Relevant Characteristics of Third Party Decision Making in Joint Venture Disputes: The Case of Commercial Arbitration

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Abstract

Parties involved in an international joint venture face the risk that their investments are hold-up in a dispute with the other party. This might be an important reason why joint ventures and other forms of organization with joint asset ownership appoint third parties, such as arbitrators, to resolve their disputes. This paper, in a first step, addresses formally how third party decision making can mitigate the hold-up problem of joint asset ownership by verifying the parties’ investment levels. Since the third party decision maker acts as an investment verification mechanism, he initiates a contest for the surplus of the joint venture and thereby sets additional incentives to invest. On the basis of this formal consideration, observability, enforcement, and short proceedings are identified as crucial characteristics for effective third party decision making. In a second step, the paper argues that commercial arbitration has a comparative institutional advantage over ordinary courts due to these characteristics. Moreover, arbitration can be considered as an integral part of the organization’s structure. This novel characterization of arbitration within the boundaries of the firm improves the understanding of organizational structures with joint ownership and explains why arbitration is preferred over ordinary courts as a third party decision making mechanism.

Keywords: Third party decision making, Joint ventures, Investment hold-up, Investment verification

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1 Introduction

In recent years, commercial arbitration has become increasingly popular as a means of dispute resolution between business partners, especially in international contexts. Examples of this are the joint construction of oil platforms, large construction sites such as airports, and the development of new technologies like semi-conductors, software or pharmaceuticals. In those ventures, the partners pool their specific capabilities in order to mutually exploit their strategic interdependency (Gulati, 1995, 1998; Argyres and Mayer, 2007; Chi, 1996). The typical legal forms of those business agreements are joint ventures, but more complex legal forms such as industry consortia are also possible. For the purpose of this paper, the term joint venture covers the various legal forms which those business agreements can take.

The advantages of arbitration compared to ordinary courts can be summarized in four points. Neutrality: partners in an international joint venture prefer a jurisdiction for their disputes that is not linked to the home country of one of the partners, since that would imply the risk that the local legal system is not fully understood or that the ordinary court is biased against foreign companies. Privacy: it is easier to maintain business with partners after the conflict resolution if the case is not discussed in public, for instance by avoiding reputation damage. Expertise of the tribunal: an arbitration court is formed by experts from the field in order to resolve the conflict. Final and enforceable decisions: arbitration usually does not foresee appeal, giving the parties a clear prospect for their future cooperation and plans. Because of the New York Convention of 1958 – which has been signed by more than 140 countries – the enforcement of the decision award is easier than that of a domestic court’s ruling (Casella, 1996; Mentschikoff, 1961; Lumineau and Oxley, 2012).

The growing importance of commercial arbitration is accompanied by a shift in the organizational structure of business forms mainly from large, conglomerative corporations towards more flexible interorganizational arrangements that mirror contractually the specific task of the cooperation (Ménard, 2013; Baker et al., 2008). Those complex organizational forms are often hybrids (Williamson, 1991) in the sense that they range between pure market transactions and vertically integrated firms. They usually lack a formal, internal authority because the assets are jointly owned by the participating parties. Thus, no party individually holds the residual right of control. As a consequence, no single party has exclusive authority over the produced surplus (Hart, 1995, 30).
In the absence of effective governance, these hybrid organizations are vulnerable to hold-ups by individual parties which can impede fruitful cooperation (Klein et al., 1978). An obvious solution to prevent these investment hold-ups is vertical integration. This means allocating the decision rights to the most important party involved in the joint venture. However, in situations in which the investment decisions of all participating parties are equally important, vertical integration faces a problem. The vertical decision making structure deprives the integrated party from optimal investment incentives (Grossman and Hart, 1986; Hart and Moore, 1990).

For this reason, alternative governance structures and elaborated contract designs are necessary (Schwartz and Scott, 2003; Gibbons, 2005b; Argyres and Mayer, 2007). In order to be successful in preventing hold-ups between the parties, these governance mechanisms should ideally tackle the problem from its root: the unverifiability of the investment levels (Kvaløy and Olsen, 2009). This unverifiability is caused by the fact that while information about the investment behavior is often observable by the parties, they might have insufficient evidence which is court-admissible to prove those investments levels. This makes it difficult for an ordinary court to act as third party decision maker since courts are bound by procedural rules to only judge based on approved evidence.

This paper argues that arbitration is a third party decision making mechanism that overcomes this procedural rules problem. Because of his private nature, an arbitrator is not bound by strict procedural rules, for example in admitting evidence (Born, 2009, 1739-1765). Therefore, he has the necessary latitude to make his decision only in accordance with his understanding about the investment levels. Moreover, due to the aforementioned characteristics of privacy and expertise of the tribunal, arbitrators have better access to the internal information flow of joint ventures than ordinary courts. As a result of the two, arbitration works as an investment verification device that avoids the necessity of transforming a hybrid organization into a single firm and forfeiting the advantages of (knowledge) specialization. Along these lines, one may argue that arbitration is a "contracting institution" that has comparative advantages against other contractual arrangements and ordinary courts when coordination of specific investments is necessary (Casella, 1996; Antràs, 2014). Hence, commercial arbitration can be understood in the framework of the boundaries of the firm as an integral part of a hybrid organization’s governance structure; it is essential for setting optimal investment incentives within hybrids.

The arbitrator creates additional incentives to invest by inducing a surplus-seeking contest. This means that he rewards higher investment levels with a greater share
of the joint venture's surplus. As a consequence, the parties of the joint venture will compete for the surplus by increasing their investment. Yet, this investment promotion faces the risk of leading to overinvestment. For this reason, the arbitrator has to carefully set the contest incentives in order to balance the problem of underinvestment with the risk of overinvestment.

If arbitration is understood as an internal affair of an organization rather than as a substitute to ordinary courts (Katz, 2008), little room remains for the much heard argument against arbitration that it would hamper the development of case law due to its private character (Paulsson and Rawding, 1995; Knahr and Reinisch, 2007). Instead, the debate on arbitration can focus on the incentives of the arbitrator compared to those of managers and other actors within the boundaries of a hybrid organization. Taking that perspective, this paper aims at contributing to the literature on the institutional structure of production (Coase, 1992).

2 Arbitrated Joint Venture Disputes

Because of its private nature, the results of joint venture disputes that were solved by commercial arbitration are usually not published. This situation makes it nearly impossible to provide a comprehensive empirical overview of arbitrated joint venture disputes. Nevertheless, certain cases with specific relevance for the development of arbitration case law are published anonymously.

This section makes use of this practice by taking four of these anonymously published cases as examples to illustrate typical disputes in an international joint venture. Leaving aside the legal specifics, the presentation of these example cases concentrates on their facts because the idea is rather to provide an abstracted impression of the nature of these disputes than a profound legal analysis.

In order to present the nature of these example disputes, the claimant and the respondent are mentioned. Secondly, the purpose of the joint venture and its ownership structure are briefly introduced. Thirdly, the dispute between the joint venture’s parties is sketched. These disputes fall into two broad categories: On the one hand conflicts about the distribution of the surplus (profit or other benefits) that the joint venture had produced and on the other hand disagreement about the contributions a party made to the joint venture. Each example concludes with the arbitrator’s decision and his characteristics as third party decision maker. These characteristics will then serve in a stylized manner as basis for the formal analysis.
2.1 Mother company of joint venture corporation shareholder (US) v. venture corporation shareholder (Mexico)

In the 2013 case *Mother company of joint venture corporation shareholder (US) v. venture corporation shareholder (Mexico)*, which was arbitrated under French jurisdiction by the International Court of Arbitration of the International Chamber of Commerce in San Diego (United States), the main cause of dispute was disagreement over the distribution of the profit of the joint venture.\(^1\) The claimant (C), a US company, and the respondent (R), a Mexican venture corporation, engaged into a joint venture for the operation of C’s warehouse stores in Northwest Mexico. 50% of the ownership shares of the joint venture were allocated to C whereas the other 50% were allocated to R.

The profits were almost entirely reinvested and hence the joint venture produced an accumulated, single surplus until the moment at which the dispute arose. This occurred 15 years after the joint venture was founded because R desired the distribution of the accumulated profit. In order to do so, it took two actions: First, it removed the director of operations, a former employee of C. Second, it called for a shareholder meeting to "decide on the distribution of dividends".\(^2\) This meeting ended in a deadlock between C and R and triggered further negotiations about the distribution of the joint venture’s surplus.

