Strategic Management of Private Benefits in a Contingent Claim Framework

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This paper deals with private benefits a majority shareholder and managers may enjoy after colluding with either minority shareholders or creditors (junior and senior). Private benefits occur each time controlling shareholders extract values from the firm without sharing with other equity holders (Shleifer and Vishny, 1997). Our main idea is that, when the bargaining power is in the hand of the controlling shareholder, the level of private benefits may result from an *ex ante* agreement between stakeholders.

A couple of equilibriums with private benefits are considered and compared to a benchmark case with no private benefit. In the first context, controlling block holders collude with minority equityholders. Extracting private benefits means obtaining some cash from the firm (*i.e.* a non risky asset). This amount of cash may also represent the present value of *real* future private benefits controllers will divert with the consent of minority. Private benefits modify here the default risk of all claims. In the second context, controlling block holders collude with creditors. Private benefits form here a residual claim written on the underlying firm's assets that is subordinated to repayment of creditors. Private benefits are essentially here a contingent claim subject to default risk. In both contexts, private benefits are linearly related to the firm's assets value so as to account for the well known size effect. The main goal of this paper is to investigate how different are wealth transfers among stakeholders in these equilibriums.

To fix ideas, it is worth reviewing important issues and empirical facts related to private benefits. Practical approaches to estimate private benefits of control take into consideration proxies, like the block premium (Barclay and Holderness, 1989), or the voting right premium if different classes of shares are prevailing. Dyck and Zingales (2004) use the block premium methodology to disentangle the effect of private benefits from the change in share value associated with the new block holder. Based on 393 transactions of control among 39 countries between 1990 and 2000, they find that on average corporate control value is 14% of the equity value of the firm, ranging from -4% to 65%. The premium paid is higher if the buyer belongs to a country that protects investors in a less intensive way. La Porta and al (2000) consider that the existence of private benefits has a negative effect on the development of security markets. Albuquerque and Schroth (2010) estimate that private benefits represent on average about 3% - 4% of the target firm's equity value or about 10% of the block's value. Interestingly, they show that private benefits increase with the firm's cash holdings and decrease with short term debt. According to Dyck and Zingales (2004), strong competition prevents firm controlling coalition from higher private benefits.

This paper deals with wealth transfers among stakeholders. Most insightful results may be summed up as follows. We assess how coalitions (with either minority shareholders or debt holders) negatively impact the wealth of absent stakeholders. We also highlight how private benefits increase the probability of default of the firm. The rise appears so significant that all company's stakeholders (suppliers, customers, employees, etc.) should certainly be concerned with. We finally investigate to which extent a single stock of equity is worth less than a portion of a majority block of shares.

The rest of this paper is organized as follows. Section 2 describes the theoretical framework, section 3 and 4 present the wealth transfers occurring in case of a collusion with the minority equity holders, and then with creditors. Section 5 gives some insights concerning the effect of a manager's retirement package on his behaviour. Section 6 addresses the share price premium problem. Basically, this section questions how much an investor is ready to pay for having private benefits. Section 7 concludes.

I. The Contingent Claim Framework

Our analysis of the firm is inspired from the standard continuous time framework developed by Black, Scholes and Merton (1973, 1974). Financial markets are perfect,

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complete and trading takes place continuously. There are neither taxes, nor transaction costs and there exists a riskless asset paying a known and constant interest rate denoted by r. Our setting accounts for the presence of various stakeholders. All firms enjoy a majority equity holder, a minority equity holder, various creditors and a manager. The majority equity holder and the manager hold jointly and severally the majority block of equity. The majority block and the minority equity holder own respectively a proportion θ and $(1-\theta)$ of the equity[1]. The manager holds a proportion $(1-\beta)$ of the majority block so that the majority equity holder owns a $\theta\beta$ fraction of the total equity. Linearly related to the firm's assets' value (when effective)[2], private benefits are seized by majority block holders only. One denotes by η the fraction received by the majority equity-holder and by $(1-\eta)$ that obtained by the manager. If ever η is different from θ, manager's efforts are taken into account. All firms are financed by equity and debts with different priority in case of default. Debts are zero-coupon bonds maturing at time T and F_S and F_J denote face values of senior and junior debts respectively[3]. Total due value is F = F_S + F_J. To avoid unnecessary complexity with respect to the manager's compensation, the firm's asset value is net of the manager's salary.

Our analysis considers three types of companies at the same point in time, all of them being at equilibrium[4]. Type A firms brave no private benefit and serve as benchmarks. Other types of firms differ because of inside collusion (not to be confused with coalition with managers). In Type B firms, collusion with minority makes private benefits possible. Other way saying, these latter are extracted from the firm with the consent of minority equity holders. The main fuel of this collusion is that the financial wealth of minority is preserved despite private benefits. In Type C firms, private benefits are possible thanks to collusion with debt holders. Here, private benefits are extracted from the firm with consent of creditors, because private benefits are subordinated to the repayment of debt.

