An Analysis of Shareholder Agreements[1]

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July 14, 2004

[1]We would like to thank Ekkehart Boehmer, Patrick Bolton, Mike Burkart, Didier Cossin, Zsuzsanna Fluck, Paolo Fulghieri, David Goldreich, Sumantra Goshal, Denis Gromb, Dirk Hackbarth, Thomas Hellmann, Chris Hennessy, Peter Högfeldt, Josh Lerner, Gilad Livne, Jan Mahrt-Smith, Georg Nöldeke, Kjell Nyborg, Christine Parlour, Pim Piers, Diego Rodriguez, Ailsa Roell, Kristian Rydqvist, Klaus Schmidt, Dorothea Shäfer, Emily Sims, John Stopford, Per Strömberg, Ernst-Ludwig von Thadden, Raman Uppal, Andrew Winton and seminar participants at the University of Arizona, NHH Bergen, the University of British Columbia, the University of California Berkeley, Columbia Law School, the CEPR European Summer Symposium on Financial Markets in Gerzensee, HEC Lausanne, the AAA-SG Meetings at Humboldt University, the Western Finance Association Meetings in Vancouver, INSEAD, ISCTE, the London Business School, the first RICAFE Conference at the London School of Economics, McGill University, HEC Paris, the University of Porto, Princeton University, the Stockholm School of Economics, the DFG Meetings at the University of Vienna, the University of Warwick, the University of Washington at Seattle, and the University of Zurich for helpful discussions. All errors are our own.

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Abstract

Shareholder agreements govern the relations among shareholders in privately-held firms, such as joint ventures or venture capital-backed firms. We provide an explanation for the use of put and call options, tag-along rights, drag-along rights, demand rights, piggy-back rights, and catch-up clauses in shareholder agreements. We view these clauses as serving (1) to induce the parties to make ex ante investments, (2) to preclude ex post transfers by the party that has the ability to engage in such transfers, and (3) to achieve the efficient ex post allocation of stakes in the firm. (JEL: G34).

Keywords: Shareholder Agreements; Investment; Transfers; Trade Sale; Renegotiation; Put Options; Call Options; Tag-along Rights; Drag-along Rights; Demand Rights; Piggy-Back Rights; Catch-Up Clauses.

1 Introduction

Shareholder agreements specify the rights and duties of shareholders when those prescribed by law and regulation are thought not to be appropriate. Shareholder agreements are used mostly when at least some shareholders are actively involved in managing the company. Examples of shareholder agreements include the joint venture and venture capital contracts that govern joint ventures and venture capital-backed firms, respectively.[1]

Shareholder agreements generally grant the parties the following rights: the option to *put* their stakes to their partners or to *call* their partners' stakes, in part or in whole, at a strike price that is typically equal to 'fair' value; *tag-along rights* (or *co-sale agreements*) which allow the parties to demand of a trade buyer buying their partners' stakes the same treatment as received by their partners; *drag-along rights* which allow the parties to force their partners to join them in selling their stakes to a trade buyer in the case of a trade sale; *demand rights* (or *registration rights*) which allow the parties to force their partners to agree to taking the firm public in an IPO; *piggy-back rights* which allow the parties to demand to be included in an IPO in proportion to their stakes in the firm; and *catch-up clauses* which maintain the parties' claims to part of the payoff from a trade sale or an IPO when the parties have ceded their stakes to their partners following the partners' exercise of a call option.

We provide an explanation for these clauses in a dynamic moral hazard setting. We view the clauses as serving (1) to induce the parties to make ex ante investments, (2) to preclude ex post transfers by the party that has the ability to engage in such transfers, and (3) to achieve the efficient ex post allocation of ownership stakes in the firm.[2] In the absence of the relevant clauses, renegotiation arising from the need to preclude ex post

[1] Standard shareholder agreements are described in Bernstein (1988), Freedman (1994), Martel (1991), and Stedman and Jones (1990). Joint venture contracts are described in Herzfeld and Wilson (1996), Linklaters et al. (1990), and Scott (1999); and venture capital contracts in Bartlett (1994) and Stedman and Jones (1990). Contracts appear to be strikingly similar across countries and legal systems (Martel, 1991). See Appendix 1 for a brief description of the clauses most commonly found in shareholder agreements.

[2] An earlier version of the paper allowed all parties to engage in ex post transfers. Many of the results were similar, but few unambiguous predictions could be obtained because of the large number of cases to consider.

transfers from the firm, to sell the firm to a trade buyer, or to take the firm public in an IPO may distort ex ante investments. When the parties' initial stakes in the firm cannot be adjusted to offset the distortion due to the expectation of renegotiation, the clauses we discuss serve to maintain the parties' incentives to make the ex ante investments by structuring renegotiation in such a way as to maintain the parties' shares of the payoff.

We show that put options maintain the parties' shares of the payoff when the parties' stakes in the firm must be altered in order to preclude ex post transfers from the firm. Tag-along rights deny the parties the ability to increase their share of the payoff by threatening to sell their stake to a trade buyer who would decrease the value of the firm, or by preceding the other parties in selling their stake to a trade buyer who will increase the value of the firm. Drag-along rights deny the parties the ability to increase their share of the payoff by threatening to hold out on a value-increasing trade sale. Demand rights deny the parties the ability to increase their share of the payoff by threatening to veto a value-increasing IPO. Piggy-back rights deny the parties the ability to increase their share of the payoff by including a disproportionate fraction of their own shares in the IPO of the firm. Call options perform a similar role to put options when the problem of ex post transfers is replaced by that of ex post investment. Catch-up clauses deny the holders of a call option the ability to use the option to increase their share of the gains from a trade sale.

Each clause can be viewed as an option. The strike price of each option is determined endogenously after the valuation is realized. The option is explicit in the case of the put and call options, and implicit in the case of the remaining clauses. In particular, drag-along rights and catch-up clauses are forms of call options, whereby a party can call his partners' stakes. Tag-along rights are a form of put option, whereby a party can put his stake to a trade buyer. These (implicit) options are state-dependent, for their exercise is dependent on the appearance of a trade buyer. The state-dependency of the options is important, for it avoids the simultaneous exercise of conflicting options and confines the optionholder's ability to exploit the strong bargaining power conferred by the option to the state in which the option can be exercised. This is in contrast to the state-independent bargaining power conferred by ownership.

Nöldeke and Schmidt (1995, 1998) consider the use of options to solve the hold-up problem.[3] They show that options can solve the hold-up problem under the assumption that a contract can be written imposing in case of default a specific trade at a fixed price. Instead, the options in our paper impose a specific allocation of stakes and have endogenous strike price. Our paper further differs from Nöldeke and Schmidt in allowing for the presence of a third party, the trade buyer. This allows us to account for the clauses intended to prevent the parties from exploiting the presence of the trade buyer to increase their share of the payoff.

Joint ventures and venture capital have received much attention in the academic literature.[4] However, only recently has the literature considered some of the clauses found in shareholder agreements. Aghion, Bolton, and Tirole (2004) provide an explanation for drag-along rights, demand rights, and piggy-back rights based on the desire for liquidity. The focus on liquidity is appropriate for venture capital investments which are generally sold in a public offering, but perhaps less so for joint ventures investments which rarely are. That similar clauses are found in joint venture and venture capital contracts suggests that there may be more to these clauses than the desire for liquidity. Kahan (2000) values various forms of the right of first refusal, which gives the remaining partners priority over a trade buyer in buying a departing partner's stake. Hauswald and Hege (2004) find that joint venture contracts that include explicit options are more likely to depart from 50-50 ownership. Hauswald and Hege interpret their finding to imply that the protection options afford minorities makes parties more willing to contemplate minority positions.