In the course of these negotiations regarding the profits distribution, R filed a case at a local court attempting to force a distribution of the surplus. Through the court decision, R acquired the payment of its dividends, according to Mexican company law. In response C started the arbitration proceedings against R, arguing that R violated the contractual mechanisms for resolving a deadlock. The arbitrator followed the argumentation of C and ordered R to repay the dividends to restore the joint venture’s financial status. With this award the arbitrator enforced the surplus sharing rule that the parties agreed on at the foundation of the joint venture.

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\(^2\) Ibid. p. 127.
2.2 Limited Liability Company (Bahrain) v. Establishment (Saudi Arabia)

In the 2006 case Limited Liability Company (Bahrain) v. Establishment (Saudi Arabia), which was arbitrated under Bahrain jurisdiction by the Gulf Cooperation Council Commercial Arbitration Center in Manama (Bahrain), a main cause of dispute was the respondent’s failure to provide balance sheets for the joint venture and the resulting ambiguity about its financial state. The claimant (C), a limited liability company from Bahrain, and the respondent (R), the owner of a Saudi Arabian Establishment, engaged into a joint venture for the operation of R’s establishment. 83.33% of the ownership shares of the joint venture were allocated to C whereas the other 16.67% were allocated to R. Additionally, R held 16.67% of C’s shares. Because of its majority position C was appointed as the manager of the joint venture, but the de facto management was with R.

In 2002 R violated its obligation to report the joint ventures financial situation in terms of the provision of balance sheets. C, subsequently, alleged that R attempted to embezzle the joint venture’s surplus and hence invoked arbitration proceedings. The arbitration court applied expert knowledge in order to survey the financial and contractual situation of the joint venture to verify the allegations. Because of the extensive assignment of the expert, the time limit of concluding the arbitration was extended by the GCC Commercial Arbitration Center. As a result of the expert’s investigations, the arbitrator awarded C SAR 17,746,462 from R. By applying the expert’s knowledge, the arbitrator verified the joint venture’s surplus and enforced its intended sharing.

2.3 Construction Company v Construction Company

In the 1996 case Construction Company v Construction Company, which was arbitrated under Swiss jurisdiction by the International Court of Arbitration of the International Chamber of Commerce in Geneva (Switzerland), the dispute concerned disagreement over the beneficiary of two Export Incentive Certificates issued by the

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Turkish state. The claimant (C), a US construction company, and the respondent (R), a Turkish construction company, entered into a joint venture for a construction project for a Turkish authority. 50% of the ownership shares of the joint venture were allocated to C whereas the other 50% were allocated to R. R was appointed as manager of the joint venture company.

Before and shortly after the foundation of the joint venture, R got issued two Export Incentive Certificates (EIC) by the Turkish state. These EICs granted the holder benefits that were in relation with the activities of the joint venture and therefore accounted to its surplus. Six years after the establishment of the joint venture R sought payment of the share of the surplus concerning the EICs' benefits. Because of the ownership structure, no decision regarding the sharing was reached in the board of the joint venture. As a result, R issued a "leadership decision" that granted itself the whole share of the surplus that was generated by the EICs' benefits. Hereupon, C called for arbitration, claiming that it was agreed in the joint venture agreement that the benefits of the EICs are to be enjoyed by the joint venture. R replied that Turkish law prohibits benefits derived from EICs to be shared with foreign entities.

In his decision the arbitrator differentiated between tax benefits and savings derived from EICs. The EICs’ tax benefits are governed by Turkish law. As a consequence they are non-transferable privileges, to which R is solely entitled to. The tax savings, on the contrary, are governed by private contractual agreement between C and R. Therefore, the stipulations in the joint venture agreement apply and hence the joint venture is entitled to these benefits. By applying his expert knowledge in legal, contractual and financial aspects, the arbitrator defined and delimited the joint venture's surplus and enforced the contracted sharing rule.

2.4 First Investor, in liquidation (EU country), Second Investor (EU country) v Ministry of Agriculture (Non-EU country)

In the case First Investor, in liquidation (EU country), Second Investor (EU country) v Ministry of Agriculture (Non-EU country), which was arbitrated by the International Court of Arbitration of the International Chamber of Commerce in Geneva

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5 Ibid. p. 341.
(Switzerland), the dispute concerned a failure by the respondent to contribute adequately to the joint venture.\textsuperscript{6} The claimant (C), two investors from European Union countries, and the respondent (R), the Ministry of Agriculture of a Non-EU country, entered into a joint venture for the cultivation of agricultural products and breeding of livestock, as well as their sales and distribution. The joint venture agreement stipulated that C contributes with funding and that R contributes with land, workforce, equipment and facilities. Moreover, it was agreed that the joint venture would stop operations if it would be not profitable for a five years period (cease agreement).

From the beginning the joint venture had difficulties starting operations mainly because the land was only partially cultivated due to property conflicts with sedentary farmers, a lack of available workforce, protests and not sufficient office space. The parties negotiated to remedy the problems and adapted their agreement respectively. Nevertheless, the joint venture was producing losses over the first years. In the course of an outbreak of a conflict in a neighboring country, R inquired C if part of the joint venture's land could be used by an international organization to host refugees. C agreed to this request that the international organization may use "a particle"\textsuperscript{7}. Thereupon, R made the whole land available for the international organization. Because accommodation facilities were established on the land by cementing the surface, a vast effort would be required to restore the land for agricultural production.

As a result, C rejected further financial contributions to the joint venture and demanded its liquidation according to the initial cease agreement by invoking arbitration proceedings. After determining his jurisdiction, the arbitrator examined the claim that R had failed to fulfill its contribution obligations. As a result of his verification of the contributions to the joint venture, the arbitrator determined that R had failed its contribution duty. Therefore, the arbitrator ordered the dissolution of the joint venture and awarded C damages to the amount of its financial contributions. In his role as third party decision maker, the arbitrator verified the parties' contributions and concluded this in the final award.

\textsuperscript{6}First Investor, in liquidation (EU country), Second Investor (EU country) v Ministry of Agriculture (Non-EU country), Final Award, ICC Case No. 12112 in Albert Jan van den Berg (ed), Yearbook Commercial Arbitration 2009- Volume XXXIV, Yearbook Commercial Arbitration, Volume 34, Kluwer Law International, pp. 77 - 110.\textsuperscript{7}Ibid. p. 77.
3 Hybrids, Arbitration and the Theory of the Firm

In a seminal paper Williamson (1991) is the first to elaborately discuss the hybrid organization, defining it as a distinct type of governance structure that lies between market and hierarchy. His starting point is that organizations have to adapt to changing situational contexts, in order to survive, and that organizational types vary in their capacity to adapt accordingly. He distinguishes between two types of adaptation, autonomous and cooperative, which mirror in the two generic governance structures of market and hierarchy. In particular, in the governance mode 'market' autonomous adaptation works best to address changes, whereas in 'hierarchy' cooperative adaptation is most efficient. The hybrid organization, as a combination of market and hierarchical features, has the advantage of being reasonably suitable to tackle both types of adaptations. As a result the concrete situational context determines, which governance mode is the most suitable to keep an organization viable.

More recently, Zingales (2000) describes from a corporate finance point of view the development of the theory of the firm with special reference to the boundary problem. He argues that the incumbent theories of the firm are certainly a necessary fundament for a principal understanding of firm organization. However, in recent years the traditional approaches towards a theory of the firm have lost their predominance as the standard role model for the more complex organizational structures, as hybrids, which are widely emerging. Today the boundaries of the firm have become fuzzy and "the major corporate governance problem has become how to prevent conflicts among stakeholders from paralyzing or destroying the firm."

(Zingales, 2000, 1648) Therefore, a sensible balance between the different actors in an organization and especially between their de jure and de facto rights of control is crucial (see also Rajan and Zingales, 2000a,b). To achieve this balance over time could indeed be the assigned task of commercial arbitration.

