve their conflict.

[1]We could add arbitration to the list of ADR mechanisms. *However, our focus is more on alternative dispute resolution mechanisms whose cost structures are lower than litigation. This can be questionned for arbitration. That's why, we rather have in mind ADR such as meditation.*

As noted by Shavell (1995), one of the main difference between ADR and litigation is that the court system is constrained by a more formal process;[2] it relies on lawyers and judges, imposes some steps that disputants have to follow, regulates the collection and presentation of the evidence, requires legal justification of claims, imposes many delays, etc..[3] A further difference is that information presented during the proceeding becomes public knowledge. In contrast, rules under ADR are more flexible, can more easily be adjusted to the case at hand and permits confidentiality.

These differences have ramifications for the costs associated with the production of an effective legal argument. That production includes all the legal activities that a party undertakes to increase her chances of winning; searching for clear evidence, for legal information, for jurisprudence that support her claim, etc. together with the forging of a legal strategy. The costs resulting from the production of an effective legal argument follow from the optimal mix of these different activities constrained by the requirements of the respective conflict resolution forum. The aforementioned additional constraints imposed by the court system implies that, for the same output, it should generate higher costs and a larger cost elasticity than ADR. Henceforth, we use this conclusion as a maintained hypothesis.

Specifically, we design a stylized model in order to analyze the decision by individuals to select ADR or litigation as conflict resolution forum. We distinguish two possible timing for that decision. We first consider a situation where the parties selection occurs after the conflict arises. In that case, the decision is made at a point in time where all the characteristics associated with the dispute are known to the parties. We also consider the alternative possibility where parties decide prior to a conflict which mechanism to employ in the case of a future disagreements. In that context, some of the characteristics associated with a conflict may not yet be realized.

Once a conflict resolution forum has been selected and in the case of a conflict, each of the party must determine how much effective effort they should produce in order to maximize their respective payoffs. In this paper, we represent the resulting strategic interaction by a Tullock game.[4] Despite

[2]Specifically, Shavell (1995, p.1) states "the formality, length and complexity of ADR are usually less than those of official proceedings".

[3]In our analysis, we take this difference as given and not deal with the causes of court formalism. On this regard, various explanations are debated. Regulating dispute resolution may come from a sovereign's will to control the outcome, or the need to protect vulnerable parties against economically or politically more powerful opponents. As stated by the German jurist Rudolf von Jhering, "form is the sworn enemy of arbitrary rule, the twin sister of liberty" [1898, p. 471] (See Djankov et al. (2003)).

[4]See Tullock (1980).

the cost advantage of ADR, we find that in the respective equilibrium parties may spend more under ADR than under litigation. Though the result may at first appear paradoxical, it is in fact the higher cost elasticity that disciplines the conflict parties and reduce their appetite for a legal battle. This generates countervailing cost effects; using the court system shifts the cost function upward, but reduces the effective legal effort. Whenever the latter effect dominates going to court becomes procedurally efficient.

However, from the point of view of contestants or potential contestants what matters for their choice between litigation and ADR is not the costs they produce, but rather their associated expected utility. We find there is a stark difference between the ex-post and ex-ante decision of the conflict resolution forum. In the former case, we find that the parties employ too often the court system. The result obtains because once all the characteristics of the conflict are realized the parties have perfectly opposite interests. Hence, if one of the forum is more advantageous for one of the party, it is worse for her opponent. However, given that using the court system is normally the fallback position, parties end up too often in court.

In contrast, when the parties select the conflict resolution forum prior to the conflict, we find the opposite result; the parties may use ADR too often. Intuitively, the parties average out over the distribution of the meritoriousness of their claim. Assuming that distribution is symmetric implies that the expected return associated with the conflict becomes zero. Hence the parties are induced to focus on the expected costs associated with the respective conflict resolution forum. This reduces the tension between procedural efficiency and the parties objective. However, because the parties decision occurs ex-ante they are not able to condition their decision on the realization and allocation of meritoriousness.

Our analysis is related to the large body of law and economics literature which deals with court and out of court settlement. Traditionally that literature models conflicts as a two-step procedure, where parties first try to settle and then go to court if they fail to reach an agreement (Cooter and Ulen (2012)). Under perfect information, parties are expected to settle to save on litigation costs, which may be quite substantial. Any agreement to settle the case will generate a surplus for the parties — in the form of saved litigation costs — that the parties can divide between themselves. In such a context, the cost of legal procedures have always a positive impact on the probability to settle the case because they increase the bargaining surplus. Following this literature, going to trial is often viewed as a procedural inefficiency resulting from negotiation failure.[5]

[5]Sources of inefficiencies may come from asymetric information, optimism, or other

Our paper departs from this approach on two main points. First, we consider a Tullock game (Tullock (1980)), where parties make costly efforts to increase their own likelihood to win. On this regard, our paper is related to a recent law and economics literature that models conflicts in which agents can influence the outcome by hiring lawyers, looking for new evidence or doing some expertises (Farmer and Pecorino (1999), Corchon (2007), Luppi and Parisi (2012), Dari-Mattiacci and Parisi (2014)). With such a perspective, our focus is on the cost structure the parties support to increase their own probability to win rather than on exogenous amounts of litigation costs. Second, we do note deal with pre-court informal settlement, but look at "intermediate structures" called ADR (alternative dispute resolution). These structures propose less formal ways (compared to litigation) for the parties to solve their conflicts. Our focus is on the choice parties have to make between ADR and litigation.

