

Choosing ADR or Litigation

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We model the decision by two contestants to select one of two conflict resolution forums in which to address their conflict; alternative dispute resolution (ADR) or litigation. Given a forum, we represent the parties' behavior by a Tullock contest. Because of the additional constraints disputants face in courts, we assume that the cost structure of providing effective legal arguments is higher under litigation. Paradoxically, litigation may be procedurally more efficient in equilibrium. The final choice of the parties is based on their respective utility and we show that a tension may arise with procedural efficiency. Finally, we also show that the timing of the decision of the conflict resolution mechanism (before or after the conflict arises) affects the choices the parties make.

1 Introduction

When a conflict arises, disputants usually attempt to negotiate and resolve the issue directly. If this fails, a litigation procedure where a civil court decides the outcome of the case is the standard dispute resolution process of modern justice systems. However, in many countries the last decades have witnessed a decrease in the effectiveness of this arrangement due to significantly higher numbers of court hearings, and consequently greater delays in handing down judgments.

This situation has led to increased interest in the use of Alternative Dispute Resolution (ADR) schemes within existing legal frameworks, but also attempts have been made to adjust the respective legal structures to fos-

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ter the use of ADR.¹ For instance, the International Chamber of Commerce (ICC) reports considerable increases in requests for arbitration and commercial mediation.² European Directive 2013/11/EU seeks to promote ADR in the consumer sphere, and an EU-wide online platform will be set up by 2016 for on-line dispute resolution.

In practice, the implementation of ADR, the means to achieve it and the success thereof have been very contrasted for various types of problem. For instance, in commercial disputes, arbitration has successfully established itself in the *laissez faire* environment in the tradition of the *Lex Mercatoria*. Commercial contractors often include of themselves a clause on the choice of dispute resolution forum in their initial agreement. At the other extreme, there are situations where the law makes ADR mandatory in some jurisdictions. For instance, in France, Australia, and the U.K., mediation or conciliation are mandatory before a hearing in labour law courts. There are also cases where a judge is granted the power to suggest or impose ADR on some litigants once a conflict arises.

As noted by a World Bank publication (World Bank, 2005, p.3), this raises a natural question as to whether “court-connected alternative dispute resolution (...) should be voluntary or mandatory”. In particular, “should the court have the power to order the two parties to try alternative dispute resolution even if one thinks it will be futile?” Furthermore, the question arises as to who should decide whether the parties should use ADR or to go to court; the parties to a conflict or a third person like the judge? These questions are at the center of our investigation. Moreover, we analyze a tension which may arise between the parties’ decisions and procedural efficiency.

In our analysis, we abstract from the characteristics of the many rules summarized under the heading ADR. Despite this level of abstraction, we emphasize four significant differences between ADR and courts. First, as noted by Shavell (1995), proceedings in civil courts typically impose a more formal structure based on the Code of Civil Procedure of the jurisdiction concerned. For instance, disputes have to follow prescribed steps which regulate the collection and presentation of information, require legal justification of claims and impose many delays. A second divergence is that information presented in courts generally becomes public knowledge whereas ADR allows information and the decision resulting from the conflict to remain confiden-

¹ADR refers to any means of settling disputes outside of the courtroom requiring the intervention of an external third-party (i.e. ADR does not include standard out-of-the court settlement). For more details on these mechanisms, see

https://www.law.cornell.edu/wex/alternative_dispute_resolution. In particular, ADR typically includes early neutral evaluation, conciliation, mediation, and arbitration.

²Last year alone, ICC reported an increase of 49,5% over 5 years.

tial (if so desired by the parties). A further difference is that courts are generally less specialized than ADR forums. As a result, courts more often seem required to call on outside expertise. Finally, in all modern countries, litigation is the fallback position; if parties cannot agree on ADR, fighting the conflict in a civil court is the last resort.

These differences have ramifications for the costs associated with the production of a legal argument under the respective dispute resolution forum and ultimately for the choice between the courts or ADR. The production of a legal argument includes all the legal activities that a party undertakes to increase its chances of winning. These activities include searching for clear evidence, legal information and jurisprudence that support the claim. In doing so, it must take into account the restrictions imposed by the dispute resolution forum. Finally, the associated costs follow from the mix of inputs and their respective costs.

In our analysis, we follow the usual economic paradigm; we take as a maintained hypothesis that for a given production level of an effective legal argument in a specific conflict resolution forum, a party selects inputs to minimize costs. The aforementioned additional constraints imposed by the court system (more formalism, publicizing information, ...) imply that, for the same level of production, costs and cost elasticity should be greater than under ADR. This observation is the starting point of a stylized model designed to study how the choice of a conflict resolution forum is made.

In the analysis, we consider two possible timings for the choice between ADR and litigation. We first imagine a situation where the choice occurs ex-post, that is after the conflict arises. This timing is typical for tort cases where the parties have no interaction prior to the occurrence of the harm. A key characteristic of the ex-post choice is that the determination of a conflict resolution forum occurs at a point in time where most of the facts associated with the parties' disagreement have materialized. We also consider the alternative possibility where parties decide ex-ante which forum to use in the event of a future disagreement. This alternative timing fits the aforementioned cases of commercial disputes.

Once a conflict resolution forum has been selected, and a controversy arises, the parties must determine how much effective effort to produce in order to maximize their respective payoffs. In our analysis, we model the resulting strategic interaction by a Tullock game. Despite the presumed cost advantage of ADR, we find that in the respective equilibrium parties may spend less under litigation. Intuitively, the higher cost elasticity associated with the court system disciplines the conflict parties and reduces their appetite for a legal contest. This generates countervailing cost effects; using litigation shifts the cost function upward, but reduces the input in the pro-

duction of legal arguments. Whenever the latter effect dominates, going to court becomes procedurally efficient.