In his survey of the literature on hybrid organizations Ménard (1996, 2013) characterizes hybrids as organizations in which multiple parties combine crucial decision and property rights but at the same time retain ownership over other essential assets. Because of this interlocking of property and authority these hybrid arrangements need special governance to align the strategic interests of their members as well as to divide the surplus among them. A means to achieve this is to deploy third parties that act as ordering forces. The main objectives of these 'external' players are to maintain coordination and discipline as well as to mitigate disputes among
the parties of the hybrid organization. For this purpose, public – such as ordinary courts – as well as private authorities – such as arbitrators – can be employed to govern the jointly owned assets. While such third party decision making considerably improves the governance, it is no panacea to govern a hybrid organization since it faces different limitations. These constraints include problems of verification of organization-internal information, disclosure of confidential information or lengthening (timewise) of the organization’s decision making process.

A third party decision making authority has to successfully address these limitations to be adequate as a governance device (Chi, 1996). It seems reasonable to assume that an arbitration court given its better access to the hybrid’s internal information flow has a comparative advantage against a public court, if the parties deal with confidential information and are interested in a long term stability of the partnership. One could go even further and argue that joint ventures largely build upon contracts that are not court-enforceable. As a consequence joint ventures may rely for a large part on relational contracting. For that reason it comes not as a surprise that the "shadow of the future" (Baker et al., 2008, 161) becomes center stage for the stability of those cooperations over time, when repeated interactions breed trust among the partners of a joint venture (Gulati, 1995, 1998). However, this does not yet solve the question what drives the temptation to renege a relational contract in an actual joint venture (Gibbons, 2005b). The key to this question lies in the allocation of asset ownership between the involved parties (Baker et al., 2002). This importance of asset ownership was first stressed in the property rights approach by Grossman-Hart-Moore (Grossman and Hart, 1986; Hart and Moore, 1990), which emphasizes the importance of asset ownership and the associated residual right of control to govern interactions of production.

Grossman and Hart (1986) begin their analysis with the assumption that although individual investment levels are observable by the parties, they are not verifiable by a court. Thus, it is impossible for the parties to enforce pre-agreed investments and hence contracting is imperfect. In a world of imperfect contracting, members in a joint venture face the risk that their (relation-specific) investments are held up by the other parties. Since each member anticipates this hold-up problem, they are reluctant to put crucial technology and knowledge into the joint venture and, consequently, an inefficient underinvestment occurs.

This underinvestment problem is addressed in the Grossman-Hart-Moore model by asset ownership (Grossman and Hart, 1986; Hart and Moore, 1990). This means that if a party owns the necessary assets for production, it is in possession of the residual
right of control and hence cannot be hold up anymore. While the integrating party cannot be hold up anymore and hence has optimal incentives to invest, the integrated party has no incentive to invest anymore because its investment will be hold up for sure. Therefore, integration is only sensible in contexts, in which one party's investment is significantly more productive. In these contexts the assets should then, accordingly, be owned by the more productive party in order to ensure optimal investment incentives for this party. If the investments of the parties are similarly important non-integration should be the desired solution in order to provide both parties with incentives to invest via the market (Grossman and Hart, 1986; Hart and Moore, 1990).

Hybrid organizations as an intermediate between integration and market transactions seem to be left out in the theory by Grossman-Hart-Moore, since these hybrids often utilize joint asset ownership. Already Holmstrom (1999, 86) criticizes this blind spot in the Grossman-Hart-Moore approach and argues that the new property rights theory reveals an inconsistency with the vast amount of joint ventures that are observed empirically. Considering this empirical fact but also drawing on the lesson of Grossman-Hart-Moore, it seems to be reasonable to assume that in a joint venture the parties' investments are rather equally important. If, otherwise, the investment of one single party would preponderate, then this party would integrate the joint venture's activities and hence dismantle the joint ownership structure. Therefore, the role of joint asset ownership in the property rights theory needs to be refined in order to better understand the significance of rights from property in hybrid organizations (Kim and Mahoney, 2005).

Maskin and Tirole (1999) point out that the assumption of the new property rights approach that investment levels are observable by the parties but not enforceable by a court is quite strong. They argue that if investment levels are observable, there must be a way to make the information verifiable by subtle mechanism design. To verify the observable investment levels Maskin and Tirole suggest to implement a revelation mechanism in the contract. To exemplify this they propose a multi-stage game of offers and counter offers to buy the asset, which sets incentives to truthfully

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8Holmstrom (1999) also states that while the Grossman-Hart-Moore approach clearly analyzes the market incentives of asset ownership and integration (i.e. the investment incentives), they miss out on the incentives that the ownership structure provides within the firm. These agency incentives are studied in the approach by Holmstrom, Milgrom, and Tirole (Holmstrom and Milgrom, 1991; Holmstrom and Tirole, 1991; Holmstrom and Milgrom, 1999) that focuses on contractability in the relation between employee and employer. A discussion about the different incentives theories in the context of the firm is provided by Gibbons (2005b,a) and more recently by Aghion and Holden (2011).
reveal the investment levels. Consequently, the investment levels would be verifiable and hence the contract enforceable.

If such a clever designed revelation mechanism makes contracts enforceable, the question arises why such mechanisms are seldom seen in reality (Aghion and Holden, 2011, 190). A plausible answer to this question is that these revelation mechanisms heavily rely on a good common knowledge about the appropriateness of investment levels in general, which is usually not the case in real life. Aghion et al. (2012) study such a Maskin-Tirole-like revelation mechanism in more detail and conclude that the success of the mechanism indeed highly depends on the assumption of correct beliefs of higher orders about the investment. As a consequence these complex revelation mechanisms are not very robust to small differences in the common knowledge about the investment levels.\(^9\)

Despite the robustness issue, the argument of Maskin and Tirole (1999) - that if information is observable it must be possible to verify it - is logically compelling. Therefore, it might be worth drawing attention to institutionalized mechanisms as an alternative that endorses information revelation in a secure environment. Third party decision making could be seen as a privately organized instrument that allows such a revelation of even sensitive investment information. Moreover, having the competence to execute the residual right of control, an arbitrator as a third party can enforce an incomplete contract. Thereby preventing the hold-up of relation-specific investment and hence remedy the ex-post inefficiency by setting optimal incentives to invest.

### 4 Investment Verification by Third Party Decision Making

Parties in a joint venture might face problems of hold-up, because contracting remains imperfect. As a consequence parties may withhold technology, knowledge, or other crucial assets. Because of this underinvestment, the joint venture underperforms and the parties miss out on profits. To attain these profits parties in a joint venture can implement a profit sharing rule in the contract, which is backed up by third party decision making to determine the relative shares. That way third party decision can be seen as an institutionalized process to verify the investment levels in a joint venture.

\(^9\)For a comprehensive response to the Maskin-Tirole-criticism see Hart and Moore (1999).
This verification process requires two attributes to be feasible. Firstly, the ruling of the third party decision maker must be enforceable. Otherwise, the decision is irrelevant and cannot serve the verification purpose. An arbitration court, as an example for third party decision making, issues an award that is enforceable in all countries which have signed the New York convention. Secondly, the third party decision maker must be able to observe the individual investment levels in a similar matter as the joint venture’s parties. If this is not the case, the decision obviously cannot be grounded on these levels and hence not account for their verification. Given these two attributes, the third party decision maker is able to hold a contest for the joint venture’s surplus, in which he rewards higher investments with a larger share of the surplus. This contest is necessary because, although the arbitrator can observe the individual investment levels, he is not aware of the optimal levels of investment.

![Diagram](image)

Figure 1: Process to verify the investment levels

To illustrate the role of this surplus seeking-contest in the verification process this section employs a simple model of investment hold-up. In a first step the hold-up problem in a joint venture with a unanimous sharing rule is illustrated. Then a third party decision maker is introduced that is able to observe the investment levels and that allocates the shares of the surplus by the means of a contest. Since this allocation is enforceable, the investment levels are verified by the third party decision making.

Consider two economic agents A and B, who jointly operate a joint venture. The joint venture is in possession of a productive asset. Because of this ownership structure A and B jointly own the asset and, consequently, either of them can veto its use.