As a consequence, our paper is also related to the more specific literature on alternative dispute resolution. Shavell (1995) compares ex-ante ADR arrangements (made before the dispute arises) or ex-post arrangements (made after the dispute arises). This paper explores the social interest and the welfare consequences of ADR. We depart from this analysis by focusing on the individual choice of the parties when they have to decide whether to use ADR or to litigate. Other papers focus on how ADR may bring parties some information that they would not otherwise learn (Mitusch and Strausz (2005), Goltsman et al. (2007), Ivanov (2010), Rahman and Obara (2010), Strausz (2012)). In contrast, we do not explore here informational problems. Our interest is on the cost structure of the two procedures (ADR versus litigation), which has not been considered before, as far as we know.

The remainder of the paper is organized as follows. Section 2 presents the model. Section 3 derives the Nash equilibrium of the Tullock game effective legal effort. Section 4 compares the Nash equilibria associated with the court system and ADR. Section 5 analyzes the ex-post and ex-ante choice of conflict resolution forum. Finally, section 6 provides a conclusion and discussion.

2 The Model

Consider two parties involved in a legal - civil or commercial - dispute over the allocation of a monetary value D. For instance, the conflict could be on which disputant should pay for an accidental damage or determine the

cognitive biases. See Hayer and Spier (1998), Daughety and Reinganum (2012) and, Daughety and Reinganum (2014) for surveys.

allocation of a valuable resource. We consider two dispute resolution forum; judicial litigation or ADR that are denoted by $m = l, a$ respectively.

Whatever dispute resolution mechanism is used, the likelihood of winning the conflict is the outcome of a simultaneous move Tullock contest in terms of the *effective legal argument* produced by each of the disputants (or their legal counselor). Specifically, denoting party i's effective legal argument by e_i, we assume the latter wins the contest with the probability

$$\Pr[i \text{ wins} \mid e_1, e_2] = \frac{e_i}{e_1 + e_2} \tag{1}$$

We use the terminology of *effective legal argument* to capture the intuition that due to more formalism in court, litigation necessitates using more resources than private settlement for the same level of e_i.[6]

The resources underpinning the development of an effective legal argument means that the production of e_i will be associated with costs. These costs cannot only depend on e_i, but also on the relative merit of the respective claim which we denote hereafter by β_i, $i = 1, 2$. By construction, the relative merit of the contestants' claim must be diametrically opposed; if the context suggests that one of the party's contention is meritorious, it follows by logic that the claim by her opponent must be demeritorious. In order to model this anti-symmetry between the β_is, we define

$$\beta_1 = 1 - \mu \text{ and } \beta_2 = \mu \tag{2}$$

where $\mu \in (0, 1)$. The case $\mu = 1/2$ implies $\beta_1 = \beta_2$ and represents a setting where the contestants' claim appear to be equally valid. This could arise either because the initial evidence happens to look balanced or it could be due to a lack of legal clarity. A conflict which is more meritorious for one of the party can be represented by shifting μ to either end of the support.

These respective merit of a disputant's claim must have an impact on the costs of an effective legal effort. Specifically, we assume that for a dispute resolution mechanism m, party i's costs has the following form:

$$C_m(e_i, \beta_i) = F_m + \beta_i \frac{e_i^{\phi_m}}{\phi_m}, \quad m = a, l \tag{3}$$

[6]The terminology comes from labor economics where a distinction is often made between "labor input" measured by the number of hours someone works and "effective labor" which refers to what these hours produce (see e.g. Akerlof and Yellen 1990). In the current context "effort" is used for the lawyers' labor input whereas "effective legal argument" refers to the legal service produced therewith.

where F_m denotes the fixed cost and ϕ_m the associated cost elasticity parameter.[7] To gain an intuition as to how the different assumptions of the model work together, consider an increase in μ. Holding the effective legal arguments fixed, party 1's costs go down while those of her opponent are raised. Hence raising μ should be interpreted as a boost in the merit of party 1's contention.

With respect to the cost parameters ϕ_m and based on the maintained hypothesis discussed in the introduction, we impose the following condition:

Assumption 1: $\phi_l > \phi_a > 1$ *and*

$$\forall e \geq 0, \quad F_l + \beta_i \frac{e^{\phi_l}}{\phi_l} \geq F_a + \beta_i \frac{e^{\phi_a}}{\phi_a} \ . \tag{4}$$

This condition maps the foregoing intuition that the formalism of legal courts as compared to the flexibility of ADR[8] generates both higher costs and a larger cost elasticity for any effective legal argument. Finally, we postulate $\phi_a > 1$ in order to ensure that both cost functions are convex in effective legal argument.