In type A firms, there is no private benefit and the firm's asset value, V, is correctly described by:

$$dV_t = \mu V_t dt + \sigma V_t dW_t . \qquad (1)$$

At time o, the firm's assets value is known to be V_0. $W = (W_t)_t$ stands for a Brownian motion and σ denotes the firm's assets volatility[5]. Standard contingent claim analysis tells us that the time o price of equity is:

$$Eq_0^F(V_0,\sigma) = V_0 N\left[d_1^F(V_0,\sigma)\right] - Fe^{-rT} N\left[d_2^F(V_0,\sigma)\right]$$

where $d_1^F(V_0,\sigma) = \frac{1}{\sigma\sqrt{T}}\left[\ln(V_0/F) + \left(r + \frac{1}{2}\sigma^2\right)T\right]$

and $d_2^F(V_0,\sigma) = d_1^F(V_0,\sigma) - \sigma\sqrt{T}$.

The senior and junior debts are respectively worth $D_0^s(V_0,\sigma) = V_0 - Eq_0^{F_S}(V_0,\sigma)$ and

$D_0^j(V_0,\sigma) = Eq_0^{F_S}(V_0,\sigma) - Eq_0^{F_S+F_J}(V_0,\sigma)$.

In type B firms, private benefits are made possible thanks to collusion with minority equity holders. At time o, the value of the firm is decreased by the amount of private benefits I_0. This is equivalent to consider that I_0 is the present value of all future private benefits net of appropriation costs. In any cases, one has:

$$I_0^\alpha = \alpha V_0 , \qquad (2a)$$

and the firm's assets value *net* of private benefits at time o is then given by:

$$X_0 = V_0 - I_0^\alpha = V_0(1-\alpha) . \qquad (2b)$$

Minority equity holders of type B firms may not agree such private benefits, in particular if they compare their situation to that of equity holders of type A firms[6]. Collusion with minority is essentially based on an agreement to set the firm's assets volatility to $\sigma(\alpha)$ so as to warranty that the equity value remains the same. More formally, one has[7]:

$$Eq_0^F\left(V_0 - I_0^\alpha, \sigma(\alpha)\right) = Eq_0^F(V_0,\sigma) . \qquad (2c)$$

Now the firm's assets value *net* of private benefits is described by:

$$dX_t = rX_t dt + \sigma(\alpha) X_t dW_t \qquad (3)$$

and prices of corporate liabilities can be valued along standard lines[8].

In type C firms, private benefits are made possible thanks to collusion with creditors. This collusion is fuelled by the subordination of private benefits to the debt service (which is a debt repayment in our setting). Private benefits are now contingent to the firm's assets value. To formalize this idea, one assumes that private benefits to be received at time T verify:

$$I_T^{\gamma,K}(V_T,\sigma) = \gamma \max\left(V_T - (F+K); 0\right).$$

$$= \gamma \times \left(V_T - (F+K)\right) 1_{V_T \geq (F+K)} . \qquad (4a)$$

Private benefits exist here if and only if the underlying firm's assets value is large enough *i.e.* $V_T > (F+K)$. The variable K is part of the implicit contract between major and minor shareholders. It is a minimum level of net worth before seizing private benefits; alternatively it can be seen as a minimum level of cash-flow to be disclosed to the market before taking private benefits[9]. The firm's assets value *net* of private benefit at time T is now worth:

$$X_T = V_T - I_T^{\gamma,K}(V_T,\sigma) . \qquad (4b)$$

The time o-value of private benefits is given by $I_0^{\gamma,K}(V_0,\sigma) = \gamma \times Eq_0^{F+K}(V_0,\sigma)$ and the total equity to be shared among equity holders is defined on the firm's assets *net* value and is worth $Eq_0^F(V_0,\sigma) - I_0^{\gamma,K}(V_0,\sigma)$ (see appendix for more details).

In the next two sections, we study pricing formulae, summed up in Table 1, for valuing shareholders' wealth within type B and type C firms. For simulations, we use base case parameters given in Table 2[10].

II. Private benefits and wealth transfers in type B firms (collusion with minority equity holders)

This section first explores shareholders' wealth in type B firms; it mainly highlights to what extent private benefits are detrimental to creditors. We finally discuss situations where private benefits and collusion are bothered by a debt covenant (Bhanot and Mello, 2006) preventing large change of default probability. Note that we skip manager here.

Table 1 displays everything necessary to discuss pricing of corporate liabilities and wealth transfer among shareholders. Private benefits are viewed here as cash available at time 0. By capturing private benefits only, majority equity holders cause various effects as shown in column 3 of Table 1. This essentially lowers the firm's assets value, increases default risk to the firm and lowers creditors in proportion. It is interesting to notice that, in absence of collusion, private benefits lower part of the wealth of majority and manager (the price of equity lowers).

The collusion with minority (that changes the volatility) further impacts shareholders' wealth, as now the equity price, *i.e.* the financial asset of equity holders' holdings, remains unaffected by private benefits. The total wealth of minority remains unchanged whatever the private benefits are, whereas those of the majority and manager increase linearly. Creditors suffer both dimensions as highlighted by the pricing formulae. Graphs of Figure 1 illustrate effects on shareholders' wealth through the decomposition:

$$Type\ B = Type\ A + \underbrace{\left[No\ Collusion - Type\ A\right]}_{Direct\ gain/loss\ due\ to\ private\ benefits} + \underbrace{\left[Type\ B - No\ collusion\right]}_{Indirect\ gain/loss\ due\ to\ collusion}$$

Figure 2 explores consequences of private benefits on credit risk indicators of the senior debt. We retain among others the default probability and the expected recovery upon default. Simulations show that the main concern for debtholders is the collusion of the majority equity-holder with minority.