From the point of view of contestants, however, what matters for the choice between litigation and ADR is not procedural efficiency, but rather their expected utility associated with the respective forum. Solving for the equilibrium choice, we find a stark difference between the ex-post and ex-ante decision. In the former, in terms of procedural efficiency parties litigate too often. This result occurs because once the characteristics of the conflict are realized the parties' opposite interests tend to dominate the decision.

When the parties select the conflict resolution forum ex-ante, it becomes easier to align incentives. Intuitively, the parties average out over the distribution of meritoriousness in potential future conflicts. This reduces the tension emanating from the symmetric opposition of benefits and refocus the determination of the conflict resolution forum on costs. In fact, we show that the parties may now agree too often on ADR.

Our analysis is related to the large body of law and economics literature which deals with conflict resolution. Traditionally this 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). With perfect information, parties are expected to settle, to save on litigation costs. 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. The cost of legal procedures then has a positive impact on the probability of settling the case (instead of litigating) because it increases the bargaining surplus.³

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 of winning without side payments. In this regard, our paper is related to recent law and economics literature that models conflicts in which agents can influence the outcome by hiring lawyers, looking for new evidence or ordering an expertise (Farmer and Pecorino, 1999; Corchon, 2007), Luppi and Parisi (2012), Dari-Mattiacci and Parisi (2014)). With this in mind, we will focus on the cost structure the parties support to increase their own chances of winning, rather than on exogenous amounts of litigation costs. This leads us to a surprising result compared to the previous literature: litigation may still be attractive for disputants, even if the cost structure for providing legal arguments is higher than for ADR. Second, we

³Following this literature, going to trial is often viewed as a procedural inefficiency resulting from negotiation failure. Sources of inefficiencies may come from asymmetric information, optimism, or other cognitive biases. See Hay and Spier (1998), Daughety and Reinganum (2012) and, Daughety and Reinganum (2014) for surveys.

focus on the choice the two disputants have to make to solve their conflict, when both litigation and ADR mechanisms are available. To our knowledge, this question has not been explored in the law and economic literature up to now, even though the public authorities continue to promote ADR as an alternative to litigation.⁴

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 modelling the individual choices of the parties when they have to decide whether to use ADR or to litigate. Other papers focus on how ADR may bring parties knowledge that they would not otherwise learn (Mitusch and Strausz, 2005; Goltsman et al., 2007; Ivanov, 2010; Rahman and Obara, 2010; Strausz, 2012). However, we do not explore informational problems here. Our interest rather bears on the cost structure of the two procedures (ADR versus litigation).

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 dispute over the allocation of a monetary value D . For instance, the conflict could be about which disputant should pay for accidental damage. Alternatively, it could involve the allocation of a valuable resource in a commercial dispute. In order to address their conflict, the parties can use one of two dispute resolution forums; judicial litigation or ADR that are denoted by $m = L, A$ respectively.

Whatever a dispute resolution mechanism is used, the likelihood of winning the conflict is the outcome of a simultaneous move in a Tullock contest in terms of respective variables referred to hereafter as *effective legal arguments*. The effective legal argument produced by party i (or its legal counselor) is denoted by $e_i \geq 0$, $i = 1, 2$. Following the logic of a Tullock game, we assume

⁴E.g. the recent report on ADR for the French Ministry of Justice (IGSJ (2015)); the enactment of a Mediation Law (Legislative Decree 28/2010) in Italy which has led to a wider use of ADR. Projects of ADR for on-line transactions are also promoted in the EU member states. More broadly, international institutions also foster the use of ADR (World Bank (2011), OECD (2014)).

that given a vector (e_1, e_2) party i wins the contest with the probability

$$p_i(e_1, e_2) = \begin{cases} \frac{e_i}{e_1 + e_2} & \text{if } e_1 + e_2 > 0 \\ \frac{1}{2} & \text{if } e_1 + e_2 = 0 \end{cases} \quad (1)$$

We use the terminology of an effective legal argument to capture the intuition that due to more formalism in court, litigation uses more resources than ADR for the same level of e_i .⁵

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 and the dispute resolution form employed, but will also hinge on the relative merit of the respective claim denoted hereafter by β_i , $i = 1, 2$. By construction, the relative merit of the contestants' claim must be diametrically opposed; if in the case at hand one of the parties' contention is meritorious, it follows that the claim of its opponent must be demeritorious. In order to model this anti-symmetry in the respective merit of the contention, we define

$$\beta_1 = 1 - \mu \text{ and } \beta_2 = \mu \quad (2)$$

where $\mu \in (0, 1)$. For instance, the case $\mu = 1/2$ yields $\beta_1 = \beta_2$ and represents a legal dispute where the contestants' claims 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 where the argument is more meritorious for one of the parties can be represented by shifting μ to either end of the support.

In order to keep the mathematics to a minimum, we assume that the cost function of effective legal effort takes the following form:

$$C^m(e, \beta) = F^m + \beta \frac{e^{\phi^m}}{\phi^m}, \quad m = A, L \quad (3)$$

where F^m denotes a fixed cost parameter and ϕ^m the associated cost elasticity parameter.⁶ To gain an intuition as to how the different assumptions of the

⁵The 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.

⁶One can generalize the findings by replacing $\frac{e^{\phi^m}}{\phi^m}$ with a strictly increasing convex function $k^m(e)$. All the results derived in the paper would extend provided that we impose a level condition, $k^L(e) > k^A(e)$ for all $e > 0$, and a requirement on the elasticity $\varepsilon^L(e) > \varepsilon^A(e)$ of the respective cost function.

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 requirement:

Assumption 1: $\phi^L > \phi^A \geq 1$ and

$$\forall e \geq 0, \forall \beta \in (0, 1), \quad F^L + \beta \frac{e^{\phi^L}}{\phi^L} > F^A + \beta \frac{e^{\phi^A}}{\phi^A} . \quad (4)$$

These conditions map the discussion in the introduction on the formalism of legal courts as compared to the flexibility of ADR. Intuitively, more formalism means adding additional restrictions on the cost minimization problem associated with the production of an effective legal argument.⁷ This should indeed generate both higher fixed costs and larger cost elasticity for any effective legal argument. Finally, we postulate $\phi^A \geq 1$ in order to ensure that both cost functions are convex in effective legal argument.

