Insider Ownership and the Decision to Go Public

LUIGI ZINGALES
University of Chicago

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This paper focuses on the role of an initial public offering (IPO) in maximizing the proceeds an initial owner obtains in selling his company. In deciding whether to undertake an IPO, and what fraction of ownership to retain, the initial owner must balance two factors. By selling to dispersed shareholders, he maximizes his proceeds from the sale of cash flow rights. However, by directly bargaining with a potential buyer, he maximizes his proceeds from the sale of control rights. Whether a company should be private or public, as well as the insider's ownership in public companies, depends on the particular combination of majority control and dispersed ownership which maximizes the incumbent's wealth. The model provides implications on the strategy to be followed in selling a company as well as on the timing of IPOs and going-private transactions.

The initial public offering (IPO) is frequently the largest equity issue a corporation ever makes. Every year an average of one-third of all the funds raised through common equity is raised through IPOs. The IPO is also an important channel through which an entrepreneur or venture capitalist gets rewarded for his initial effort. Our understanding of the process of "going public" is critical to any attempt both to increase equity financing and to stimulate entrepreneurial and venture capitalist activities. The latter has been stated as an objective in the public policy debate over the capital gains tax (see Poterba (1989)).

Until the beginning of the 1980's the decision to go public was considered a simple stage in the growth process of a corporation. This interpretation can no longer hold. In the 1980's the U.S. experienced a major wave of large and mature firms going private. The result was that, despite a growing economy and a long bull market, in the 1980's the U.S. share in world market capitalization shrank from 53.3% to 29.9%. Very little is known about why companies choose to revert back to private ownership and whether this is a temporary or a permanent situation. According to Kaplan (1991) these neo-private companies are "neither short lived nor permanent." He estimates that only 50% of large leveraged buyouts (LBO) become public again within seven years after the LBO transaction. Furthermore, 7% of those companies in his sample that returned to public offering went private again later.

Starting with Pagano (1993), existing models emphasize some aspects of the traditional trade-off between the costs and benefits of going public.\(^1\) On the cost side, there are the registration and underwriting costs (on average 14% of the funds raised, according to Ritter (1987)), the underpricing cost (on average 15%, Ritter (1987)), the annual disclosure costs, and the agency problems generated by a separation between ownership and control (Jensen and Meckling (1976)). On the benefit side, there are diversification, the possibility of equity financing beyond the initial entrepreneur's limited wealth, a less costly access to

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the capital market, an increased liquidity of the company's shares, and some outside monitoring (Holmström and Tirole (1993)).

I do not deny that all these factors are important in the decision of whether a firm should go public. However, corporate control is also an important and previously unexplored aspect of the problem. For instance, Pagano, Panetta and Zingales (1994) find that, in the three years following an IPO, turnover in control is twice that of similar yet privately held companies, and the effect is even stronger for IPOs of subsidiaries of publicly traded companies. This suggests that the decision to take a company public should be addressed as a possibly optimal method to sell a company.

In this paper, the decision of a firm to go public is the result of a value-maximizing decision made by an initial owner who wants to eventually sell his company. By going public, the initial owner can change the proportion of cash flow rights and control rights which he will retain when he bargains with a potential buyer. To the extent that the market for corporate control is not perfectly competitive, this proportion will affect the total amount of surplus he can extract from a potential buyer of the company. Therefore, the initial owner uses the IPO to optimize the structure of his ownership in the company, so as to maximize his total proceeds from its eventual sale.

There are two possible sources of a buyer's higher valuation, which the incumbent should seek to capture: the increase in cash flow and the increase in private benefits of control. These two components are very different in nature. Cash flow rights are enjoyed by all shareholders in proportion to the size of their equity stake in the company. Private benefits are captured only by the controlling shareholder. It follows that the markets for these two components are also very different. The market for cash flow rights, populated by a large number of small investors, is fully competitive. As a result, the incumbent, by selling cash flow rights to dispersed shareholders, is able to fetch their full value under the buyer. By contrast, the market for controlling blocks, restricted to a few large investors who derive private benefits from controlling a company, is not fully competitive. As a consequence, the incumbent in general will not be able to extract the buyer's full reservation value through direct bargaining.

It follows that these two components of a company's value are better sold through two separate mechanisms: cash flow rights should be auctioned off to dispersed shareholders, private benefits of control should be bargained over in a direct negotiation. The incumbent's objective would be to separately utilize these two different selling techniques for the two components of a company's value. By selling cash flow rights to dispersed shareholders and still retaining control, the incumbent succeeds in extracting the surplus which derives from the buyer's increased cash flow, avoiding the need to bargain over it with the buyer. However, by retaining control, the incumbent succeeds in extracting some of the surplus deriving from the buyer's larger private benefits in a direct negotiation.

However, there are two limits to this strategy. First of all, the value of cash flow rights is affected by who holds control. If the incumbent chooses to retain too few cash flow rights, then, as I shall argue later, he might lose the incentive to sell control to a more efficient buyer later on. This will completely eliminate any surplus from trade, decreasing the value of the company and the wealth of the incumbent. This limit to the extraction of surplus determines the optimal level of insider's ownership in a public company.

Second, the combination of cash flow rights and control rights might be limited by the law. In the absence of any restriction, the incumbent will always sell enough cash flow rights to dispersed shareholders to extract all the surplus deriving from the buyer's increased cash flow. In this case I shall also argue that it is never optimal for the incumbent
to retain less than 50% of the votes. However, if the law restricts the stripping of cash flow rights from voting rights, either the incumbent retains control and fails to extract all the increase in the value of cash flow rights or, in order to extract the entire increase in the value of cash flow rights, he must relinquish his majority control.

These results apply when the potential buyer is expected to increase the future value of cash flow rights. By contrast, when the potential buyer is expected to reduce the value of cash flow rights, then the dispersion of small shareholders makes them less effective, rather than more effective, in extracting the buyer’s surplus. In such a case the model predicts that the value-maximizing way of divesting a company is not to undertake an IPO, but to keep the company private, and to bargain over the entire company with the potential buyer. Actually, when the potential buyer is expected to reduce the value of cash flow rights, the model suggests that even publicly traded companies should be taken private, and that this is more likely to occur after a decline in a company’s stock price.

This model, which considers only one dimension of the going public decision, is most suitable for analysing the decision of a publicly traded company to take public one of its subsidiaries. In this context, the other major aspects of the decision to go public (like limited wealth and diversification) appear either less important or irrelevant. The existing literature distinguishes corporate divestitures by the strategy adopted in selling the unit: distribution of equity claims in the subsidiary directly to its shareholders (spin-offs), sale of an equity stake in the subsidiary to the public (carve-outs) and direct sale of the subsidiary to a third party (direct sell-offs).

This paper provides a unified framework to analyse the choice among these different strategies. Direct sell-offs are preferable when the potential buyer is likely to reduce the value of cash flow rights. Spin-offs should be preferred when the potential buyer’s private benefits of control are nil. Carve-outs should be chosen in all other cases. The model also predicts that divestments through carve-outs should be more profitable for the seller than direct sell-offs and, nevertheless, that not all divestments should follow this strategy. Finally, the model is able to explain why IPOs are more frequent during stock market booms and going private transactions are more frequent during stock market downturns.

The rest of the paper proceeds as follows. Section 1 describes the framework of the model and its main assumptions. At the end of the section a numerical example illustrates how this mechanism works. Section 2 provides the solution of the basic model. Section 3 embeds the analysis in a two-period framework, showing when and why a company may reverse its previous decision and go private after an IPO. Section 4 discusses when this selling mechanism may be optimal and considers some possible variations that will guarantee to the incumbent full extraction of the buyer’s surplus. Section 5 illustrates how this model can be applied to explain the different strategies used in corporate sell-offs. The concluding section summarizes the findings and suggests several directions for future research.

1. THE MODEL AND A NUMERICAL EXAMPLE

In this section I describe the model, the timing, and the fundamental assumptions. After that, I present a numerical example that illustrates the intuitions of the model.

2. It is possible, thus, that the choice is driven by the desire to write managerial incentive contracts using the subsidiary stock price (see Holmström and Tirole (1993)). As I shall argue in Section 5, this does not seem the main force behind many corporate divestitures, given the brevity of their life as public companies.
1.1. The framework

The timing of events is shown in Figure 1. At time 0 the initial owner of a company considers whether to go public or to remain private.\(^3\) If he decides to go public he should determine the fraction \(\phi\) of the company he wants to retain afterward.\(^4\)

There are two important factors that influence the owner's decision. The income produced by the company consists of an observable and verifiable component \(v'\) and by an observable but non-verifiable component \(B'\), which, following the literature, I will call private benefits.\(^5\) Only the party who has control over the use of corporate resources can enjoy these private benefits. I assume that control is retained by the incumbent until he turns it over to someone else or someone else obtains a majority of votes. When the initial owner sells shares to outside shareholders, he can only claim to give them a fraction of the verifiable income the company will produce in future.