Figure 1: Wealth transfers in Type B firms

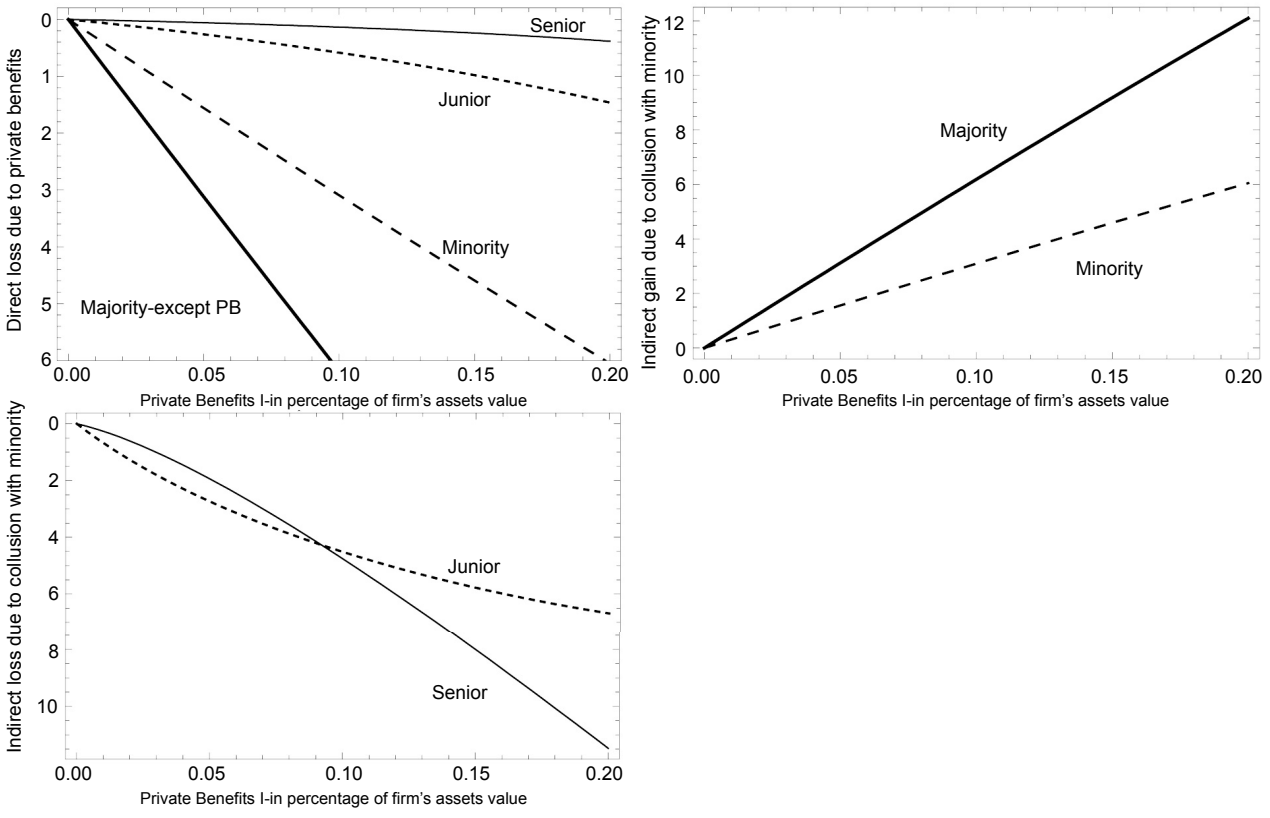
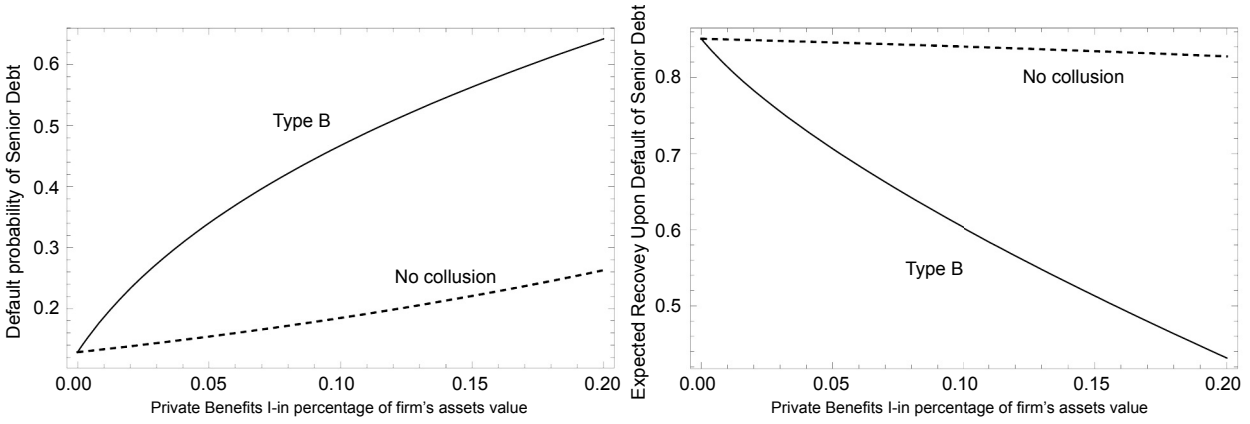


Figure 2: Private benefits seriously impacts senior debt risk indicators



Equilibrium of type B firms corresponds to situations where creditors are really worse off if they cannot react appropriately. Such a situation may occur in firms financed by (non coordinated) suppliers or by bankers who do not embed any suitable covenants in their loans. Embedding a covenant that prevents any rating change (*i.e.* any dramatic change in default probability) can significantly decrease the set of agreements for colluded equity holders or even prevent such collusion. Such covenants simultaneously bound the level of cash private benefits captured at time o and the volatility adjustment majority equity holders can envisage.