Before solving for the equilibrium, we briefly discuss the effect of the level of costs on the winning probability. Suppose i is involved in a legal dispute that uses the conflict resolution mechanism m. Moreover suppose i has decided to spend c_i^m. We can use (3) to solve for the level of effective legal argument that is financed therewith;

$$e_i^m = \left(\frac{\phi_m}{\beta_i} \left(c_i^m - F_m \right) \right)^{1/\phi_m} \ . \tag{5}$$

Substituting (5) into (1) and writing the β_i in terms of μ yields:

$$\Pr\left[1 \text{ wins} \mid c_1^m, c_2^m, \mu\right] = \frac{\alpha^m \psi^m \left(c_1^m - F_m \right)}{\alpha^m \psi^m \left(c_1^m - F_m \right) + \psi^m \left(c_2^m - F_m \right)} \tag{6}$$

where $\alpha^m = \left(\frac{\mu}{1-\mu} \right)^{1/\phi_m}$ and $\psi^m \left(c_i^m - F_m \right) = \left(c_i^m - F_m \right)^{1/\phi_m}$. Equation (6) emphasizes the relationship of our framework to existing models. For in-

[7] One can easily generalize the model by replacing $\frac{e_i^{\phi_m}}{\phi_m}$ with a strictly increasing convex function $k_m(e_i)$. All the results derived in the paper would go through provided that we impose a level condition, $k_l(e_i) > k_a(e_i)$ for all $e_i > 0$, and a requirement on the elasticity $\varepsilon_l(e_i) > \varepsilon_a(e_i)$ of the respective cost function. We decided against such a generalization in order to keep the proof as simple as possible.

[8] The confidentiality feature of ADR could also contribute to justify the assumption.

stance, setting $\phi_m = 1$ and $F_m = 0$ exactly reproduces the Farmer and Pecorino (2010) setup.[9]

3 The Nash Equilibrium of the Tullock Contest

In this section, we consider the parties' incentive to invest in effective legal argument taking the conflict resolution method m and the characteristics of the disagreement (μ, D) as given and known to both sides. In their respective optimization problem, each party takes the effective effort of her opponent as given by the Nash Equilibrium. Hence i solves:[10]

$$\max_{e_i \geq 0} \ \frac{e_i}{e_i + \hat{e}_j^m} D - F_m - \beta_i \frac{e_i^{\phi_m}}{\phi_m} \text{ s.t. } (2) \tag{I}$$

where $(\hat{e}_1^m, \hat{e}_2^m)$ denotes the Nash equilibrium in effective legal argument. Accordingly, i's optimal response to $\hat{e}_j^m$ is implicitly defined by the first-order condition of (I):

$$\frac{\hat{e}_j}{(e_i + \hat{e}_j)^2} D - \beta_i e_i^{\phi_m - 1} = 0 \quad , j \neq i \ . \tag{7}$$

There is a symmetric expression defining j's optimal response. Using the response functions, we obtain the following result.

Proposition 1 *At the Nash equilibrium, both disputants allocate the same amount of resources to their effective legal argument. Moreover, contestant i produces the effective effort:*

$$\hat{e}_i^m = \left(\frac{\beta_i^{\phi_m^{-1}} \beta_j^{\phi_m^{-1}}}{\left(\beta_j^{\phi_m^{-1}} + \beta_i^{\phi_m^{-1}} \right)^2} \frac{D}{\beta_i} \right)^{\phi_m^{-1}} \qquad i \neq j \wedge i, j = 1, 2 \tag{8}$$

Proof. Multiplying i and j's first-order condition respectively with e_i and e_j implies the equality:

$$\beta_i \left(\hat{e}_i^m \right)^{\phi_m} = \beta_j \left(\hat{e}_j^m \right)^{\phi_m} , \quad j \neq i \wedge i, j = 1, 2 \tag{9}$$

[9] In contrast, specifying $\mu = 1/2$ and $F_m = 0$ generates an environment which satisfies the assumptions used by Corchon (2007).

[10] In order to avoid confusion, we write the optimizing vaviables in small roman letters, (x_1, x_2), and their value at the Nash equilibrium in capital letter (X_1, X_2).

It implies that at the Nash equilibrium both parties' variable costs must be equal. Adding the fixed costs verifies the first claim.

Using (9) to solve for $\hat{e}_j$, we obtain:

$$\hat{e}_j^m = \left(\frac{\beta_i}{\beta_j}\right)^{\phi_m^{-1}} \hat{e}_i^m, \quad j \neq i \wedge i, j = 1, 2 \ . \tag{10}$$

We can now substitute (10) into i's first-order condition. Rearranging the resulting equality and cancelling identical terms immediately yields (8). ■

Using (2), (8), and (9), we can rewrite the Nash equilibrium effective legal argument levels in terms of the conflict intensity. We can use the result to evaluate the disputants corresponding costs associated with the method m as a function of the parameters (μ, D) which characterize the conflict:

$$\widehat{C}_m(\mu, D) = F_m + \phi_m^{-1} \frac{(1-\mu)^{\phi_m^{-1}} \mu^{\phi_m^{-1}}}{\left((1-\mu)^{\phi_m^{-1}} + \mu^{\phi_m^{-1}}\right)^2} D \ . \tag{11}$$

