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Shotgun mechanisms for common-value partnerships: The unassigned-offeror problem

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HIGHLIGHTS

- We present the first experimental study of shotgun mechanisms with an unassigned offeror.
- We consider a common-value, one-sided asymmetric information model.
- In theory, coordination problems may lead to inefficient outcomes.
- Shotgun mechanisms with unassigned offerors also create unfair outcomes.
- Our experimental findings are aligned with the theoretical predictions.

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ABSTRACT

Shotgun clauses are commonly included in the business agreements of partnerships and limited liability companies (LLCs), but the role of offeror typically remains unassigned. In a common-value, one-sided asymmetric information setting, unequal and inefficient outcomes occur with an unassigned offeror. Experimental results are aligned with our theory.

1. Introduction

Deadlocks or impasses between joint owners concerning fundamental business decisions can paralyze closely-held companies including partnerships and LLCs. When a business relationship deteriorates to the point where the joint owners cannot be reconciled, it may become necessary to dissolve the business venture and/or to dissociate one (or more) of the owners. Placing an accurate value on the business assets – a necessary step in finalizing a business divorce – can be difficult, especially when the best wisdom concerning the value of the assets is in the minds of the business owners themselves, and an outside market for the assets does not exist.

In a shotgun mechanism, one owner names a single buy–sell price and the other owner then decides whether to sell or buy at that price. Shotgun provisions are fairly common in the private business agreements of partnerships and LLCs.[1] In the words of Judge Frank Easterbrook, "[t]he possibility that the person naming the price can be forced either to buy or to sell keeps the first

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[1] These mechanisms may also be referred to as Texas shootouts, Russian roulette, Chinese wall clauses, put–call options, dynamite or candy bar methods, or simply buy–sell mechanisms (Carey, 2005). See Crawford (1977), Che and Hendershott (2008), and De Frutos and Kittsteiner (2008). See also our previous work and the references cited there (Brooks et al., 2010).

mover honest".[2] In private contractual settings, the identity of the offeror is typically not specified, i.e., the role of offeror remains unassigned.

Shotgun mechanisms are sometimes mandated by judges when overseeing business divorce proceedings. In *Kinzie v. Dells*, a recent business deadlock case from Canada,[3] the presiding judge describes the appropriate assignment of the role of offeror: "In a 'shotgun' sale, the court must determine the party who will make the first offer. Normally, the party who is in the best position to assess the value of the business and determine the fair market value is ordered to make the initial offer."

This article theoretically and experimentally studies shotgun mechanisms in a common-value, one-sided asymmetric information setting. When the role of offeror remains unassigned, coordination failures arise and *unequal* and *inefficient* outcomes are obtained.[4] Equitable and efficient outcomes are achieved only when the role of offeror is assigned to the better-informed party. It may be difficult for the owners to adequately assign the role of offeror in the shotgun provision. The identity of the better-informed party in the event of deadlock is frequently unforeseeable ex ante. In contrast, the ex post feature of the judicial implementation of the mechanism might allow courts to identify the better-informed party and properly assign the role of offeror.

2. Theoretical framework

Suppose that two co-venturers[5] own equal stakes in a firm with uncertain value x, which is drawn from a uniform distribution on the interval $[x_L, x_H]$. $\bar{x}$ is the average value. The informed player (Owner 1) knows the true value of x; the uninformed owner (Owner 2) does not observe the value. Thus, this game has one-sided asymmetric information with common values. We assume that there is a business deadlock; the assets will be more valuable if ownership is consolidated. Resolving the deadlock will create an additional a of value, so after the consolidation of ownership the assets are worth $x + a \in [x_L + a, x_H + a]$. In a shotgun mechanism, one owner names a single buy–sell price, which we represent as p, and the other owner is compelled to either buy or sell shares at that named price. If Owner i purchases Owner j's stake for price p, the payoff for Owner i is $x + a - p$ and the payoff for Owner j is p. If the business remains deadlocked, each owner receives $\frac{x}{2}$. The equilibrium concept is the perfect Bayesian equilibrium.

We will show that when the role of offeror is unassigned, inefficient outcomes may result as a consequence of a coordination failure between the owners. To understand this outcome, it is useful to restate our previous findings regarding the equilibria with assigned offerors (Brooks et al., 2010).[6] Proposition 1 first characterizes the unique fully-separating equilibrium of the shotgun mechanism when the informed party, Owner 1, makes the buy–sell offer. Owner 1's buy–sell offer fully reveals Owner 1's type x and leads to an equitable division of the surplus.[7] Second, it outlines the equilibrium of the shotgun mechanism when the uninformed party, Owner 2, makes the buy–sell offer. Owner 2's offer reflects the average value of the assets rather than the realized value (since x is known only to Owner 1), and Owner 1 receives a greater equilibrium share of the surplus than Owner 2.