■ III. Private benefits and wealth transfers in type C firms (collusion with creditors)

In type C firms, collusion with creditors takes the form of a subordination of private benefits to debt repayment. Depending on parameters γ and K, private benefits are more or less aggressive towards minority's interests. Figure 3 clarifies what happens at maturity. Left graph of Figure 3 illustrates with coloured areas the sharing of equity among equity holders. The black bold line stands for the value of total equity. The right graph of Figure 3 plots the contingent pay-off received by equity holders with respect to their financial participation (remind that the majority equity holder enjoys additional private benefits too). Parameters γ and K influence the slope *i.e.* the sensitivity change to the underlying firm's assets.

Applying standard arguments and using Table 1 give the time o value of private benefits and those of the different shares. Private benefits are equal to

$$I_0^{\gamma,K}\left(V_0,\sigma\right)=\gamma\, Eq_0^{F+K}\left(V_0,\sigma\right).$$

Majority equity holders own a portfolio whose value may be described by:

$$I_0^{\gamma,K}\left(V_0,\sigma\right)+\theta\left[Eq_0^{F}\left(V_0,\sigma\right)-I_0^{\gamma,K}\left(V_0,\sigma\right)\right]. \qquad (5)$$

This expression has been chosen among many others as it refers explicitly to $Eq_0^F\left(V_0,\sigma\right)$ - the equity of an equivalent type A firms. Rewriting this equation $\left(1-\theta\right)I_0^{\gamma,K}\left(V_0,\sigma\right)+\theta Eq_0^F\left(V_0,\sigma\right)$ states that holding a portfolio made of private benefits and a portion of equity in the firm with private benefits is equivalent to holding $\left(1-\theta\right)$ of private benefits (only) and θ of the shares of an equivalent type A firm i.e; having long positions in two options:

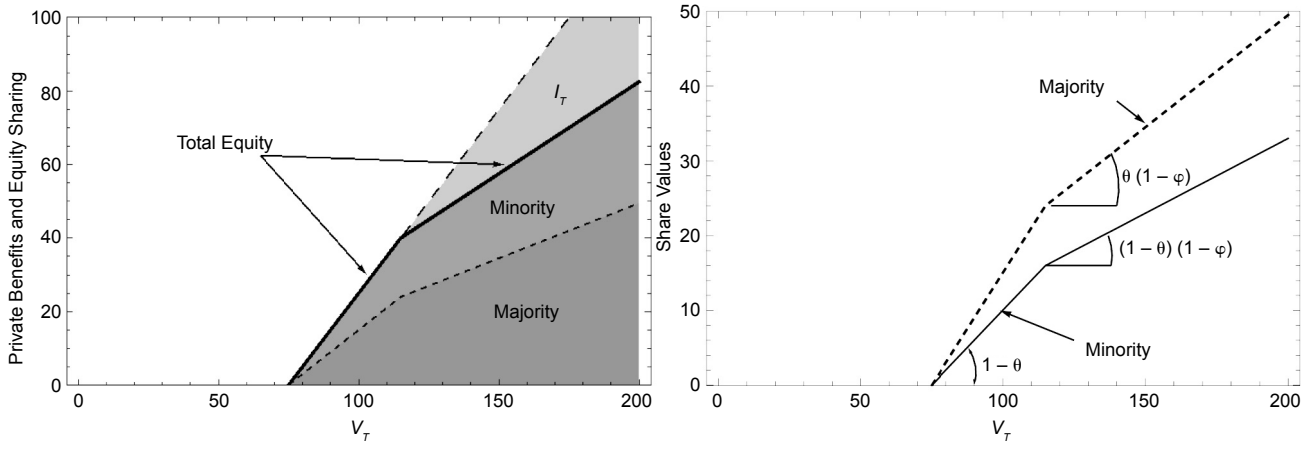
$$\left(1-\theta\right)\gamma Eq_0^{F+K}\left(V_0,\sigma\right)+\theta Eq_0^{F}\left(V_0,\sigma\right). \qquad (6)$$

The minority equity holders' position may be described by:

$$\left(1-\theta\right)\left[Eq_0^{F}\left(V_0,\sigma\right)-I_0^{\gamma,K}\left(V_0,\sigma\right)\right]$$
$$=\left(1-\theta\right)Eq_0^{F}\left(V_0,\sigma\right)-\left(1-\theta\right)\gamma Eq_0^{F+K}\left(V_0,\sigma\right) \qquad (7)$$