From the first part of proposition 1, we know that we do not need to index $\widehat{C}_m(\mu, D)$ by the identity of the contestant. It also implies that $\widehat{C}_m(\mu, D)$ must be symmetric in μ around $\mu = 1/2$, i.e. $\widehat{C}_m(\mu, D) = \widehat{C}_m(1-\mu, D)$. Intuitively, it does not matter whether it is disputant 1 who has a meritorious claim and 2 a demeritorious. one, or the reverse. Taking derivative of (11) with respect μ gives the impact of making the contest more balanced ($\mu < 1/2$) or less balanced ($\mu > 1/2$) on the level of equilibrium costs. While cumbersome, it is nonetheless easily verified that

$$\frac{\partial \widehat{C}_m}{\partial \mu} = \frac{D}{\phi_m^2} \frac{(1-\mu)^{\frac{1}{\phi_m}-1} \mu^{\frac{1}{\phi_m}-1}}{\left((1-\mu)^{\frac{1}{\phi_m}} + \mu^{\frac{1}{\phi_m}}\right)^3} \left((1-\mu)^{\frac{1}{\phi_m}} - \mu^{\frac{1}{\phi_m}}\right) \ . \tag{12}$$

On the RHS of (12), the first two fractions are clearly positive. Hence, $\widehat{C}_m$ is increasing in μ for $0 \leq \mu \leq \frac{1}{2}$, decreasing otherwise and takes a maximum at $\mu = \frac{1}{2}$, i.e. when the parties' claim appear to have equal merit. Figure 1 plots the case $F_m = 0$, $\phi_m = 2$ and $D = 100$.

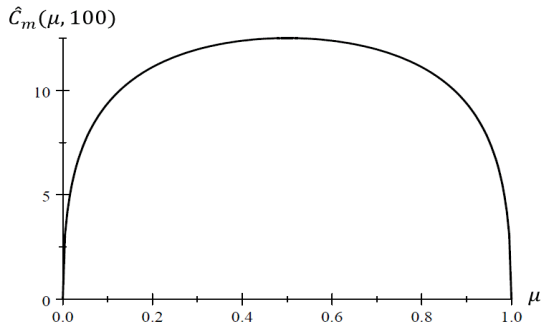

Figure 1: Disputants Costs at the Nash Equilibrium

Due to the symmetry, we only discuss the interpretation of the graph from the perspective of party 1. Using (9), equation (6) simplifies and can be written as:

$$\Pr\left[1 \text{ wins} \mid \widehat{C}_m, \mu\right] = \frac{\mu^{1/\phi_m}}{\mu^{1/\phi_m} + (1-\mu)^{1/\phi_m}} \tag{13}$$

As μ converges to the extremes either 1 almost surely loses ($\mu \to 0$) or almost surely wins ($\mu \to 1$). In both cases, the disadvantaged party has no interest to spend any resources. As a result, there is also no need for the meritorious party to incur spending. As μ moves toward the center of the support, the marginal benefit of the disadvantaged party increases inducing him to spend more resources and forcing her opponent to also raise spending. Finally, when $\mu = 1/2$ both claims are equally meritorious and total costs are at their highest level. Moreover, at the Nash equilibrium both contestants have the same chance of winning.

4 Litigation versus Arbitration: A Comparison

In this section, we compare the Nash equilibria associated with the respective conflict resolution mechanism. We examine how the choice of m impacts party's chances of winning, his expected utility and associated costs.

4.1 Winning probabilities

We only consider party 1. Due to the symmetry around $\mu = 1/2$, the logic then extend to the second party. Taking the derivative of (13) with respect

to ϕ_m yields

$$\frac{\partial \Pr}{\partial \phi_m}[1 \text{ wins} \mid \mu, \phi_m] = \frac{\phi_m^{-2}(1-\mu)^{\phi_m^{-1}}\mu^{\phi_m^{-1}}}{\left((1-\mu)^{\phi_m^{-1}} + \mu^{\phi_m^{-1}}\right)^2} \ln\frac{1-\mu}{\mu} \ . \tag{14}$$

The first fraction on the RHS is positive. Accordingly, the sign of $\frac{\partial \Pr}{\partial \phi_m}$ is determined by $\ln\frac{1-\mu}{\mu}$; for $\mu \in (0, 1/2)$ it is positive, at $\mu = 1/2$ it vanishes and it is negative otherwise. This means that when the cost elasticity to produce effective legal arguments increases (i.e. switching from ADR to litigation), the winning probability of the disadvantaged party (i.e. $\mu < 1/2$ in the case of party 1) increases. On the contrary, the winning probability of the advantaged party (i.e. $\mu > 1/2$ from the perspective of party 1) decreases.

Proposition 2 *Comparing the Nash equilibria associated with Litigation and ADR, we find that the probability of winning the legal contest by the disputant with the meritorious claim becomes smaller under litigation and that of the party with the demeritorious. claim larger.*

Proof. *The claim follows directly from (14) and $\phi_l > \phi_a$ by assumption 1.* ■

Figure 2 provides a graphical representation of proposition 2 using the numerical values $\phi_a = 2$ and $\phi_l = 4$. The graphic plots contestant 1's winning probabilities under litigation and arbitration by the solid and the dashed curve respectively.

