Profiting From Experts' "Tyranny" in Partnerships

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Abstract

A savvy business partner may be able to contribute more to a partnership. But a savvy partner also has a better grasp on information about market conditions that determine the termination value of the partnership, thus commanding higher rents if the joint venture is dissolved. Hence, having an expert for a business partner may leave one vulnerable to their "expertise tyranny." This paper presents the optimal mechanism for sourcing a business partner from amongst two potential candidates, an expert and an amateur. The expert's informational advantage and command of higher information rents makes the optimal auction actually biased *in their favor*: Higher future information rents make them willing to bid higher for the right to become partners today. This higher willingness to pay can be captured through payments for the right to be made partner. Thus, through a "judo-inspired" contract where the expert agent's informational advantage is turned against her, the principal can profit from the expert's "tyranny."

Keywords: Partnerships, procurement, dynamic mechanism design, endogenous information structure

JEL Classification Numbers: D82, D86

1 Introduction

In joint ventures, business partners pool resources to exploit an asset or a business opportunity, and thus create value. But business partnerships may be dissolved, in which case one of the partners buys the other one's shares to resell the asset. The terms of the dissolution of the partnership represent how the partners split this termination value of their joint venture.

A savvy business partner may be able to contribute more to a partnership. But a savvy partner also has a better grasp on information about market conditions that determine the termination value of the partnership, thus commanding higher rents if the joint venture is dissolved. Hence, having an expert for a business partner may leave one vulnerable to their "expertise tyranny." How should we choose between an expert and an amateur for a business partner?

This paper presents the optimal mechanism for sourcing a business partner from amongst two candidates, an expert and an amateur partner. The expert's informational advantage and command of higher information rents makes the optimal auction actually biased *in their favor*: Higher future information rents make them willing to bid higher for the right to become partners today. Thus, experts are more attractive than amateurs as potential business partners, not only for being able to (possibly) generate more value in the course of the partnership, but also because they are willing to pay more for the right to become partners. This higher willingness to pay can be captured through payments for the right to be made partner. Hence, through a "judo-inspired" contract where the expert agent's informational advantage is turned against her, the principal can profit from the expert's "tyranny."

In this sense, the ownership structure determines the *information structure* at the partnership-dissolution stage. The choice of partner determines whether the dissolution negotiations will be place between two uninformed partners or between two asymmetrically-informed partners, with the agent having the slight of hand over the principal. The expert's "tyranny" in this paper takes the form of higher information rents commanded by the expert partner in the dissolution negotiations. The principal can capture these rents through the terms of the constitution of the partnership, turning the expert agent's advantage into her own advantage.

The economics literature on partnerships is vast, but it is almost exclusively focused on the problem of dissolving partnerships. The seminal paper is Cramton et al. (1987), which identifies the class of initial ownership structures that are consist with dissolving a partnership efficiently in an IPV environment. This problem has been extended more recently to non-IPV environments.

Loertscher and Wasser (2015) analyzes the more-general problem of how to best dissolve *any* given partnership. Solving this more-general also allows them to find the optimal *ex-ante* ownership structure, by maximizing the expected surplus as a function of the vector of initial shares.

My contribution to this literature is twofold. Unlike Loertscher and Wasser (2015), I analyze the partnership-constitution problem at the *interim* stage, not the ex-ante stage. More importantly, I endogenize the information structure at the dissolution stage by linking it to the choice of partner. Thus, the partnership-constitution problem in this paper is a dynamic problem.

The information structure is determined by the choice of partner, the two candidates being asymmetric. In Francetich (2016), the principal faces a single agent, and she can affect the information structure through the ownership structure. Granting the agent the majority of shares is granting control and first-hand access to information about the value of the venture. In the optimal contract, the principal *giveth* the agent an informational advantage to *taketh-away* her rents: All else equal, the shares allocated maximize the agent's information rents, and these rents are extracted through the transfers. Higher rents makes the agent willing to pay more for a majority of shares. A similar intuition is featured in the optimal auction in the present paper. However, whether the higher information rents translate into an upward or a downward bias in the number of shares given the agent depends on the elasticity of the quantile function of the distribution of resale values. This elasticity condition is analogous to the well-known demand-elasticity condition for revenue maximization by a monopolist.

2 The Model

A principal owns a durable asset, or a business opportunity, and wants to procure a partner to exploit the asset. After exploitation, the partnership is to be dissolved, selling the asset at its resale value.

