

Stakeholders and the composition of the voting rights of the board of directors

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Abstract

We propose a new approach to dynamic representation of different groups of stakeholders on the board of directors. This approach is based on a simple economic model of the firm, with an objective function to maximize its market value. We look at the marginal claim of each stakeholder on the assets of the firm. It divides the voting rights based on the change in value of each stakeholder with a one dollar change in the value of the firm as a whole. We translate these conditions to relative voting powers on the board. While there are many claims in the academic and popular literature on sharing voting rights on the board, our paper is the first to propose a quantitative dynamic model of the power sharing in the corporation.

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1. Introduction

The Millennium started with collapses of several major corporations, that were previously considered to be “Blue-Chip” companies, among them Enron and WorldCom in the U.S.A., Parmalat in Italy, and more. These famous recent events emphasized one common problem: all showed failure in their corporate governance and raised the question about the role of the board of directors (BoD). In some cases members of the boards of directors are being blamed for not fulfilling their duties.

The question of what are the exact roles of the boards of directors in corporations attracted the attention of academicians, corporate officers, regulators, and legislators. In recent years it is closely related to the issues of corporate governance.

One major question is whether board members should represent solely the interests of the shareholders, or whether the interests of debtholders as well as other stakeholders should be taken into account. In pure economic terms, is the role of the board to maximize the value of shareholders only, or the value of the firm to all stakeholders. Brealey and Myers (2005, p. 8) highlight the potential conflicts of interests that may arise between shareholders and management (“The principal–agent problem”) and point to other stakeholders, such as the company’s workforce, banks,

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bondholders, and even the government, as having a claim on part of the corporate profits. These conflicts are broadly referred to as “agency problems” which inevitably involve “agency costs”.

Fama and Jensen (1983) suggest that agency problems, especially conflicts between management, shareholders and bondholders, or among groups of shareholders, will be mitigated either by the stock market, where the dissenting shareholders can dispose of their shares, or by the potential threat of a takeover, or by board of directors comprised of experts.

Linck et al. (in press) focus on the determinants of board structure. They acknowledge that there is no general equilibrium theory of board structure. Also there is no legal mandate determining the board composition. One stream of academic literature suggests that board structure develops efficiently to accommodate the firm’s contractual environment. An opposite approach suggests that board structure may be a result of agency problems. The authors find empirically that firms structure their boards in response to the costs and benefits of the board’s monitoring and advising roles.

Linck et al. (2008) look at three measures of board structure: board size, board independence and board leadership. Boone et al. (2007) also look at board size and board independence and how these parameters are associated with the three major roles of the board: making decisions concerning the scope of operations, monitoring roles and negotiation roles. The first role, that of approving the business plan and endorsing major investments, is also suggested by Fama and Jensen (1983), Coles et al. (2008) and Lehn et al. (2005). The second role, of monitoring management and the performance of the firm, is also suggested by Demsetz and Lehn (1985), Raheja (2005) and Harris and Raviv (in press). The third role, of selecting a new CEO or top officers and new board members, is discussed by Hermalin and Weisbach (1998) and Baker and Gompers (2003).

Our paper focuses on a different aspect of board structure viz how board members represent the conflicting interests of various stakeholders of the firm, and the extent to which stakeholders, including employees, should be represented on the BoD. Our approach is based on economic optimization principles and may lead to a reduction of the agency and monitoring costs of the various stakeholders and to a better alignment of the conflicting interests, especially when accepting a new business plan or changing strategic plans of the firm. We propose a new approach, consistent with value maximization, that provides dynamically representation to different groups of stakeholders based on their marginal sensitivity to changes in the value of the company.

While there are many claims in the academic and popular literature on sharing voting rights on the board, our paper is the first to propose a quantitative dynamic model of the power sharing in the corporation.

Our proposal is in the spirit of Modigliani–Miller (M&M) approach, where the objective function of the firm is to maximize its value, so that all claimholders can improve their wealth.

2. Should stakeholders be represented on the board?

It is often argued that only equityholders, having the residual claim on the firm’s assets, should be represented on the BoD. It is claimed that other claimholders have contractual arrangements to protect their claims. Also, it is argued that shareholders trying to maximize their value over time, are concerned about the firm’s reputation and therefore will take the interests of other stakeholders into account.

It is often advocated that employees should have representation on the board of directors, since they constitute an important stakeholder (or to better align their interests with those of management.) This last view is especially popular in Europe. In addition, the contribution of employees is often recognized by offering them various types of share-based compensation (e.g., options plan) which effectively make them partial owners. These schemes are widely used for senior executives and in cases where the contribution of the employees to the value of the business is more significant, such as in high-tech firms. In our approach under certain conditions employees should be represented on the board, and we propose a method to quantify their degree of representation on the board.