At time 1, an individual or a corporation interested in buying the company arrives. This potential buyer, "rival," has different valuations of the company (\(v'\) and \(B'\)). To make the problem interesting I will assume that the total valuation of the rival is bigger than the total valuation of the incumbent (i.e., \(B' + v' > B' + v\)).\(^6\)

At time 2 the bargaining between the incumbent and the rival starts and takes the following form: if the incumbent retains a majority of votes, then the rival can prevail only by buying out the incumbent. In this case the bargaining process is the following: with probability \(\psi \in [0, 1]\) the incumbent makes a take-it-or-leave-it offer to the buyer. If the buyer accepts, then control is transferred. Otherwise, the game ends. With probability

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3. There are other situations that are meant to be captured by this model. One is the relationship between an LBO fund (like KKR) and previously acquired companies (like RJR Nabisco or Duracell). Another is the relationship between a parent company and its wholly owned subsidiary. This latter case is different from the former because value-maximizing behaviour by a single owner is not a legitimate assumption if the parent company is a public company with diffuse ownership. To include this case I have assumed that the management of the public company is pushed toward value maximization by the threat of a disciplinary takeover.

4. In the real world, even start-up companies are rarely 100%-owned by one individual. However, initial investors are generally directly involved in the company, sitting on the board of directors and sharing management responsibilities (and perquisites). They are also generally protected by an implicit or explicit contract that prevents one party from selling his stake without other parties' consent, both before and after the IPO. Therefore, for the purpose of the model these different owners can legitimately be considered as a single owner.

5. By now, the existence of private benefits of control is a well-documented empirical fact (see Barclay and Holderness (1989) and Zingales (1994a)) widely used in the literature on control (see Grossman and Hart (1988) and Harris and Raviv (1988, 1989)). In the case of a public company owning a subsidiary, one possible example of private benefits is the value of some soft information to which the control position in the subsidiary gives access. For example, the developer of a computer application package can profit from controlling the producer of the operating system under which its application runs, because it can learn some characteristics of future releases of the operating system ahead of its competitor. This type of information cannot be sold by the subsidiary; therefore the benefit to the parent does not correspond to a monetary loss for the subsidiary.

6. A similar analysis can be made for the case \(B' + v' < B' + v\). In this case the initial owner wants to structure the corporation so that the rival can never prevail. What makes the case less interesting is that going public is never strictly better than remaining private.
1 − ψ it is the buyer who makes a take-it-or-leave-it offer. Again if the offer is accepted, then control is transferred. Otherwise, the game ends. The probability ψ ∈ [0, 1] in intended to capture the incumbent’s bargaining power.

If the incumbent does not retain a majority of votes, then the first stage of the game is the same. In this case, though, if his initial offer is rejected by the incumbent, the rival can attempt to get control by buying a majority of votes from dispersed shareholders.7

At this stage the rival and the incumbent compete à la Bertrand through formal tender offers. In my analysis I only consider unrestricted and unconditional tender offers.8 Similarly, I assume that all the tender offers are made to succeed with probability one. At the end of this phase, the highest bidder prevails and the game ends.

In the tender offer subgame I assume that outside shareholders are atomistic; that is, they do not perceive themselves as pivotal in the tender offer outcome. This is the context in which Grossman and Hart (1980) argued that outside shareholders are able to free ride on the improvement implemented by a rival. The assumption that shareholders are atomistic is an extreme one that approximates the case of small individual shareholders.9 This is consistent with the fact that individual investors are, by far, the most important buyers in IPOs.10

Without loss of generality I assume that no production activity takes place between date 0 and date 2, that the company is worthless after time 3, and that the (risk-free) interest rate is zero. In order to focus only on the value of control, I also assume that everyone is risk neutral, that the two contestants are not liquidity constrained, and that at the bargaining phase the valuation parameters are common knowledge. Finally, in the general model I allow the incumbent to freely combine cash flow and voting rights. I will then mention how the results are changed by relaxing this assumption.

1.2. A Numerical Example

To fix ideas, I present a numerical example, where the characteristics of the incumbent and the rival are reported in Table I and where the bargaining power of the incumbent is assumed to equal 1/2.

The incumbent’s total valuation of the company (B′ + v′) is equal to $140, while the potential buyer’s is $150. Therefore, there are $10 of potential gains from trade. If the

7. Note that I assumed that private benefits accrue entirely to the largest shareholder, independent of the size of his stake. If, following Brukart, Gromb, and Panunzi (1994), I make the size of private benefits dependent on the size of the controlling stake, then retaining a minority block would make the incumbent even worse-off.
8. A tender offer is unrestricted when it is for 100% of the shares. It is unconditional if the price offered does not depend on any event, in particular on the number of shares tendered. For further discussion on this issue see footnote 13.
9. In fact, Holmström and Nalebuff (1992) argue that complete free riding is the limit case when each shareholder owns one indivisible share. In more general cases, there is only partial free riding.
10. Weiss (1989) estimates that, in the first quarter after an IPO, individuals own more than 88% of the shares offered. This compares with an average of 56% of all equities outstanding.
incumbent keeps the company private at time 0, the bargaining at time 2 will be over the whole company. Given the stated assumptions regarding the bargaining process, at time 2 the incumbent will sell the company at $145, that is, his reservation price ($140) plus the amount of gain from trade he is able to extract from the buyer ($\frac{1}{2} \cdot 10$).

Now assume that at time 0 the incumbent sells 10% of the company to outside investors. In this world of perfect foresight, outside shareholders are prepared to pay for 10% of the shares only the price of 10% of the verifiable income produced by whoever will run the company between times 2 and 3. Therefore, in order to compute the proceeds of the IPO I should determine first who will prevail at time 2. Note that it is not guaranteed that the rival will prevail at time 2. In fact, the incumbent arrives at time 2 with the entire control value but only 90% of the value of the cash flow. Therefore, a transaction can take place only if the incumbent’s valuation of his stake (not that of the entire company) is less than or equal to the buyer’s valuation for that stake, that is, $B^t + \phi v^t \leq B^r + \phi v^r$, where $\phi$ is the stake retained by the incumbent. This condition is satisfied for $\phi = 0.9$. In fact, the seller reservation price for the 90% stake is $130, while the reservation price of the buyer $136. The potential gains from trade are $6. The incumbent, selling the majority stake at time 2, gets his reservation value plus one-half of the trade surplus. This adds up to $133. Given that he still has an incentive to sell at time 2, the outside investors will value their shares according to the rival’s cash flow, that is, $0.1 \times 140 = 14$. Therefore, the total proceeds of the sale are $147, strictly more than the $145 he would have obtained keeping the firm private.

Thus, a two-stage sale allows the incumbent to extract even more surplus from the buyer. Through the IPO the initial owner extracts a portion of the trade surplus, without having to bargain with the buyer over it. At time 2 the two parties will bargain over the remaining surplus, and the incumbent will get a constant fraction of it (in this case one-half). Therefore, by selling in the IPO, the incumbent profits through strategic use of the outside shareholders’ ability to free ride on the rival’s improvements.

Small outside shareholders cannot be brought into the bargaining game because they are dispersed, and they have no incentives to enter it because they can free ride. The IPO credibly commits the incumbent to exclude a fraction of the company’s profits from his valuation. In this sense insiders’ ownership, even if it is spread among different people, differs from outsiders’ ownership. Even if insiders did not bind themselves to a joint sale, the incumbent cannot obtain a better price by claiming that he is not linked to them in any way, because his claim would not be credible.

In Section 2, I will show that the optimal amount the incumbent should sell at the IPO is 25%. This can be understood simply by noticing that $\phi = 0.75$ solves the equation $B^t + \phi v^t = B^r + \phi v^r$. Therefore, the incumbent succeeds in extracting all the rival’s surplus. In fact, his total proceeds are $40 + 0.75 \times 100 + 0.25 \times 140 = 150$. However, this is not necessarily the case for all possible values of the rival’s parameters. Sections 2 and 4 will discuss the set of parameter values under which this mechanism is not able to extract all of the rival’s surplus, and provide alternative strategies to achieve this result.

Remark. The equilibrium just proposed is not broken if the initial owner is allowed to sell more shares between the IPO and the appearance of the rival, provided that his trades

11. This does not imply that the buyer needs to buy 100% of the company, but that the incumbent, owning all the company, takes into account the value of 100% of the shares in the bargaining at time 2. Given the symmetry in information, it is irrelevant whether the rival pays the incumbent in cash or in company stock.
are disclosed when they occur. The risk of unraveling is generated by the fact that after the IPO the initial owner cares about the value of his own stake, and not the total value of the company. Nevertheless, he does not gain by deviating. Without an additional sale his 75% stake is worth $115 \((40 + 0.75 \times 100)\). If he sells more shares, he will get only \(\nu'\) per share. In fact, outside investors know that, if he retains less than 75% of the shares, at time 2 he will never sell his stake to the superior rival. Therefore, they are not prepared to pay more for those shares than the value of the cash flow rights under the incumbent. Then, the sale of any positive amount of shares \(a\) will make the 75% stake worth \(40 + (\frac{3}{2} - a)100 = \$115\), that is, exactly as before. Therefore, the initial owner does not strictly gain by selling additional shares. This result holds in general. Therefore, in what follows, I can ignore the possibility of further sales without loss of generality.