To illustrate our analysis, we consider the joint venture contract between General Motors (GM) and Fiat S.p.A (Fiat).[5] Fiat owns 80% of Fiat Auto, and GM the remaining 20%.

[3] The hold-up problem arises when firm-specific investments make the parties vulnerable to opportunism on the part of their partners. See Grossman and Hart (1986), Hart and Moore (1988, 1990), and Williamson (1985).

[4] Allen and Phillips (2000), Bhattacharyya and Lafontaine (1995), Darrough and Stoughton (1989), Hauswald and Hege (2002), McConnell and Nantell (1985), Mohanram and Nanda (1998), Oxley (1997), Pisano (1989), Rey and Tirole (1998), and Robinson and Stuart (2002) study various aspects of joint ventures and alliances. Aghion, Bolton, and Tirole (2004), Berglöf (1994), Cornelli and Yosha (2003), Dessein (2002), Gompers (1995), Hellmann (1998, 2001), Inderst and Müller (2004), Kaplan and Strömberg (2002, 2003), Kirilenko (2001), Neher (1999), Repullo and Suarez (1998), and Schmidt (2003) study various aspects of venture capital contracts.

[5] The contract can be found on http://media.gm.com/images/0010filing.htm. Our rendering of the con-

The contract grants Fiat the right to put its 80% stake in Fiat Auto to GM, for a period commencing 42 months and ending 9 years after the signing of the contract. In the event Fiat and GM cannot agree on a strike price for the option, the price is set equal to "Fair Market Value." Fair market value is based on the valuation conducted by two and possibly four investment banks, each bank having conducted its valuation alone. In case Fiat should arrange for the sale of its stake in Fiat Auto to a third party, the contract grants that party the right to "drag" GM "along" — subject to what is akin to a right of first refusal by GM.[6] Conversely, the contract grants GM the right to "tag along" Fiat in the sale to the third party. The contract can be extended up to a total period of 19 years. In case it is not, or at the conclusion of the 19-year period, the put option and the other rights expire. GM then has the right to demand of Fiat the listing of Fiat Auto in an IPO. The purpose of our analysis is to shed light on the allocation of options and rights in contracts such as this. Why, for example, does Fiat have a put option rather than GM a call option? Note that the protection of minority shareholders explanation of such clauses would predict that it would be GM as minority shareholder who would hold the option to put its stake to Fiat as majority shareholder.[7]

We proceed as follows. We present the initial setting in Section 2. In Section 3, we consider the situation that would prevail in the absence of the clauses and the problems that may then arise. We then proceed to show how the various clauses we consider can remedy these problems. We analyze the case where ownership of the firm should remain with the founding parties in Section 4, and that where it should be transferred to a trade buyer in Section 5. We establish the result that the clauses taken together elicit the desired ex ante investments in Section 6. We then consider a number of applications and extensions. We analyze the case where the firm should be taken public in an IPO in Section 7. We consider ex post investment rather than transfers in Section 8. We consider the joint venture contract between GM and Fiat in Section 9. We conclude in Section 10 by discussing the

tract, here and in Section 9, is necessarily simplified.

[6] Note that we do not consider the right of first refusal in the present paper.

[7] Indeed, Lerner and Schoar (2003) find that private equity contracts in emerging markets often include the option for minority investors to put their stakes to the majority owner. Minority investors readily admit that these put options are intended to protect them from expropriation by the majority owner.

similarities and differences between shareholder agreements and the rules and regulations that govern tender offers and the sale of control blocks. Appendix 1 contains a brief overview of the clauses found in standard shareholder agreements. Appendix 2 contains a number of proofs.

2 The initial setting

Two parties a and b jointly start a firm. They sign a contract that allocates initial stakes γ to party a and $1-\gamma$ to party b. The contract may include put and call options, tag-along rights, and drag-along rights.[8] The put and the call require the setting of a strike price. This is typically taken to be what contracts refer to as the 'fair' value of the firm. Shareholder agreements therefore include a clause outlining how this value is to be determined. A popular option is to delegate valuation to an external expert, such as an investment bank or a firm of accountants. Alternatively, the clause may set out a formula for how value is to be determined. For the purpose of our analysis below, it is not necessary that the valuation be perfect, but that it be unbiased. We consider the fair value of the firm as the value of the firm under the conditions that result from the exercise of the option.

Each party must make a non-contractible investment towards the success of the firm. Let i_n denote the investment made by party n at a cost $\frac{1}{2}c_n i_n^2$, $n \in \{a, b\}$.

Once the investments have been made, the firm can remain the property of the two founding parties a and b, or one or both founding parties can sell their stake to a trade buyer t in a trade sale. We assume that the trade buyer has no bargaining power when bargaining with one or both founding parties.

There are two possible states: the state s_t, in which the acquisition of a majority stake in the firm by the trade buyer increases the value of the firm, and the state s_f in which

[8] We shall briefly analyze demand rights and piggy-back rights in Section 7. This is because the analysis of demand rights and piggy-back rights closely follows that of drag-along rights and tag-along rights, respectively. We analyze catch-up clauses in Section 8.

such acquisition decreases the value of the firm.[9] We denote p_t the probability of state s_t and p_f the probability of state s_f, $p_t + p_f = 1$. We say that the firm is in use $u = t$ when the trade buyer has acquired a majority stake in the firm or the entire firm. We say that the firm is in use $u = f$ when the trade buyer has acquired a minority stake in the firm or none at all.

The value of the firm in use $u \in \{t, f\}$ and state $s \in \{s_t, s_f\}$ is $V_u(s) \min[i_a, i_b] \equiv V_u(s) I$.[10] From the definition of the states s_t and s_f, we have $V_t(s_t) > V_f(s_t)$ and $V_f(s_f) > V_t(s_f)$.

We consider the possibility of value-decreasing ex post transfers from the firm. The transfers we have in mind are very general. They may take the form of what Johnson, La Porta, Lopez de Silanes, and Shleifer (2000) call "tunneling" — theft by the majority owner of the firm. They may consist in having one or the other owner use know-how it has acquired from the firm to compete with the firm. They may consist in having the minority owner use any blocking power it may have to frustrate even value-creating initiatives on the part of the majority owner, if these should adversely affect the minority owner.

Regardless of the specific nature of the transfer, we assume that only one party can engage in a transfer. This assumption simplifies the analysis and delivers clear testable implications as to which party should have what rights under what circumstances. We consider in turn i) the case where one of the two founding parties, say party a, can engage in transfers and ii) the case where the trade buyer t can do so.

A transfer decreases the value of the firm by a constant fraction Δ, $0 < \Delta < 1$, from $V_u(s) I$ to $V_u(s) I(1 - \Delta)$ in use $u \in \{t, f\}$ and state $s \in \{s_t, s_f\}$. The benefit of the transfer to the party that has engaged in the transfer is $\alpha V_u(s) I \Delta$. Transfers are value-decreasing: $\alpha < 1$. However, as the full cost of the transfer is shared by the owners of the

[9] The subscript f stands for founding: it is used to refer to a situation in which ownership of the firm should remain with the founding parties.