The principal has two potential business partners. These agents $i = 1, 2$ observe a private signal or type $s_i \in [\underline{s}_i, \overline{s}_i] \subseteq \mathbb{R}_+$, drawn independently under the distribution given by density function f_S.[1] The resale value of the asset is given by $v \in [\underline{v}, \overline{v}] \subseteq \mathbb{R}_+$, with density function f_V. We maintain the following independence assumption between these signals.

Assumption 1 (Independence). *Signals s_1, s_2 and v are independent.*

The rationale for this assumption is that s_1, s_2 capture how much value each agent will contribute to the partnership, while v captures market conditions that neither agent nor the principal control.[2]

The principal has to decide whether to partner with agent 1 or agent 2. In either case, the split of shares is fixed beforehand, and it is given by $\theta \in [0, 1]$ denoting the number of shares the chosen agent will be given. If she chooses to partner up with agent $i = 1, 2$

[1] We can easily accommodate a *productivity advantage* for agent 1, by allowing for the distribution of signal s_1 to dominates that of s_2 in the sense of first-order stochastic dominance. In this case, agent 1 is more likely to generate a higher value for the partnership than agent 2. This form of asymmetry leads to well-known bid handicaps, and goes in the opposite direction as that resulting from the asymmetry introduced by Assumption 2 below.

[2] The role of this assumption is discussed further in the closing section.

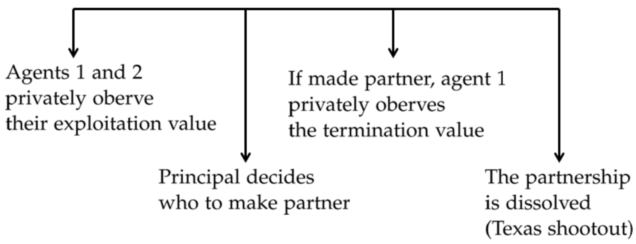


Figure 1: Timing.

of type s_i, the exploitation value to be split is s_i. Thus, the agents' signals are what they "brings to the table."

But how much value is raised in the course of the partnership is not the only consideration for the principal to decide between potential partners. Agent 1 is a "savvy" or expert potential partner. This is embodied in the following assumption.

Assumption 2 (Private information on v)**.** *Agent 1 privately observes v at the time of dissolving the partnership (if made partner).*

This is the sense in which agent 1 has a better understanding of the resale conditions of the partnership than both agent 2 and the principal.

Thus, agent 1 will enjoy an informational advantage over the principal at the time of dissolving the partnership, which will enable her to command higher information rents. The timing and information structure is represented in Figure 1.

3 Dissolution Mechanism

In this section, we analyze the mechanism to dissolve the partnership between the principal and the selected partner. Allocations at this stage are represented by pairs $\kappa = (\kappa_A, \kappa_P) \in \{0,1\}^2$ such that $\kappa_A + \kappa_P = 1$, where $\kappa_A = 1$ represents the partner agent gaining full ownership, and $\kappa_P = 1$ represents the principal taking over. The payment from the agent to the principal, which may be negative, is denoted by $\tau \in \mathbb{R}$.

3.1 Agent 2 is the partner

In this case, dissolution negotiations are between two equally- uninformed partners. Payoffs are $u_P = \kappa_P E(V) + \tau$ for the principal, and $u_2 = \kappa_2 E(V) - \tau$ for agent 2; agent 2's outside option is $u_A^0 = \theta E(V)$. From the agent's participation constraint, $u_A \geq u_A^0$, we get $\tau \leq (\kappa_A - \theta)\, E(V)$. Thus, $u_P \leq \kappa_P E(V) + (\kappa_A - \theta)\, E(V) = (1-\theta)E(V)$.

This upper bound on u_P is attained by the *Texas-shootout* mechanism in which the principal makes the offer (Brooks et al., 2010). In this mechanism, the principal calls a price $p \geq 0$, and the agent decides whether to buy the principal's shares or to sell her shares for price p; see Figure 2. In equilibrium, the agent randomizes between buying the principal's shares and selling her shares with probabilities θ, $1-\theta$. Under this randomization, the principal announces a price of $p = E(V)$. Equilibrium payoffs are $\theta E(V)$ for the agent and $(1-\theta)E(V)$ for the principal.