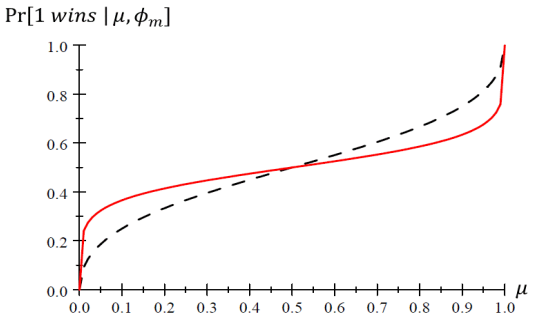

Figure 2: Winning probabilities of contestant 1 at the Nash equilibrium

There are three points in the diagram where judicial litigation and ADR produce the same chances of winning. First, as μ converges to 1 the situation

becomes increasingly advantageous to disputant 1. As the marginal costs of effective legal argument for party 1 converges to zero, individual 2 realizes he has no chance to win; $\hat{e}_2^m$ converges to 0 and disputant 1 wins almost certainly. Second, at the other extreme where μ converges to 0, the roles of the disputants are reversed and party 1 almost never wins. Finally, when $\mu = 1/2$ the claim of both appear to have equal merit. As discussed in the foregoing section, both parties' winning chance become equal at 1/2.

In all the other cases, 1's winning probability across the two conflict resolution mechanisms evolves differently. When the cost elasticity is high (i.e. using the court system), both parties reduce their effective legal argument as compared to a situation where the cost elasticity is smaller (as under ADR). The reduction in effective legal arguments means that the winning probabilities are more determined by luck and converge to 1/2. This is negative for the party with the meritorious case, but beneficial for her opponent.

4.2 Procedural efficiency

From (11), we concluded that under either conflict resolution mechanisms the variable costs goes to zero as μ converges to the end points of the support. Hence, given that the fixed costs associated with the respective mechanisms satisfy $F_l > F_a$, we find that for cases where the claim of one party becomes overwhelmingly meritorious ADR is clearly more cost efficient.

At the other extreme, in situations where both claims have equal merit, $\mu = 1/2$, the Nash variable costs associated with the respective mechanisms l and a simplify and satisfy:

$$\widehat{VC}_l\left(\frac{1}{2}, D\right) = \frac{D}{4\phi_l} < \frac{D}{4\phi_a} = \widehat{VC}_a\left(\frac{1}{2}, D\right) \ . \tag{15}$$

Intuitively, the change in ϕ has two implications for variable costs; a level and a marginal effect. The marginal effect of an increase ϕ is to reduce the $\hat{e}_i$. The level response goes in the opposite direction for $\hat{e}_i > 1$. It turns out that the marginal effect dominates because ϕ measures the elasticity of variable costs. However, the total effect on costs also depends on the difference in fixed costs between litigation and ADR.

Proposition 3 *Suppose the cost parameters and the disputed value D satisfy*

$$F_l + \frac{D}{4\phi_l} < F_a + \frac{D}{4\phi_a} \ . \tag{16}$$

In that case, there are situations where litigation becomes procedurally more efficient than ADR at the Nash equilibrium.

Figure 3 exemplifies the case of proposition 3 for the parameter constellation $D = 100$, $F_a = 0$, $F_c = 2$, $\phi_a = 2$ and $\phi_c = 4$. The graphic follows the same convention as above where the dashed and the solid curve represent the Nash equilibrium costs for ADR and for litigation.

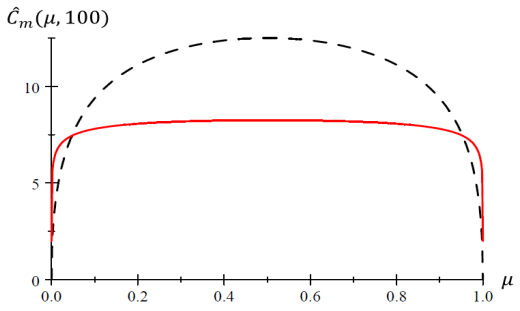

Figure 3: Cost comparison at the Nash Equilibria

As discussed above, at the extremes of the support the fixed costs differential dominates so that ADR is more cost effective. As the situation across contestants becomes more balanced (μ moves towards the center) the variable costs associated with litigation grow slower than those associated with ADR. In the figure, the fixed costs differential becomes exactly offset by the change in variable costs for $\mu \approx 0.05$ and $\mu \approx 1 - 0.05$. Accordingly, for $-0.05 < \mu < 0.95$ litigation becomes more advantageous because the reduction in variable costs compensates for $F_l - F_a$. Finally, observe that in Figure 3, the condition (16) is satisfied since at $\mu = 1/2$ the solid curve is below the dashed one.

4.3 Utilities comparison

From the perspective of procedural efficiency, the costs associated with the respective dispute resolution mechanism are decisive for a comparison. However, from the point of view of a contestant what matters for his choice between litigation and ADR is his expected utility associated with the corresponding method.

As in section 4.1 we focus on party1's problem. Assuming the parties have agreed to employ the resolution method m, party 1's Nash equilibrium utility is given by:

$$\widehat{u}_1^m(\mu) = \frac{\hat{e}_1^m}{\hat{e}_1^m + \hat{e}_2^m} D - F_m - (1 - \mu) \frac{(\hat{e}_1^m)^{\phi_m}}{\phi_m} \tag{17}$$

Substituting the Nash equilibrium solution (eq. 8), the definitions of the β_i (eq. 2), rearranging and cancelling common terms yields:

$$\widehat{u}_1^m(\mu) = -F_m + \left(1 - \frac{\phi_m^{-1}(1-\mu)^{\phi_m^{-1}}}{(1-\mu)^{\phi_m^{-1}} + \mu^{\phi_m^{-1}}}\right) \frac{\mu^{\phi_m^{-1}} D}{(1-\mu)^{\phi_m^{-1}} + \mu^{\phi_m^{-1}}} \tag{18}$$

For the sake of example, we use the foregoing numerical example to plot the utility of contestant 1 associated with ADR (dashed curve) and litigation (solid curve).