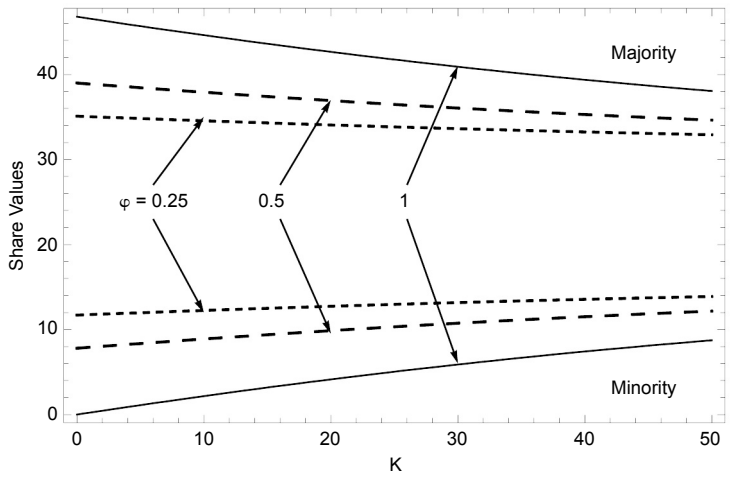
This position is essentially an "asymmetric" vertical spread (*i.e.* a vertical spread with different weights). If ever γ is set to one, the vertical spread becomes vanilla and the equity pay-off (viewed as a whole) is capped. Since minority equity holders only have a portion of equity, their revenue is not only contingent but capped to $\left(1-\theta\right)K$. Of course depending on the level K, this may be viewed as "not that unfair". Whatever the value of γ is, the above asymmetric spread captures the interest of minority equity holders. Figure 4 illustrates how the wealth of the majority and minority equity holders (at time o) evolves as parameters K and γ change. When $\gamma=1$, the pay-off function for equity is that of a symmetric vertical call spread.

Figure 3: Wealth sharing at maturity in Type C firms at maturity



Even if subordination is sufficient to prevent loss incurred from private benefits at maturity, the majority equity holder still holds an option to receive private benefits. The *vega* of his or her total portfolio is given by: $\theta v^F + (1-\theta)\gamma v^{F+K}$ where $\nu^F = S_0\sqrt{T}n\left(d_1\left(V_0,\sigma\right)\right)$, whereas that of the minority's is $(1-\theta)v^F - (1-\theta)\gamma v^{F+K}$. Hence, there is a transfer of vega at the expense of minority shareholders. Notice that minority activism can limit or even prevent consequences of such a transfer.

Figure 4: Wealth transfers in Type C firms at time 0



■ IV. Retirement packages offered to manager matter

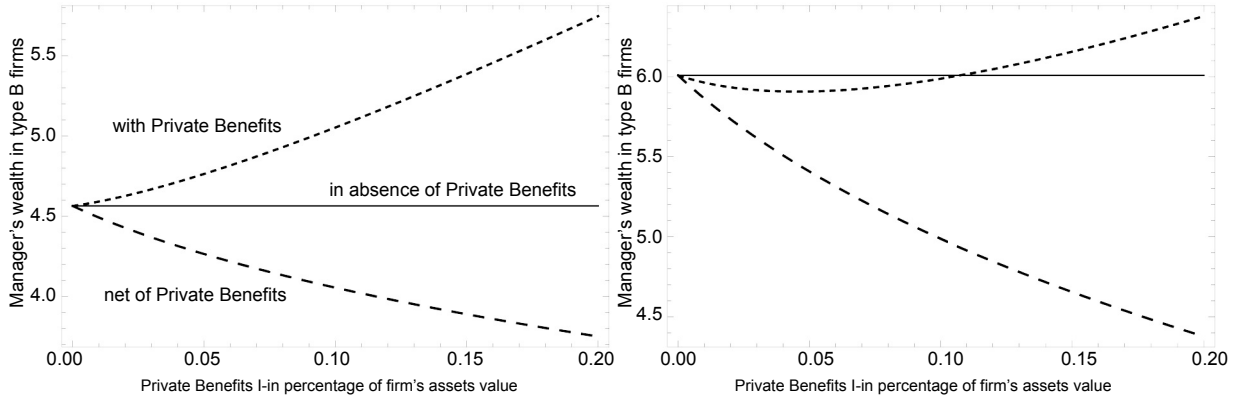
Up to now, managers' position was strictly aligned to that of the majority equity holder so that a distinct treatment was not necessary. The aim of this section is to highlight consequences of collusions on the manager's wealth. To enrich the setting, we assume that the firm has granted a retirement package to the manager. In other words, this latter essentially holds a junior debt written on the firm in addition to shares in the company and the portion of private benefits he/she can receive. No doubt this may trouble alignment of interest between managers and majority equity holders (Sundaram and Yermack (2007)). If the manager's retirement package represents a proportion $(1-\varphi)$ of junior debt, his or her wealth may be written:

$$(1-\eta)I_0 + (1-\beta)\theta \times Eq_0 + (1-\varphi)\times J_0 \qquad (8)$$

where I_0 stands here either for the cash benefits obtained at time 0 (in type B firms) or for the time 0 value of the promise to receive a portion of private benefits at maturity (in type C firms)[11]. In type B firms, previous analysis suggests that existence of private benefits can seriously damage the junior claim component of the manager's portfolio. This is in sharp contrast with type C firm where the retirement package *i.e.* junior claim component of the manager's portfolio is completely secured. This means that managers are better off in an obvious way.

Figure 5 offers simulations for what can happen in type B firms. Left and right graphs differ with respect to what the retirement package represents within the portfolio. It is a less important portion of the manager's wealth in the left graph than it is in the right graph. Both graphs plot the manager's wealth for different values of private benefits (in abscissa).