[10] We have chosen to use the Leontieff production function $I \equiv \min[i_a, i_b]$ because it has the property that the first-best investments can be induced even under joint ownership (Hauswald and Hege, 2004; Legros and Matthews, 1993). This allows us to concentrate on transfers — see below — and on the trade sale as the unique causes of the departure from efficient investment, and on the role of the clauses we discuss in avoiding such departure. In an earlier draft of the paper, we used a more general concave production function. We obtained similar results, but the notation and the exposition were much more cumbersome.

firm whereas the benefits are received only by the party that has engaged in the transfer, a party that has a stake γ (respectively $1-\gamma$) in the firm will engage in a transfer if $\alpha > \gamma$ (respectively $\alpha > 1-\gamma$). We assume that $\alpha > \frac{1}{2}$. This implies that only by giving a party that has the ability to engage in transfers a majority stake in the firm — or by buying him out completely — can that party be deterred from engaging in transfers.

We note that the interpretation of $\Delta > 0$ as transfer can be changed to one of $\Delta < 0$ as investment, in which case a party that has a stake γ (respectively $1-\gamma$) in the firm will *not* make a value-creating ex post investment if $\alpha > \gamma$ (respectively $\alpha > 1-\gamma$). We have chosen the former interpretation because transfers have been a foremost concern of parties in joint ventures (Doz and Hamel, 1998; Reich and Mankin, 1986). We return to the latter interpretation in Section 8.

We allow the founding parties a and b to renegotiate the original contract after the state is realized but before transfers or a trade sale have taken place. Renegotiation takes the form of a standard asymmetric Nash bargaining game, in which parties a and b have bargaining power $\beta(s)$ and $1-\beta(s)$, respectively. Note that bargaining power may vary with the realized state $s \in \{s_t, s_f\}$.

To summarize, the timing of the model is as follows:

- At time 0, parties a and b sign a contract that specifies the parties' initial stakes γ and $1-\gamma$, respectively. The contract may contain clauses that allocate rights to the parties.
- At time 1, parties a and b invest i_a and i_b, respectively.
- At time 2, the state is realized. Parties a and b may renegotiate the original contract and/or exercise the relevant rights.
- At time 3, a trade sale and/or a transfer may take place. The payoffs are received.

3 Preliminary analysis absent the clauses

Our purpose in the present section is to discuss the problems that arise in the absence of the clauses. In the sections that follow, we shall show how the various clauses we consider can remedy these problems.

In the spirit of backward induction, we first consider the ex post stakes that prevent value-decreasing transfers. In state s_f, in case party a can engage in a transfer and that party's initial stake γ is less than α, the parties renegotiate the original stakes so as to increase party a's stake from $\gamma < \alpha$ to $\gamma^r \geq \alpha$.

In state s_t, the trade buyer must acquire a majority stake in the firm for the value of the firm to be increased from $V_f(s_t) I$ to $V_t(s_t) I$ absent transfers. In case party a can engage in a transfer, the trade buyer must buy out party a. This is because the requirement that the trade buyer acquires a majority stake in the firm in state s_t precludes the prevention of transfers by party a by giving that party a majority stake in the firm. In case it is the trade buyer that can engage in a transfer, the trade buyer's majority stake in the firm must be at least $\alpha > \frac{1}{2}$.

We now turn to the investment stage. We consider the first-best investments i_a^{FB} and i_b^{FB}. These are the solution to the problem

$$\underset{\widehat{i}_a, \widehat{i}_b}{Max}\ p_f V_f(s_f)\,\widehat{I} + p_t V_t(s_t)\,\widehat{I} - \frac{1}{2} c_a \widehat{i}_a^2 - \frac{1}{2} c_b \widehat{i}_b^2 \tag{1}$$

where $\widehat{I} \equiv \min\left[\widehat{i}_a, \widehat{i}_b\right]$. From the first-order conditions, the first-best investment levels satisfy

$$I^{FB} = i_a^{FB} = i_b^{FB} = \frac{p_f V_f(s_f) + p_t V_t(s_t)}{c_a + c_b}$$

Note that the parties make identical investments at the first-best. This is because any difference in investment $|i_a - i_b|$ would be wasted given the Leontieff production function $\min[i_a, i_b]$.

We now show that — if the founding parties can commit to retain their shares in state s_f and to sell them to the trade buyer in state s_t, and if party a can commit not to engage in transfers in state s_f — the first-best investments i_a^{FB} and i_b^{FB} can be elicited despite the problem of double moral hazard (Holmström, 1982).[11] This is because the Leontieff production function makes each party the unique residual claimant to the investment he makes at the optimum (Hauswald and Hege, 2004; Legros and Matthews, 1993).

Proposition 1 *If the founding parties can commit to retain their shares in state s_f and to sell them to the trade buyer in state s_t, and if party a can commit not to engage in transfers in state s_f, the parties can be induced to make the first-best investments when given initial stakes γ_0 and $1-\gamma_0$ with*

$$\gamma_0 = \frac{c_a}{c_a + c_b}$$

Proof: See Appendix 2.■

Note that $\gamma_0 \lesseqgtr \frac{1}{2}$ as $c_a \lesseqgtr c_b$. The party with higher cost must be given a larger stake in order to be induced to make the same investment as his lower cost counterpart.

Of course, it is difficult if not impossible for the parties credibly to make such commitments as in Proposition 1, because a founding party that can increase his payoff by reneging assuredly will do so. Renegotiation may ensue, ensuring ex post efficiency but distorting ex ante investment.[12]

What then is the value of Proposition 1? The proposition shows that a sufficient condition for the first-best investments to be elicited is to make the founding parties share the final payoff in the proportions $\gamma_0 = \frac{c_a}{c_a+c_b}$ and $1-\gamma_0 = \frac{c_b}{c_a+c_b}$. Thus, when the state s_f is realized, party a can engage in transfers, and the parties' stakes in the firm must be altered from the initial proportions $(\gamma, 1-\gamma)$ to the proportions $(\gamma^r, 1-\gamma^r)$, the increase in value made possible by such change must be shared in such a way as to make the parties share in the final payoff in the proportions $(\gamma_0, 1-\gamma_0)$. Similarly, when the state s_t is realized and a

[11] Note that the conditions specified are sufficient but need not be necessary.
[12] This is a well-known result. See Hart (1995) for example.

majority stake in the firm must be sold to the trade buyer, the proceeds from the sale must be shared such that the founding parties' shares of the final payoff are in the proportions $(\gamma_0, 1-\gamma_0)$.

It is clear that this will not be the case absent the clauses, for the parties' payoffs in renegotiation are determined by their bargaining powers, and these will generally not be such as to make the parties share in the final payoff in the desired proportions. We argue in the sections that follow that the various clauses found in shareholder agreements have the effect of structuring renegotiation in such a way as to maintain the founding parties' shares of the final payoff in the initial proportions, γ and $1-\gamma$. It then suffices to set $\gamma = \gamma_0$ to obtain the desired shares of the final payoff, thereby eliciting the first-best investments.[13]

We consider the situations that arise in each of the two states s_f and s_t, with party a or the trade buyer having the ability to engage in transfers. For each situation, we show how the founding parties' shares would be altered absent any clause, and identify the clause or clauses that serve to maintain the founding parties' shares. We assume throughout that $\gamma < \alpha$: only if the inequality is true do ex post transfers by party a constitute a problem. Transfers by the trade buyer require either $\gamma < \alpha$ or $1-\gamma < \alpha$.