2. A ONE-PERIOD MODEL

The selling decision presented in the previous section involves three agents (incumbent, outside shareholders, and a rival) and two stages (the initial public offering and the bargaining for the controlling stake). This is a finite game of perfect information; therefore, the subgame-perfect equilibrium can be simply computed by backward induction.

2.1. The second stage

Let’s first consider the second stage. The initial owner arrives at this stage owing a fraction \(\phi \in [0, 1]\) of the cash flow rights, while the remaining \((1 - \phi)\) is owned by dispersed shareholders. The outcome of this stage heavily depends on whether the incumbent retains a majority of votes.

If the incumbent retains a majority of votes, then any transfer of control must take place with his consent. If he values his block of shares more than the rival does (i.e., if \(B' + \phi' > B' + \phi\)), then he will never sell it and his payoff will simply be his valuation of the control block \((B' + \phi')\). By contrast, if he does have the incentive to sell, then he will do so by direct bargaining. In this case, his payoff will be increased by the amount of surplus he is able to extract from the rival \(([B' + \phi'] + \phi'[B' + \phi' - B' - \phi'])\).

If the incumbent does not retain a majority of votes, then a transfer of control may take place independently of his agreement. In fact, if the incumbent rejects the rival’s offer, the rival can make a tender offer directly to dispersed shareholders. Again, the game will be solved backwards.

If the rival reaches the Bertrand competition stage, then his cost of prevailing is given by the following lemma:

**Lemma 1.** If only unrestricted and unconditional tender offers are allowed, then the least costly bid that will guarantee control to the rival is \(\max \{B' + \phi', \nu'\}\).

12. In many countries there are disclosure requirements for large shareholders. In the U.S. the owner of more than 10% of a stock is deemed to be an insider and as such has to disclose all his trades, while 5% owners have to disclose only material changes in their holdings. This is generally ex post disclosure. Nevertheless, combined with problems of market liquidity, it has the effect of preventing a large shareholder from divesting a substantial stake in the company without being noticed.

13. Allowing conditional tender offers confers an advantage to the rival. As Grossman and Hart (1988) indicated, when conditional offers are allowed the rival can always take over a company by offering to pay \(\nu'\) if more than 50% of the shares are tendered to him and a very large amount \(P > B' + \phi'\) if less than 50% are tendered. This offer prevents any possible counteroffer by the incumbent. Therefore, allowing conditional bids will strengthen the bargaining position of the rival and will make it even less desirable for the incumbent to retain less than 50%.
Proof. See Appendix. ||

The intuition of the lemma is straightforward. In the tender offer subgame the rival should outbid the incumbent and convince the outside shareholders to tender. The former result is obtained by bidding at least the incumbent reservation value \((B^i+v')\), the latter by bidding at least \(v'\). In fact, dispersed shareholders take for granted the outcome of the contest and will never tender below the value their shares would have if they did not tender and the rival prevailed. The final payoff depends on whether the cash flow produced by the rival is larger or smaller than the entire valuation the incumbent attributes to the company \((v'\) greater or smaller than \(B^i+v')\).

Now that I have solved the tender offer stage, I can go back and determine the outcome of the bargaining stage. Let's first consider the case \(v'<B^i+v'\). With probability \(\psi\) it is the rival who has the right to make the initial offer. He will offer the minimum price the incumbent can accept. The incumbent's reservation utility is \(\phi[B^i+v']\), because this is the amount he receives if the game reaches the tender offer stage. Therefore, the rival offers \(\phi[B^i+v']\) and the incumbent accepts. With probability \((1-\psi)\) it is the incumbent who has the right to make the initial offer. He will ask for the highest possible price that the rival is prepared to accept. The rival accepts only if accepting makes him no worse off than rejecting and entering the tender offer phase. By accepting the offer to buy the incumbent's stake at \(P\) the rival gets \(B^i+\phi v'-\phi P\). By rejecting and prevailing at the tender offer stage he gets \(B^i+v'-B^i-v'\). Therefore, his indifference price is obtained by finding the minimum \(P\) that solves

\[
B^i+v'-B^i-v' \leq B^i+\phi v'-\phi P,
\]

or

\[
P = \frac{B^i+v'-(1-\phi)\psi v}{\phi}.
\]

Summarizing, with probability \(\psi\) the incumbent's stake will change hands at \(B^i+v'-(1-\phi)\psi v\) and with probability \((1-\psi)\) at \(\phi[B^i+v']\). Therefore, if the incumbent does not retain a majority of votes his proceeds from selling his stake will be

\[
\phi[B^i+v'] + \psi(1-\phi)[B^i+v'-v'].
\]

If \(v'>B^i+v'\), a similar reasoning establishes that the incumbent proceeds are simply \(\phi v'\).\(^{14}\) Having computed the proceeds whether the incumbent retains a majority of votes or not, I can derive the following lemma:

Lemma 2. If voting rights and cash flow rights can be freely combined, then retaining a majority of votes is a dominant strategy.

Proof. See Appendix. ||

When voting power can be separated from cash flow rights, then there is no reason for the incumbent to relinquish his voting majority: he would weaken his bargaining position without any benefit. By contrast, as I shall show later, when voting power is

\(^{14}\) In this case the possibility of a tender offer plays in the incumbent's favour. The incumbent can credibly reject any offer below \(v'\) because he knows that the rival will take over anyway, by offering that price to induce small shareholders to tender.
linked to cash flow rights, then losing the voting majority may enhance the incumbent's proceeds. Note that if \( B^i + \nu^i < \nu^r \) and \( B^r = 0 \), then not retaining control (and selling 100% of cash flow rights) yields the same payoff as retaining a majority of votes and selling all cash flow rights. It is in this context that Grossman and Hart (1988) obtain the optimality of one share-one vote.

2.2. The first stage

Having resolved the second stage, I can turn now to the first one. Here the initial owner has to decide what fraction of his company he should sell to public shareholders in the IPO in order to maximize his total revenues. His choice of \( \phi \) affects his payoff in two ways: it changes the size of the gains from trade at the bargaining stage and it determines how much the outside shareholders are prepared to pay for his shares. In fact, dispersed shareholders will pay a price that is a function of the outcome of the second stage; that is, equal to \( \nu^i \) if the incumbent remains in control and equal to \( \nu^r \) if the rival prevails. Who will eventually control the company depends on the proportion of shares retained by the incumbent in the first stage.

In fact, according to Lemma 2 the incumbent will always retain enough voting power to veto any transfer of control. It is important, then, to establish whether at time 2 he retains the incentives to agree to a transfer of control (i.e., whether \( B^i + \phi \nu^i \leq B^r + \phi \nu^r \)).

The payoff of the initial owner as a proportion of the cash flow rights he retains is

\[
V = \begin{cases} 
(1 - \psi)(B^i + \phi \nu^i) + \psi(B^r + \phi \nu^r) + (1 - \phi) \nu^i & \text{if } B^i + \phi \nu^i \leq B^r + \phi \nu^r \\
B^i + \nu^r & \text{if } B^i + \phi \nu^i > B^r + \phi \nu^r 
\end{cases}
\]

**Proposition 1.** The solution of the maximization of the value of the firm \( V \) with respect to the insider’s ownership \( \phi \) is the following:\(^{15}\)

(i) If \( \nu^i \leq \nu^r \), then the optimal insider ownership is \( \phi^* = 1 \).

(ii) If \( \nu^i > \nu^r \), then the optimal insider ownership is \( \phi^* = \max \{0, (B^i - B^r)/(\nu^i - \nu^r)\} \).

The optimal amount of revenue accruing to the incumbent is given by

\[
V^* = \begin{cases} 
B^i + \nu^i + \psi(B^i + \nu^i - B^i - \nu^i) & \text{if } \nu^i \leq \nu^r, \\
(1 - \psi)B^i + \psi B^r + \nu^i & \text{if } \nu^i > \nu^r, B^r > B^i, \\
B^i + \nu^r & \text{if } \nu^i > \nu^r, B^r \leq B^i. 
\end{cases}
\]

**Proof.** See Appendix. ||

The intuition behind Proposition 1 is straightforward. From the corporate control perspective the only reason why the initial owner wants to go public is to extract more surplus from an eventual sale of his company. He does that by selling cash flow rights to outside shareholders. By doing so he will extract some or all of the rival’s surplus before the bargaining stage. By pre-selling these gains in the competitive IPO market he secures the entire gain. On the contrary, by retaining all the cash flow rights until the bargaining with the rival he will be able to obtain only a fraction of these gains.

This mechanism has two limitations. First, it works only if the potential buyer is expected to increase the cash flow (i.e., \( \nu^i > \nu^r \)). Otherwise, the opposite result holds. By

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15. The maintained assumption is that \( B^i + \nu^i > B^i + \nu^r \).
pre-selling some cash flow rights the incumbent increases the surplus from trade and this makes him worse off rather than better off. This explains why the incumbent wants to go public if and only if \( v' > v \). The second limitation is that the above mechanism is only good at extracting the surplus deriving from the rival’s increased cash flow, not the surplus coming from his larger private benefits.\(^{16}\) This explains why for \( B' < B' \) the incumbent does not succeed in extracting all the rivals’ surplus.