Figure 5: Impacts on the manager's wealth in type B firms



On the left graph $1-\beta = 1-\varphi = 1-\eta = 10\%$. On the right graph, $1-\beta = 1-\eta = 10\%$ but $1-\varphi = 80\%$.

The solid (and horizontal) line stands for what he/she owns in a type A firm (with no private benefit). The other lines represent the manager's wealth gross or net of private benefits he/she can receive. In the right graph, we change proportions within portfolio and make the retirement package more important. Both graphs show how the financial shares of the portfolio suffer from private benefits. The overall effect is however positive on the left while it is positive or negative on the right. This depends on whether captured private benefits are sufficient to cover negative effects on financial shares. On the right graph, received private benefits may be insufficient to balance negative effects on financial shares, unless they attain a large part of the firm's assets (10%). This simulation suggests that managers with large retirement packages can have a different behaviour with respect to private benefits. When private benefits (or equivalently their own share in private benefits) are small to moderate, they will not be that collaborative with majority equity holders. Probably they will be even reluctant to small private benefits. The reverse is true as private benefits become larger.

V. On the share price premium due to private benefits

As a final comment on the effects of private benefits, let's reconsider the equity premium issue. This is the extra value, one denotes x, (informed) investors are ready to pay for acquiring available stocks on the market. Three different situations occur here. The first one arises when an investor wants to build the majority block with a proportion θ of the equity. If total equity is quoted Eq, then the majority equity holder is willing to pay $(1+x)\theta Eq = \theta Eq + I$ *i.e.* $x = \dfrac{I}{\theta Eq}$.

This is exactly the sharing of (targeted) private benefits value on every stock that is bought[12]. The second situation arises when a second block aims at participating to private benefits (in the exact proportion of held equity), then the new investor is willing to pay $(1+x)(1-\theta)Eq = (1-\theta)Eq + (1-\theta)I$ *i.e.* $x = \dfrac{I}{Eq}$[13]. This is exactly the amount of private benefits a share. Interestingly, this premium is lower than the one previously paid by the majority equity holders. The difference constitutes a good proxy for assessing the loss incurred by the majority who does not enjoy private benefits alone anymore. To avoid this, this latter can decide to acquire some stocks so as to maintain his control on the private benefits. He or she should be ready to pay $\theta Eq + (1+x)\theta' Eq = (\theta+\theta')Eq + I$ *i.e.* $x = \dfrac{I}{\theta' Eq}$. Here, private benefits are just shared on the stocks to be bought.

VI. Conclusion

This article develops a contingent claim analysis of private benefits. We observe that when private benefits are contingent, the controlling group holds an option on private benefits. Simulations highlight the large benefits they can obtain at the expense of other stake holders. Some environments are more favourable than other for private benefits. We can expect the size of the firm and that of free cash-flows (Jensen, 1986) to matter as well as the business profile of the firm. To get an *ex ante* agreement with all stakeholders, it is compulsory to limit the size of private benefits so that the wealth transfers can be accepted, and do not lead people to leave the financial set up of the firm. During the *ex ante* discussions the threat of a covenant or that of a minority's shareholder activism may be used

to reach an equilibrium situation, even if controlling shareholders have the bargaining power. The impact of private benefits extracted by the controlling share holder group may be very severe on the default risk probability of the firm.

A couple of avenues for future research arise at the end of this paper. The first one is the mixing of the two extreme cases we consider. It is clear indeed that most real companies stand in-between type "B" firms and type "C" firms in the sense that collusion exists, but reaction in return exists as well[14]. Analysis of the mixed situation is out of the scope of the current paper but certainly insightful. "Tunneling" is a second possible and interesting issue to consider at the end of this paper. Tunneling may be viewed as an extreme and, maybe a more subtile kind of private benefits (Anatasov and *al*. (2010)). Here, controlling shareholders loot the firm at their own advantage in an indirect way. The channel they use to extract benefits is now possibly outside the company.

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1 The fraction of the equity owned by the majority block (θ) may be viewed as strictly greater than ½. Note that this is not mandatory, as control may be obtained by lower values if minority equity is dispersed and uncoordinated.

2 It is well documented that private benefits are related to the size of the firm. Behaviours such as the hubris and the empire-building inclination also matter.

3 On occasion, the junior debt will capture the manager's rights to retirement.

4 Equilibriums result from specific agreements between (financial) stakeholders.

5 The historical drift of the firm's assets value is not *r* but a drift we can denote by μ. Since the market is complete, firm's assets can be shorted and then arbitrage arguments justify the existence and uniqueness of the risk neutral environment. This issue is important to develop an analysis of corporate governance problems. Of course, private benefits are not tradable, but they are fundamentally attached to majority equity holders' stakes that are tradable.

6 To see this, notice that the equity is now worth $Eq_0^F\left(X_0,\sigma\right) = Eq_0^F\left(V_0 - I_0,\sigma\right)$ when dynamics of $\left(X_t\right)_t$ is similar to that described in equation (1). As the equity value decreases, the financial wealth of minority equity holders diminishes.

7 We assume that management chooses the initial firm's assets' volatility at no cost and only once (at time 0) for sake of tractability and avoidance of further asset substitution.