4 The state s_f: Put options and tag-along rights

We consider the state s_f in which majority ownership of the firm should remain with a founding party. We first consider the case where it is party a that can engage in transfers, and derive a rationale for put options in shareholder agreements.

[13] An alternative to the use of the clauses is to adjust the parties' initial stakes for the expected effect of renegotiation. For example, a founding party that expects to see his share of the payoff decreased by renegotiation may be allocated a high initial stake in the firm. A limitation of this solution is that the necessary adjustments to the parties' initial stakes may be so large as to take these below 0 or above 1. This will be the case where there is a large discrepancy in the partners' bargaining power, a far from uncommon situation. In venture capital, for example, the upper hand generally belongs to the venture capitalist. Adjusting for the expected effect of renegotiation may imply giving the entrepreneur an initial stake greater than 1, clearly an impossibility. Even a stake less than 1 but well above 0.5 may be infeasible because of control considerations.

4.1 Party a can transfer: Put options

As $\gamma < \alpha$, party a should increase his stake from γ to $\gamma^r \geqslant \alpha$. We show in Proposition 2 that a put option held by party b to put a stake $\gamma^r - \gamma$ to party a at fair value serves to change the parties' stakes from $(\gamma, 1-\gamma)$ to $(\gamma^r, 1-\gamma^r)$ while maintaining the parties' shares of the payoff in the initial proportions γ and $1-\gamma$.

Proposition 2 *A put option at fair value serves to change the founding parties' stakes in the firm while maintaining the parties' initial shares of the payoff.*

Proof: See Appendix 2.■

Setting the strike price of the option equal to fair value denies both parties any direct benefit from the exercise of the option. This maintains the parties' payoffs in the initial proportions γ and $1-\gamma$. Nonetheless, by changing the parties' stakes from $(\gamma, 1-\gamma)$ to $(\gamma^r, 1-\gamma^r)$, the exercise of the option precludes transfers by party a.

Clearly, a call option held by party a to call a stake $\gamma^r - \gamma$ from party b at fair value would — if exercised — achieve the same result as the put option just analyzed. However, such an option would not be exercised by a, who would instead seek to exploit the leverage he is afforded by the ability to engage in transfers. To see this, note that party a's payoff from bargaining with b is

$$\begin{aligned} & \gamma V_f(s_f) I(1-\Delta) + \alpha V_f(s_f) I\Delta + \beta(s_f)\left[V_f(s_f) I - \left[V_f(s_f) I(1-\Delta) + \alpha V_f(s_f) I\Delta\right]\right] \\ \geqslant\ & \gamma V_f(s_f) I(1-\Delta) + \alpha V_f(s_f) I\Delta \\ >\ & \gamma V_f(s_f) I \end{aligned} \tag{2}$$

where the last inequality is true by the assumption that $\gamma < \alpha$. As $\gamma V_f(s_f) I$ constitutes party a's payoff from exercising the call option, it is clear that a would let the call option expire and bargain with b.[14] Conversely, party b will exercise the put option in order to

[14] We provide a rationale for call options in Section 8.

deny party a the benefit of exploiting the leverage a is afforded by his ability to engage in transfers.[15]

The presence of the trade buyer leaves the preceding analysis unchanged. Neither founding party profits from selling his stake to the trade buyer. Indeed, the parties would see their combined payoff decrease if the majority owner were to sell his stake to the trade buyer, as this would decrease the value of the firm from $V_f(s_f)$ to $V_t(s_f)$.

4.2 The trade buyer can transfer: Tag-along rights

We now consider the case where it is the trade buyer who can engage in transfers, and derive a rationale for tag-along rights in shareholder agreements.

We have seen in Section 4.1 that the ability to engage in transfers is a source of leverage to the party endowed with that ability. We note in the present section that it may also be a source of leverage to a party who sells his stake to the party endowed with the ability to engage in transfers.

To see this, denote the founding party that owns a majority stake in the firm by M, and the founding party that owns a minority stake by m.[16] We show that having both founding parties keep their stakes in the firm is not a Nash Equilibrium. Party m clearly can profit from selling his stake to the trade buyer when party M keeps his stake. The value of party m's stake to the trade buyer will be received by party m in its entirety, as the trade buyer has no bargaining power when bargaining with a founding party. This value is

$$\gamma_m V_f(s_f) I(1-\Delta) + \alpha V_f(s_f) I\Delta > \gamma_m V_f(s_f) I \tag{3}$$

[15] Formally

$$\begin{aligned}
& (1-\gamma) V_f(s_f) I(1-\Delta) + (1-\beta(s_f)) [V_f(s_f) I - [V_f(s_f) I(1-\Delta) + \alpha V_f(s_f) I\Delta]] \\
= \; & V_f(s_f) I - [\gamma V_f(s_f) I(1-\Delta) + \alpha V_f(s_f) I\Delta + \beta(s_f) [V_f(s_f) I - [V_f(s_f) I(1-\Delta) + \alpha V_f(s_f) I\Delta]]] \\
< \; & V_f(s_f) I - \gamma V_f(s_f) I \\
= \; & (1-\gamma) V_f(s_f) I
\end{aligned}$$

where the inequality is true by inequality (2).

[16] $M = a$ and $m = b$ if $\gamma > \frac{1}{2}$, in which case $\gamma_M = \gamma$ and $\gamma_m = 1-\gamma$; $M = b$ and $m = a$ if $\gamma < \frac{1}{2}$, in which case $\gamma_M = 1-\gamma$ and $\gamma_m = \gamma$.

where the inequality is true by the assumption that $\alpha > \frac{1}{2}$ and the definition of m as the minority owner, $\gamma_m < \frac{1}{2}$. Party m's gain is party M's loss.[17]

If $\gamma_M < \alpha$, party M might profit from selling his stake to the trade buyer when party m keeps his stake. This would be the case if

$$\gamma_M V_t(s_f) I(1-\Delta) + \alpha V_t(s_f) I\Delta > \gamma_M V_f(s_f) I \tag{4}$$

Of course, no sale to the trade buyer will take place in equilibrium, for such sale — whether of a minority stake that affords the trade buyer the opportunity to engage in transfers, or a majority stake that lowers the value of the firm absent transfers from $V_f(s_f)$ to $V_t(s_f)$ — is value-decreasing. However, the bargaining intended to prevent such sale will alter the parties' shares of the final payoff, thereby distorting the parties' ex ante investment.

Tag-along rights serve to preclude such bargaining. By granting a founding party the right to make the sale of a stake by the other founding party conditional on the acquisition by the buyer of both founding parties' stakes, tag-along rights deny the trade buyer — and therefore the founding party threatening to sell his stake to the trade buyer — the ability to profit from transfers. This is because the trade buyer will not engage in value-decreasing transfers when he is the unique owner of the firm. The highest price the trade buyer can offer for the entire firm is therefore $V_t(s_f)$. As $V_t(s_f) < V_f(s_f)$, neither founding party will sell his stake to the trade buyer. We have thus shown

Proposition 3 *Tag-along rights deny the parties the ability to increase their share of the payoff by threatening to sell their stake to a trade buyer who would decrease the value of the firm.*

[17] Party M's payoff becomes

$$\begin{aligned} & V_f(s_f) I - [\gamma_m V_f(s_f) I(1-\Delta) + \alpha V_f(s_f) I\Delta] \\ < \; & V_f(s_f) I - \gamma_m V_f(s_f) I \\ = \; & (1-\gamma_m) V_f(s_f) I \\ = \; & \gamma_M V_f(s_f) I \end{aligned}$$

where the inequality is true by inequality (3).