**Corollary 1.** Given the incumbent’s bargaining power \( \psi < 1 \), his total valuation for the company \( B' + v' \), and the rival’s total valuation \( B' + v' > B' + v' \), then the incumbent’s total proceeds from selling his company are always bigger when \( v' > v' \) than when \( v' \leq v' \).

**Proof.** See Appendix.

Corollary 1 simply states that, ceteris paribus, the incumbent is better off when \( v' > v' \) than when \( v' \leq v' \). The reason is simply that in the first case a dispersed ownership increases the incumbent’s ability to extract the rival’s surplus, while in the second case it does not. At the same time, Proposition 1 suggests that when \( v' \leq v' \) the incumbent prefers to bargain directly with the rival instead of using the two-stage strategy involving an IPO. As a consequence, the model predicts that, ceteris paribus, companies optimally divested through an IPO should generate larger total proceeds for the incumbent than companies optimally sold in a direct negotiation.

Proposition 1 is obtained under the assumption that the incumbent is free to combine cash flow rights and voting rights. However, in most countries companies cannot combine these two elements at will. These restrictions range from an outright ban of differential voting shares to limitations on the minimum amount of cash flow rights necessary to retain a majority of votes. Let \( \alpha \) be this minimum amount (for example, under a one share–one vote rule \( \alpha \) corresponds to 0.5). Then the payoff of the initial owner as a function of the fraction of cash flow rights he retains is

\[
V = \begin{cases} 
(1 - \psi)[B' + \phi v'] + \psi[B' + \phi v'] + (1 - \phi )v' & \text{if } B' + \phi v' \leq B' + \phi v' \quad \text{and } \phi \geq \alpha, \\
B' + v' & \text{if } B' + \phi v' > B' + \phi v' \quad \text{and } \phi \geq \alpha, \\
\phi (B' + v') + \psi(1 - \phi )[B' + v' - v'] & \text{if } v' < B' + v' \quad \text{and } \phi < \alpha, \\
v' & \text{if } v' \geq B' + v' \quad \text{and } \phi < \alpha.
\end{cases}
\]

**Proposition 2.** When the minimum proportion of cash flow right attached to the majority of votes is equal to \( \alpha \), then the solution of the maximization of the value of the firm \( V \) with respect to the insider’s ownership \( \phi \) is the following:

(i) If \( v' \leq v' \) (area (i) in Figure 2), then \( \phi^* = 1 \).

(ii) If \( v' > v' , B' > B' \), and \( \alpha v' \leq B' + \alpha v' + \psi[B' - B' + \alpha (v' - v')] \) (area (ii) in Figure 2), then \( \phi^* = \alpha \).

(iii) If \( v' > v' , B' \leq B' \), and either \( v' < B' + v' \) or \( \alpha v' \leq B' + \alpha v' + \psi[B' - B' + \alpha (v' - v')] \) (area (iii) in Figure 2), then \( \phi^* = \max \{ \alpha, (B' - B')/(v' - v') \} \).

(iv) If \( v' \geq B' + v' \) and \( \alpha v' > B' + \alpha v' + \psi[B' - B' + \alpha (v' - v')] \) (area (iv) in Figure 2), then \( \phi^* \) is any value below \( \alpha \).

16. To be precise: a two-stage sale fails to extract the rival’s private benefits when these are larger than those of the incumbent.
The optimal amount of revenue accruing to the incumbent is given by

\[
V^* = \begin{cases} 
B^i + v^i + \psi[B^r + v^r - B^i - v^i] & \text{if } v^r \leq v^i, \\
B^i + \alpha v^i + (1 - \alpha)v^r + \psi[B^r - B^i + \alpha(v^r - v^i)] & \text{if } v^r > v^i, B^r > B^i, \text{ and } \\
\alpha v^r < B^i + \alpha v^i + \psi[B^r - B^i + (1 - \alpha)(v^r - v^i)] & \text{if } v^r > v^i, B^r \leq B^i, \text{ and either } v^r < B^i + v^i \text{ or } \\
\min \{B^r + v^i, B^i + \alpha v^i + (1 - \alpha)v^r + \psi[B^r - B^i + \alpha(v^r - v^i)]\} & \text{if } v^r \geq B^i + v^i \text{ and } \\
v^r & \alpha v^r \geq B^i + \alpha v^i + \psi[B^r - B^i + \alpha(v^r - v^i)],
\end{cases}
\]

\[
\text{Proof. See Appendix.}
\]

In areas (i) and (iiiia) the constraint that control be attached to at least a fraction \(\alpha\) of the cash flow rights is never binding. The results, then, coincide with those in Proposition 1. By contrast, in areas (ii), (iiiib) and (ivb) the constraint is always binding and the optimal solution is to retain a majority of votes with the fraction \(\alpha\) of cash flow rights attached to it. Finally, in area (iva) the difference between the rival’s and the incumbent’s cash flow rights is so large that extracting all the surplus arising from this difference becomes the primary concern of the incumbent. The restriction on the separation of residual claims from votes, forces the incumbent to give up control in order to be better able to extract all the difference in the value of cash flow rights.

Note that, although the restrictions on the separation between cash flow and voting rights change the optimal level of insider’s ownership, these restrictions do not change the regions in which it is it is optimal for the incumbent to go public (i.e., all regions except (i)).

Remark 1. The surplus extraction function of dispersed shareholders is more robust in areas (ii) and (iii) than in area (iv). In fact, the last case requires that small shareholders
do not perceive themselves as pivotal in the control contest (as in Grossman and Hart 1980). By contrast, in the first two cases this assumption is not required, because small shareholders are never pivotal. In those areas the incumbent retains a majority of the voting power and so he alone has the ability to transfer control to the rival.17

Remark 2. Corollary 1 (and Proposition 1) remain unchanged if I allow the rival to buy shares at the IPO. When the incumbent chooses to retain a majority control, the rival cannot gain control by purchasing some minority shares, nor can he realize a capital gain on these shares. In fact, the small shareholders’ competition will drive the price of those shares to $v'$. In addition, if he buys some of them, he will weaken his bargaining position at time 2 because he will suffer a capital loss $v' - v$ if he does not take over the company. Therefore, in this case he does not want to buy any shares at the IPO.

If the optimal amount retained by the incumbent is less than a majority control, then the rival, if present at the IPO, may want to secretly amass a controlling block. However, Proposition 2 shows that the incumbent will optimally sell more than 50% of the votes at the IPO only when the maximum value he can extract from the buyer is $v'$. In these cases the rival will end up paying $v'$ to all shareholders anyway, independently of when and how he achieves control. Therefore, the outcome does not change.18

3. A TWO-PERIOD MODEL

In the previous section I considered the questions of whether an initial owner should take public his privately held company and what fraction of it he should retain after the IPO. This leaves open the following question: provided that an initial owner has taken his company public, is it ever optimal for him to reverse this decision and take the company private? To analyse this question I need a two-period framework. This is obtained simply by staggering two one-period models and is illustrated in Figure 3.

At time 0 the incumbent starts with a privately held concern and chooses a fraction of shares $\phi_1$ that he wants to retain in his company thereafter. He knows that with probability $\pi$ a potential buyer appears at time 1. If he appears, then a bargaining phase starts and then the game ends. Otherwise, the game continues. At time 2 some new information is released, which might change the expectations about the characteristics of a potential buyer. At time 3 the initial owner has a second chance to choose his ownership level ($\phi_2$). At time 4 the potential rival appears and a bargaining phase starts.19 Finally, at time 5

17. Even in area (iv), though, a complete free-riding can be achieved with non-atomistic shareholders if non-voting shares are used. On this see Gromb (1992).
18. Similarly, it would not pay off for an arbitrageur to accumulate a large stake at the IPO stage.
19. For simplicity I assume that the probability of a buyer appearing at time 4 given that he did not appear at time 2 equals 1. The substance of the results will be unchanged if this conditional probability is less than 1.
production takes place and the company is liquidated. In what follows for simplicity I will refer to the interval between time 0 and time 2 as period I and to the one between time 3 and time 5 as period II.

With respect to the basic model there are only two differences. First, for simplicity, production is concentrated only at the end of period II. Second, and most important, at time 0 the incumbent does not know the exact characteristics of the potential buyer, but he has a prior distribution for the possible buyers. This distribution will be updated at time 2 on the basis of new information becoming available at that time.

The solution of the incumbent maximization decision proceeds backwards. Section 2 has solved the period-II problem for the case where $\phi_1 = 1$ (i.e., the company starts at time 3 as private). Before moving to the first-period problem, though, I need to find the second-period solution when the company arrives at time 3 as publicly traded (i.e., $\phi_1 = \bar{\phi} < 1$, with the remaining $1 - \bar{\phi}$ shares held by dispersed shareholders).