Before concluding the description of the model, a few remarks are in order to some of the underlying assumptions. First, our framework nests the well known model used by Farmer and Pecorino (1999) which were among the first authors to study equilibrium court costs using a Tullock game.⁸ A difficulty to directly see the relationship between the two setups is that Farmer and Pecorino did not explicitly model legal effort and, instead, formulated the winning probabilities in terms of the parties' costs. To see the similarity between the two approaches, suppose that in our model the parties agreed to employ the conflict resolution mechanism m and that the merit allocation is characterized by μ . In order to derive the winning probabilities as a function of costs, let us assume that party i decided to spend the amount c_i^m . We

⁷Many reports mention the formalism of legal courts compared to the flexibility of ADR. Consider the following examples. In October 2011 the World Bank's note on "settling out of court" states that ADR (compared to litigation) "provides confidentiality, choice of neutral parties, more flexibility of procedure" (p.1). A document published by "citizensadvice.org.uk" states that "the main advantages of using ADR are: (...) the procedure is less formal than going to court (...), the procedure is confidential" (<https://www.citizensadvice.org.uk/Documents/Advice%20factsheets/Consumer%20Affairs/c-alternative-dispute-resolution.pdf>). Last, the US Agency for International Development reports that "If the main problems with the courts are complex and inappropriate procedures(...) ADR programs can provide streamlined procedures to accelerate case disposition" (p.9) (<https://www.usaid.gov/sites/default/files/documents/1868/200sbe.pdf>).

⁸Their model has provided the base setup for a number of other papers, see e.g. Corchon (2007), Hirschleifer and Osborne (2001), and Garcia, Reitzes and Benavides (2005).

can now invert (3) to solve for the level of effective legal argument that i can finance therewith:

$$e_i^m = \left(\frac{\phi^m}{\beta_i} (c_i^m - F^m) \right)^{1/\phi^m}. \quad (5)$$

Substituting (5) into (1) and writing the β_i in terms of μ , we obtain for the probability that party 1 wins the conflict:⁹

$$q_1^m(c_1^m, c_2^m, \mu) = \frac{\alpha^m \psi^m (c_1^m - F^m)}{\alpha^m \psi^m (c_1^m - F^m) + \psi^m (c_2^m - F^m)} \quad (6)$$

where $\alpha^m = \left(\frac{\mu}{1-\mu} \right)^{1/\phi^m}$ and $\psi^m (c_i^m - F^m) = (c_i^m - F^m)^{1/\phi^m}$. The Farmer and Pecorino (1999) framework obtains for the parameters $\phi^m = 1$ and $F^m = 0$. Alternatively, setting $\mu = 1/2$ and $F_m = 0$ yields an environment which satisfies the assumptions discussed in Corchon (2007). In other words, the framework developed in the current paper nests the standard models that apply Tullock games to study court behavior.¹⁰

Second, in order to focus on the comparison between ADR and litigation, we do not consider out-of-court settlements. In any case, many conflicts are not resolved by an out-of-court agreement. Hence, an interpretation is that we target those cases.

Third, we also ruled out the possibility of a side payment which a party may offer in order to influence her opponent's decision of a dispute resolution forum. This may be relevant because litigation is the fall back position. Hence if i prefers ADR, but her opponent favors litigation, in the absence of a side payment the conflict will be resolved in court. A side payment could motivate the latter to accept ADR as a conflict resolution mechanism which would be efficiency improving if i 's gain is larger than the side payment. However, with the interpretation that our analysis focuses on the set of conflicts where parties could not settle out-of-court, it seemed to us unrealistic that the same individuals could agree on side payments. Moreover, the different attempts to incentivize ADR suggests that according to policy makers conflicts are too often resolved in court which suggests that for these cases side payments were not agreed upon.

⁹To reduce the complexity of notation and avoid confusion, we write: $q_i^m(c_1^m, c_2^m, \mu) \equiv p_i(e_1^m(c_1^m, c_2^m, \mu), e_2^m(c_1^m, c_2^m, \mu))$

¹⁰An alternative would have been to start our model directly with equation (6). We decided against it because we felt that it masks the relationship between the aforementioned formalism of legal courts and the way it impacts the winning probabilities.

3 The Nash Equilibrium of the Tullock Contest

In this section, we analyze the parties' incentive to invest in effective legal argument and solve for the Nash equilibrium. At this stage of the game, the conflict resolution method m and the characteristics (μ, D) associated with the conflict have already been determined and are known to both sides. In their respective optimization problem, each party rationally anticipates the effective legal effort produced by her opponent. Accordingly, party i solves:

$$\max_{e_i \geq 0} \frac{e_i}{e_i + a_j^m} D - F^m - \beta_i \frac{e_i^{\phi^m}}{\phi^m} \text{ s.t. (2)} \quad (\text{I})$$

whereby a_j^m denotes the Nash equilibrium in effective legal argument of party j . To keep notation to a minimum, we use the following convention in the remainder of the paper; party j always denotes i 's opponent and *vice versa* (i.e. if $i = 1$ then $j = 2$ etc.). The objective function in (I) is strictly concave so that i 's optimal response to his expectation about her opponent's behavior, $a_j^m > 0$, becomes implicitly defined by the first-order condition of (I):¹¹

$$\frac{a_j^m}{(e_i + a_j^m)^2} D - \beta_i e_i^{\phi^m - 1} = 0. \quad (7)$$

There is a symmetric expression defining j 's optimal response. Together these response functions define the Nash equilibrium. We summarize our findings in the ensuing 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:*

$$a_i^m = \left(\frac{\beta_i^{1/\phi^m} \beta_j^{1/\phi^m} D}{(\beta_j^{1/\phi^m} + \beta_i^{1/\phi^m})^2 \beta_i} \right)^{1/\phi^m} \quad i, j = 1, 2 \quad (8)$$

¹¹Observe that $(a_1^m, a_2^m) = (0, 0)$ cannot be a Nash equilibrium. For $a_j^m = 0$ a small increase in a_i from 0 to ε leads to a discrete jump in i 's probability to win from 1/2 to 1 for a marginal increase in costs. For $a_j^m > 0$ satisfying (7) leads to $e_i > 0$. Note that the argument assumes even $e_i = 0$ the parties pay F^m . Intuitively, even in the absence of any effort towards an effective legal argument the party must still show up at the conflict resolution forum. An alternative is to assume $D > F^L$. We ignore the issue in the remainder.