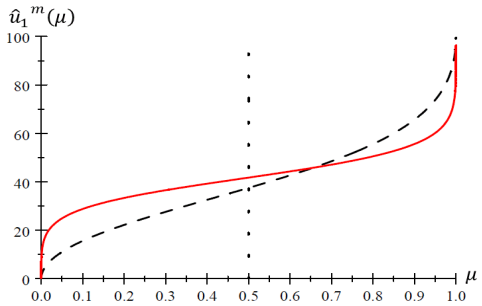

Figure 4: U_1^m for $F_a = 0$, $F_c = 2$, $\phi_c = 4$ and $\phi_a = 2$

By definition, the utility associated with m is a scaled representation of the related winning probability multiplied by D minus the applicable costs. Accordingly, if the cost differential at $\mu = 1/2$ were zero, the utility would intersect at that point; $\widehat{u}_1^l(1/2) = \widehat{u}_1^a(1/2)$. In Figure 3, the parameters are such that $\widehat{C}_l\,(1/2, D) < \widehat{C}_a\,(1/2, D)$ and hence $\widehat{u}_1^l(1/2) > \widehat{u}_1^a(1/2)$.

The representation in Figure 4 is obviously specific to the parameters which were selected. Suppose, we keep the variables F_a, ϕ_a and ϕ_l constant, but we increase the fix costs associated with litigation. For every μ, this would lower the utility associated with litigation. Geometrically, it shifts the solid curve downward. As a result, the intersection between the two utility curves, denoted hereafter by μ^I, shifts to the left. For sufficiently large litigation fixed costs, this intersection will occur at a point $\mu^I < 1/2$. For instance, with $F_l = 10$, we have:

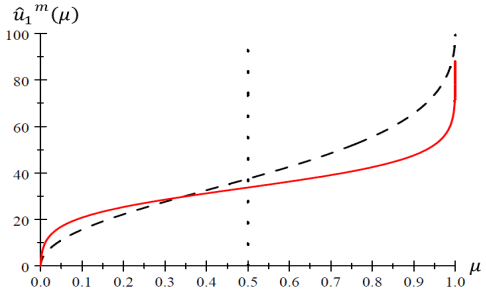

Figure 5: $\widehat{u}_1^m$ for $F_a = 0$, $F_c = 10$, $\phi_c = 4$ and $\phi_a = 2$

5 Selecting the Dispute Resolution Forum

In this section, we distinguish two possible timing for the decision of a dispute resolution forum. We first consider situations where the parties decision is made *ex-post that is* once the allocation of merit is known. Next, we analyze the alternative where the parties decide *ex-ante* which forum to employ in the case of an *ex-post* conflict. That setup is likely to occur for commercial dispute where the parties are already contractually related and can envisage how to deal with potential future disagreements.

5.1 Ex-post choice

Keeping in mind that the fallback option is litigation, the parties will only employ ADR if both contestants find it advantageous to do so. This creates a strong bias towards litigation. For instance, the set of situations represented in Figure 4 can only lead to litigation. Indeed, for any conflict characterized by $\mu < 0.65$ party 1 is better of by going to court while for $\mu > (1 - 0.65)$ it would prefer ADR. However, by a symmetric argument contestant 2 will never agree to ADR for $\mu > (1 - 0.65)$. Hence, there is no intersection over the support where both parties simultaneous agree to ADR. While the conclusion is specific to the parameter specification, the logic is more general and summarized in the next result.

Proposition 4 *Consider the parameters F_a, F_l, ϕ_l, ϕ_a and D. Suppose that $\mu = 1/2$ litigation is procedurally efficient, then there is no merit allocation $(\mu, 1 - \mu)$ where parties agree to ADR.*

Proof. Consider the case where

$$F_l + \frac{D}{4\phi_l} = F_a + \frac{D}{4\phi_a} \ . \tag{19}$$

At $\mu = 1/2$ both methods yield the same costs (i.e. in figure 3, the solid and the dashed curve just touch for $\mu = 1/2$). Moreover, for both mechanisms the respective winning probabilities are equal at $1/2$. Altogether, we have:

$$\widehat{u}_1^l\left(\frac{1}{2}\right) = \widehat{u}_1^a\left(\frac{1}{2}\right) \ . \tag{20}$$

It follows from Proposition 3 that any situation where litigation is procedurally efficient can be thought as a reduction in F_l compared to the associated case satisfying (19). Compared to that case, it means a shift in $\widehat{u}_1^l(\mu)$. Accordingly, we are in a situation similar to figure 4 where parties always end up in court verifying the claim. ■

In situations captured by Proposition 4, there is a tension between the procedurally efficient method and the decisions taken by parties. For instance, consider the figures 3 and 4 which have drawn using the same parameter constellation except for the change in F_l. From the discussion of figure 3, we already know that for $\mu \notin [-0.05, 0.95]$ using ADR would be procedurally efficient. However, by Proposition 4 in that region one party always finds it advantageous to insist on litigation. Observe that for given parameters F_a, F_l, ϕ_l and ϕ_a situations captured by Proposition 4 will always occur for sufficiently large D.