If the initial level of ownership $\bar{\phi}$ is greater than the optimal level of ownership in the last period (i.e., $\bar{\phi} > \phi^*_2$), then the following lemma shows that the optimal amount of insider ownership chosen at time 3 is the same as derived in Proposition 1.

**Lemma 3.** If $\bar{\phi} > \phi^*_2$, then the incumbent’s choice of $\phi$ at time 3 equals $\phi^*_2$.

**Proof.** See Appendix. ||

If $\bar{\phi} < \phi^*_2$, then I have to distinguish two cases: either $\nu' \geq \nu'$ and then $\phi^*_2 = 1$ (i.e., the company should be private) or $\nu' < \nu'$ and $\bar{\phi} < \phi^*_2 < 1$ (i.e., it would be optimal that the company be sold to the rival while public, but the current level of insider’s ownership is insufficient to motivate the incumbent to transfer control). As the two following lemmas state, in the first case the incumbent can move to the optimal solution, while in the second case he cannot.

**Lemma 4.** If $\bar{\phi} < \phi^*_2 = 1$, then the incumbent will take the company private.

**Proof.** See Appendix. ||

**Lemma 5.** If $\bar{\phi} < \phi^*_2 < 1$, then it is not optimal for the incumbent to move $\phi = \phi^*_2$.

**Proof.** See Appendix. ||

Lemma 5 shows how the free-riding of atomistic shareholders may prevent an efficient change in control. This is nothing but Grossman and Hart’s (1980) result extended to the case where a large shareholder is present. In this particular case, the incumbent must purchase additional shares in order to have the incentive to transfer control to the rival. In fact, while his cash flow rights are inferior to the rival’s ones, his private benefits of control are larger. As a consequence, the incumbent may benefit from the transaction only if he enjoys a large enough capital gain on his cash flow rights. However, this is

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20. Introducing production during period I will complicate notation without adding any new insight.
21. This impossibility of some efficient transfers has already been shown by Caprio (1992) and Bebchuk (1994) in cases where the level of the incumbent’s ownership is exogeneously given. Lemma 5 simply extends this result to the case wherein the incumbent is allowed to change his stake.
22. Note that when $\nu' < \nu'$ a situation like $\bar{\phi} < \phi^*_2 < 1$ may occur if and only if $B' > B'$. In fact when $B' < B'$, $\phi^*_2 = 0$ and it is impossible that $\bar{\phi} < \phi^*_2$. 
impossible if he has to repurchase some of them from the market. In fact, if small shareholders anticipate that he will have the incentive to transfer control to the rival at time 4, then they will not sell him shares below the value of their shares under the rival (i.e., \( v' \)). But at this price the incumbent does not realize any capital gain.

A consequence of Lemma 5 is that, in general, the optimal level of insider's ownership cannot be obtained by a simple period-by-period maximization. Rather, it will always be bigger than or equal to the one-period solution. This is a direct consequence of the asymmetry between Lemma 3 and Lemma 5: there are no long-term costs in choosing "too much ownership", while there might be long-term costs if the level of ownership is too low.

Extending the logic of Lemmas 3–5 to a multi-period model, one can easily derive that in a multi-period model insider's divestment may optimally occur in several steps, but increases will only take the form of complete buybacks (i.e., going private transactions). The optimality of multi-stage sales has been established, in different contexts, by Welch (1992) and Perotti (1990). However, this model is unique in pointing out the asymmetry between divestments and reinvestments.

The general solution of the two-period model is highly dependent on the time 0 prior distribution of the rival's characteristics. In the following I will not analyze all the possible cases, but I will focus on just one case that illustrates why and when an initial owner might want to reverse his initial going-public decision in the second period.

I assume that the prior distribution attributes a probability \( p \) to the event that a potential buyer will increase the company's profits (\( v'^{'} > v' \)) and probability \( (1-p) \) that he will decrease them (\( v'^{'} < v' \)).23 By contrast, the level of the potential buyer's private benefit is assumed to be non-stochastic.24 In this context, I obtain the following result:

**Proposition 3.** It is optimal for the incumbent to go public at time 0 if and only if \( E[v'] > v' \). The incumbent may later reverse his decision and take the company private at time 3 if \( E[v'] < v' \).

**Proof.** See Appendix. \( \Box \)

The solution is rather intuitive. The incumbent will choose to go public at time 0 when the advantages of going public early on (more surplus extraction in the case of an early arrival of the rival) offset the cost of going public (i.e., to start period II with a sub-optimal allocation of ownership). If \( v'^{'} < v' \), then the cost of going public is zero, because by Lemma 4 the incumbent can adjust his ownership. Therefore, the problem boils down to a single-period problem as presented in Section 2. The only difference is that now the rival's characteristics are uncertain. However, Proposition 1's results carry through by substituting \( v' \) with its expectation. Therefore, the incumbent will go public at time 0 if and only if the expected value of cash flow rights under the rival is larger than the value under the incumbent (\( E[v'] > v' \)).

At time 2, the incumbent (and the public shareholders) update their estimates on the characteristics of a potential buyer. If the expectation of the rival's characteristics continues to be such that \( E[v'] \geq v' \), then it is optimal for the initial owner to leave the company.

---

23. As I will argue in Section 5.2 there is some evidence that cash flow rights are more highly correlated with the market than private benefits. Therefore, the stock market performance may affect the expected characteristics of a potential buyer. For consistency with Section 2 I maintain the assumption that the rival (independent of his type) values the company more than the incumbent (\( B'^{'} + v'^{'} > B'^{'} + v' \)).

24. One possible justification for this assumption is that the potential acquirer's cash flow rights have a higher beta than his private benefits, and I restrict my attention to the case in which the latter is zero.
public. By contrast, if the expectation becomes that the rival will reduce the value of cash flow rights relative to their value under the incumbent (\(E[v'] < v'\)), then the company's shares will trade at \(v_i < v'\). In this case it is optimal for the incumbent to buy back those shares and to take the company private, as stated in Lemma 4.

Proposition 3 also has implications about when a company should go private. In this world, stock prices reflect the value of cash flow rights under the expected controller. Therefore, before the time 2 release of information, the stock price equals \(E[v']\). If the company went public at time 0, then, by Proposition 3, it must have been the case that at that time \(E[v'] > v'\). But Proposition 3 also indicates that an incumbent would choose to go private only if \(E[v'] < v'\). This implies that the incumbent will take the company private at time 3 if and only if the information released at time 2 reduced the expectation of \(E[v']\) to a point below \(v'\). As a result, I obtain the following corollary:

**Corollary 2.** The decision to take a company private should follow a decline in that company's stock price.

### 4. EXTENSIONS AND DISCUSSION

In Section 2 I argued that an incumbent can extract more surplus from an eventual buyer by taking his company public. Here, I discuss, within the context of the one-period model, whether this is always an optimal mechanism to extract the rival's surplus and compare my proposed mechanism with others which produce similar results.

#### 4.1. Optimality of the mechanism considered and possible alternatives

Simple inspection of the results in Proposition 1 suggests that the mechanism proposed is optimal if \(B' + v' > v'\). In fact, in this region the incumbent will always succeed in extracting the rival’s entire surplus. Even if these conditions are not satisfied, a simple modification of the basic idea can guarantee a full extraction of the rival’s surplus.

The simplest (and most used) device is the introduction in the corporate charter of a “fair price amendment.” A fair price amendment requires a bidder to pay the same price per share to all shareholders. In the presence of differential voting shares, the rival has to pay at least \(B' + \phi v'\) to the incumbent to purchase a majority of votes and a fraction \(\phi\) of cash flow rights. This means a per-share price equal to

\[
\frac{B' + \phi v'}{\phi} = \frac{B'}{\phi} + v'.
\]

Because of the fair price amendment, the bidder should extend the same offer to all the shareholders. Therefore, the rival will end up paying \(B'/\phi + v'\) for the whole company. Note that if cash flow rights and control rights can be separated, then the incumbent can always retain a small enough fraction of the cash flow attached to his full control power.

---

25. In this particular example \(E[v'] = p \cdot v_i + (1 - p) \cdot v_f\). With probability \(\pi\) the rival appears at time 1 and outside shareholders expect to receive \(E[v']\). If he does not appear at time 1 and the incumbent learns he is of type \(v_i\) (probability \(1 - \pi)p\), then outside shareholders are bought off at \(v_i\). Otherwise, they receive \(v_f\). Overall, their expected payoff is \(E[v']\).

26. Playboy Enterprises is an example of a dual-class company with a fair price amendment involving all the shares.
such that

\[
\frac{B'}{\phi} + \psi = B' + \psi'.
\]

In this case the surplus extraction is complete. Israel (1992) arrives at the same result using a combination of a supermajority rule and debt (instead of non-voting shares).\(^{27}\)

An alternative mechanism to extract all the surplus deriving from the rival’s larger private benefits can be obtained by applying Aghion and Bolton’s (1987) idea of stipulated damage contracts.\(^{28}\) The interesting feature, from a corporate finance point of view, is that this mechanism corresponds to a certain type of poison pill.