Proof. Multiplying i and j 's first-order condition respectively with a_i^m and a_j^m leads to the equality:

$$\beta_i (a_i^m)^{\phi^m} = \beta_j (a_j^m)^{\phi^m}, \quad i, j = 1, 2 \quad (9)$$

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 a_j^m , we obtain:

$$a_j^m = \left(\frac{\beta_i}{\beta_j} \right)^{1/\phi^m} a_i^m, \quad i, j = 1, 2. \quad (10)$$

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

We can use the foregoing result to solve for the Nash Equilibrium costs as a function of the mechanism resolution forum m and the conflict characteristics denoted hereafter by $\psi^m(\mu, D)$. Specifically, substituting (8) and (9), and using (2), we obtain:

$$\psi^m(\mu, D) = F^m + 1/\phi^m \frac{(1-\mu)^{1/\phi^m} \mu^{1/\phi^m}}{((1-\mu)^{1/\phi^m} + \mu^{1/\phi^m})^2} D. \quad (11)$$

The structure of $\psi^m(\mu, D)$ implies that the Nash equilibrium costs are symmetric in μ around $\mu = 1/2$, i.e. $\psi^m(\mu, D) = \psi^m(1-\mu, D)$. Intuitively, it does not matter whether it is disputant 1 who has a meritorious claim and 2 a demeritorious one, or the reverse. Taking the 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

$$\frac{\partial \psi^m}{\partial \mu} = \frac{D}{(\phi^m)^2} \frac{(1-\mu)^{\frac{1}{\phi^m}-1} \mu^{\frac{1}{\phi^m}-1}}{\left((1-\mu)^{\frac{1}{\phi^m}} + \mu^{\frac{1}{\phi^m}} \right)^3} \left((1-\mu)^{\frac{1}{\phi^m}} - \mu^{\frac{1}{\phi^m}} \right). \quad (12)$$

On the RHS of (12), the first two fractions are clearly positive. Hence, $\psi^m(\mu, D)$ 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 $D = 100$.

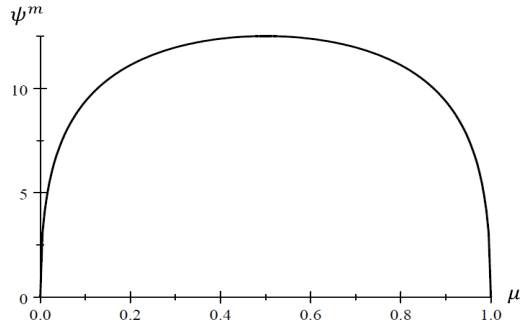


Figure 1: Disputants Costs at the Nash Equilibrium

Due to the symmetry, we only discuss the interpretation of the graph from the perspective of party 1. Keeping in mind that at the Nash equilibrium both have the same costs, equation (6) simplifies and can be written as:

$$q_1^m(\psi^m, \psi^m, \mu) = \frac{\mu^{1/\phi^m}}{\mu^{1/\phi^m} + (1 - \mu)^{1/\phi^m}} \quad (13)$$

As μ converges to the extremes, either 1 almost surely loses ($\mu \rightarrow 0$) or almost surely wins ($\mu \rightarrow 1$). In both cases, the disadvantaged party has no benefit to spend any resources. As a response, the meritorious party has also no incentives to invest. Altogether, neither party incurs spending. As μ moves toward the center of the support, the marginal benefit of the disadvantaged party increases inducing him to spend more resources. This induces 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 ADR: A Comparison

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

4.1 Winning probabilities

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

respect to ϕ_m yields

$$\frac{\partial q_1^m}{\partial \phi^m}(\psi^m, \psi^m, \mu) = \frac{(\phi^m)^{-2} (1 - \mu)^{1/\phi^m} \mu^{1/\phi^m}}{\left((1 - \mu)^{1/\phi^m} + \mu^{1/\phi^m} \right)^2} \ln \frac{1 - \mu}{\mu}. \quad (14)$$

The first fraction on the RHS of (14) is positive. Accordingly, the sign of $\frac{\partial q_1^m}{\partial \phi_m}$ 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 parties switch from ADR to litigation which produces an increase in the cost elasticity to produce effective legal arguments, the winning probability of the disadvantaged party (i.e. $\mu < 1/2$ in the case of party 1) increases. Conversely, 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. Symmetrically, the winning probability of the party with the demeritorious claim becomes 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 ADR by the solid and the dashed curve respectively.

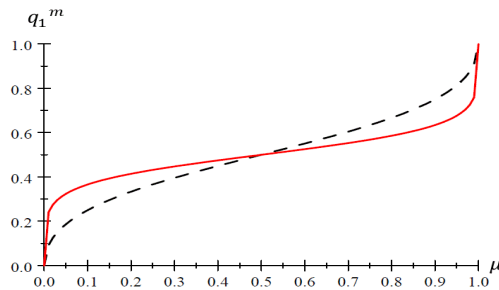


Figure 2: Winning probabilities of contestant 1 at the Nash equilibrium

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 cost of effective legal argument for party 1 converges to zero, individual 2 realizes he has no chance of winning; a_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 more meritorious case (i.e. $\mu > 1/2$), but beneficial for her opponent.