![Timeline](image)

Figure 2: Timeline of the model
In order to make use of the asset, A and B need to make relation-specific investments \( a \) and \( b \) in period 1, which cannot be contracted ex ante for two reasons. Firstly, the production function is unknown at \( t = 0 \), which means that no party knows the optimal levels of investment ex ante. Secondly, while at \( t = 2 \) investment levels can be observed by the parties of the joint venture, they cannot be verified externally by a court. As a result, courts cannot enforce the contract of the joint venture. Since it is not possible to contract and to enforce specific investment levels, the governance structure of the joint venture has to set the proper incentives in order to stimulate efficient investment levels.

In period 2 the joint venture produces a surplus according to a production function \( F(a, b) \) which is continuously differentiable, concave in the investment levels and satisfies:

\[
F(0, 0) = 0, \quad \frac{\partial F}{\partial x} > 0, \quad \frac{\partial^2 F}{\partial^2 x} < 0 \quad \forall x \in \{a, b\}
\] (1)

Furthermore, it is assumed that the investment of both parties are equally efficient:

\[
\frac{\partial F}{\partial a} = \frac{\partial F}{\partial b} \quad \forall a = b \in [0, \infty)
\] (2)

Given these assumptions there exists a first-best investment level that maximizes the overall surplus \( F(a, b) - a - b \), which satisfies:

\[
\frac{\partial F}{\partial a^{FB}} = \frac{\partial F}{\partial b^{FB}} = 1
\] (3)

The two parties’ individual payoffs are described by the following functions:

\[
\pi_A(a) = z(a, b|g)F(a, b) - a
\]
\[
\pi_B(b) = (1 - z(a, b|g))F(a, b) - b
\] (4) (5)

Thereby \( z(a, b|g) \) describes the rule for sharing the joint surplus, which is determined by Nash bargaining. The outside options for the parties, namely the payoff in case of disagreement, depend on the form of governance \( g \), which can be either unanimous sharing \((g = US)\) or determination by third party \((g = TP)\).
4.1 Unanimous Surplus Sharing

In the baseline scenario without determination by a third party the parties of the joint venture can only collectively enjoy the residual right of control. This collective control is due to the fact that both parties own the joint venture jointly and hence either can veto decisions regarding its surplus. Because of this joint possession of the residual right of control and the consequential veto power, each party is able to freeze the payout if the surplus in case of disagreement. Consequently, a consensus is required for the implementation of a sharing rule. This implies that the parties’ outside options in the bargaining stage are zero. Accordingly, this simple two-person Nash-bargaining without outside options (at \( t=2 \)) leads to an equal sharing of the surplus:

\[
Z(a, b|US) = 0.5 \tag{6}
\]

Given this sharing rule each agent only takes the marginal effect on his own profit into account when he chooses his investment level:

\[
0.5 \frac{\partial F}{\partial a_{US}} = 0.5 \frac{\partial F}{\partial b_{US}} = 1 \tag{7}
\]

Notice, that the left-hand side of equation (7) describes the marginal benefits whereas the right-hand side describes the marginal costs of investing. Since the marginal costs in the first best solution are identical, the marginal benefits of the first order conditions of both (3) and (7) can be equalized:

\[
0.5 \frac{\partial F}{\partial a_{US}} = \frac{\partial F}{\partial a_{FB}} \implies \frac{\partial F}{\partial a_{US}} > \frac{\partial F}{\partial a_{FB}} \tag{8}
\]

\[
0.5 \frac{\partial F}{\partial b_{US}} = \frac{\partial F}{\partial b_{FB}} \implies \frac{\partial F}{\partial b_{US}} > \frac{\partial F}{\partial b_{FB}} \tag{9}
\]

Given assumption (1), the investment levels will be below the first-best solution:

\[
a^{US} < a^{FB} \tag{10}
\]

\[
b^{US} < b^{FB} \tag{11}
\]

\(^{10}\text{For a proof see Appendix A.1}\

\(^{11}\text{For a proof see Appendix A.2}\)
Proposition 1. The application of unanimous surplus sharing leads to an underinvestment by the joint venture’s parties in comparison to the first-best solution.

4.2 Third Party Decision Making

With an unanimous sharing rule the parties’ outside options are zero in a dispute over the surplus. Therefore, the Nash bargaining in $t = 2$ between the two parties will lead to an equal sharing. However, this sharing rule means that the parties profit from the marginal product of their investments only partially. Because of this limitation in benefit of their investments’ marginal products, the parties’ incentives to invest are weaker than in the first-best solution. This incentive issue causes an underinvestment in the joint venture.

Third party decision making can remedy this underinvestment problem by making the parties’ outside option contingent on their investment levels. Therefore, it is assumed that the third party decision maker is able to observe the individual investment levels in the same manner as the joint venture’s parties do in $t = 2$. This contingency allows the parties to improve their outside option (i.e. their payoff in case of disagreement) by investing and accordingly sets an additional incentive to invest. This means, while under unanimous sharing the incentive to invest is only provided by the internalized share of the marginal product of investment, the investment incentive under third party decision making is twofold. On the one hand the share of the marginal product that is internalized and on the other hand the prospect to improve payoff in the event of disagreement during the Nash bargaining stage.

This outside option improves in higher levels of investment because in case of a dispute the third party decides about the distribution of the surplus. Since the arbitrator does not know the optimal levels of investment, he is bound to reward higher investments only. Applying the rule – the more a party invests, the higher will be his share of the surplus (12) – the third party decision maker makes use of his ability to observe individual investment levels. By basing his distribution on the investment levels of the parties, the third party decision maker creates a contest for the surplus of the joint venture that sets additional incentives to invest. These additional incentives emerge because investing is the mean to compete this surplus-seeking contest. Because the outside options determine the sharing in a Nash bargaining and because the third party distributes the whole surplus, the factual
sharing rule \( z(a, b|TP) \) will be directly assigned by him even if no dispute arises.\(^{12}\)

\[
\frac{\partial z}{\partial x}(a, b|g = TP) \begin{cases} 
> 0 & \text{if } x = a \\
< 0 & \text{if } x = b 
\end{cases}
\] (12)

While other views on dispute resolution usually emphasize the wasteful activities of the contest (e.g. litigation costs), this analysis concentrates instead on a non-wasteful mean of competition, namely the level of investment. To increase his outcome of the contest, each party has to raise his level of investment. This raise signals greater productivity to the decision maker, who, consequently, awards a greater share of the surplus to the respective party. Therefore, investing has two positive consequences for the parties’ payoffs. Firstly, it increases their share of the surplus and secondly, it simultaneously increases the joint venture’s surplus itself. Because of this instrument of competition, the efforts exerted in the contest are not wasteful but increase the contest’s prize: the surplus of the joint venture (c.f. Chung, 1996).

Moreover, the third party is by assumption not biased towards any party. Because of that, he awards the same share of the surplus to each party if the investments are equal:

\[
z(a, b|g = TP) = 0.5 \quad \text{if } a = b
\] (13)

The following general Tullock contest success function satisfies these conditions (Hirshleifer, 1989; Skaperdas, 1996):

\[
z(a, b|g = TP) = \frac{a^m}{a^m + b^m}
\] (14)

The mass effect parameter \( m \) describes the shape of the sharing rule in relation to the relative investments of the two parties. Figure 3 illustrates this for the investment

\(^{12}\)Since the third party decision maker determines the distribution of the surplus in case of a dispute, the disagreement point \( \{d_A, d_B\} \) for the Nash bargaining is given by his distribution decision. Given that the outcome of the Nash bargaining has to satisfy the condition \( \max(x_A - d_A)(x_B - d_B) \) and that the third party assigns the whole surplus of the joint venture \( F(a, b) = d_A + d_B \), it follows that the factual distribution of the surplus as an outcome of the Nash bargaining is equal to the distribution the third party decision maker would determine in case of a disagreement (i.e. \( x_A = d_A \) and \( x_B = d_B \)).
of A relative to a given investment of B. The mass effect parameter indicates the elasticit y of the arbitrator’s decision, which is at the point of equal investment \((a = \bar{b})\):\(^{13}\)

\[ \varepsilon_z = \frac{m}{2} \quad (15) \]

If \(m\) is very small (e.g. 0.1), then the third party’s decision is very inelastic. This means, that the third party decision maker departs only marginally from a 50:50 sharing of the surplus even if the investment levels differ dramatically and hence the contest sets only little extra incentives to invest.\(^{14}\) On the contrary, if \(m\) is very large, then the decision elasticity of the third party decision maker is very high. A high decision elasticity indicates that the third party significantly alters the division of the surplus even if there are only minimal differences in the investment levels. Thus, a high decision elasticity implies that the contest provides strong additional investment incentives. Because of this relation between the mass effect parameter and the decision elasticity, it determines the intensity of the investment incentives that the contest creates. Therefore, the mass effect is an important parameter for the decision maker to set in order to balance the investment incentives of the joint venture.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{mass_effect.png}
\caption{Mass effect parameter and decision elasticity}
\end{figure}

\(^{13}\)For a proof see Appendix A.3.