Let’s assume, for simplicity, that the incumbent has already succeeded in extracting all the surplus deriving from cash flow by selling his cash flow rights to outside shareholders. How can he also extract the surplus \(B' - B\)? He can write the corporate charter so that if a change in control takes place a sum equal to \(B' - B\) per share (remember that the total number of shares has been normalized to one) should be paid to outside shareholders. This contract is identical to a type of poison pill known as a “flip-in plan.” Under such a plan each shareholder is given the right to purchase the target shares at a large discount if there is a change in control. The discount can be interpreted as the side payment \(B' - B\) guaranteed to outside shareholders. In this situation, the rival ends up paying \(\psi\) for the cash flow rights and \(B'\) for the right to take over the company (\(B'\) to the incumbent and \(B' - B\) to outside shareholders). In other words, the rival pays out his whole valuation for the company \((B' + \psi)\). Obviously, the value of this poison pill for individual investors will be reflected in the shares’ prices at the time of the IPO. In this way the initial owner is able to extract the whole rival’s surplus.

In sum, although simply selling a fraction of the company to outside shareholders is not always an optimal mechanism to extract the rival’s surplus, the addition of a few (reasonable) clauses allows the incumbent to completely capture the rival’s surplus. Nevertheless, this mechanism is by no means unique. For instance, a stipulated damage clause à la Aghion and Bolton does not have to take the form of a poison pill, but it can simply be a contract with a third party signed by a privately held firm. Alternatively, the incumbent can run an auction in which different combinations of a firm cash flow and control rights are sold at different prices—as suggested by Cornelli and Li (1993). Therefore, it is legitimate to ask why it is relevant to focus on the decision to go public.

The reason is fairly obvious. As I stated in the introduction, although this model focuses only on the corporate control dimension, there are many other important factors in the decision to go public. In particular, the distribution of equity claims to outside investors improves the extent of risk sharing. Therefore, the first-order question is not which mechanism does better in an abstract setting, but rather how the decision to go public, which may have other motivations as well, is affected by the corporate control dimension.\(^{29}\) In this respect I believe it is an interesting finding that an IPO may not only

\(^{27}\) However, he rules out by assumption any direct negotiation between the incumbent and rival. In his model all the control changes have to take place through non-negotiated tender offers even if the incumbent retains a majority of the votes. He does not take into account the possibility that a fair price amendment will achieve the same results.

\(^{28}\) Aghion and Bolton show how stipulated damage contracts can increase a firm’s profitability by extracting more surplus from a possible entrant.

\(^{29}\) Nevertheless, even from a purely theoretical point of view this mechanism performs well with respect to the proposed alternatives. In fact, the use of dispersed shareholders provides a much stronger commitment than a stipulated damage contract signed with a private third party. This is not an issue in the context of the Aghion and Bolton model, because the entry decision cannot be the object of a direct negotiation between the entrant and the incumbent. However, in the takeover market the rival can negotiate directly with both the incumbent and the other party who signed the stipulated damage contract. This will recreate a situation of
increase the total proceeds obtained by the incumbent but, with a few additions to the corporate charter, can even extract the entire surplus of a potential buyer. Starting with Leland and Pyle (1977), the corporate finance literature has emphasized the costs borne by an entrepreneur who wants to access the public equity market to diversify his wealth and raise new capital. What makes this paper interesting is the finding that going public may produce an extra benefit (like surplus extraction) as well.

4.2. Related Literature

The idea of using a contract with a third party to extract more rent from a bargaining goes back to Diamond and Maskin (1979). In finance all applications focus on the idea that debt, and in particular public debt, can be used to commit part of a firm's cash flow, leaving less surplus to that firm's bargaining partners—for instance, to extract concessions from unions (Perotti and Spier (1993)), from a bank (Rajan (1992)), from an acquirer (Israel (1991)), or from the Government in the case of procurement contracts (Spiegel (1991)). This paper, instead, describes the strategic use of disperse equity claims in enhancing the incumbent's ability to extract the surplus from a potential buyer.

5. IMPLICATIONS

This paper considers only the control aspect of the process of going public. Therefore, before discussing some empirical implications of this model it is important to assess how relevant the control dimension is in the going public (or private) decision, relative to other often mentioned factors, which are absent from this model.

If—as suggested in this model—the desire to maximize the proceeds from an eventual sale of control is an important motivation underlying IPOs, then one should see a high turnover in control in the years following an IPO. This phenomenon is documented for Sweden by Rydqvist and Höglund (1994), who report that control changes hands in 36% of IPOs within 5 years after the initial offerings. They also report that 34% of U.K. IPOs are taken over within 5 years of listing. Although, these figures suggest a high turnover in control, they do not prove that control turnover is abnormally high after an IPO. Evidence of this kind is provided by Pagano, Panetta and Zingales (1994). In the Italian context, they compare control turnover after an IPO with the normal turnover in control occurring in the same years among privately held firms. They find that the former is twice as large as the latter and the difference is statistically significant at the 1% level.30

While control considerations appear to be relevant for European IPOs, the U.S. evidence is less clear. Mikkelson and Shah (1994) report a 29% turnover in control in the five years following the IPO for established firms (defined as firms having more than 5 years of sale history), while turnover is only 13% for IPOs of young start-up companies. Although these figures do not include transfers of control blocks, they would suggest that bilateral monopoly (to be precise, a monopolist against two duopolists) that reduces the strength of the incumbent's commitment. As a result he would probably appropriate a smaller fraction of the surplus. The going public process (i.e., the distribution of equity claims among small dispersed shareholders) remains the best safeguard against renegotiation.

30. It should be said, though, that in the presence of uncertainty about the buyer's type is it not necessarily the case that turnover increases after an IPO. In fact, in the context of a similar model, Bechuk and Zingales (1995) argue that in order to maximize the amount of surplus extracted, an initial owner facing some uncertainty on the buyers' characteristics may choose, ex ante, to retain a level of ownership that, ex post, blocks some efficient transfers of control.
in the latter group financing considerations are prevalent, while in the former control considerations are also very important.³¹

However, there is one particular group of IPOs where other issues, like risk aversion and limited wealth, should be less of an issue: the initial offering of a wholly owned subsidiary of a publicly traded company (the so-called equity carve outs). The existing evidence for carve-outs supports the importance of control considerations. Both Schipper and Smith (1986a, b) and Klein et al. (1991) find that "a carve-out is almost always followed by either a parent reacquisition of the subsidiary's outstanding shares or a disposal of the parent's remaining interest" (Klein et al. (1991)). The latter study follows the 1966–1983 carve-out sample until December 1988. At that date 48% of the carved-out subsidiaries had been re-acquired, 37% sold off, and only 15% still remained publicly traded subsidiaries.³² Finally, Michaela and Shaw (1995) find no evidence suggesting these transactions are motivated by financing needs.

For all these reasons, I will state the empirical implications of this model in terms of subsidiaries of publicly held companies. Nevertheless, the same logic should apply to IPOs in general, to the extent that financing considerations are not prevalent.

5.1. Corporate divestiture

Previous literature has distinguished corporate divestitures by the strategy adopted in selling the sub-unit: distribution of equity claims in the subsidiary directly to the parent company's shareholders (spin-offs), sale of an equity stake in the subsidiary to the public (carve-outs) and direct sale of the subsidiary to a third party (direct sell-offs). This paper provides a unified framework to analyse the choice among these different strategies.

If a company is interested in maximizing the proceeds from divesting a sub-unit which strategy should it follow?³³ Proposition 1 suggests that a direct sell-off is preferable whenever the potential buyer is expected to reduce the value of cash flow rights under the incumbent (i.e., \( E[\nu] < \nu' \)). This might be more likely if the potential acquirer can easily siphon out some profits after acquiring control of the unit. For instance, when a subsidiary is a small sub-unit of an integrated production process, it may be difficult to assess its profitability independent of the profitability of the acquirer, leaving a majority shareholder more discretion in increasing the non-verifiable component of income at the expense of the verifiable one (and thus leaving dispersed shareholders worse off). In these cases a direct sell-off is the most profitable divestiture strategy.

By contrast, if \( E[\nu'] > \nu' \), then the optimal strategy to divest is either a carve-out or a spin-off (where the spin-off corresponds to the case \( \phi = 0 \)). Spin-offs should be preferred when the potential buyer's private benefits of control are nil, or when the characteristics of the potential buyer collocate him in area (iv) in Figure 1 and voting rights cannot be completely separated from cash flow rights. In all other cases a two-stage sale (like a

³¹. This would square with the observed difference in the age of companies undertaking an IPO. According to Rydqvist and Högholm (1994) European IPOs are on average 48 years old, while Gompers (1992) documents that U.S. IPOs are 11 years old.

³². Furthermore, all of the carve-outs that survived as public subsidiaries took place in 1982–1983, that is, in the last two years of the sample. The median time before a sell-off is 1 year and 4 months, and before a re-acquisition, 4 years and 6 months. So the remaining 15% of carved-out subsidiaries may eventually be either sold or re-acquired. For example, I found that between December 1988 and December 1990 an additional company was sold off.