4.2 Procedural efficiency

In this subsection, we focus on the total costs at the Nash equilibrium associated with the respective conflict resolution mechanism. From (11), we concluded that under either conflict resolution mechanism the variable costs go to zero as μ converges to the end points of the support. Hence, given that the respective fixed costs satisfy $F^L > F^A$, we conclude that for cases where the claim of one party becomes overwhelmingly meritorious, ADR is clearly more cost effective and, hence, procedurally efficient.

At the other extreme, consider the situation where both claims have equal merit, i.e. $\mu = 1/2$. Using (11) to calculate the variable costs at the Nash equilibrium, $VC^m(\mu, D)$, we obtain:

$$VC^m\left(\frac{1}{2}, D\right) = \frac{D}{4\phi^m}. \quad (15)$$

Given that $\phi^L > \phi^A$ we obtain that with equal merit variable costs under litigation are always smaller than with ADR. Intuitively, the higher elasticity parameter associated with going to court sufficiently reduces the parties' incentive for a legal fight to compensate for the higher power of the costs function and to guarantee $VC^L\left(\frac{1}{2}, D\right) < VC^A\left(\frac{1}{2}, D\right)$. Accordingly, if the fixed costs differential is not too large, litigation remains more cost efficient. Next result summarizes the finding.

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

$$F^L + \frac{D}{4\phi^L} < F^A + \frac{D}{4\phi^A} . \quad (16)$$

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

Inequality (16) can be rewritten as follows

$$\frac{F^L - F^A}{D} < \frac{1}{4} \left(\frac{1}{\phi^A} - \frac{1}{\phi^L} \right) . \quad (17)$$

Accordingly, litigation is more likely to be procedurally efficient for large D and/or small fixed costs differences $F^L - F^A$.

Figure 3 exemplifies the case of proposition 3 for the parameter constellation $D = 100$, $F^A = 0$, $F^L = 2$, $\phi^A = 2$ and $\phi^L = 4$. The graphic follows the same convention as in the foregoing figure where the dashed and the solid curve represent the respective curves associated with ADR and litigation.

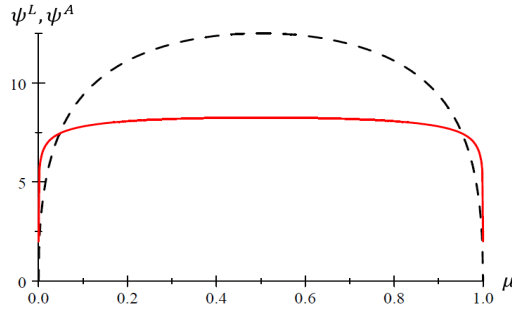


Figure 3: Cost comparison at the Nash Equilibria

As discussed above, at the extremes of the support the fixed costs differential dominates so that ADR is clearly more cost effective. As the situation across contestants becomes more balanced (μ moves towards the center) the variable costs associated with litigation grow more slowly 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 merit allocations such that $0.05 < \mu < 0.95$, litigation becomes more advantageous. 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

In the foregoing subsection on procedural efficiency, the costs associated with the respective dispute resolution mechanisms were decisive for the comparison. However, from the point of view of a contestant what matters for his choice between litigation and ADR is not cost but rather his expected utility associated with the corresponding method.

As in subsection 4.1 we focus without loss of generality on party 1's problem. Assuming the parties have agreed to employ the resolution method m , the Nash Equilibrium utility of party 1 is given by:

$$u_1^m(\mu, D) = q_1^m(\psi^m(\mu, D), \psi^m(\mu, D), \mu) D - \psi^m(\mu, D) \quad (18)$$

Proposition 4 *Suppose the cost parameters and the disputed value D satisfy (16), then we have $u_1^L(1/2, D) > u_1^A(1/2, D)$*

Proof. Keeping in mind that at $\mu = 1/2$, the winning probabilities are the same for both mechanisms, we have $u_1^L(1/2, D) - u_1^A(1/2, D) = \psi^A(1/2, D) - \psi^L(1/2, D) > 0$ by (16). ■

As an illustration, we use the foregoing numerical example to plot the utility of contestant 1 associated with ADR (dashed curve) and litigation (solid curve). Given that the example satisfies the condition (16), as predicted by proposition 4 contestant 1 has a higher Nash utility under litigation for $\mu = 1/2$.

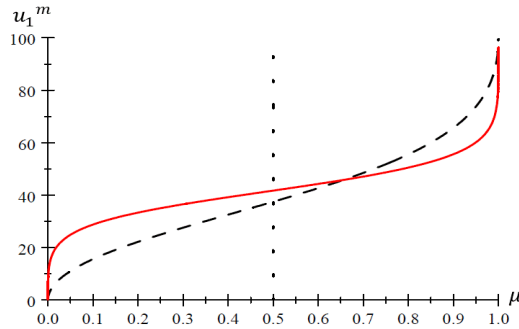


Figure 4: u_1^m for $F^A = 0$, $F^L = 2$, $\phi^A = 2$ and $\phi^L = 4$

The point of intersection between the two utility curves, denoted by μ_1^I hereafter, plays a key role in the remainder. As we can see from graphic, in the situation represented by Figure 4 individual 1 prefers litigation for any

merit allocation which satisfies $\mu < \mu_1^I = 0.65$. This 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 means that the solid curve is shifted downward while leaving the dashed curve remains unaffected as illustrated in Figure 5. As a result, the intersection between the two utility curves, i.e. μ_1^I , shifts to the left. For sufficiently large litigation fixed costs, the condition (16) is no longer satisfied and the inequality in Proposition 4 is reversed. Accordingly, the intersection of the two curves occurs at a point $\mu_1^I < 1/2$. For instance, with $F^L = 10$, we have:

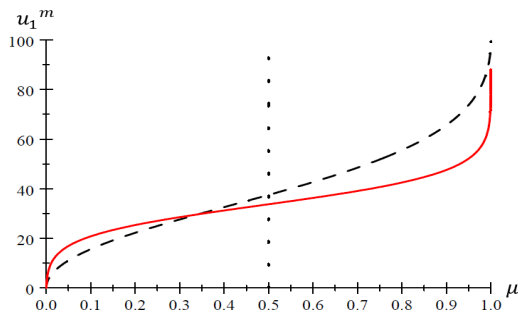


Figure 5: u_1^m for $F^A = 0$, $F^L = 10$, $\phi^A = 2$ and $\phi^L = 4$

5 Selecting the Dispute Resolution Forum

In this section, we distinguish two possible timings for the decision of a dispute resolution forum. We first consider a case where the parties decision is made *ex-post* that is once the conflict has arisen and the allocation of merit is known to the constestants. This type of configuration would automatically arise whenever conflict parties are not contractually bound prior to the occurrence of a conflict.

Next, we analyze the opposite case where the parties decide *ex-ante* which forum to choose in the event of a future conflict. That setup is likely to occur for commercial disputes where the parties can envisage how to deal with potential future disagreements at the signature of the initial contract.

In either case, the fall back dispute resolution forum is the one guaranteed by civil law. Accordingly, unless both parties agree to the use of ADR (*ex-ante* or *ex-post*), they will resolve their dispute in court. This arrangement naturally creates a strong bias towards litigation.

5.1 Ex-post choice

To start with consider the parameter constellation $D = 100$, $F^A = 0$, $F^L = 2$, $\phi^A = 2$ and $\phi^L = 4$ which was used for drawing Figures 3 and 4. Using these parameters, we concluded in subsection 4.3 that party 1 would favor litigation whenever the merit of her case satisfies $\mu < 0.65$ and ADR for $\mu > 0.65$. However, by a symmetric argument contestant 2 will prefer to go to court whenever the meritoriousness of his case satisfies $(1 - \mu) < 0.65$ or equivalently for $\mu > 0.35$. On the other hand, he would agree to ADR for $\mu < 0.35$.

Obviously, for the numerical example represented in Figures 3 and 4, there is no merit allocation where both parties simultaneously agree to ADR despite the fact that litigation is only procedurally efficient $0.05 < \mu < 0.95$.¹² While the conclusion is specific to the parameters used in this example, the logic is more general and summarized in the next result.

Proposition 5 *Suppose the cost parameters and the disputed value D satisfy (16), then there is no merit allocation $(\mu, 1 - \mu)$ where parties agree to ADR.*

Proof. From the foregoing subsection, we know that (16) implies that $\mu_1^I > 1/2$. Moreover, by proposition 4 party 1 prefers ADR if and only if $\mu \geq \mu_1^I > 1/2$. However by symmetry, party 2 prefers ADR if and only if $1 - \mu \geq \mu_1^I > 1/2$, hence for $\mu < 1/2$. Clearly no merit allocation can satisfy both requirements. ■

Situations captured by Proposition 5 leads to a tension between procedural efficiency and the decisions taken by parties whenever ADR becomes procedurally efficient. For instance, in the above example for $\mu \notin [0.05, 0.95]$ though ADR is procedurally efficient, by Proposition 5 one party always finds it advantageous to block the use of ADR. This type of tension will always occur when (17) is satisfied, for instance, for sufficiently large D . In those situations the parties are not efficient decision makers.

The tension between the procedurally efficient method and the decision by the parties becomes maximal in situations where the RHS and the LHS of (16) are exactly equal. In that case, 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 (for instance, by an increase in F^L) in such a way that the two costs curve become tangent at $\mu = 1/2$. In this case, in the equivalent of Figure 4 the utility curves intersect at $\mu = 1/2$. Hence, for $\mu < 1/2$ party 1 prefers ADR while party 2 prefers

¹²See the discussion of Figure 3 on page 4.2.

litigation. For $\mu > 1/2$ the roles are reversed. Hence despite the fact that ADR is procedurally efficient in every case, the contestants always end up in court.

The aforementioned tension between procedural efficiency and the parties' decision disappears for a sufficiently small D or a fixed costs differential that is large enough. For instance, in the foregoing numerical example, setting $F^L \geq 16$ while holding the other parameter constant yields such a case. The next graphic is an analogon to Figure 5 where the full curve (i.e. expected utility under litigation) has been sufficiently shifted downward by setting $F^L = 16$ that it is entirely below the dotted curve. Intuitively, the higher fixed cost F^L makes litigation sufficiently costly to induce both contestants to always agree to ADR for all merit allocation. Moreover, with $F^L \geq 10$ this is also efficient.

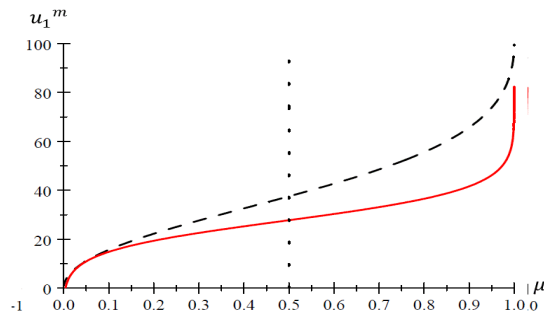


Figure 6: u_1^m for $F^A = 0$, $F^L = 16$, $\phi^L = 4$ and $\phi^A = 2$

A similar result obtains for sufficiently small D (holding F_l unchanged). Intuitively, these are situations where the benefit to the weaker party of going to court sufficiently decreases to make ADR attractive for both sides.