\(^{14}\) A special case is the situation if \(m = 0\), in this situation the third party’s decision is perfectly inelastic which means that he awards always half of the surplus to each party irrespective of their investment levels. Since this mimics the situation of unanimous surplus sharing, it is not further considered in the remainder of the section.
Including the third party decision maker’s sharing rule into the two parties’ individual profit functions (4)+(5) and maximizing these by choosing the investment levels, leads to the following optimality conditions:\(^{15}\)

\[
\frac{ma^mb^m}{(a^m + b^m)^2} F(a, b) + \frac{a^m}{a^m + b^m} \frac{\partial F}{\partial a} = 1 \tag{16}
\]

\[
\frac{ma^mb^{-1}}{a^m + b^m} F(a, b) + \frac{b^m}{a^m + b^m} \frac{\partial F}{\partial b} = 1 \tag{17}
\]

Giving symmetry assumption (2), the investments of both parties are equally productive and hence both parties will face symmetric objective functions. Because of this symmetry both parties will invest in equilibrium the same amount \((a = b)\). Therefore, equations (16) and (17) simplify to:

\[
\frac{m}{4a} F(a) + \frac{1}{2} \frac{\partial F}{\partial a} = 1 \tag{18}
\]

Solving for the marginal investment \(\frac{\partial F}{\partial a}\) leads to:

\[
\frac{\partial F}{\partial a} = 2 - \frac{m}{2a} F(a) \tag{19}
\]

From (7) it is known that for unanimous surplus sharing the investment level is such that \(\frac{\partial F}{\partial a} = 2\). Plunging this result into (19) allows to compare the investment level under third party decision making and unanimous surplus sharing:

\[
\frac{\partial F}{\partial a} = \frac{\partial F}{\partial a}^{US} - \frac{m}{2a} F(a) \tag{20}
\]

If a non-zero level of investment is assumed then any \(m \in (0, \infty)^{16}\) means that \(\frac{\partial F}{\partial a} < \frac{\partial F}{\partial a}^{US}\). Accordingly, it can be concluded given assumption (1) that the investment levels will be higher with third party decision making than with unanimous surplus sharing \((a > a^{US} \text{ and } b > b^{US})\).

\(^{15}\)For a proof see Appendix A.4.

\(^{16}\)An \(m = 0\) would lead to a 50:50 sharing of the surplus irrespective of the levels of investments (see supra note 14). This exactly mimics the incentives under the non-arbitration regime and hence the investment levels would be equal in both cases.
Proposition 2. If the third party decision maker sets the sharing rule with a non-zero mass effect parameter \( m \), then third party decision making induces additional investment incentives which increase the investment above the level of an unanimous surplus sharing rule.

Equalizing equations (3) and (18) gives the condition under which third party decision making induces first-best investment:

\[
\frac{m}{4a^{FB}} F(a^{FB}) + \frac{1}{2} \frac{\partial F}{\partial a^{FB}} = \frac{\partial F}{\partial a^{FB}}
\]  

(21)

Solving for \( m \):

\[
m = 2 \frac{\partial F}{\partial a^{FB}} \frac{a^{FB}}{F(a^{FB})} = 2 \times \varepsilon_{F,a^{FB}} \quad \Leftrightarrow \quad \varepsilon_{F,a^{FB}} = \frac{m}{2} = \varepsilon_z
\]

(22)

Where \( \varepsilon_{F,a^{FB}} \) describes the investment elasticity of production. It can be concluded, accordingly, that to achieve the first-best investment levels the investment elasticity of production must be equal to the third party’s decision elasticity. Therefore, the sharing rule under third party decision making should be set in a way such that the elasticity of the sharing rule is equal to the elasticity of the production in the point of first-best investment.

Proposition 3. Third party decision making leads to first-best investment if the elasticity of the decision rule is equal to the elasticity of the production in the point of first-best investment.

The result that the elasticity of the third party’s decision rule must be equal to the investment elasticity to reach first-best investment levels, circumstantiates the earlier claim that the third party has to carefully balance the incentives of the contest. If, on the one hand, he applies a very elastic decision rule, the additional incentives might be too strong and inveigle the parties to overinvest. On the other hand, if the third party applies a rather inelastic rule, the investment levels might be below first-best. Therefore, it is important for the third party decision maker to have expertise in the production technology in order to successfully calibrate the additional incentives the verification contest sets.
4.3 Noisy Observability

Besides the calibration problem, a third party decision maker could also suffer from noise in his observability of the individual investment levels. To analyze this, assume that $\alpha$ describes the degree of noise in the third party decision maker’s observations of the investment levels, where $\alpha \geq 0$ (Amegashie, 2006). If $\alpha = 0$ then the third party can perfectly observe the individual investments. Thus, a $\alpha > 0$ means that the observability is noisy. The larger the degree of noise gets, the higher is the influence of chance in the third party’s decision.

$$z(a, b) = \frac{a^m + \alpha}{a^m + b^m + 2\alpha}$$  \hspace{1cm} (23)

Taking this modified sharing function with noise and plugging it into the parties’ profit functions leads to the following optimality condition for the investment level:\footnote{For a proof see Appendix A.5.}

$$\frac{\partial F}{\partial a} = \frac{\partial F}{\partial a_{US}} - \frac{m}{2} \frac{a^{m-1}}{a^m + \alpha} F(a)$$  \hspace{1cm} (24)

In comparison to the optimality condition under no noise (20), in the last term $\frac{1}{a}$ changed to $\frac{a^{m-1}}{a^m + \alpha}$. To analyze this change, the sensitivity of the fraction $\frac{a^{m-1}}{a^m + \alpha}$ in $\alpha$ is examined. If there is a very low degree of noise the fraction approaches:

$$\lim_{\alpha \rightarrow 0} \frac{a^{m-1}}{a^m + \alpha} = \frac{1}{a}$$  \hspace{1cm} (25)

This matches the situation under perfect observability. However, the larger the degree of noise gets, the lower are the additional investment incentives the contest sets. If $\alpha$ becomes very large, the fraction $\frac{a^{m-1}}{a^m + \alpha}$ approaches:

$$\lim_{\alpha \rightarrow \infty} \frac{a^{m-1}}{a^m + \alpha} = 0$$  \hspace{1cm} (26)

This implies that the last term of equation (24) becomes zero and hence the investment levels under unanimous surplus sharing and under third party decision making with a very high degree of noise are equal. This means that high noise in the observability of the third party cancels out the additional investment incentives the contest sets.
**Proposition 4.** If there is a very high degree of noise in the observability of the third party decision maker, then third party decision making fails to increase investment levels above the level of unanimous surplus sharing.

### 4.4 Imperfect Enforcement

Another issue that could impair the effectiveness of third party decision making is the possibility that the decision maker’s award cannot be perfectly enforced. This means technically that the third party decision maker is not able to distribute the whole surplus between the parties and that the the parties have to unanimously share the remainder. If $\beta \in [0, 1]$ is assumed to be the severity of the enforcement problem, then the sharing rule changes accordingly:

$$
z(a, b) = \beta \times 0.5 + (1 - \beta) \frac{am}{a^m + bm}
$$

(27)

Taking this modified rule with imperfect enforcement and plugging it into the parties’ profit functions leads to the following optimality condition for the investment level:\textsuperscript{18}

$$
\frac{\partial F}{\partial a} = \frac{\partial F}{\partial a_{US}} - (1 - \beta) \frac{m}{2a} F(a)
$$

(28)

Comparing this optimality condition to the situation under perfect enforcement (20), one can see that the enforcement problem affects the additional incentives the contest sets. If $\beta$ becomes very low the investment levels approach the levels with perfect enforcement. However, if the enforcement problem increases, the last term of (28) approaches:

$$
\lim_{\beta \to 1} (1 - \beta) \frac{m}{2a} F(a) = 0
$$

(29)

This means that the additional incentives the contest sets vanish and hence the investment levels will be the same as under unanimous surplus sharing. This intuitive result highlights the importance of the enforceability of the third party’s decision. If the decision award cannot be enforced at all, the joint venture’s parties have the revert to unanimous surplus sharing.