8 A couple of remarks deserve to be done. First, existence and uniqueness of the volatility is warranted, because the Black, Scholes and Merton pricing formula for the call option is a one-to-one function of it. Second, computation of the volatility requires a numerical approach, such as the Newton-Raphson procedure.

9 *K* can actually capture number of different cases If ever *K* is set to 0, the majority block extracts some private benefits just as debtholders are repaid. If ever γ is set to 0 and/or *K* to infinity, the benchmark case is recovered. We consider linear private benefits with respect to the firm's asset value. A proportional specification (say $I_T = \alpha V_T 1_{V_T \geq (F+K)}$) implies a time 0 value similar to that of an asset or nothing ($I_T = \alpha V_0 N\left[d_1^{F+K}\left(V_0,\sigma\right)\right]$). Notice that we favour linearity against proportionality to avoid discontinuity of the contingent pay-off.

10 Just to comment a few, private benefits are worth up to 20 percent of the firm's assets value. Larger values are related to the tunneling phenomenon that deserves a specific treatment.

11 Eq_0 and J_0 are corresponding equity and junior debt values.

12 It must be pointed out that a specific situation arises when the investor buys (partly or totally) the block of an incumbent equityholder. There is a problem of asymmetry of information here. In this case, indeed, the 'former' blockholder knows exactly the amount of private benefits, while the new one can only estimate their value with available information. Among other references, interested readers can consult Burkart *et al.* (2003).

13 We assume here that he/she buys every share not held by the majority equity holder.

14 More precisely, collusion with minor shareholders in type "B" firms will make the creditor react, while collusion with creditors in type "C" firms will make minor shareholders react because all of them may lose a significant portion of wealth.

References

- Albuquerque R. and Schroth E. (2010), Quantifying private benefits of control from a structural model of block trades, *Journal of Financial Economics*, 96, 33-55.
- Atanasov V., Black B., Ciccotello C. and Gyoshev S. (2010), How does law affect finance? An examination of equity tunneling in Bulgaria, *Journal of Financial Economics*, 96, 155-173.
- Barclay M. and Holderness C. (1989), Private benefits from control of public corporations, 1989, *Journal of Financial Economics*, 25, 371-395.
- Bhanot K. and Mello A. (2006), Should corporate debt include a rating trigger?, *Journal of Financial Economics*, 79, 69-98.
- Black F. and Scholes M. (1973), The pricing of options and corporate liabilities, *Journal of Political Economy*, 81, 637-654.
- Burkhart M., Panunzi F. and Shleifer A. (2003), Family Firms, *Journal of Finance*, 58, 2167-2201.
- Coles J., Naveen D. and Naveen L. (2006), Managerial incentives and risk-taking, *Journal of Financial Economics*, 79, 431-468.
- Dyck A. and Zingales L. (2004), Private benefits of control: an international comparison, *Journal of Finance*, 59, 537 - 599.
- Jensen M. (1986), The agency cost of free cash flow: Corporate finance and takeovers, *American Economic Review*, 76, 323-330.
- La Porta R., Lopez-de-Silanes F. and Shleifer A. (2000), Investor protection and corporate governance, *Journal of Financial Economics*, 59, 3-27.
- Merton R. (1974), On the pricing of corporate debt: The risk structure of interest rates, *Journal of Finance*, 29, 449-470.
- Shleifer A. and Vishny R. (1997), A survey of corporate governance, *Journal of Finance*, 52, 737-783.
- Sundaram R. and Yermack D. (2007), Pay me later: Inside debt and its role in managerial compensation, *Journal of Finance*, 62, 1551-1588.

Table 1: Pricing shareholders' wealth in Type A, B and C firms

	Type A	In case of no collusion	Type B	Type C
Total Equity	$Eq_0^F\left(V_0,\sigma\right)$	$Eq_0^F\left(V_0-I_0^\alpha,\sigma\right)$	$Eq_0^F\left(V_0-I_0^\alpha,\sigma(\alpha)\right)=Eq_0^F\left(V_0,\sigma\right)$	$Eq_0^F\left(V_0,\sigma\right)-I_0^{\gamma,K}\left(V_0,\sigma\right)$
Private Benefits I_0^α	none	αV_0	αV_0	$\gamma Eq_0^{F+K}\left(V_0,\sigma\right)$
Majority Equity holder	$\theta\beta Eq_0^F\left(V_0,\sigma\right)$	$\eta I_0^\alpha\left(V_0\right)+\theta\beta Eq_0^F\left(V_0-I_0^\alpha,\sigma\right)$	$\eta I_0^\alpha\left(V_0\right)+\theta\beta Eq_0^F\left(V_0,\sigma\right)$	$\eta I_0^{\gamma,K}\left(V_0,\sigma\right)$ $+\theta\beta\left[Eq_0^F\left(V_0,\sigma\right)-I_0^{\gamma,K}\left(V_0,\sigma\right)\right]$
Manager	$\theta\left(1-\beta\right)Eq_0^F\left(V_0,\sigma\right)$	$\left(1-\eta\right)I_0^\alpha\left(V_0\right)+\theta\left(1-\beta\right)Eq_0^F\left(V_0-I_0^\alpha,\sigma\right)$	$\left(1-\eta\right)I_0^\alpha\left(V_0\right)+\theta\left(1-\beta\right)Eq_0^F\left(V_0,\sigma\right)$	$\left(1-\eta\right)I_0^{\gamma,K}\left(V_0\right)$ $+\theta\left(1-\beta\right)\left[Eq_0^F\left(V_0,\sigma\right)-I_0^{\gamma,K}\left(V_0\right)\right]$
Minority Equity holder	$\left(1-\theta\right)Eq_0^F\left(V_0,\sigma\right)$	$\left(1-\theta\right)Eq_0^F\left(V_0-I_0^\alpha,\sigma\right)$	$\left(1-\theta\right)Eq_0^F\left(V_0,\sigma\right)$	$\left(1-\theta\right)\left[Eq_0^F\left(V_0,\sigma\right)-I_0^{\gamma,K}\left(V_0\right)\right]$
Senior Debt	$V_0-Eq_0^{F_S}\left(V_0,\sigma\right)$	$\left(V_0-I_0^\alpha\right)-Eq_0^{F_S}\left(V_0-I_0^\alpha,\sigma\right)$	$\left(V_0-I_0^\alpha\right)-Eq_0^{F_S}\left(V_0-I_0^\alpha,\sigma(\alpha)\right)$	$V_0-Eq_0^{F_S}\left(V_0,\sigma\right)$
Junior Debt	$Eq_0^{F_S}\left(V_0,\sigma\right)-Eq_0^F\left(V_0,\sigma\right)$	$Eq_0^{F_S}\left(V_0-I_0^\alpha,\sigma\right)-Eq_0^F\left(V_0-I_0^\alpha,\sigma\right)$	$Eq_0^{F_S}\left(V_0-I_0^\alpha,\sigma(\alpha)\right)-Eq_0^F\left(V_0,\sigma\right)$	$Eq_0^{F_S}\left(V_0,\sigma\right)-Eq_0^F\left(V_0,\sigma\right)$