³³. Here, I assume that the parent company maximizes shareholder's value; therefore, I ignore the difference between cash flow in the pocket of the company and cash flow in the pocket of its shareholders. Sell-offs are typically done by public companies under a takeover threat, which pushes the management toward value maximization. As a result, value maximization seems a reasonable assumption.
carve-out) should be chosen. For example, if one interprets private benefits of control as potential synergies, a subsidiary with limited possibilities for synergies is better sold through a spin-off rather than a carve-out.

This taxonomy is useful to fix ideas, but it does not easily lead to testable implications. However, some other implications of the model do. For example, according to Corollary 1 we should observe two-stage sales being more profitable and, nevertheless, direct sales still being used. This implication could be tested by simply comparing the average proceeds obtained for subsidiaries sold using a direct-sale approach versus those obtained using a two-stage sale method. I am not aware of any test in this sense. The only indirect piece of evidence in support of this claim (which I could find) is provided by Klein et al. (1991). They observe that the total abnormal return experienced by parent company announcing a two-stage sale of a subsidiary exceeds the abnormal return of companies announcing a direct sell-off. If the abnormal stock return can be interpreted as an indicator of the amount of trade surplus enjoyed by the seller, then this piece of evidence is consistent with my claim.34

Another implication deriving from Lemma 2 and Proposition 1 is that in a two-stage sale the incumbent should never release control at the first stage, even at the cost of issuing differential voting shares. Consistently, Schipper and Smith find that only two parent companies in their sample of 73 (3%) sold a majority of the voting power in the first stage, and that as many as 20% of the companies made use of differential voting shares to retain control.35

Similarly, the high frequency of re-acquisitions can be explained in the context of the two-period model in Section 3. That model provides an additional testable implication. According to Corollary 2 parent companies should repurchase only subsidiaries whose stock prices have under-performed. Unfortunately, the above mentioned studies do not provide any indication on this issue.

5.2. Timing of the IPOs

The model indicates that selling a company by taking it public is the value-maximizing choice if two conditions are satisfied: the potential buyer values the company more than the incumbent \( (B' + v' > B' + v) \), and that the value of cash flow rights under the buyer's management is larger than their value under the incumbent \( (v' > v) \). In other words, the difference between the buyer and the incumbent cash flow rights \( (v' - v) \) should be positive and bigger than \( B' - B' \). Therefore, the optimality of going public depends on the relative distribution of \( v' - v \) and \( B' - B' \).

It is reasonable to expect that the cross-sectional variation in the difference between the incumbent's and the rival's valuations is increasing in the average level of those valuations (i.e., if the average value of both \( v' \) and \( v' \) increases by the same amount, then the standard deviation of their difference \( \sigma(v' - v') \) increases as well). If this is the case, then when the average value of private benefits of control is small with respect to the value of cash flow rights, a company satisfying the second condition to go public (i.e., \( v' > v' \) is

34. Of course, it is hard to be certain that in their study all the other firm characteristics are held constant. Therefore, this evidence should be considered only suggestive until further study.

35. The percentage of companies issuing dual-class shares is remarkably high given that during their sample period (1965–1983) the acceptance of differential voting shares was very limited. At that time the NYSE was not allowing listing of dual-class companies and only 5% of the Amex companies and 4% of the Nasdaq companies had dual-class arrangements. See Seligman (1986).
more likely to satisfy also the first one (i.e., \( v' - v > B' - B' \)) and vice versa.\(^{36}\) Therefore, according to the model, when private benefits matter relatively less than cash flow rights more companies should go public.

By the same logic, more companies should decide to go private when private benefits of control are relatively more important. In fact, the two conditions that would lead a public company to go back private are: \( B' + v' > B' + v' \) and \( v' < v' \). These two conditions (that can only hold when \( B' > B' \)) boil down to \( 0 > v' - v' > (B' - B') \). Clearly, if private benefits are very small with respect to cash flow rights, then this condition is very hard to satisfy. By contrast, when private benefits are very large, it is more likely that a company finds itself in the situation where a potential buyer has a higher valuation for the entire company but lower cash flow rights.

The value of cash flow rights is likely to be more sensitive to aggregated fluctuations in the stock market than the value of private benefits. For example, a reduction in the aggregate risk premium will lead to an increase in the present value of cash flow rights, both under the incumbent and under the rival. However, it does not necessarily affect the value of either parities' private benefits of control.\(^{37}\)

Therefore, when the level of stock market prices is high, private benefits are relatively less important. However, this also implies that more companies will want to go public. In other words, the model predicts that the IPO activity should rise following an increase in stock prices. By contrast, when stock prices are low, the average value of cash flow rights is low and then private benefits of control are relatively more important. This explains why going private transactions should increase in a down market.\(^{38}\)

There is some evidence supporting these claims. Lerner (1994) finds that the probability of an IPO of a biotechnology firm is significantly affected by the level of the biotechnology sector stock market index. Similarly, Pagano, Panetta, and Zingales (1994) find that in general the probability of an IPO is positively and significantly affected by the median ratio between the market and the book value of equity of firms in the same industry sector.

I am not aware of any evidence on the probability of going private, but the fact that 1988 (after the 1987 crash) was the historical peak for going private transactions does support the model.

6. CONCLUSIONS

This paper provides a new framework to analyse the decision of a firm to go public. It analyses this choice within the broader problem of the optimal method to sell a company. When the potential buyer is expected to increase the value of cash flow rights, then the initial owner can use an IPO to extract a portion of the trade surplus, without having to bargain with the buyer over it. Otherwise, the value-maximizing way of divesting a company is not to undertake an IPO, but to keep the company private, and to bargain over the entire company with the potential buyer.

36. The result can be formally derived by assuming that \( v' - v' \) and \( B' - B' \) are multivariate normal distributed with zero mean.

37. To test the realism of this assumption I look at the correlation between the average premium attached to voting rights in the U.S. and the S&P 500 index. As argued in Zingales (1994b), the voting premium can be considered a measure of the relative size of private benefits with respect to cash flow rights. I found a negative and statistically significant correlation between the two, supporting the idea that private benefits are less sensitive than cash flow rights to market fluctuations.

38. The same argument can be extended to a cross-country comparison. If, as argued in Zingales (1994a, b), private benefits of control differ across countries as a function of the degree of protection guaranteed to minority shareholders, then countries where private benefits are smaller should have a larger proportion of companies that are publicly traded.
This model, which considers only the corporate control aspect of the going-public decision, is most suitable for analysing corporate divestitures, since the other major aspects of the decision to go public (like the demand for equity financing and risk diversification needs) appear less important. In this context the paper is important because it is the first one to explain the choice among different divestiture methods. The model predicts that direct sell-offs are preferable when the potential buyer is likely to reduce the value of cash flow rights. Spin-offs should be preferred when the potential buyer’s private benefits of control are nil. Carve-outs should be chosen in all the other cases. A fruitful area of future research is an empirical analysis of the choice among these strategies.  

Although the corporate control dimension is not as predominant in start-up companies, it is not irrelevant either. For instance, venture capital funds face the problem of profitably unloading their investments within the lifetime of the fund. Clearly, they face the same type of alternatives: privately negotiated sales, IPO followed by a negotiated sale of the control block, or distribution of 100% of equity among dispersed shareholders. While other factors are also at work, this model provides a useful guideline to direct future empirical research.

Finally, the framework provided in this paper is also useful to improve our understanding of the incentives underlying the decision to go public. Much of the policy debate implicitly assumes that it is socially beneficial to subsidize the access of entrepreneurs to the public equity market. While there are clear reasons why that might be the case, this paper points out this is not necessarily the case. In this model the decision to go public is entirely driven by the desire to maximize the incumbent’s surplus. As Bebchuk and Zingales (1995) point out, this might lead to a divergence between private optimality and social optimality. The empirical relevance of this distortion is yet another important area for future research.

**APPENDIX**

**Proof of Lemma 1.** Case 1: $B^t + v^t > v^t$. The minimum winning bid the rival can make is $B^t + v^t$. Any lower offer will be defeated by an incumbent counter-offer, which can be as high as his reservation price for the company. At $B^t + v^t$ outside shareholders will tender, otherwise they get $v^t < B^t + v^t$. Given that outside shareholders tender, the incumbent will tender as well. In fact, by selling his stake he receives $\phi (B^t + v^t)$, which is more than the $\phi v^t$ he would receive by keeping his stake. Therefore, a bid at $B^t + v^t$ prevails.

Case 2: $B^t + v^t \leq v^t$. The minimum winning bid is $v^t$. Any offer below $v^t$ cannot prevail. In fact, if outside shareholders expect the offer to win they are better off not tendering and receiving $v^t$, so they will not tender and the offer will fall through. Outside shareholders are prepared to tender only at a price bigger than or equal to $v^t$. This price is above the incumbent reservation value, so he has no feasible counterbid. So the bid at $v^t$ wins.