\textsuperscript{18}For a proof see Appendix A.6.
Proposition 5. If it is problematic to enforce the third party’s decision award, then third party decision making fails to increase investment levels above the level of unanimous surplus sharing.

4.5 Lengthy Proceedings

The effectiveness of third party decision making is also compromised when it takes a long time until a decision is reached. During such a lengthy proceeding the surplus of the joint venture is blocked and hence not accessible by the parties. This means that the period of time from investment in the joint venture to the payment of the surplus is relatively long. Investments with large gaps between investment and repayment yield smaller real returns than other investments with equal nominal returns but shorter maturity. Therefore, lengthy proceedings by the third party decision maker harm the attractiveness of the joint venture investment and consequently cause underinvestment.

In order to formally analyze this problem length proceedings generate, assume that the parties discount future returns with the factor $\delta \in (0, 1)$ (this could be e.g. the parties’ finances costs) and that the length of the decision proceedings by the third party is denoted by $l$. Given these assumptions the parties’ profit function becomes:

$$\pi_A(a) = \delta^l \frac{a^m}{a^m + b^m} F(a, b) - a$$

Maximizing this modified profit functions leads to the following optimality conditions for the investment of the parties:\textsuperscript{19}

$$\frac{\partial F}{\partial a} = \frac{1}{\delta^l} \frac{\partial F}{\partial a^{US}} - \frac{m}{2a} F(a)$$

If the third party’s proceedings are not lengthy $l = 0$, $\delta^l$ becomes 1 and hence the equation reflects the result under perfect conditions. To analyze the parties’ investment decision as the length of the proceeding increases, the derivative of optimality condition with respect to $l$ is taken:

$$\frac{\partial F^2}{\partial a \partial l} = -\frac{1}{\delta^l} \frac{\partial F}{\partial a^{US}} \log(\delta)$$

\textsuperscript{19}For a proof see Appendix A.7
Since $0 < \delta < 1$ it follows that $\log(\delta) < 0$. Given this and the assumption that the marginal investment is always positive $\frac{\partial F}{\partial a} > 0$, equation (32) implies that if $l$ increases then the marginal product of investment increases as well. Because a larger marginal product of investment denotes a lower investment level, it can be concluded that as the third party’s proceedings get lengthier the parties invest less into the joint venture.

**Proposition 6.** If the third party’s proceedings to determine the sharing of the surplus are lengthy, then third party decision making fails to remedy the underinvestment problem.

5 Third Party Decision Making - Courts vs. Arbitration

The preceding model indicates that with third party decision making parties in a joint venture can set up a verification institution that improves the investment incentives and hence contributes to the governance of the hybrid organization. However, the question arises whether arbitration, as implied in the beginning of this paper, is the most adequate third party or if not also ordinary courts can serve this purpose. Analyzing the comparative institutional advantages of commercial arbitration against ordinary courts for the analytical background of the presented model is helpful to tackle with this question.

In an international context parties may mistrust an ordinary court, because of two reasons: First, they may suspect a home bias. That means parties may believe a court favoring that party that is at home at the court’s jurisdiction. This would imply that the non-biased assumption (13) does not hold and hence that an ordinary court as third party decision maker fails to set appropriate incentives for both parties. Second, parties may be or may feel unfamiliar with the law of the jurisdiction where the ordinary court is located. Surely, in a specific case both reasons may be more or less severe. But it creates certainly a comparative disadvantage for ordinary courts against arbitration courts, which are not tied to a specific jurisdictional law and which have no interest to protect their firms at home (see, e.g., Benson, 1999).

---

20 See for example the famous case of The Bremen v. Zapata Off-Shore Company (407 U.S. 1 (92 S.Ct. 1907, 32 L.Ed.2d 513)), where only finally the US Supreme Court accepted a forum clause of the parties’ initial contract.
The international enforcement of an arbitration award is easier than the enforcement of a verdict of an ordinary court. This is because an arbitration award becomes directly enforceable through the New York convention in the jurisdiction of the convention’s signatories. Compared to that easy way of enforcement it needs the way through international treaty law and bilateral treaties to enforce a court decision of a sovereign state in another sovereign state. Therefore, an ordinary court faces a much higher $\beta$ then an arbitrator. Thus the additional investment incentives a court sets as third party decision maker are much weaker and remedy the threat of hold-up only marginally. Even though one may think that this obstacle might be overcome, it creates uncertainty and makes enforcement a lengthy process compared to arbitration. In addition, an arbitration award does not foresee appeal, which makes arbitration not only quicker to get a final decision, but it also adds to the reduction of uncertainty (see, e.g., Bühring-Uhle et al., 2006, 66).

With regard to observability and verification of information in a joint venture, the privacy and expertise of arbitration courts create also a comparative institutional advantage against ordinary courts. Arbitration panels consist of experts that have ample technological and business knowledge from the field that is brought to the arbitration panel. Therefore, an arbitrator as third party decision maker can utilize this expertise to properly set $m$ in order to carefully balance the additional investment incentives the contest sets. This is usually not the case with ordinary courts, which have set panels and must obtain expertise through requesting expert assessment from third parties. Thereby sometimes complicated court procedures must be met, before a neutral expert witness can be appointed (Sidak, 2013). Moreover, the privacy of arbitration courts contributes to the willingness of parties to share specific information, which translates into lower noise ($\alpha$) compared to ordinary courts (see, e.g., Stipanowich, 2004, 846).

Another advantage of arbitration in contrast with ordinary courts is that an arbitrator has greater freedom in forming his judgment. This means that an arbitrator can base his decision on customs in international trade and is not bound to justify it by the application of any specific national law (Craig et al., 1990, 295). In fact, arbitrators quite often deviate from incumbent law if they believe that this leads to better decisions (Ware, 1999, 719). This freedom and the before mentioned fact that arbitration verdicts usually cannot be appealed, give the arbitrator the necessary latitude in his judgment that allows him to take information into account which is only observable by the joint venture’s parties. This advantage in evidence hearing translates into lower values of $\alpha$ and hence a better incentive setting of an arbitrator.
as third party. This, in contrast, is not possible for an ordinary court, which can only judge on the basis of admitted evidence, which might imply that the court suffers from noisier observations of the parties’ individual investment levels.

Leaving these problems regarding bias, enforcement, information, and latitude aside and assuming that an ordinary court could solve these institutional disadvantages, an ordinary court would have weaker incentives to determine an optimal value of $m$. Figure 4 illustrates this twofold incentive problem by comparing the benefits and costs of expending more effort on the sharing decision for an arbitrator and a judge.

On the one hand, a judge has lower benefits from devoting effort to a good decision making than an arbitrator. This is because his income is fixed and does not increase if the judge performs well. On the contrary, if an arbitrator performs well and hence is demanded more often, he can charge a higher price for his services. Certainly, the judiciary is a meritocratic organization and a judge is promoted to a higher court if he performs well. However, that increases the benefits only to a limited extend and hence the judge’s benefits curve lies below the arbitrator’s.

On the other hand, the costs of expending effort in order to make better decisions are higher for the judge than for the arbitrator. The latter usually hears similar cases whereas a judge cannot specialize this easily. Therefore, he has to acquire specific knowledge for each case in order to comprehend the parameter of the production process and ultimately set the mass effect parameter to induce efficient investment. This is more costly for the judge than for a specialized arbitrator, which implies that the judge’s cost curve is above the arbitrator’s.

Given the condition that the judge’s benefit curve lies below and its cost curve lies
above the arbitrator’s respective curves, a judge will devote less effort on the sharing-decision than an arbitrator. Therefore, the setting of the mass effect parameter would be more inaccurate for a decision by a judge than by an arbitrator. This inaccuracy implies that an arbitrator can still better induce the optimal investment by setting up a profit-seeking contest than an ordinary court even if the institutional disadvantages could be overcome.