The tension between the procedurally efficient method and the decision by the parties becomes maximal in situations characterized by (19). Indeed for that case, plotting the Nash costs would verify (by construction) that ADR is procedurally efficient for all possible merit allocation. Nevertheless, the parties would always choose litigation! Geometrically, this occurs when in an analogon to Figure 3, the full curve (i.e. the litigation costs) is shifted upward (by the increase in F_l) in such a way that the two costs curve become tangent at $m = 1/2$. In that case, in the equivalent of Figure 4 the utility curves also intersect at $\mu = 1/2$. Hence, for $\mu < 1/2$ party 1 prefers ADR while party 2 prefers litigation. For $\mu > 1/2$ the roles are reversed but the implication the same; the contestants end up in court.

To conclude the section, two remarks are in order. First, for sufficiently large fixed costs differential or sufficiently small D the parties will agree on ADR. For instance, in the foregoing numerical example, setting $F_l \geq 16$ while holding the other parameter constant yields. Geometrically, these cases can be represented by an analogon to Figure 5 where the full curve (i.e. expected

utility under litigation) has been sufficiently shifted downward by the increase in F_l that it is entirely below the dotted curve. Intuitively, the higher fixed cost F_l makes litigation sufficiently costly to induce the parties to always agree to ADR. Figure 6 represents this result for $F_l = 16$.

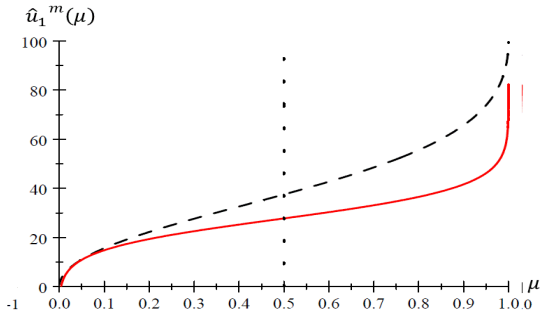

Figure 6: $\widehat{u}_1^m$ for $F_a = 0$, $F_c = 16$, $\phi_c = 4$ and $\phi_a = 2$

A similar result obtains for sufficiently small D (holding F_l unchanged). Intuitively, it sufficiently decreases the benefit to go to court for the weaker party.

Second, observe that when arbitration becomes initially advantageous for both parties, it starts around the point $\mu = 1/2$. The intuition follows from figure 2. With $\mu = 1/2$ both methods generate the same likelihood of winning. Hence all that matters is the cost differential. As long as (16) does not hold, the parties should use arbitration. As you move away from $\mu = 1/2$, the two methods yield different likelihood of winning. This distorts incentives. Again from Figure 2, the weaker party tends to prefer the court system because it improves its chances of winning. Altogether, evaluating the procedural efficiency which results when parties decide on the conflict resolution forum litigation ex-post, we find that it induces too much litigation.

5.2 Ex-ante choice

In this subsection, we consider situations where the parties can contractually agree beforehand on the conflict resolution forum to be employed should a need arise in some future. At the contracting stage, we assume that D is known, but μ is not.[11] Naturally, the parties have some anticipation about

[11]From (18), we know that the ex-post utility is linear in D. Accordingly,even if D was not yet known at the time of contracting, our conclusion would be unaffected if D and μ were independently distributed random variables. For that case, we can think of D as the expected value of the monetary equivalent of the conflict.

a potential conflict. We assume that these anticipations can be captured by the distribution of $H(\mu)$ over the support $(0,1)$. In the remainder, we assume that $h(\cdot) = H'(\cdot)$ is symmetric around $1/2$. Keeping in mind the relationship between β_i and μ, it implies $\Pr\left[\beta_1 \leq \overline{\beta}\right] = \Pr\left[\beta_2 \leq \overline{\beta}\right]$ for all $\overline{\beta} \in (0,1)$. Due to this symmetry, we can continue to focus on party 1.

Consider the situation if the parties have agreed to the conflict resolution mechanism m. In the case of a conflict, party 1's expected utility becomes

$$E\left[\widehat{u}_1^m\right] = E\left[\frac{\hat{e}_1^m(\mu)}{\hat{e}_1^m(\mu) + \hat{e}_2^m(\mu)}\right] D - F_m - (1-\mu)\frac{\left[\hat{e}_1^m(\mu)\right]^{\phi_m}}{\phi_m}. \tag{21}$$

In order to decide which mechanism it should prefer, party 1 solves for the difference $\Delta E\left[\widehat{u}_1\right] = E\left[\widehat{u}_1^l\right] - E\left[\widehat{u}_1^a\right]$. Note however the following equality

$$E\left[\frac{\hat{e}_1^l(\mu)}{\hat{e}_1^l(\mu) + \hat{e}_2^l(\mu)}\right] D - E\left[\frac{e_1^a(\mu)}{e_1^a(\mu) + \hat{e}_2^a(\mu)}\right] D = 0 \tag{22}$$

which follows from the double symmetry $h(\mu) = h(1-\mu)$ and $\Delta(\mu) = -\Delta(1-\mu)$ where

$$\Delta(\mu) = \frac{\hat{e}_1^l(\mu)}{\hat{e}_1^l(\mu) + \hat{e}_2^l(\mu)} - \frac{e_1^a(\mu)}{e_1^a(\mu) + \hat{e}_2^a(\mu)} \tag{23}$$

Accordingly, the difference $\Delta E\left[\widehat{u}_1\right]$ simplifies and becomes:

$$\Delta E\left[\widehat{u}_1\right] = F_l - F_a + E\left[\widehat{cv}_l(\mu, D) - \widehat{cv}_a(\mu, D)\right] \tag{24}$$

The simplification has an immediate implication summarized in the next result.