5.2 Ex-ante choice

In this subsection, we consider the situation where the parties can contractually agree beforehand on the conflict resolution forum to be chosen should the need arise in some future. In order to analyze the parties' forum choice, we need to extend the foregoing model to include the parties' anticipation at the contracting stage about the characteristic of a future conflict. For the sake of economy, we suppose that D is known, but μ is not.¹³ We denote by $H(\mu)$ the

¹³From (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

cumulative distribution of meritoriousness over the support $(0, 1)$. Moreover, we assume that $h(\cdot) = H'(\cdot)$ is symmetric around $1/2$. Keeping in mind the relationship between β_i and μ , it implies $\Pr[\beta_1 \leq \tilde{\beta}] = \Pr[\beta_2 \leq \tilde{\beta}]$ for all $\tilde{\beta} \in (0, 1)$. Due to this symmetry, we can continue to focus on the decision problem of party 1.

Consider a conflict situation where the parties have agreed to the conflict resolution mechanism m and the allocation of meritoriousness is $(\mu, 1 - \mu)$. The Nash equilibrium of the Tullock game in effective effort takes the exact same form as in section 3 so that the parties' respective effective legal argument is given by (8). Ex-ante the contestants will anticipate this outcome so that party 1's expected utility becomes:

$$\mathbf{E}[u_1^m] = \mathbf{E}\left[\frac{a_1^m(\mu)}{a_1^m(\mu) + a_2^m(\mu)}D - F^m - VC^m(\mu, D)\right]. \quad (19)$$

In order to derive which of the two conflict resolution forum it should favor, party 1 solves for the difference $\Delta \mathbf{E}[u_1] = \mathbf{E}[u_1^L] - \mathbf{E}[u_1^A]$. Note however the following equality

$$\mathbf{E}\left[\frac{a_1^L(\mu)}{a_1^L(\mu) + a_2^L(\mu)}\right] = \mathbf{E}\left[\frac{a_1^A(\mu)}{a_1^A(\mu) + a_2^A(\mu)}\right] \quad (20)$$

which follows from the double symmetry $h(\mu) = h(1 - \mu)$ and $\Delta(\mu) = -\Delta(1 - \mu)$ where¹⁴

$$\Delta(\mu) = \frac{a_1^L(\mu)}{a_1^L(\mu) + a_2^L(\mu)} - \frac{a_1^A(\mu)}{a_1^A(\mu) + a_2^A(\mu)} \quad (21)$$

Accordingly, the difference $\Delta \mathbf{E}[u_1]$ simplifies and becomes:

$$\Delta \mathbf{E}[u_1] = F^L - F^A + \mathbf{E}[VC^L(\mu, D) - VC^A(\mu, D)] \quad (22)$$

were independently distributed random variables. In that case, we would interpret of D as the expected value of the monetary equivalent of the conflict.

¹⁴Geometrically, this can be seen in Figure 2. More generally, observe that using (13) the equality $\Delta(\mu) = -\Delta(1 - \mu)$ follows because

$$1 = \frac{\mu^{1/\phi^L} + (1 - \mu)^{1/\phi^L}}{\mu^{1/\phi^L} + (1 - \mu)^{1/\phi^L}} = \frac{\mu^{1/\phi^A} + (1 - \mu)^{1/\phi^A}}{\mu^{1/\phi^A} + (1 - \mu)^{1/\phi^A}} = 1$$

or equivalently

$$\frac{\mu^{1/\phi^L}}{\mu^{1/\phi^L} + (1 - \mu)^{1/\phi^L}} - \frac{\mu^{1/\phi^A}}{\mu^{1/\phi^A} + (1 - \mu)^{1/\phi^A}} = \frac{(1 - \mu)^{1/\phi^A}}{\mu^{1/\phi^A} + (1 - \mu)^{1/\phi^A}} - \frac{(1 - \mu)^{1/\phi^L}}{\mu^{1/\phi^L} + (1 - \mu)^{1/\phi^L}}.$$

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

Proposition 6 *Suppose that for the parameters F^A, F^L, ϕ^L, ϕ^A and D the conflict resolution forum ADR is procedurally efficient for all $\mu \in (0, 1)$. Then the parties find it optimal to contract ex-ante to use ADR should a future conflict arise.*

The stark contrast between the propositions 5 and 6 associating the ex-post versus ex-ante decision is best seen when the RHS and LHS of (16) are equal. We noted in the foregoing subsection that in such a context ADR is procedurally efficiency for all the feasible merit allocation, but that in the case of an ex-post decision the parties would nevertheless end up in court. In contrast, with an ex-ante agreement proposition 6 implies that the parties would contractually bind themselves to use ADR should a conflict arise.

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 this case, ex-ante the parties would continue to agree on ADR as $\Delta E[u_i] > 0$. Accordingly, evaluating the ex-post efficiency of an ex-ante agreement on the conflict resolution forum, we find that contrary to the foregoing subsection, parties may now employ ADR too often.

6 Conclusion and discussion

In this paper, we present a model to study the choice of a conflict resolution forum by disputants. A maintained hypothesis in our analysis is that ADR mechanisms are less formal than court procedure, impose fewer constraints on the collection and presentation of information, allow for confidentiality and generally lead to shorter delays than litigation. Since ADR mechanisms impose fewer constraints, cost and cost elasticity of producing effective legal arguments are assumed to be lower than for litigation.

We analyze the aforementioned environment to analyze the parties' behaviors in court and ADR processes. We show that litigation may generate less spending at the Nash equilibrium and become procedurally more efficient. Intuitively, the larger cost elasticity acts as a commitment device inducing the parties to restrict spending.

However, the parties' decisions with respect to the choice of a conflict resolution forum depend on their respective benefit in an environment where litigation is the fallback position. This may create some tension between the choice made by the disputants and procedural efficiency. This tension is the higher, (i) the lower the fixed costs differential between court and ADR,

(ii) the higher the compensation, and (iii) the more unbalanced the parties are at the beginning. We also show that the timing of the decision matters. When the conflict resolution method is determined by the parties before the conflict arises, ADR may be chosen too frequently. When the choice is made after the conflict arises, litigation is used too often.