However, a word of caution seems necessary with regard to the comparative institutional advantage of arbitration courts, because this advantage exists only for commercial arbitration. Commercial arbitration implies that the partners opt voluntarily for an arbitration court and that the decision affects no other third parties. This is different with non-commercial arbitration. For example, in a labor law suit it can be questionable, whether the employee has voluntarily agreed to arbitration, or if the agreement was a kind of precondition to get the position. Arbitration in a labor law case may also not take into account broader social goals as fairness of wages and other social norms in industrial relations. In those cases a regular court is better equipped to find a good solution from a social welfare point of view, because it can incorporate in its decisions public goals and social values (Cole, 1996).

6 Conclusion

The unverifiability of investments in joint ventures poses the threat of generating hold-ups, thus causing the parties to underinvest. Seizing upon the argument of Maskin and Tirole (1999), this paper proposes that third party decision making should be seen as a mechanism to verify investment levels. To illustrate this idea, the paper presents a model in which the third party frames his decision as a contest for the joint venture’s surplus. The results of the model indicate that this contest sets additional incentives to invest. The third party decision maker’s ability to verify these investments, still, is vulnerable to noise in his observability and to enforcement problems of his decision awards.

Since commercial arbitration addresses these issues better than other forms of third party decision making, it is appealing for joint ventures. Moreover, in an international context, arbitration has several institutional advantages over ordinary courts such as no home country bias, enforcement according to the New York convention, greater latitude in decision making, and better observability.
In particular, the greater latitude an arbitrator has is of great importance for his ability to verify the investments. Because he is not bound by national laws determining strict procedural rules, an arbitrator can form a judgment also in cases in which ordinary courts are not able to. In addition, the advantage arbitrators have in observing the investments is a necessary condition for their verifiability. Arbitration panels are not necessarily manned only with legal professionals but also with experts in the respective industry. These industry experts hold business and technical knowledge that helps them link their decision more closely to the facts of the case. Moreover, the non-disclosure of the arbitration information allows arbitrators to access sensitive business information. By highlighting these two key characteristics of arbitration, it is visible that the arbitrator is an internal actor of the joint venture. Thus, arbitration can be understood as an integral governance device within the boundaries of the firm in the context of hybrid organizations.
References


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A. Extended Proofs

A.1 Nash bargaining under unanimous sharing

Given the veto power of each party, it follows that the disagreement point is \{d_a = 0, d_B = 0\} (outside options are zero). Let:

\[ x_A \equiv z(a,b|US)F(a,b) \]  
(33)

and

\[ x_B \equiv (1 - z(a,b|US))F(a,b) \]  
(34)

The Nash bargaining solution must satisfy

\[ \max (x_A - d_A)(x_B - d_B) = \max x_Ax_B \]  
(35)

such that \( F(a,b) = x_A + x_B \). It follows that \( x_A = x_B = F(a,b)/2 \) and hence:

\[ z(a,b|US) = 0.5 \]  
(36)

A.2 Individual maximization under unanimous sharing

Taking the two parties’ individual payoff functions (4)+(5) and plugging in the unanimous sharing rule \( z(a,b|N) = 0.5 \) leads to:

\[
\pi_A(a) = 0.5 \times F(a,b) - a \\
\pi_B(b) = 0.5 \times F(a,b) - b 
\]  
(37) (38)

Maximizing by taking partial derivatives with respect to \( a \), \( b \) and let the derivatives be zero:

\[
\frac{\partial \pi_A}{\partial a}^\text{US} = 0.5 \frac{\partial F}{\partial a}^\text{US} - 1 = 0 \]  
(39)

\[
\frac{\partial \pi_B}{\partial b}^\text{US} = 0.5 \frac{\partial F}{\partial b}^\text{US} - 1 = 0 \]  
(40)
Solving for the marginal costs of investing:

\[
0.5 \frac{\partial F}{\partial a_{US}} = 0.5 \frac{\partial F}{\partial b_{US}} = 1 \tag{41}
\]

### A.3 Decision elasticity

Third party’s decision function:

\[
z(a, b | g = TP) = \frac{a^m}{a^m + b^m} \tag{42}
\]

Taking first partial derivative with respect to A’s investment level:

\[
\frac{\partial z}{\partial a} = \frac{ma^{m-1}b^m}{(a^m + b^m)^2} \tag{43}
\]

Elasticity of decision in point \((a, z)\):

\[
\varepsilon_z = \frac{\frac{\partial z}{\partial a} a}{a z} = \frac{ma^{m-1}b^m a}{(a^m + b^m)^2 z} \tag{44}
\]

Assuming equal investment \(b = a\), which implies because of \((13)\) \(z = 0.5\):

\[
\varepsilon_z = \frac{ma^{m-1}a^m}{(2a^m)^2 \cdot 0.5} = \frac{m}{2} \tag{45}
\]

### A.4 Individual maximization under third party decision making

Taking the two parties’ individual payoff functions \((4) + (5)\) and plugging in the third party decision maker’s sharing rule \((14)\):

\[
\begin{align*}
\pi_A(a) & = \frac{a^m}{a^m + b^m} F(a, b) - a \\
\pi_B(b) & = \frac{b^m}{a^m + b^m} F(a, b) - b
\end{align*} \tag{46, 47}
\]

Maximizing by taking partial derivatives with respect to \(a, b\) and let the derivatives be zero:
\[
\frac{\partial \pi_A}{\partial a} = \frac{(a^m + b^m)ma^{m-1} - a^m m a^{m-1}}{(a^m + b^m)^2} F(a, b) + \frac{a^m}{a^m + b^m} \frac{\partial F}{\partial a} - 1 = 0
\] (48)

\[
\frac{\partial \pi_B}{\partial b} = \frac{(a^m + b^m)mb^{m-1} - b^m m b^{m-1}}{(a^m + b^m)^2} F(a, b) + \frac{b^m}{a^m + b^m} \frac{\partial F}{\partial b} - 1 = 0
\] (49)

Solving for the marginal costs of investing and simplifying:

\[
\frac{ma^{m-1}b^m}{(a^m + b^m)^2} F(a, b) + \frac{a^m}{a^m + b^m} \frac{\partial F}{\partial a} = 1
\] (50)

\[
\frac{ma^{m-1}b^m}{(a^m + b^m)^2} F(a, b) + \frac{b^m}{a^m + b^m} \frac{\partial F}{\partial b} = 1
\] (51)

A.5 Noise in third party’s decision function

Taking third party’s decision function with noise:

\[
z(a, b) = \frac{a^m + \alpha}{a^m + b^m + 2\alpha}
\] (52)

Plugging the noisy sharing rule into the two parties’ individual payoff functions (4)+(5):

\[
\pi_A(a) = \frac{a^m + \alpha}{a^m + b^m + 2\alpha} F(a, b) - a
\] (53)

\[
\pi_B(b) = \frac{b^m + \alpha}{a^m + b^m + 2\alpha} F(a, b) - b
\] (54)

Taking partial derivatives with respect to \(a, b\):

\[
\frac{\partial \pi_A}{\partial a} = \frac{(a^m + b^m + 2\alpha)ma^{m-1} - (a^m + \alpha)ma^{m-1}}{(a^m + b^m + 2\alpha)^2} F(a, b) + \frac{a^m + \alpha}{a^m + b^m + 2\alpha} \frac{\partial F}{\partial a} - 1
\] (55)

\[
\frac{\partial \pi_B}{\partial b} = \frac{(a^m + b^m + 2\alpha)mb^{m-1} - (b^m + \alpha)mb^{m-1}}{(a^m + b^m + 2\alpha)^2} F(a, b) + \frac{b^m + \alpha}{a^m + b^m + 2\alpha} \frac{\partial F}{\partial b} - 1
\] (56)

Simplifying:

\[
\frac{\partial \pi_A}{\partial a} = \frac{(b^m + \alpha)ma^{m-1}}{(a^m + b^m + 2\alpha)^2} F(a, b) + \frac{a^m + \alpha}{a^m + b^m + 2\alpha} \frac{\partial F}{\partial a} - 1
\] (57)

\[
\frac{\partial \pi_B}{\partial b} = \frac{(a^m + \alpha)mb^{m-1}}{(a^m + b^m + 2\alpha)^2} F(a, b) + \frac{b^m + \alpha}{a^m + b^m + 2\alpha} \frac{\partial F}{\partial b} - 1
\] (58)
Assuming party symmetry $b = a$ and finding maximum by $\frac{\partial \pi_A}{\partial a} = 0$:

$$\frac{(a^m + \alpha)ma^{m-1}}{(2a^m + 2a)^2} F(a,b) + \frac{a^m + \alpha}{2a^m + 2\alpha} \frac{\partial F}{\partial a} - 1 = 0 \quad (59)$$