Proposition 1. *First, suppose Owner* 1 *(the informed party) is assigned the role of offeror. There is a unique fully-separating equilibrium where Owner* 1 *offers* $p_1(x) = \frac{x+a}{2}$ *and Owner* 2 *randomizes between buying and selling with equal probability. The ex ante expected payoffs of each owner are* $\frac{\bar{x}+a}{2}$. *Second, suppose Owner* 2 *(the uninformed party) is assigned the role of offeror. In equilibrium, Owner* 2 *offers* $p_2 = \frac{\bar{x}+a}{2}$. *Owner* 1 *sells his stake to Owner* 2 *when* $x < \bar{x}$ *and buys Owner* 2*'s stake when* $x \geq \bar{x}$.[8] *The ex ante expected payoffs of Owner* 1 *and Owner* 2 *are* $\frac{\bar{x}+a}{2} + \frac{x_H - x_L}{8}$ *and* $\frac{\bar{x}+a}{2} - \frac{x_H - x_L}{8}$, *respectively.*

We now consider the shotgun mechanism with an unassigned offeror. In this mechanism, the two owners have the option (but not the obligation) to make simultaneous buy–sell offers. If only one offer is made, the receiver is compelled to either buy the stake of the offeror or to sell his own stake. If two offers are made, a coin flip determines which of the two offers applies. The results of our first two propositions suggest a potential conflict between the two owners in this setting. The uninformed player, Owner 2, would prefer that Owner 1 makes the buy–sell offer since $p_1(x) = \frac{x+a}{2}$ gives Owner 2 an equitable share of the surplus. Owner 1 would prefer that Owner 2 make the buy–sell offer, since receiving $p_2 = \frac{\bar{x}+a}{2}$ will allow Owner 1 to exploit his informational advantage.

When the gains from consolidation, a, are sufficiently large, then there are multiple equilibria. In one equilibrium, Owner 1 makes a perfectly-revealing and equitable offer $p_1(x) = \frac{x+a}{2}$ and Owner 2 mixes between accepting and rejecting (as in Proposition 1). In a second equilibrium, Owner 2 makes an offer $p_2 = \frac{\bar{x}+a}{2}$ and Owner 1 buys when x is high and sells if x is low (as in Proposition 1). Interestingly, there is also a mixed-strategy equilibrium where Owner 2 mixes between making an offer and not making one, and Owner 1 offers $p_1 = \frac{x+a}{2}$ if and only if his type, x, is sufficiently close to the average type $\bar{x}$. In this mixed-strategy equilibrium, it is possible that neither owner makes a buy–sell offer, leaving the gains from trade, a, unrealized.[9] Proposition 2 characterizes the equilibria.

Proposition 2. *Suppose the role of offeror has not been assigned. If* $a < \frac{x_H - x_L}{4}$ *then Owner* 1 *(the informed party) makes a buy–sell offer and Owner* 2 *(the uninformed party) does not. If* $a \geq \frac{x_H - x_L}{4}$ *then:*

(i) *There is an equilibrium where Owner* 1 *(the informed party) makes an offer and Owner* 2 *does not;*

(ii) *There is an equilibrium where Owner* 2 *(the uninformed party) makes an offer and Owner* 1 *does not; and*

(iii) *There is a mixed-strategy equilibrium where Owner* 2 *(the uninformed party) offers* $p_2 = \frac{\bar{x}+a}{2}$ *with probability* θ *and makes no offer with probability* $1 - \theta$. *Owner* 1 *(the informed party) offers* $p_1(x) = \frac{x+a}{2}$ *when* $x \in [\bar{x} - \Delta, \bar{x} + \Delta]$ *and does not make an offer otherwise. The payoffs of Owner* 1 *and Owner* 2 *are* $\frac{\bar{x}+a}{2} + a\left(\theta - \frac{1}{2}\right)\left(1 - \frac{2\Delta}{x_H - x_L}\right)$ *and* $\frac{\bar{x}+a}{2} - a\left(\frac{1}{2} - \frac{\Delta}{x_H - x_L}\right)$, *respectively.* $\theta \in (0, 1)$ *and* $\Delta \in \left(0, \frac{x_H - x_L}{2}\right)$ *exist and solve the following system of two equations:* $2\Delta^2 - 8a\Delta = (x_H - x_L)^2 - 4a(x_H - x_L)$ *and* $\Delta = 2a(1 - \theta)/\theta$.

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2 *Valinote v. Ballis;* 295 F3d. 666 (Ill. 2002).

3 *Kinzie v. Dells* 2010 BCSC 1360 (Can. B.C.). Shotgun mechanisms are rare in the United States, but see *Fulk v. Washington Serv. Assocs.* No. 17747-NC, 2002 BL 1389 (Del. Ch. June 21, 2002). See Landeo and Spier (forthcoming-a,b).

4 Landeo and Spier (forthcoming-a,b) and Brooks et al. (2010) do not study shotgun mechanisms with unassigned offerors. In a different environment, De Frutos and Kittsteiner (2008) theoretically explore an auction mechanism for assigning the role of offeror.

5 According to Hauswald and Hege (2006), 80% of all joint ventures incorporated in the U.S. between 1985 and 2000 are two-partner joint ventures.

6 See our previous work (Brooks et al., 2010) for formal discussion and proofs.

7 There also exists a pooling equilibrium where Owner 1 offers $p(x) = \frac{\bar{x}+a}{2}$ and Owner 2 mixes between buying and selling with equal likelihood. The expected payoffs are the same as in the separating equilibrium.

8 Here, we assume that the recipient buys when indifferent.

9 This outcome might also explain why privately-contracted shotgun clauses are rarely triggered. See Brooks et al. (2010).