3.2 Agent 1 is the partner

Now, the principal is dealing with the expert agent, who has privately observed v. The agent is asked to report this information, and the allocation and payments are determined based on this report. We thus represent a *dissolution mechanism* between the principal and agent 1 as a pair of functions $\kappa(v) = (\kappa_A(v), \kappa_P(v))$ and $\tau(v)$. Incentives must be provided for the agent to report v truthfully.

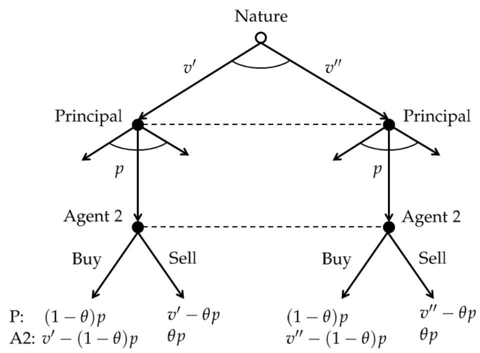


Figure 2: Information structure in negotiations to dissolve the partnership with agent 2.

Payoffs are given by $u_P = E[\kappa_P(V)E(V) + \tau(V)]$ for the principal, and $u_A(v) = \kappa_A(v)v - \tau(v)$ and $u_A^0(v) = \theta v$ for the agent. Thus, we have a situation of *countervailing incentives*: The agent's outside option depends on her private information. This means that the agent's "worst-off" type, the type that is exactly indifferent between buying the principal's shares and selling hers, is not necessarily her lowest type; in fact, this worst-off type has to be determined as part of the mechanism.

Denote the worst-off type by $\underline{v}(\theta)$. This is the lowest type that buys out the principal, or the highest type that sells her shares: $\kappa_A(v) = I(v \geq \underline{v}(\theta))$, $\kappa_P(v) = I(v < \underline{v}(\theta))$. For any other type $v \in [\underline{v}, \overline{v}]$, incentive compatibility requires that:

$$u_A(v) = u_A(\underline{v}(\theta)) + \int_{\underline{v}(\theta)}^{v} \kappa_A(\epsilon)\mathrm{d}\epsilon = \theta\underline{v}(\theta) + I(v \geq \underline{v}(\theta))(v - \underline{v}(\theta)).$$

Thus, payments must be given by:

$$t(v) = I(v \geq \underline{v}(\theta))v - \theta\underline{v}(\theta) - I(v \geq \underline{v}(\theta))(v - \underline{v}(\theta)) = I(v \geq \underline{v}(\theta))\underline{v}(\theta) - \theta\underline{v}(\theta).$$

Hence, the principal's feasible payoffs are:

$$
\begin{aligned}
u_P &= E[\kappa_P(V)E(V) + t(V)] \\
&= \int_{\underline{v}}^{\underline{v}(\theta)} v f_V(v)\mathrm{d}v + \underline{v}(\theta)[1 - F_V(\underline{v}(\theta))] - \theta\underline{v}(\theta).
\end{aligned}
$$

Define the function $h : [\underline{v}, \overline{v}] \to \mathbb{R}$ as $h(x) := \int_{\underline{v}}^{x} v f_V(v)\mathrm{d}v + x[1 - F_V(x)] - \theta x$. We have $h'(x) = 1 - F_V(x) - \theta$ and $h''(x) = -f_V(x) \leq 0$, so this function is maximized at $x^* = F_V^{-1}(1-\theta)$. Thus, we want to set $\underline{v}(\theta) = F_V^{-1}(1-\theta)$.

This optimal mechanism is also implemented by the Texas shootout with the principal calling the price; see Figure 3. Agent 1 buys the principal's shares if $v - (1-\theta)p > \theta p$, or $v > p$; she sells her shares if $v < p$; and is indifferent between buying and selling if $v = p$. The principal chooses $p \geq 0$ to maximize her expected payoffs:

$$
\begin{aligned}
u_P(p) &= F_V(p)E\left[V - \theta p | V < p\right] + (1 - F_V(p))(1-\theta)p \\
&= \int_{\underline{v}}^{p} v f_V(v)\mathrm{d}v + p(1 - F_V(p)) - \theta p.
\end{aligned}
$$

The solution is $p = F_V^{-1}(1-\theta)$. Equilibrium payoffs are $u_P^* := \int_{\underline{v}}^{F_V^{-1}(1-\theta)} v f_V(v)\mathrm{d}v$ for the principal, and $u_A^*(v) := \theta F_V^{-1}(1-\theta) + \max\left\{v - F_V^{-1}(1-\theta), 0\right\}$ for agent 1.