5 The state s_t: Drag-along rights and tag-along rights

We now consider the state s_t, in which majority ownership of the firm should be acquired by the trade buyer. Again, we distinguish between the case where party a can engage in transfers and that where the trade buyer can. We also distinguish between the case where a is majority owner of the firm and that where b is. We establish a rationale for drag-along rights and establish an alternative rationale for tag-along rights.

5.1 Party a can transfer: Drag-along rights

We first consider the case where party a can engage in transfers and a is minority owner of the firm. As is clear from the definition of state s_t, both founding parties gain from the sale of a majority stake in the firm to the trade buyer. A sale must include the sale of party a's entire stake, for a would otherwise engage in transfers. As a is minority owner of the firm, b must join a in selling at least part of his stake to the trade buyer.[18]

We first show that a concurrent sale by the two founding parties is not a Nash Equilibrium. By holding out on a concurrent sale with b, a can appropriate to himself the entirety of the increase in value made possible by the preclusion of transfers.[19] By holding out on a concurrent sale with a, b can appropriate to himself the entirety of the gains made possible by the transfer of majority ownership from a founding party to the trade buyer.[20,21]

[18] The stake sold by party b must be such as to constitute a majority stake in the firm when combined with the stake sold by party a.

[19] Formally

$$\begin{aligned} & \gamma V_t(s_t) I(1-\Delta) + \alpha V_t(s_t) I\Delta + [V_t(s_t) I - [V_t(s_t) I(1-\Delta) + \alpha V_t(s_t) I\Delta]] \\ = \; & \gamma V_t(s_t) I + (1-\gamma) V_t(s_t) I\Delta \\ > \; & \gamma V_t(s_t) I \end{aligned}$$

[20] Formally

$$\begin{aligned} & (1-\gamma) V_f(s_t) I + [V_t(s_t) I - V_f(s_t) I] \\ = \; & (1-\gamma) V_t(s_t) I + \gamma [V_t(s_t) I - V_f(s_t) I] \\ > \; & (1-\gamma) V_t(s_t) I \end{aligned}$$

where the inequality is true by $V_t(s_t) > V_f(s_t)$.

[21] Note that there is no incentive for one founding party to precede the other in selling to the trade buyer. As noted in Section 4.2, the incentive to do so is to exploit the trade buyer's ability to engage in transfers.

As the sale to the trade buyer is value-increasing, the parties will seek to avoid hold-out on such sale by bargaining. However, bargaining alters the parties' shares of the final payoff and distorts investment.

An alternative to bargaining is to grant the party that would be penalized by bargaining the right to force his counterpart to join him in selling his stake to the trade buyer. The counterpart does not do so of his own accord, for his benefit from bargaining prompts him to threaten hold-out. Drag-along rights prevent this.

We have thus shown

Proposition 4 *Drag-along rights deny the parties the ability to increase their share of the payoff by threatening to hold out on a value-increasing trade sale.*

What if party a is majority owner of the firm? In such case, only hold-out by a is of concern. This is because a can appropriate both the gains from precluding transfers and those from transferring majority ownership to the trade buyer.[22] Party b must be granted the right to drag a along in order for b to maintain his share of the payoff.

Recall from Section 4.1 that party b will be granted a put option when party a can engage in transfers. Does this option allow b at least to dispense with drag-along rights? The answer is in the negative. The put option precludes transfers by a by granting that party majority ownership of the firm. But such a mechanism is not applicable to state s_t, in which majority ownership should be granted the trade buyer and transfers by a be precluded by the complete buyout of that party.[23]

There is not such ability in the present case.

[22] Formally,

$$\begin{aligned} & \gamma V_f(s_t) I(1-\Delta) + \alpha V_f(s_t) I\Delta + [V_t(s_t) I - [V_f(s_t) I(1-\Delta) + \alpha V_f(s_t) I\Delta]] \\ = \; & \gamma V_t(s_t) I + (1-\gamma) V_t(s_t) I\Delta + (1-\gamma)[V_t(s_t) I - V_f(s_t) I](1-\Delta) \\ > \; & \gamma V_t(s_t) I + (1-\gamma) V_t(s_t) I\Delta \\ > \; & \gamma V_t(s_t) I \end{aligned}$$

where the first inequality is true by $V_t(s_t) > V_f(s_t)$.

[23] Regardless of whether party a is majority or minority owner of the firm, and whether the put option is i) exercised by party b before the sale of b's stake to the trade buyer, or ii) threatened to be exercised by the trade buyer having acquired the option from b along with b's stake, a's payoff from holding out on a

5.2 The trade buyer can transfer: Tag-along rights and drag-along rights

We now consider the case where it is the trade buyer that has the ability to engage in transfers.

As in Section 4.2, a founding party can seek to exploit the trade buyer's ability to engage in transfers. If $\gamma_M < \alpha$, the majority owner M clearly can profit from preceding his minority counterpart m in selling his stake to the trade buyer, for the value of M's stake to the trade buyer is

$$\gamma_M V_t(s_t) I(1-\Delta) + \alpha V_t(s_t) I\Delta > \gamma_M V_t(s_t) I \tag{5}$$

Party m too can profit from preceding his counterpart in selling his stake to the trade buyer, if

$$\gamma_m V_f(s_t) I(1-\Delta) + \alpha V_f(s_t) I\Delta > \gamma_m V_t(s_t) I \tag{6}$$

Again, as in Section 4.2, a founding party's gain is the other's loss.[24] And, as in Section 4.2, the resulting distortion in the founding parties' shares of the final payoff can be avoided by granting one founding party the right to tag along the other founding party in a trade sale. This is because tag-along rights require that the trade buyer's purchase of the founding

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concurrent sale with b is

$$\begin{aligned} \gamma V_f(s_t) I + [V_t(s_t) I - V_f(s_t) I] &= V_t(s_t) I - (1-\gamma) V_f(s_t) I \\ &> V_t(s_t) I - (1-\gamma) V_t(s_t) I \\ &= \gamma V_t(s_t) I \end{aligned}$$

where the inequality is true by $V_t(s_t) > V_f(s_t)$. The initial expression reflects the fact that the exercise of the option i) transforms party a into the majority owner of the firm in case he should initially have been only a minority owner and ii) precludes transfers by that party.

[24] For example, if party M should precede party m in selling his stake to the trade buyer, m's payoff would be

$$\begin{aligned} & V_t(s_t) I - [\gamma_M V_t(s_t) I(1-\Delta) + \alpha V_t(s_t) I\Delta] \\ < \; & V_t(s_t) - \gamma_M V_t(s_t) I \\ = \; & (1-\gamma_M) V_t(s_t) I \\ = \; & \gamma_m V_t(s_t) I \end{aligned}$$

where the inequality is true by inequality (5).

parties' stakes be made on identical terms and conditions, thereby ensuring that the parties' shares of the proceeds from the trade sale are in proportion to their stakes, specifically γ and $1-\gamma$. The difference between Section 4.2 and the present section is that the sale to the trade buyer is desirable in the present case, as $V_t(s_t) > V_f(s_t)$.