Simplifying:

$$\frac{(a^m + \alpha)ma^{m-1}}{4(a^m + \alpha)^2} F(a,b) + \frac{a^m + \alpha}{2(a^m + \alpha)} \frac{\partial F}{\partial a} - 1 = 0 \quad (60)$$

$$\frac{ma^{m-1}}{4(a^m + \alpha)} F(a,b) + \frac{1}{2} \frac{\partial F}{\partial a} - 1 = 0 \quad (61)$$

Solving for marginal investment $\frac{\partial F}{\partial a}$:

$$\frac{\partial F}{\partial a} = 2 - \frac{m}{2} \frac{a^{m-1}}{a^m + \alpha} F(a,b) \quad (62)$$

Plugging in marginal investment under unanimous sharing $2 = \frac{\partial F}{\partial a} US$:

$$\frac{\partial F}{\partial a} = \frac{\partial F}{\partial a} US - \frac{m}{2} \frac{a^{m-1}}{a^m + \alpha} F(a) \quad (63)$$

### A.6 Imperfect enforcement of third party’s awards

Assuming that the share $\beta$ of the surplus cannot be distributed by the third party because it cannot be enforced, implies that the factual third party awards $d_A \equiv (1 - \beta) \frac{a^m}{a^m + b^m} F(a,b)$ and $d_B \equiv (1 - \beta) \frac{b^m}{a^m + b^m} F(a,b)$. The Nash bargaining solution must satisfy $\max (x_A - d_A)(x_B - d_B)$ such that $F(a,b) = x_A + x_B$. It follows that $x_A = [\beta \frac{1}{2} + (1 - \beta) \frac{a^m}{a^m + b^m}] F(a,b)$ and $x_B = [\beta \frac{1}{2} + (1 - \beta) \frac{b^m}{a^m + b^m}] F(a,b)$ hence the sharing rule becomes:

$$z(a,b) = \beta \times 0.5 + (1 - \beta) \frac{a^m}{a^m + b^m} \quad (64)$$

Plugging the imperfect sharing rule into the two parties’ individual payoff functions (4)+(5):

$$\pi_A(a) = [\beta \times 0.5 + (1 - \beta) \frac{a^m}{a^m + b^m}] F(a,b) - a \quad (65)$$

$$\pi_B(b) = [\beta \times 0.5 + (1 - \beta) \frac{b^m}{a^m + b^m}] F(a,b) - b \quad (66)$$
Taking partial derivatives with respect to $a$, $b$:

\[
\frac{\partial \pi_A}{\partial a} = \frac{\beta}{2} \frac{\partial F}{\partial a} + (1 - \beta) \frac{a^m b^m (a^m b^m)^{-1} - a^m a^m (a^m b^m)^{-1}}{(a^m b^m)^2} F(a, b) + (1 - \beta) \frac{a^m}{a^m + b^m} \frac{\partial F}{\partial a} - 1 \tag{67}
\]

\[
\frac{\partial \pi_B}{\partial b} = \frac{\beta}{2} \frac{\partial F}{\partial b} + (1 - \beta) \frac{a^m b^m (a^m b^m)^{-1} - b^m b^m (a^m b^m)^{-1}}{(a^m b^m)^2} F(a, b) + (1 - \beta) \frac{b^m}{a^m + b^m} \frac{\partial F}{\partial b} - 1 \tag{68}
\]

Simplifying:

\[
\frac{\partial \pi_A}{\partial a} = \frac{\beta}{2} \frac{\partial F}{\partial a} + (1 - \beta) \frac{b^m a^m (a^m b^m)^{-1} - a^m a^m (a^m b^m)^{-1}}{(a^m b^m)^2} F(a, b) + (1 - \beta) \frac{a^m}{a^m + b^m} \frac{\partial F}{\partial a} - 1 \tag{69}
\]

\[
\frac{\partial \pi_B}{\partial b} = \frac{\beta}{2} \frac{\partial F}{\partial b} + (1 - \beta) \frac{a^m b^m (a^m b^m)^{-1} - b^m b^m (a^m b^m)^{-1}}{(a^m b^m)^2} F(a, b) + (1 - \beta) \frac{b^m}{a^m + b^m} \frac{\partial F}{\partial b} - 1 \tag{70}
\]

Assuming party symmetry $b = a$ and finding maximum by $\frac{\partial \pi_A}{\partial a} = 0$:

\[
\beta \frac{1}{2} \frac{\partial F}{\partial a} + (1 - \beta) \frac{a^m}{2a} F(a, b) + (1 - \beta) \frac{1}{2} \frac{\partial F}{\partial a} = 1 \tag{71}
\]

Solving for marginal investment $\frac{\partial F}{\partial a}$ and plugging in marginal investment under unanimous sharing $2 = \frac{\partial F}{\partial a}$:

\[
\frac{\partial F}{\partial a} = a \frac{\partial F}{\partial a_{US}} - (1 - \beta) \frac{m}{2a} F(a) \tag{72}
\]

### A.7 Lengthy third party proceedings

Taking the parties’ profit functions that discount the future repayments.

\[
\pi_A(a) = \delta^l \frac{a^m}{a^m + b^m} F(a, b) - a \tag{73}
\]

\[
\pi_B(b) = \delta^l \frac{b^m}{a^m + b^m} F(a, b) - b \tag{74}
\]

Taking partial derivatives with respect to $a$, $b$:

\[
\frac{\partial \pi_A}{\partial a} = \delta^l \frac{(a^m + b^m) a^m (a^m b^m)^{-1} - a^m a^m (a^m b^m)^{-1}}{(a^m b^m)^2} F(a, b) + \delta^l \frac{a^m}{a^m + b^m} \frac{\partial F}{\partial a} - 1 \tag{75}
\]

\[
\frac{\partial \pi_B}{\partial b} = \delta^l \frac{(a^m + b^m) b^m (a^m b^m)^{-1} - b^m b^m (a^m b^m)^{-1}}{(a^m b^m)^2} F(a, b) + \delta^l \frac{b^m}{a^m + b^m} \frac{\partial F}{\partial b} - 1 \tag{76}
\]
Simplifying:

\[
\frac{\partial \pi_A}{\partial a} = \frac{\delta^l m a^{m-1} b^m}{(a^m + b^m)^2} F(a, b) + \delta^l \frac{a^m}{a^m + b^m} \frac{\partial F}{\partial a} - 1 \quad (77)
\]

\[
\frac{\partial \pi_B}{\partial b} = \frac{\delta^l m a^m b^{m-1}}{(a^m + b^m)^2} F(a, b) + \delta^l \frac{b^m}{a^m + b^m} \frac{\partial F}{\partial b} - 1 \quad (78)
\]

Assuming party symmetry \( b = a \) and finding maximum by \( \frac{\partial \pi_A}{\partial a} = 0 \):

\[
\frac{\delta^l m a^{m-1} a^m}{(2a^m)^2} F(a, b) + \delta^l \frac{a^m}{2a^m} \frac{\partial F}{\partial a} - 1 = 0 \quad (79)
\]

Simplifying:

\[
\frac{\delta^l m^2}{4} F(a, b) + \delta^l \frac{1}{2} \frac{\partial F}{\partial a} = 1 \quad (80)
\]

Solving for marginal investment \( \frac{\partial F}{\partial a} \):

\[
\frac{\partial F}{\partial a} = \frac{1}{\delta^l} 2 - \frac{m}{2} F(a, b) \quad (81)
\]

Plugging in marginal investment under unanimous sharing \( \frac{\partial F}{\partial a} = \frac{\partial F}{\partial a^\text{US}} \):

\[
\frac{\partial F}{\partial a} = \frac{1}{\delta^l} \frac{\partial F}{\partial a^\text{US}} - \frac{m}{2} F(a, b) \quad (82)
\]