3.3 Continuation values from dissolving the partnership

Based on these two scenarios, the partners the enjoy following expected payoffs from the dissolution negotiations. For the principal, we have:

$$
\begin{cases}
W_{P1}(\theta) := \int_{\underline{v}}^{F_V^{-1}(1-\theta)} v f_V(v)\mathrm{d}v & \text{if agent 1 is chosen,} \\
W_{P2}(\theta) := (1-\theta)E(V) & \text{if agent 2 is chosen.}
\end{cases}
$$

Intuitively, we have $W_{P1}(\theta) < W_{P2}(\theta)$: The principal enjoys a higher payoff in the dissolution of a partnership with the amateur partner. This is the manifestation of the

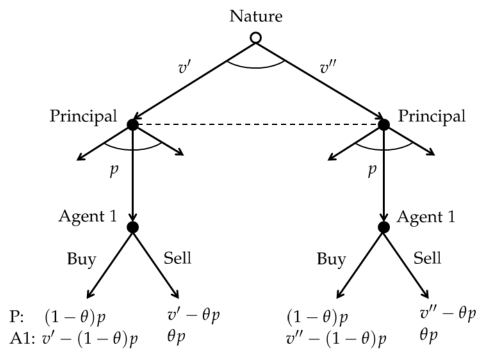


Figure 3: Information structure in negotiations to dissolve the partnership with agent 1.

"tyranny of experts" in this model; agent 1 commands higher information rents at the expense of the principal. For the agents, if made partner, continuation values are:

$$\begin{cases} W_1(\theta) := \theta F_V^{-1}(1-\theta) + \int_{F_V^{-1}(1-\theta)}^{\overline{v}} v f_V(v)\mathrm{d}v & \text{for agent 1,} \\ W_2(\theta) := \theta E(V) & \text{for agent 2.} \end{cases}$$

Once again, intuitively, we have that $W_1(\theta) > W_2(\theta)$; agent 1 enjoys information rents that agent 2 does not in negotiating the dissolution of the partnership.

The next theorem provides the support for these intuitions.

Theorem 1 (Expert's "Tyranny"). *For every $\theta \in (0,1)$, we have: a) $W_{P1}(\theta) < W_{P2}(\theta)$, and b) $W_1(\theta) > W_2(\theta)$, with equality for $\theta \in \{0,1\}$.*

Proof. We have $W_{P2}(0) = E(V) = W_{P1}(0)$, and $W_1(0) = 0 = W_2(0)$; similarly, $W_{P2}(1) = 0 = W_{P1}(1)$, and $W_1(1) = E(V) = W_2(1)$. Now, assume that $\theta \in (0,1)$. We have that $W_{P2}(\theta) > W_{P1}(\theta)$ if and only if $\frac{1}{\theta}\int_{F_V^{-1}(1-\theta)}^{\overline{v}} v f_V(v)\mathrm{d}v > E(V)$. Now, $\theta = 1 - F_V\left(F_V^{-1}(1-\theta)\right)$; thus, the expression on the right-hand side is the truncated expectation $E\left[V \mid V > F_V^{-1}(1-\theta)\right]$, and the inequality follows. Similarly, $W_1(\theta) > W_2(\theta)$ if and only if $F_V^{-1}(1-\theta) + \frac{1}{\theta}\int_{F_V^{-1}(1-\theta)}^{\overline{v}} v f_V(v)\mathrm{d}v > E(V)$; the latter inequality follows as before. □

4 Constitution Mechanism

Now, we turn to the mechanism to constitute the partnership. Now, allocations are represented by pairs $q = (q_1, q_2) \in \{0,1\}^2$ such that $q_1 + q_2 = 1$, where $q_1 = 1$ represents agent 1 being made partner, and $q_2 = 1$ denotes the choice of agent 2 for partner. The payments from the agents to the principal (which, again, may be negative) are denoted by $t = (t_1, t_2) \in \mathbb{R}^2$.