We have thus shown

Proposition 5 *Tag-along rights deny the parties the ability to increase their share of the payoff by preceding the other parties in selling their stake to a trade buyer who will increase the value of the firm.*

What if neither inequality (5) nor inequality (6) is true? Clearly, neither founding party will wish to precede the other in selling his stake to the trade buyer in such case. But would a founding party wish to hold out on a concurrent sale to the trade buyer? Party m clearly will not, for he has no leverage absent the ability to engage in transfers. In contrast, party M will, for he can thereby appropriate the entirety of the gains from transferring majority ownership to the trade buyer.[25] As in Section 5.1, party m must therefore be granted the right to drag party M along.

Is there a conflict between tag-along rights on the one hand and drag-along rights on the other? Not on the basis of the discussion in Section 4.2 and the present section. This is because these two sets of rights operate in exactly the same manner: they force a trade buyer to treat the two founding parties identically, thereby making it impossible for one founding party to profit from the presence of the trade buyer at the expense of the other. There is therefore no scope for conflict between the two sets of rights.

[25] Party M's payoff from holding out is

$$\begin{aligned}
& \gamma_M V_f(s_t) I(1-\Delta) + [V_t(s_t) I - [V_f(s_t) I(1-\Delta) + \alpha V_f(s_t) I\Delta]] \\
= \; & V_t(s_t) I - (1-\gamma_M) V_f(s_t) I(1-\Delta) - \alpha V_f(s_t) I\Delta \\
= \; & V_t(s_t) I - \gamma_m V_f(s_t) I(1-\Delta) - \alpha V_f(s_t) I\Delta \\
> \; & V_t(s_t) I - \gamma_m V_t(s_t) I \\
= \; & (1-\gamma_m) V_t(s_t) I \\
= \; & \gamma_M V_t(s_t) I
\end{aligned}$$

where the inequality is true by the assumption that inequality (6) is false.

6 Investments and Initial Stakes

The preceding sections have shown that the various clauses we consider structure renegotiation in such a way as to make the founding parties' shares of the final payoff equal to the parties' initial stakes in the firm, γ and $1-\gamma$. Using Proposition 1, we can then conclude that a sufficient condition for inducing the parties to make the efficient ex ante investments is to set the parties' initial stakes γ and $1-\gamma$ equal to γ_0 and $1-\gamma_0$, respectively. We have thus shown

Proposition 6 *Put options, tag-along rights, and drag-along rights combine with initial stakes* $\gamma_0 = \frac{c_a}{c_a+c_b}$ *and* $1-\gamma_0 = \frac{c_b}{c_a+c_b}$ *to induce the founding parties* a *and* b *to make the first-best investments* i_a^{FB} *and* i_b^{FB}*, respectively.*

7 An extension to demand rights and piggy-back rights

We now consider demand rights and piggy-back rights. For that purpose, we introduce a new state $s = s_{ipo}$ and a new use of the firm $u = ipo$.[26] When the state s_{ipo} is realized, the firm should be taken public in an IPO: $V_{ipo}(s_{ipo}) > V_u(s_{ipo})$ for $u \in \{t, f\}$. We make the important assumption that no transfers are possible once the firm has been listed. Thus, we presume that the various constraints imposed on listed firms by stock exchanges, regulation, and the law for the purpose of protecting shareholders are effective at doing so.[27]

We first note that there is no need for one founding party to drag the other along in state s_{ipo}: a founding party that sells his stake in the IPO obtains the same payoff regardless of whether he is joined by the other founding party in such sale. There is the need, however, for the denial of veto rights over the decision to take the firm public. This is because the party whose bargaining power is high relative to his stake in the firm would otherwise threaten to veto the IPO, for the purpose of exploiting his favorable bargaining position to increase

[26] These could have been introduced in the main model of Section 2, but were not in order to keep the exposition in Sections 3, 4 and 5 relatively simple.

[27] This is somewhat of an exaggeration, but may be justified by comparison with the case of unlisted firms.

his share of the final payoff.

To see this, consider the two inequalities that would have to hold simultaneously for neither party to threaten to veto the IPO, when the alternative to the IPO is use $u = f$, with the exercise of the put option intended to preclude transfers if party a should be able to engage in transfers:[28]

$$\gamma V_{ipo}(s_{ipo}) \geqslant \gamma V_f(s_{ipo}) + \beta(s_{ipo})\left[V_{ipo}(s_{ipo}) - V_f(s_{ipo})\right]$$

and

$$(1-\gamma) V_{ipo}(s_{ipo}) \geqslant (1-\gamma) V_f(s_{ipo}) + (1-\beta(s_{ipo}))\left[V_{ipo}(s_{ipo}) - V_f(s_{ipo})\right]$$

From the observation that the sum of the LHS of the preceding inequalities equals the sum of their RHS, it is clear that the two inequalities can hold simultaneously only when they are both equalities. But this requires $\beta(s_{ipo}) = \gamma$, which generally will not be the case. Instead, party a will threaten to veto the IPO if $\beta(s_{ipo}) > \gamma$, and party b otherwise. Party a in the first case, and party b in the second, must therefore be denied the right to veto. This is what demand rights do.

We have thus shown

Proposition 7 *Demand rights deny the parties the ability to increase their share of the payoff by threatening to veto a value-increasing IPO.*

Is there a need for tag-along rights in state s_{ipo}? Yes, to the extent that only a limited fraction of the firm can be sold in the IPO, and one founding party — presumably the majority owner M — has the ability to include a disproportionate fraction of his own shares in the offering. Tag-along rights then allow the other founding party to include his shares in the offering in proportion to his stake in the firm. In such context, tag-along rights are referred to as piggy-back rights.

[28] A similar argument can be made when the alternative to the IPO is a trade sale.

We can thus write

Proposition 8 *Piggy-back rights deny the parties the ability to increase their share of the payoff by including a disproportionate fraction of their own shares in the firm's IPO.*

8 Transfers as investment: Call options, put options and catch-up clauses

We now transform the problem of ex post transfers into one of ex post investment. For that purpose, and as noted in Section 2, we assume that $\Delta < 0$ and define $\Gamma \equiv -\Delta > 0$. In contrast to ex post transfers, ex post investment is value-creating as it increases the value of the firm in use $u \in \{t, f\}$ and state $s \in \{s_t, s_f\}$ from $V_u(s) I$ to $V_u(s) I(1+\Gamma) - \alpha V_u(s) I\Gamma$ (recall that $\frac{1}{2} < \alpha < 1$).

The analogue to Proposition 1 in the case of ex post investment can be shown. There is still the need to maintain the founding parties' shares of the final payoff. The payoff is $V_f(s_f) I(1+\Gamma) - \alpha V_f(s_f) I\Gamma$ in state s_f and $V_t(s_t)$ in state s_t when it is party a that makes the ex post investment. The payoff is $V_f(s_f) I$ in state s_f and $V_t(s_t) I(1+\Gamma) - \alpha V_t(s_t) I\Gamma$ in state s_t when it is the trade buyer that makes the ex post investment.

We first consider the state s_f in the case where it is party a that makes the ex post investment. Recall from Section 3 the assumption that $\gamma < \alpha$. Party a's stake must therefore be increased from $\gamma < \alpha$ to $\gamma^r \geq \alpha$ for party a to be induced to make the ex post investment. By analogy to Proposition 2 in Section 4.1, we can show that options at fair value serve to change the founding parties' stakes in the firm while maintaining the parties' initial shares of the payoff. The difference with Section 4.1 is that there is now the need for call options as well as put options. Whether party a has an option to call a stake $\gamma^r - \gamma$ from party b, or party b has an option to put a stake $\gamma^r - \gamma$ to party a, depends on the relation between the parties' stakes and their bargaining power.