**Proof of Lemma 2.** If $B^t > B^r$ then it is easy to show that by retaining a majority of votes and a fraction $\phi$ of cash flow rights the incumbent is always able to extract all the buyer’s surplus. In fact, if $\phi$ is such that constraint $B^t + \phi v^t \leq B^r + \phi v^t$ is binding, then the incumbent proceeds are

$$B^t + \phi v^t + (1 - \phi )v^t = B^r + \phi v^t + (1 - \phi )v^t = B^r + v^t.$$ 

Consequently, the incumbent cannot do better by relinquishing his voting majority. If $B^t < B^r$, then by selling all the cash flow rights he wants and retaining a majority of votes the incumbent obtains

$$(1 - \psi)B^t + \psi B^r + \max \{v^t, v^t\} > \max \{B^t + v^t, v^t\},$$

that is, his payoff if he does not retain a majority of votes.

**Proof of Proposition 1.** Any $\phi$ such that $B^t + \phi v^t > B^r + \phi v^t$ is sub-optimal, because $\phi = 1$ provides a higher payoff. Therefore, the objective function boils down to maximizing $V$ subject to the constraint $B^t + \phi v^t < B^r + \phi v^t$.

differentiating \( V \) w.r.t. \( \phi \) yields \( \frac{\partial V}{\partial \phi} = (1 - \psi)(u' - v'). \) This is positive if \( u' > v' \), therefore in this case \( \phi^* = 1. \) If \( u' = v' \), then the derivate is zero over the entire interval \( \{ (B'' - B')/(u' - v') \}, \) Therefore, I choose \( \phi^* = 1. \) Otherwise, it is negative and \( \phi^* = \max \{ 0, (B'' - B')/(u' - v') \} \).

**Proof of Corollary 1.** If \( B' \leq B' \), then \( V^* = B' + u' \) when \( u' > v' \). Therefore, the incumbent’s payoff cannot be any better when \( u' \leq u' \) and it is actually worse if \( \psi < 1. \) If \( B' > B' \), then \( V^* \) can be rewritten as \( B' + u' + (1 - \psi)(u' - v') + \psi[B' + v' - B' - u'] \) when \( u' > v' \) and as \( B' + u' + \psi[B' + v' - B' - u'] \) when \( u' \leq u' \). By comparing the two, it follows that, for a given difference between \( B' + u' \) and \( B' + v' \), \( V^* \) is greater when \( u' > v' \) than when \( u' \leq u' \).

**Proof of Proposition 2.**

Case (i). For \( \phi \in [0, \alpha] : \partial V / \partial \phi = (1 - \psi)(u' - v') \geq 0. \) For \( \phi \in [0, \alpha] : \partial V / \partial \phi = (-1) \psi(u' - v') > 0. \) Given that \( \lim_{\phi \to \alpha} V(\phi) < V(\alpha) \), then \( \phi^* = 1. \)

Case (ii). For \( \phi \in [0, \alpha] : \partial V / \partial \phi = (1 - \psi)(u' - v') < 0. \) Therefore, the maximum is at \( \phi = \alpha. \) For \( \phi \in [0, \alpha] : \partial V / \partial \phi = (1 - \psi)[B' + u' - v'] \). This derivative is positive if \( u' < B' + v'. \) In such cases \( \lim_{\phi \to \alpha} V(\phi) < V(\alpha) \), then \( \phi^* = \alpha. \) If \( u' \geq B' + u' \), then the derivative is equal to zero over the whole interval. In this case \( \phi^* = \alpha \) is optimal as long as \( V(\alpha) = (1 - \psi)[B' + \alpha u'] + \psi[B' + \alpha v'] + \alpha u' > v' \) or \( B' > -(1 - \psi)/(\psi)(B' + \alpha u') + (-1 - \psi)/\psi v'. \) This is the line that separates area (ii) from area (iv). Therefore, to the left of that line \( \phi^* = \alpha. \)

Case (iii). For \( \phi \in [0, \alpha] : \partial V / \partial \phi = (1 - \psi)(u' - v') < 0. \) In this case the constraint \( B' + \phi u' \leq B' + \phi v' \) may be binding. Therefore, the maximum is at \( \phi = \max \{ \alpha, (B' - B')/(u' - v') \} \).

Case (iv). It is just the complement of case (ii). Whenever \( V(\alpha) = (1 - \psi)[B' + \alpha u'] + \psi[B' + \alpha v'] + \alpha u' < v' \) then \( \phi^* \) is any value below \( \alpha. \)

**Proof of Lemma 3.** Let \( \tilde{\phi} \) be the level of initial holdings. Then, at time 3 the incumbent maximizes

\[
V = \begin{cases} 
\psi[B' + \phi u'] + (1 - \psi)[B' + \phi v'] + (1 - \tilde{\phi})v' & \text{if } B' + \phi u' \leq B' + \phi v' \\
B' + \phi v' & \text{if } B' + \phi u' > B' + \phi v'
\end{cases}
\]

with respect to \( \phi. \) The objective function equals the one in Proposition 1 minus \( \tilde{\phi} v' \), which is a constant. It follows that the optimal \( \phi \) is equal to \( \phi^* \) obtained in Proposition 1.

**Proof of Lemma 4.** Let \( \lambda \in [0, 1 - \tilde{\phi}] \) be the fraction of shares the incumbent buys back at time 3. Then \( \lambda \) will be chosen to maximize \( V = [B' + (\psi + \lambda)u'] + \psi[B' + B' + (\psi + \lambda)(v' - u')] - \lambda P \), where \( P \) is the per-share price paid to minority shareholders. Under the maintained assumption that \( B' + u' > B' + \phi \), \( \phi^* = 1 \) if and only if \( u' > \psi \). Therefore, control will be transferred to the rival independent of the amount repurchased by the incumbent. As a result, minority shareholders expect to receive \( v' \) per share and are prepared to tender at any price bigger or equal to it. Substituting \( P = v' \) in the maximization problem and differentiating yields \( \partial V / \partial \lambda = (1 - \psi)(v' - u') > 0. \) Therefore, \( \lambda^* = 1 - \tilde{\phi}, \) that is, it is optimal to take the company private.

**Proof of Lemma 5.** I shall show that the incumbent has no incentive to move his ownership at or above \( \phi^*_2 \). Let \( \lambda \in [\phi^*_2 - \tilde{\phi}, 1 - \tilde{\phi}] \) be the fraction of shares the incumbent buys back at time 3. I have to prove that for any \( \lambda \) in that interval the incumbent is worse off than remaining at \( \tilde{\phi}. \) If he does not repurchase any share the incumbent’s wealth is \( B' + \phi u'. \) If he repurchases \( \lambda \) shares his wealth is \( B' + (\phi + \lambda)u') + \psi[B' + B' + (\phi + \lambda)(v' - u')] - \lambda P, \) where \( P \) is the price paid in the stock repurchase. Given that \( \lambda \geq \phi^*_2 - \tilde{\phi}, \) minority shareholders anticipate that control will be transferred to the rival after the stock repurchase. Therefore, they will not sell their shares at any price below \( \psi \). Substituting \( P = \psi \) it is easy to see that \( [B' + \phi u'] > [B' + (\phi + \lambda)u'] - \lambda u' \geq [B' + (\phi + \lambda)u'] + \psi[B' + B' + (\phi + \lambda)(v' - u')] - \lambda v', \) where the first inequality follows from the fact that \( \tilde{\phi} < \phi^*_2 \) implies \( B' + \phi u' \leq B' + \phi v' \) and the last one from the fact that \( B' + \phi u' \geq B' + B' + \psi[B' + B' + (\phi + \lambda)(v' - u')] \) for any \( \phi \geq \phi^*_2. \)

**Proof of Proposition 3.** The proof is by backward induction. The optimal \( \phi_2 \) is either \( \phi^* \) (as defined in Proposition 1) or 1, depending on the realization of \( u'. \) If \( u' = u' \) and consequently \( \phi^* = 1, \) then the level of

40. To simplify the proofs I assume \( \psi < 1. \) Note that if \( \psi = 1 \) the incumbent succeeds to extract all the rival’s surplus independently of the mechanism used, therefore, this case is uninteresting.
ownership chosen in the first period does not affect the possibility of achieving $\phi^*$ in the second period (Lemma 4). By contrast, when $\nu = \nu^*$, then $\phi^*$ can be achieved if and only if $\phi^* \geq \phi^t$. However, in this case $\phi^t = \phi^* = 0$, therefore the above inequality is always satisfied because $\phi \in [0, 1]$. As a result, I can write the incumbent objective as

$$\max_{\phi^t} V = \pi \{ B' + \phi^t \nu' + (1 - \phi^t) E\nu' + \psi [B' - B^t + \phi^t (E\nu' - \nu')] \} + (1 - \pi) [pV_{\phi^t}^P + (1 - p) V_{\phi^t}^F],$$

where $V_{\phi^t}^P$ are the optimal incumbent proceeds derived in Proposition 1 when the rival is respectively of type $\nu^t$ or $\nu'$. Differentiating $V$ with respect to $\phi^t$ yields that $\phi^t < 1$ if and only if $E[\nu'] \geq \nu'$. Moreover, if at time 3 $E[\nu'] < \nu'$, it follows from Lemma 4 that it is optimal for the incumbent to take the company private. ||

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