Each agent reports their private information, and the choice of partner and corresponding payments are determined. We denote by $s = (s_1, s_2)$ the profile of agents' signals (and their reports, if truthful). We represent a *constitution mechanism* between the principal and the agents as a pair of functions $q(s) = (q_1(s), q_2(s))$ and $t(s) = (t_1(s), t_2(s))$. Figure 4 depicts the timing in this mechanism.

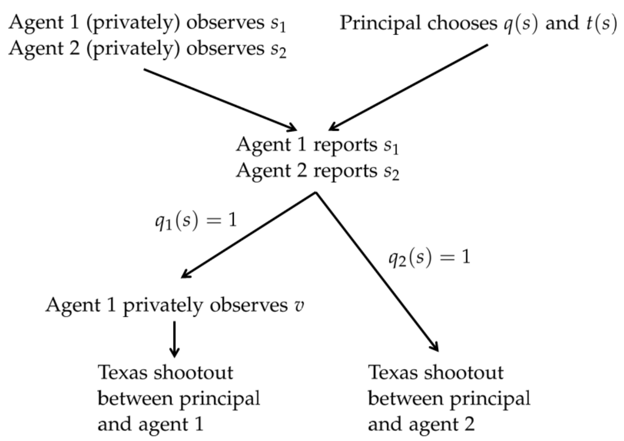


Figure 4: Information structure in constitution negotiations.

The principal's expected payoffs when the agents are truthful are given by:

$$U_P(q,t;\theta) = E\left[(1-\theta)\left(q_1(S)S_1 + q_2(S)S_2\right) + t_1(S) + t_2(S)\right]$$
$$+ \delta E\left[q_1(S)W_{P1}(\theta) + q_2(S)W_{P2}(\theta)\right],$$

where $\delta \in [0,1]$ is the discount factor. The principal collects her share of the exploitation value and the corresponding continuation value from dissolving the partnership with the selected partner, as well as agents' payments. The agents' expected payoffs under truthful reporting are given by:

$$U_1(s) := q_1(s)\theta s_1 - t_1(s) + \delta q_1(s)W_1(\theta),$$
$$U_2(s) := q_2(s)\theta s_2 - t_2(s) + \delta q_2(s)W_2(\theta).$$

Agents collect their share of the exploitation value and their continuation value if made partner, net of the payment to the principal. Both principal and agents share the same discount factor for future payoffs.

The problem of designing a procedure to select a partner is thus reduced to a standard mechanism-design problem with linear utilities. Hence, a mechanism $q(s), t(s)$ is incentive compatible if and only if $q_1(\cdot, s_2)$ and $q_2(s_1, \cdot)$ are non-decreasing, and if the transfer functions are given by:

$$t_1(s) = q_1(s)\left[\theta s_1 + \delta W_1(\theta)\right] - U_1(\underline{s}_1) - \theta \int_{\underline{s}_1}^{s_1} q_1(\epsilon, s_2)\mathrm{d}\epsilon,$$
$$t_2(s) = q_2(s)\left[\theta s_2 + \delta W_2(\theta)\right] - U_2(\underline{s}_2) - \theta \int_{\underline{s}_2}^{s_2} q_2(s_1, \epsilon)\mathrm{d}\epsilon.$$

Both agents will be willing to partake in the mechanism provided that, in addition,

$U_1(\underline{s}_1), U_2(\underline{s}_2) \geq 0$. The principal's feasible payoffs can then be written as:

$$\begin{aligned} & U_P(q,t;\theta) \\ & = E\left\{q_1(S)\left[\phi_S(S_1;\theta) + \delta(W_{P1}(\theta) + W_1(\theta))\right] + q_2(S)\left[\phi_S(S_2;\theta) + \delta(W_{P2}(\theta) + W_2(\theta))\right]\right\}, \end{aligned}$$

where $\phi_S(x;\theta) := x - \theta\frac{1-F_S(x)}{f_S(x)}$.