To see this, note that the alternative to the exercise of the option is bargaining between

the parties. The parties' payoffs in bargaining are

$$\gamma V_f(s_f) I + \beta(s_f) [V_f(s_f) I(1+\Gamma) - \alpha V_f(s_f) I\Gamma - V_f(s_f) I]$$

and

$$(1-\gamma) V_f(s_f) I + (1-\beta(s_f)) [V_f(s_f) I(1+\Gamma) - \alpha V_f(s_f) I\Gamma - V_f(s_f) I]$$

These are to be contrasted with the parties' payoffs from the exercise of the option, which are $\gamma(V_f(s_f) I(1+\Gamma) - \alpha V_f(s_f) I\Gamma)$ and $(1-\gamma)(V_f(s_f) I(1+\Gamma) - \alpha V_f(s_f) I\Gamma)$. When $\beta(s_f) > \gamma$, party a clearly prefers bargaining to the exercise of the call option. Such bargaining must be avoided. It can be avoided by granting party b the option to put the stake $\gamma^r - \gamma$ to a when $\beta(s_f) > \gamma$. Conversely, when $\beta(s_f) < \gamma$, it is a who must be granted the option to call the stake $\gamma^r - \gamma$ from b.

Rather than repeating the analysis of Sections 4.2 and 5 for the case of ex post investment, we summarize the results for the two cases in Tables 1 (ex post transfers) and 2 (ex post investment).

	a can transfer	t can transfer
s_f	put options	tag-along rights
s_t	drag-along rights	tag-along rights if (5) and/or (6) are true drag-along rights if both (5) and (6) are false

Table 1: Circumstances and clauses in the case of ex post transfers

	a invests	t invests
s_f	put or call options	no rights needed
s_t	drag-along rights	drag-along rights

Table 2: Circumstances and clauses in the case of ex post investment

There are two principal differences between Tables 1 and 2. We have already discussed

the first, which is the absence of call options in Table 1. The second is the absence of tag-along rights in Table 2. Both differences can be ascribed to the same basic phenomenon: ex post transfers allow one founding party to profit at the expense of the other party, whereas ex post investment profits both parties. The purpose of put options and tag-along rights in Table 1 is to protect the party at whose expense transfers would be, and to constrain the party that would profit from transfers. That latter party would be party a in case it is party a that can engage in transfers, and the founding party that can exploit the trade buyer's ability to engage in transfers in case it is the trade buyer that has such ability. As there is no such problem in the case of ex post investment, there is no need for tag-along rights, and the choice between put and call options is determined by the relation between the parties' stakes and their bargaining power.

We have argued in Sections 4 and 5 that there is no scope for conflict between the various clauses in the case of ex post transfers. This remains true in the case of ex post investment, with one exception: when party a has a call option and alone is aware of an impending trade sale, a can exercise the option prior to the trade sale in order to profit from the difference between the price paid by the trade buyer and the fair value computed by an external expert not yet aware of the trade sale to come. Doing so allows the trade buyer to increase his payoff from the trade sale from $\gamma V_t(s_t) I$ to $\gamma^r V_t(s_t) I - (\gamma^r - \gamma)[V_f(s_f) I(1+\Gamma) - \alpha V_f(s_f) I\Gamma]$. Catch-up clauses deny a the ability to do so, by granting b a claim to the gain foregone as a result of a's exercise of the option.[29]

9 GM and Fiat

We now return to the joint venture contract between GM and Fiat described in the Introduction. Recall that the contract grants Fiat the option to put its stake to GM and to drag GM along in the case of a trade sale of Fiat Auto. It grants GM the right to tag along Fiat in such case, as well as the right to demand of Fiat the listing of Fiat Auto.

[29] Why do catch-up clauses not apply when a founding party has exercised its put option? Presumably because, unlike a call option, a put option does not afford its holder the opportunity to profit from preceding its partner and the external expert in acquiring information about a trade sale.

On the basis of the joint venture contract and various newspaper and magazine articles, we can explain the preceding clauses as follows. The joint venture contract commits GM and Fiat to a number of collaborative ventures in Latin America and in Europe, in powertrain operations, material purchasing activities, and back-office facilities for automotive financing. Beyond these specific collaborative ventures and the ex ante investment they involve, there is the issue of whether Fiat Auto can survive as an independent carmaker in an industry that deems economies of scale to be all-important. In case the answer should be in the negative, GM would appear to be a natural acquiror. As the acquisition of Fiat Auto by GM likely would involve significant ex post investment by GM, which would need to integrate the operations of Fiat Auto into its own, options are needed in line with the argument made in Section 8. These take the form of put options held by Fiat rather than call options held by GM, because a sale of Fiat Auto likely would take place under conditions of weak bargaining power for Fiat.[30]

GM is not, however, the only potential acquiror of Fiat Auto.[31] In case Fiat's 80% stake in Fiat Auto should be acquired by a party other than GM, that party may make an ex post investment that benefits GM as 20% shareholder in Fiat Auto, or engage in ex post transfers at GM's expense.[32] As noted in Section 8, the first issue calls for Fiat's right to drag GM along. In line with our discussion in Section 5.2, the second issue calls for GM's right to tag along Fiat.

It is of course possible that Fiat Auto should remain independent. In such case, GM's demand rights provide GM with an exit route if exit should be desired. That it is GM rather that Fiat that has the right to demand a listing is consistent with Fiat having very high bargaining power in the state where Fiat Auto should remain independent.

Why does Fiat not have the right to tag along GM and GM the right to drag Fiat along

[30] The sale of Fiat Auto would be an admission of defeat by Fiat's controlling Agnelli family, for whom Fiat Auto — founded in 1899 by a group of ex-cavalry officers that included Giovanni Agnelli — has long been the jewel in the family crown. Such sale can therefore be expected to take place only under very adverse circumstances for Fiat.

[31] Indeed, Daimler-Chrysler had offered to buy Fiat Auto prior to the joint venture with GM.

[32] The acquiror would engage in ex post transfers in case $\gamma_M = 80\% < \alpha$. Recall that the subscript M denotes the majority partner, the acquiror of Fiat's stake in the present case.

in case GM sells its stake in Fiat Auto? As noted in Sections 4.2 and 5.2, Fiat's tag-along rights would be made necessary by the possibility for the acquiror of GM's minority stake to engage in transfers. If the minority partner cannot engage in transfers, perhaps because of control considerations, then there should be no need to grant Fiat any tag-along rights. As noted in Section 5.1, GM's right to drag Fiat along would be made necessary by the desire on Fiat's part to appropriate the entire gains made possible by the transfer of majority ownership to the acquiror. This consideration may not be applicable to Fiat, which will only consider selling Fiat Auto under very adverse circumstances, in which case its ability to hold out on a trade sale is likely to be very low.[33]

10 Conclusion

We have presented an explanation for a number of key clauses that often appear in shareholder agreements, such as those between partners in a joint venture and between a venture capitalist and an entrepreneur. The clauses preserve the parties' incentives to make ex ante investments when ex post renegotiation may alter the parties' shares of the payoff.