$Eq_0^F\left(x,\sigma\right)=xN\left[d_1^F\left(x,\sigma\right)\right]-Fe^{-rT}N\left[d_2^F\left(x,\sigma\right)\right]$ with $d_1^F\left(x,\sigma\right)=\frac{1}{\sigma\sqrt{T}}\left[\ln\left(x/F\right)+\left(r+\frac{1}{2}\sigma^2\right)T\right]$ and $d_2^F\left(x,\sigma\right)=d_1^F\left(x,\sigma\right)-\sigma\sqrt{T}$, and $F=F_J+F_S$, in case of multiple debts.

Table 2: Parameters for simulations

Initial Firm's assets value	V_0	100
Initial volatility	σ	30%
Risk-free interest rate	r	5%
Block holder's rights (in % of equity)	θ	2/3
Minority's rights (in % of equity)	$1-\theta$	1/3
Manager's fraction of majority block	$1-\beta$	10%
Debt maturity	T	5
Senior Face Value	F_S	50
Junior Face Value	F_J	20
Manager's fraction of junior debt (retirement package)	$1-\varphi$	10%
Manager's fraction of private benefits	$1-\eta$	9% or 11%
Majority equity holder's fraction of private benefits	η	89%
Private benefits in % of the firm's assets value	α, γ	Up to 10%
Private benefits occurrence	K	Up to 20% of $F = F_S + F_J$

Appendix

Given that $I_T^{\gamma,K} = \gamma\left(V_T - \left(F+K\right)\right)1_{\{V_T-(F+K)>0\}}$ and the firm's asset value net of private benefits $X_T = V_T - I_T^{\gamma,K} = V_T 1_{\{V_T<F+K\}} + \left(V_T - \gamma V_T + \gamma F\right)1_{\{V_T>F+K\}}$, it should be clear that :

$$\left\{V_T > F+K\right\} = \left\{X_T > \left(F+K\right)\right\}.$$

Beyond this threshold, both variables are the same (meaning that they reach that value in the same way), afterwards they differ only by their sensitivity with respect to the underlying process. If this is not clear, notice that:

$$\left\{V_T > F+K\right\} = \left\{\left(1-\gamma\right)V_T > \left(1-\gamma\right)\left(F+K\right)\right\} = \left\{\left(1-\gamma\right)V_T + \gamma\left(F+K\right) > \left(F+K\right)\right\} = \left\{X_T > \left(F+K\right)\right\}$$

The total equity at time T, which is defined on the firm's assets value net of private benefits is now

$$\begin{aligned}
\left[X_T - F\right]^+ &= \left(X_T - F\right)1_{\{X_T>F\}} \\
&= \underbrace{\left(X_T - F\right)1_{\{F+K>X_T>F\}}}_{X_T=V_T\, on\left\{F+K>X_T>F\right\}} + \left(X_T - F\right)1_{\{X_T>F+K\}} \\
&= \left(V_T - F\right)1_{\{F+K>V_T>F\}} + \left(V_T - \gamma\left(V_T - \left(F+K\right)\right) - F\right)1_{\{V_T>F+K\}} \\
&= \underbrace{\left(V_T - F\right)1_{\{F+K>V_T>F\}} + \left(V_T - F\right)1_{\{V_T>F+K\}}}_{\left[X_T-F\right]^+} - \underbrace{\gamma\left(V_T - \left(F+K\right)\right)1_{\{V_T>F+K\}}}_{\left[X_T-(F+K)\right]^+} \\
&= \left[V_T - F\right]^+ - \gamma\left[V_T - \left(F+K\right)\right]^+
\end{aligned}$$