Notice that, through the transfers, the principal captures the *aggregate* continuation value, $W_{P2}(\theta) + W_2(\theta) = E(V)$ and $W_{P1}(\theta) + W_1(\theta) = E(V) + \theta F_V^{-1}(1-\theta)$. Thus, the information rents commanded by the expert can be extracted from her by the principal, through the terms of the constitution of the partnership. Hence, as in the judo principle, the principal can use the expert agent's informational advantage to her own favor. And since $W_{P2}(\theta) + W_2(\theta) < W_{P1}(\theta) + W_1(\theta)$, this will make partnering with agent 1 a more appealing proposition. Going back to the principal's payoff, we have:

$$\begin{aligned} & U_P(q,t;\theta) \\ & = E\left\{q_1(S)\left[\phi_S(S_1;\theta) + \delta\theta F_V^{-1}(1-\theta)\right] + q_2(S)\phi_S(S_2;\theta) + (q_1(S)+q_2(S))\delta E(V)\right\}; \end{aligned}$$

agent 1's information rents in the dissolution stage become a bias *in her favor* for being selected as a partner in the first place.

To solve for the optimal mechanism, we introduce the following assumption.

Assumption 3 (Regularity)**.** *The function $\phi_S(\cdot\,;\theta)$ is strictly increasing.*

Under this assumption, the optimal allocation rule is given by the point-by-point maximizer of the integrand in U_P.

The preceding exposition leads to the following theorem.

Theorem 2 (Optimal Mechanism)**.** *The optimal allocation rules are given by:*

$$q_1^*(s) := I\left(s_1 \geq \phi_S^{-1}\left(\max\left\{\phi_S(s_2), -\delta E(V)\right\} - \delta\theta F_V^{-1}(1-\theta);\theta\right)\right),$$
$$q_2^*(s) := I\left(s_2 \geq \phi_S^{-1}\left(\max\left\{\phi_S(s_1) + \delta\theta F_V^{-1}(1-\theta), -\delta E(V)\right\};\theta\right)\right);$$

and the optimal payment rules are:

$$t_1^*(s) = q_1^*(s)\left[\theta\phi_S^{-1}\left(\max\left\{\phi_S(s_2), -\delta E(V)\right\} - \delta\theta F_V^{-1}(1-\theta);\theta\right) + \delta W_1(\theta)\right],$$
$$t_2^*(s) = q_2^*(s)\left[\theta\phi_S^{-1}\left(\max\left\{\phi_S(s_1) + \delta\theta F_V^{-1}(1-\theta), -\delta E(V)\right\};\theta\right) + \delta W_2(\theta)\right].$$

Proof. That q_1^*, q_2^* are the optimal allocation rules follows from pointwise maximization of U_P. The assumption that ϕ_S is increasing guarantees incentive compatibility. The expression for the payment rules come from plugging in q_1^*, q_2^* in the expressions for t_1, t_2, respectively, on the previous page, and from noticing that the information rents for the lowest-type agents have to be 0 in the optimal mechanism. (They must be non-negative under individual rationality, and they enter negatively in U_P.) □

Compared to the standard auction-design problem, we have the presence of the extra term $\theta F_V^{-1}(1-\theta)$, capturing agent 1's information rent in the dissolution stage. The principal captures this rent through the payment for being made partner. Thus, agent 1's informational advantage becomes an *asset* rather than a liability to the principal. The optimal mechanism features the judo principle of using one's opponent strength against them: The principal captures, through the transfers, the aforementioned information rents of agent 1.

The optimal mechanism in Theorem 2 can be implemented by means of the following asymmetric auction.

Theorem 3 (Implementation)**.** *The following asymmetric auction implements the optimal mech-*

anism. Both agents submit bids simultaneously. Serious bids for agents 1 and 2 cannot be below $r_1 := \phi_S^{-1}\left(-\delta E(V) - \delta\theta F_V^{-1}(1-\theta);\theta\right)$ *and* $r_2 := \phi_S^{-1}(-\delta E(V);\theta)$*, respectively. If only agent 1 submits a serious bid, she is made partner, and pays the principal* r_1 *per share plus a fee of* $\delta W_1(\theta)$*. If agent 2 is the only serious bidder, she is made partner and pays* r_2 *per share plus a fee of* $\delta W_2(\theta)$*. If both bids are serious, bids are weighted according to:*

$$b_1 \mapsto \omega_1(b_1;\theta) := \phi_S(b_1;\theta) + \delta\theta F_V^{-1}(1-\theta), \quad b_2 \mapsto \omega_2(b_2;\theta) := \phi_S(b_2;\theta),$$

for agents 1 and 2, respectively. The agent with the highest weighted bid is made partner, and pays either the lowest (unweighed) bid that would have still allowed her to win, $\omega_i^{-1}(\omega_{-i}(b_{-i};\theta);\theta)$*, or her reserve price, whichever is higher, plus the corresponding fee.*