Many of the clauses we have discussed recall the rules and regulations that govern tender offers and the sale of control blocks.[34] For example, tag-along rights recall the mandatory bid rule, which requires a bidder to bid for all the shares of a target, and the equal opportunity rule, which requires the acquiror of a control block to offer non-controlling shareholders the same terms and conditions as offered the selling blockholder. Similarly, drag-along rights recall squeezeouts, which allow the acquiror of a control block to 'squeeze' minority shareholders out of the firm.

Yet, there are differences. Thus, the offer made to target shareholders in a tender offer may take the form of a two-tier offer, and the market rule rather than the equal opportunity

[33] An alternative explanation is that drag-along rights may be abused in case side payments from the trade buyer to the minority partner, GM, are possible. We have not considered side payments in our analysis because we have assumed that such payments would be invalidated by courts.

[34] See for example Bebchuk (1994), Bebchuk and Kahan (1999), Burkart, Gromb and Panunzi (1997, 1998, 2000) Easterbrook and Fischel (1991), Hermalin and Schwartz (1996), Kahan (1993), and Romano (1992).

rule governs the sale of control blocks in many jurisdictions, including the United States. In contrast to the equal opportunity rule, the market rule does not impose on the acquiror of a control block the requirement to extend his offer to non-controlling shareholders. Finally, the price at which minority shareholders are squeezed need satisfy only an appraisal standard, which does not entitle minority shareholders to the premium offered the selling blockholder.

Why the differences? In the case of a tender offer, the answer has to do with the need to ensure that the acquisition is not precluded by the free rider problem (Grossman and Hart, 1980). But there should be no such problem in the case of the sale of a control block. In that case, our analysis suggests that the differences we have mentioned are related to the need to induce ex ante investment. Only a controlling blockholder makes such investment. Small, dispersed shareholders do not, as they play no role in management. They therefore make no investment beyond the price of their shares. That only the controlling blockholder makes an ex ante investment, for example in bringing forth a value creating change of control transaction, suggests that only the controlling blockholder should profit from such a transaction. This is in order to maintain his incentives to make the requisite investment. The appraisal remedy, which effectively grants small shareholders the right to put their shares to the firm, ensures that small shareholders are not harmed by change of control transactions, but also denies them the benefit of these transactions. The need to induce the making of ex ante investment on the part of the controlling blockholder, and on his part only, suggests that this is as it should be.

Appendix 1: An overview of shareholder agreements

Standard shareholder agreements typically contain the following articles or groups of articles (Bernstein, 1988; Freedman, 1994; Martel, 1991; Stedman and Jones, 1990):

- Termination of prior agreements between some or all shareholders regarding the organization and affairs of the company, as well as warranties and covenants specifying that all shares are free and clear of all claims.
- Provision of control: Designation of the rights and duties of the shareholders in the management of the company, and requirement of prior unanimous consent for major decisions such as the declaration of any dividend and the issuance or sale of shares.
- Restrictions on the transfer of shares: The shareholders commit not to sell, pledge, or charge their shares except with the prior written consent of all other shareholders.
- Survivorship arrangements: Upon the death of any shareholder, the personal representatives of the deceased shall sell the shares of the deceased to the company, typically at a price specified in the article on valuation. Life insurance policies will be issued to the benefit of the shareholders to ensure that this article can be enforced.
- Valuation: The 'fair' value of the shares is generally determined by an external expert, or it is based on a previously agreed upon valuation formula.
- Right of first refusal: A shareholder offered to sell his shares to an outside investor at some price is required to offer his shares to the other shareholders at the same price. If the other shareholders decline, the first shareholder is free to sell his shares to the outside investor.
- Pre-emption rights: A shareholder wishing to sell his stake in the company is required to offer his shares to the other shareholders, typically at "fair value." These are usually substitutes for, and less common than, rights of first refusal.
- Put options: A shareholder is granted put options on the shares held by the other shareholders. The strike price is generally the "fair" value of the shares.

- Call options: Similar to put options.

- Catch up clauses: When a shareholder exercises a call option, the selling shareholder maintains a claim on part of the payoff subsequently realized by the first shareholder in a trade sale or an IPO.

- Drag-along rights: In case a shareholder sells his stake to an outside investor, drag-along rights grant the investor the right to buy out the other shareholders' stakes at the same price and on the same terms as the first shareholder's stake. Drag-along rights can be viewed as conditional call options granted the outside investor.

- Tag-along rights (or co-sale agreements): In case a shareholder sells his stake to an outside investor, tag-along rights grant the other shareholders the right to require the outside investor to buy these shareholders' stakes at the same price and on the same terms as the first shareholder's stake. Tag-along rights can be viewed as conditional put options granted all shareholders.

- Demand rights (or initial public offering clauses): Shareholders agree in advance the circumstances in which they will take the company public. Demand rights ensure that the company will be taken public once a prespecified level of profit is achieved, or when the company has a specific need for outside finance. Demand rights may require all shareholders to participate in the offering.

- Piggy-back rights allow the parties to demand to be included in an IPO in proportion to their stakes in the firm.

- Non-competition: Each and every shareholder undertakes not to compete with the firm.

- Dispute resolution and arbitration: The shareholders agree to follow a specified procedure to resolve disputes. The procedure may specify the appointment of an arbitrator.

Appendix 2: Proofs

Proof of Proposition 1: The problems solved by parties a and b are

$$\underset{\widehat{i}_a}{Max}\ p_f\gamma V_f\left(s_f\right)\min\left[\widehat{i}_a, i_b\right] + p_t\gamma V_t\left(s_t\right)\min\left[\widehat{i}_a, i_b\right] - \frac{1}{2}c_a\widehat{i}_a^2$$

and

$$\underset{\widehat{i}_b}{Max}\ p_f\left(1-\gamma\right)V_f\left(s_f\right)\min\left[i_a, \widehat{i}_b\right] + p_t\left(1-\gamma\right)V_t\left(s_t\right)\min\left[i_a, \widehat{i}_b\right] - \frac{1}{2}c_b\widehat{i}_b^2$$

These have first-order conditions

$$\left[p_f\gamma V_f\left(s_f\right) + p_t\gamma V_t\left(s_t\right)\right]1_{i_a\leqslant i_b} = c_a i_a$$

and

$$\left[p_f\left(1-\gamma\right)V_f\left(s_f\right) + p_t\left(1-\gamma\right)V_t\left(s_t\right)\right]1_{i_a\geqslant i_b} = c_b i_b$$

where $1_{[...]}$ denotes the indicator function. The solution must satisfy $i_a = i_b$. It now suffices to note that setting $\gamma = \frac{c_a}{c_a+c_b} \equiv \gamma_0$ yields the desired result.■

Proof of Proposition 2: Let F denote the fair value of the firm under the conditions that result from the exercise of the option: $F = V_f\left(s_f\right)I$. The strike price of the option therefore equals $\left(\gamma^r - \gamma\right)V_f\left(s_f\right)I$, thereby ensuring that party b does indeed exercise the put option.

The preceding implies that, when making the ex ante investments, the parties' payoffs conditional on the state s_f being realized are

$$\gamma^r V_f\left(s_f\right)I - \left(\gamma^r - \gamma\right)F = \gamma^r V_f\left(s_f\right)I - \left(\gamma^r - \gamma\right)V_f\left(s_f\right)I = \gamma V_f\left(s_f\right)$$

for party a and $\left(1-\gamma\right)V_f\left(s_f\right)I$ for party b. The parties' payoffs have been maintained in the initial proportions γ and $1-\gamma$.■

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