These results allow us to discuss the identity of the decision maker and the timing of the choice with regard to the decision on the conflict resolution method. As stated in the introduction, there is a wide range of situations across jurisdictions; in some environments disputants are free to choose the method they wish, and in other cases ADR is imposed by the law and/or decided by the judge.

We also believe that our model helps to better understand observed practices. ADR is widely used in some fields of law while it remains little considered in some others. For instance, 78 616 civil cases have voluntarily been through conciliation in 2013 in France (+24,7% compared to 2012) (IGSJ (2015)). However, compared to the 717 379 new cases brought in civil courts in 2013, conciliation still represents a small part of the total caseload. On the opposite, conciliation or arbitration clauses are widely chosen in commercial contracts. For instance, 90% of contracts in international trade have a clause allowing for arbitration in case of conflicts between the parties.¹⁵ Our model contributes to shed a new light on these observations by identifying several factors explaining the choice between these alternatives.

Regarding policy recommendations, our results show that the disputants' choice is not always consistent with procedural efficiency, so that transferring the decision to the judge may avoid inefficiency. Moreover, we find that ADR is not always the best method to minimize global costs, which implies that it should not be always demanded. For instance, when the fixed cost differential is low and the compensation D is high, ADR is likely to entail overspending, such that litigation may be more efficient, i.e. leads to lower total costs incurred by the two parties.

In our analysis, we model the contest between the parties by a Tullock game. Using a different game form may yield different results in terms of the cost comparison. However, the conclusion with respect to the ex-post and ex-ante tension is likely to remain. The intuition is that ex-post the parties clearly have divergent interests as long as the costs are too high relative to the benefits. Conversely, assuming meritoriousness is symmetrically distributed, we should still find that the expected benefit adds up to zero. Accordingly, it will be the cost difference that will matter.

¹⁵Source:<http://www.affiches-parisiennes.com/l-entreprise-face-au-choix-de-l-arbitrage-4213.html>)

A number of significant factors are absent from our analysis. For instance, we ignore the issues relating to publication of judgments, which obviously differs from court to ADR, since ADR typically allows for confidentiality. In addition, we subsumed all the different forms of alternative dispute resolution mechanisms into a single scheme. In reality, there are considerable differences between mediation, conciliation and arbitration etc. All these items provide interesting avenues for future research.

References

- Akerlof, G., and Yellen, J. (1990). The Fair Wage–Effort Hypothesis and Unemployment. *The Quarterly Journal of Economics*, 105(2), 255–283.
- Garcia, A., Reitzes, J., and Benavides, J. (2005). Incentive Contracts for Infrastructure, Litigation and Weak Institutions. *Journal of Regulatory Economics*, 27(1), 5-24.
- Cooter, R., and Ulen, T. (2012). *Law and Economics*. Pearson Edition.
- Corchon, L. (2007). The Theory of Contests: A Survey. *Review of Economic Design*, 11, 69–100.
- Dari-Mattiacci, G., and Parisi, F. (2014). Returns to Effort in Rent-seeking Games. *Public Choice*, 159(1), 9–104.
- Daughety, A. F., and Reinganum, J. F. (2012). Settlement. *The Encyclopedia in Law and Economics*, Volume 8, Chapter 15: Procedural Law and Economics. Elgar Publishing.
- Daughety, A. F., and Reinganum, J. F. (2014). Settlement and Trial: Selected Analyses of the Bargaining Environment. *Vanderbilt university department of economics working papers 14-00006*, Vanderbilt University Department of Economics.
- Farmer, A., and Pecorino, P. (1999). Legal Expenditure as a Rent-seeking Game. *Public Choice*, 100(3), 271-288.
- Goltsman, M., Hörner, J., Pavlov, G., and Squintani F. (2009). Mediation, Arbitration and Negotiation. *Journal of Economic Theory*, 144(4), 1397-1420.
- Hirshleifer, J., and Osborne, E. (2001). Turth Effort and the Legal Battle. *Public Choice*, 100, 169-195.
- Hay, B., and Spier, K. (1998). Settlement of Litigation. *The New Palgrave Dictionary of Economics and the Law*. MacMillan Reference Limited, Peter Newman, editor.
- IGSJ (2015). *Rapport sur le développement des modes amiables de résolution des litiges*. Inspection Générale des Services Judiciaires.

- Ivanov, M. (2010). Communication via a Strategic Mediator. *Journal of Economic Theory*, 145(2), 869-884.
- Luppi, B., and Parisi, F. (2012). Litigation and Legal Evolution: Does the procedure matter? *Public Choice*, 152(1), 181–201.
- Mitusch, K., and Strausz, R. (2005). Mediation in Situations of Conflict and Limited Commitment. *Journal of Law, Economics, and Organization*, 21(2), 467-500.
- OECD (2014). *BEPS Action 14: Make Dispute Resolution Mechanisms More Effective*. Public Discussion Draft.
- Rahman, D., and Obara, I. (2010). Mediated Partnerships. *Econometrica*, 78(1), 285 – 308.
- Reinganum, J. F., and Wilde, L. (1986). Settlement, Litigation, and the Allocation of Litigation Costs. *RAND Journal of Economics*, 17(4), 557–566.
- Shavell, S. (1995). Alternative Dispute Resolution: An Economic Analysis. *The Journal of Legal Studies*, 24(1), 1–28.
- Strausz, R.(2012). Mediated contracts and Mechanism Design. *Journal of Economic Theory*, 147(3), 1280-1290.
- Tullock, G.(1980). *Efficient Rent-seeking* in: J.M. Buchanan, R.D. Tollison, and G. Tullock, *Toward a theory of the rent-seeking society*, (Texas A.& M. University Press, College Stationn), 97-112.
- World Bank (2005). *Alternative Dispute Resolution: When it works, When it doesn't*. PremNotes, Public Sector, 99, 1-4.
- World Bank (2011). *Alternative Dispute Resolution Guidelines*. Investment Climate Advisory Services of the World Bank Group.