Proposition 5 *Suppose that for the parameters F_a, F_l, ϕ_l, ϕ_a and D ADR is procedurally efficient for all $\mu \in (0,1)$, then the parties find it optimal to contract ex-ante to resolve a conflict using ADR.*

The stark contrast between the propositions 4 and 5 associated the ex-post versus ex-ante decision is best seen when (19) is satisfied. We noted in the foregoing subsection that in such a context private settlement is always procedurally efficiency, but the parties would nevertheless always end up in court. In contrast, with an ex-ante agreement, the parties agree to ADR.

Suppose, we now reduce F_l slightly. Hence, in a ball just that around $\mu = 1/2$ litigation becomes cost efficient, but otherwise ADR remains procedurally better. In that case, ex-ante the parties would continue to agree on ADR as $\Delta E\left[\widehat{u}_i\right] > 0$. Accordingly, evaluating the ex-post efficiency of an ex-ante agreement on the conflict resolution forum, we find that it may lead to too much private settlements.

6 Conclusion and discussion

In this paper, we propose a model comparing ADR to litigation. Since ADR are less formal than courts, we assume that the cost structure of ADR is lower than that of litigation. Using a Tullock game, we show however that litigation may still entail fewer spending at equilibrium, and then be preferred by the disputants. This is all the more likely (i) the lower the fixed costs differential between court and ADR, (ii) the higher the compensation, and (iii) the more unbalanced parties are at the beginning. Our results then show why parties may still prefer to litigate, even if the cost structure of litigation is higher than that of ADR.

Our approach has however some limits. First, we mainly look at the trade-off between ADR and litigation as a cost/benefit analysis. Actually, other considerations may influence the choice of the parties to litigate or to use ADR. For instance, the need to make public a decision will give incentives to choose litigation rather than ADR. More broadly, justice is multidimensional and bringing a claim to court does not only reduce to cost considerations. For instance, court decisions are also worthwhile to make progress on law, and develop trust in institutions, hoping for economic development.

In addition, we model a situation where parties have the choice between ADR and litigation. Parties to a conflict often face such a choice. As an illustration, the recent European Directive 2013/11/EU aims at promoting ADR for consumers and traders to have the choice to solve their disputes without going to court. A new Directive (Alternative Dispute Resolution and Online Dispute Resolution) is under preparation to make ADR available for all contractual disputes in every market sector (e.g. travel, banking, dry cleaning) and in every Member State. ADR is not mandatory but an option for disputants. However, the assumption whereby parties are able to choose their conflict-resolution method can be discussed. To quote some examples, conciliation is required before going to court for labor conflicts in France, in the U.K. and in Australia. In some other situations, the judges may be granted with the power to choose whether the parties should first use ADR or not, so that the decision is made by the judges rather than by the parties. However, our model contributes to the debate on how to introduce ADR, and who should decide for it. We show that allowing the parties to choose how they want to solve their conflicts may not be efficient in some circumstances.

Related to this, ADR is not a pre-court settlement mechanism in our model. Our viewpoint is to explore what happens if the disputants could choose between two methods (ADR and litigation) to solve their conflicts. These methods are then exclusive and not successive. However, this does not represent a strong weakness of our reasoning, as parties can challenge

the decision in both methods. If a party is not satisfied with the outcome of any method, they can challenge it (through appeal under litigation, and through court under ADR). This also explain why we consider that there is always "a winner" under ADR and litigation: if this solution is not satisfying for one party, there is still the possibility to challenge this decision.

Another discussion could bear on the winning probabilities in the two conflict-solving methods. While the cost structures are different, the "structures" of the probabilities are the same. This reflects the implicit assumption that there is no "competency advantage" or bias of judges compared to third parties under ADR: both look at the evidence brought by the parties and interpret it in the same way. Introducing differences of competencies would not be entirely satisfying as there is no consensus on whether judges or other third parties have more specific knowledge on some issues. Moreover, if predictive values were different in ADR and litigation, it would be hard to consider a situation where both disputants (with opposing interests) would agree to choose one method rather than the other. We then assume that both ADR and litigation have the same predictive values but different cost structures.

Similarly, ADR fostering negotiation gathers different procedures (mediation, conciliation, neutral evaluation, ...). We consider here a general view of ADR, as a formal structure - but less formal than court- for the disputants to find a solution to their conflicts. Future researches could explore how different the various ADR procedures are, and how this impacts our results.

Let us add that we focus on the cost structure and implicitly assume that each party bears its own costs. Our model could then be extended to explore how cost allocation rules, or different litigation financing systems (insurance, contingent fees, third-party financing,...), could challenge our results.

Last, our interest is on the individual choice between ADR and litigation from the disputants' viewpoints. We do note explore all the welfare consequences of using ADR. For instance, one could wonder how the use of ADR impacts the number of disputes, their frequency, the proportion of frivolous claims, the social costs of justice (as a public service) or the levels of care.

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