Proof. Under the regularity assumption, ϕ_S is invertible. Thus, both r_1 and r_2 are well defined, and ω_1 and ω_2 are also invertible. Given a profile of bids $b = (b_1, b_2)$, let $V_i(b; s_i)$ denote the payoff of agent i of type s_i in the auction. We have:

$$V_i(b;s_i) = \begin{cases} 0 & b_i < \max\left\{\omega_i^{-1}(\omega_{-i}(b_{-i};\theta);\theta), r_i\right\}, \\ \theta\left[s_i - \max\left\{\omega_i^{-1}(\omega_{-i}(b_{-i};\theta);\theta), r_i\right\}\right] & b_i \geq \max\left\{\omega_i^{-1}(\omega_{-i}(b_{-i};\theta);\theta), r_i\right\}. \end{cases}$$

Notice that we can write $q_1^*(b)$ and $q_2^*(b)$ as $q_1^*(b) = I\left(b_1 \geq \max\left\{r_1, \omega_1^{-1}(\omega_2(b_2;\theta);\theta)\right\}\right)$ and $q_2^*(b) = I\left(b_2 \geq \max\left\{r_2, \omega_2^{-1}(\omega_1(b_1;\theta);\theta)\right\}\right)$. By incentive compatibility:

$$V_1(b;s_1) = q_1^*(b)\left[\theta s_1 + \delta W_1(\theta)\right] - t_1^*(b) \leq U_1(s_1, b_2) = V_1(s_1, b_2; s_1),$$
$$V_2(b;s_2) = q_2^*(b)\left[\theta s_2 + \delta W_2(\theta)\right] - t_2^*(b) \leq U_2(s_2, b_1) = V_2(s_2, b_1; s_2).$$

Hence, both agents participate and bid truthfully, and the resulting outcome coincides with the optimal mechanism. □

In the proposed auction, there is an asymmetry related to agent 1's informational advantage. On the one hand, it is easy to see that $r_1 < r_2$; agent 1 has to meet a lower bar for her bid to be admissible. On the other hand, we have the term $\delta\theta F_V^{-1}(1-\theta)$ in $\omega_1(b_1;\theta)$; for all $b_1, b_2 \in \mathbb{R}$, $\omega_2(b_2;\theta) > \omega_1(b_1;\theta)$ if and only if $\phi_S(b_2;\theta) - \phi_S(b_1;\theta) > \delta\theta F_V^{-1}(1-\theta)$. This condition means that, for agent 2 to be made partner over agent 1, it is not sufficient for her to outbid agent 1; she must outbid the expert by a sufficiently high margin. The flip side of this bias in favor of agent 1 is that she is charged a higher fee in the event of winning.

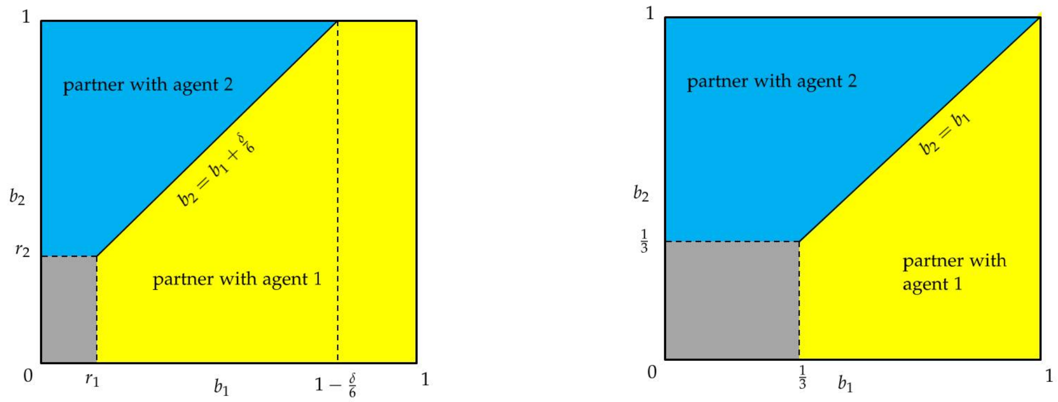
Thus, the optimal auction favors the expert *because* of, rather than *in spite* of, her command of higher information rents at the dissolution stage at the expense of the principal. Following the old judo principle of using the strength of one's opponents against them turns, the principal favors the expert and captures this "favor" for herself through the transfers, thus profiting from agent 1's "tyranny."

We illustrate the optimal auction in the following example.

Example. The principal wants to auction half of her business, so $\theta = \frac{1}{2}$. The agents' types s_1, s_2 are i.i.d. $U[0,1]$. The resale value is also $U[0,1]$. The reserve prices in the auction in Theorem 3 are $r_1 = \frac{1}{3} - \frac{\delta}{2}$ for agent 1 and $r_2 = \frac{1-\delta}{3}$ for agent 2. The fees are $\delta\frac{5}{8}$ for agent 1 and $\frac{\delta}{4}$ for agent 2. The bid-weight functions are $\omega_1(b_1;1/2) = \frac{3}{2}b_1 - \frac{1}{2} + \frac{\delta}{4}$ and $\omega_2(b_2;1/2) = \frac{3}{2}b_2 - \frac{1}{2}$, respectively. Thus, if both bids are serious, agent 1 is made partner if and only if $\omega_1(b_1;1/2) > \omega_2(b_2;1/2)$, or $b_1 > b_2 - \frac{\delta}{6}$; agent 2 must outbid agent 1 by at least $\frac{\delta}{6}$. Figure 5 depicts the allocation rule in the auction from Theorem 3, and compares it to the benchmark where agents are symmetric in their (lack of) expertise.

5 Optimal Allocation of Shares

[In Progress]



Allocation rule from Theorem 3 Symmetric benchmark

Figure 5: Optimal auction in the example, compared to the symmetric benchmark.

6 Conclusion

A savvy business partner may be able to contribute more to a partnership. But a savvy partner also has a better grasp on information about market conditions that determine the termination value of the partnership, thus commanding higher rents if the joint venture is dissolved. Hence, having an expert for a business partner may leave one vulnerable to their "expertise tyranny."

However, as judo teaches, the strength of an opponent can be turned against them and to our advantage. This is how the optimal auction for the right to be made partner works. It is biased *in favor* of, not against, the expert: Higher future information rents make them willing to bid higher for the right to be partners today. This higher willingness to pay is, in turn, captured through payments for the right to be made partner.

Some questions are raised. The reason why the principal can extract the expert's advantage for herself is that the she can charge different amounts to the different agents for their becoming partner. What if transfers have to be symmetric? Namely, what if the principal cannot "price discriminate" between the different agents? Now, she will not be able to capture the expert's information rent, and partnering with agent 1 will become a relatively less attractive proposition.

Assumption 4 is a standard assumption. Without it, the allocation rule in Theorem 2 may not be increasing, and the proposed mechanism violates incentive compatibility. In this case, the optimal mechanism will involve ironing.

Assumption 1, instead, is more substantial. While independence between s_1 and s_2 is a common assumption, independence between these signals and v allows us to limit the link between the constitution and dissolution stages to the identity of the chosen partner. We may want to allow for the possibility that the agents' contribution in the course of the partnership affect the distribution of resale value. In this case, there is a direct informational connection between the two stages. The agents' report in the constitution stage now affect the principal's beliefs about the distribution of resale value. If these beliefs can be pinned down, we will be able to modify the corresponding continuation values and obtain a similar auction as in the present paper.

An implicit assumption that we have maintained throughout is that the principal knows which agent is the expert and which agent is the amateur. We can imagine a scenario in which the agents' "level of expertise" is their private information, and they have to "prove themselves" to the principal. If one and only one of the agents is an expert, then the principal can extract this information costlessly; this would be a case of correlated private information (Cremer and McLean, 1988). But if the levels of expertise are independent across agents, then the constitution mechanism has to be augmented by an expertise-report stage.

A possibility that has not been explored in this paper is that the partner that takes over after the dissolution carries on with the business rather than resell it. In this case, the termination value is a private value, not a common value. The results from Loertscher and Wasser (2015) allow us to characterize the new continuation values, and a similar optimal contract follows.

Finally, we have assumed that the principal and her chosen partner will inexorably dissolve the partnership. But partnerships may be long lasting, with information about the value of the venture arriving over time; and the decision to continue with or dissolve the partnership is made based on this information. Now, the problem is one of both constituting and timing the dissolution of the partnership. This is the subject of ongoing research.

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