An interesting and famous court case, the bankruptcy case of Credit Lyonnais, the French bank that provided financing for a takeover bid of MGM, addressed this issue. In a famous decision by Justice Chancellor Allen it is claimed: “At least where a corporation is operating in the vicinity of insolvency, a board of directors is not merely the agent of the residue risk bearers, but owes its duty to the corporate enterprise”.¹ In the footnote to this quote it is argued that “(T)he possibility of insolvency can do curious things to incentives, exposing creditors to risks of opportunistic behavior and creating

¹ *Credit Lyonnais Bank Nederland, N.V. v. Pathe Communications Corp.*, Del. Ch., C.A. No. 12150, mem. op. at 83–85, Allen, C. (Dec. 30, 1991).

complexities for directors.” The footnote goes on and explains, with a numerical example, how shareholders can try to appropriate more value at the expense of other stakeholders. Judge Allen concludes, therefore, that directors have a special duty to protect the stakeholders, especially when the company is on the brink of bankruptcy.

We don’t argue that the labor market is necessarily inefficient or that shareholders don’t care about the employees and their conditions. On the contrary, in competitive markets, labor will get its fair compensation, and all interests may be aligned. However, we deal with a dynamic environment where external conditions may change dramatically, and with dynamic decisions of the firm to invest in new areas, to acquire other activities or merge companies. The relevant question is how the dynamic changes can affect the stakeholders.

For example, the 9/11 terrorist act, affected the airline industry in a massive way, reducing substantially the demand and raising costs, and driving the major companies toward bankruptcies. The companies tried to cut costs, including the cost of labor, as well as post-pension obligations to veteran workers. Dividends to shareholders were also substantially cut. Such a crisis opens the issue of how to share the burden among the stakeholders. Undoubtedly, in such a case, the employees “own” part of the future value of the firm, and they should have a say. We propose that their representation will be proportional to the marginal impact of the change in the firm’s value on their implied value. Of course when the value of the firm improves, the marginal share of the employees may be reduced, and that of shareholders may go up. This change can be reflected in the BoD composition.

In our paper we do not address the issue of how to construct an optimal contract with management in order to align its interest with those of shareholders. Instead, we discuss issues related to the composition of the board of directors and its representation of the interests of the firm’s various stakeholders. We claim that in imperfect capital markets with costly monitoring, the interest of various claimants should be represented on the board. In order to implement our proposal, cumulative voting is mandatory and each class of securities should vote separately for a certain quota of seats on the board. The method proposed in this paper examines the marginal claim of each stakeholder with respect to a change in the value of the firm. Our approach reduces the incentives of the shareholders to make decisions that maximize their value at the expense of other stakeholders, since such decisions, may shift voting power away from the shareholders.

3. Potential conflicts of interests between shareholders and bondholders

A company may have many stakeholders, who have a future claim on the corporation. Amongst all claimholders only equity holders are entitled to make decisions on strategic investments, to select the board of directors, and elect the major corporate officers. The remaining stakeholders, such as bondholders, have claims on the company’s assets but do not participate in the decision-making. Their influence is incorporated in the bond covenants. Bondholders can contractually limit the lines of business in which a company engages, but other than this, their influence on corporate performance is extremely limited. As long as the company is not in the process of bankruptcy or does not violate the terms of the bond covenant, bondholders are restricted to playing a passive role.

Once the company enters bankruptcy procedures, bondholders as well as other stakeholders may have a say, either through the courts or in formulating a recovery plan for the company. At this phase, the collective decision-making process is not well defined, and the assignment of decisions-making and distribution of voting rights remains nebulous.

The situation, in which all corporate decision-making powers are bestowed on the shareholders is a source of potential conflicts of interests. Shareholders can take actions directly by decision of the board of directors, and indirectly by decisions of the CEO who is nominated by the board, which are contrary to the interests of the other stakeholders. A decision to increase the riskiness of the firm’s assets, for example can lead to the transfer of wealth from bondholders to shareholders (if unexpected). Shareholders, whose claim is similar to a call option on the firm’s assets, benefit from increased volatility of the assets, since they can reach higher asset value in the future.² Simultaneously, debtholders lose value from volatility, since the probability of default increases.

Bondholders can protect their interests by imposing restrictions in the loan or bond covenants. Too many restrictions, however, can harm corporate decision making in a way that leads to sub-optimal decisions. Moreover, it is impossible to cover potential conflicts of interest in advance, leaving bondholders and other stakeholders unduly vulnerable to the decisions of controlling shareholders. “Agency problems” are as relevant for creditors as they are for

² See Galai and Masulis (1976).

minority shareholders and deserve to be addressed in the context of corporate governance. Our proposal can lead to a reduction in the deadweight costs of too restrictive contracting, by allowing shareholders and bondholders to discuss their common interests in the board room. It is in the spirit of Modigliani and Miller's "side negotiations," as means to mitigate potential conflict of interests. Our claim is that board room negotiations can reduce the costs of reaching better solutions for all stakeholders.

4. Potential conflicts of interests between shareholders and employees

Shareholders are investing in a risky business in the hope of achieving a high return on their investment. Their investment allows the company to recruit employees and give them a workplace. Initially, the interests of both employees and investors are seemingly well aligned. However, the potential conflict is built-in. If possible, shareholders have interest to decrease the payroll and increase the productivity of employees. Employees want to achieve higher salaries and other compensations, even if the profitability of the firm is reduced.

Key employees, i.e., those specific employees who hold specialized know-how which is hard to replace, may have a leverage, while trying to extract their marginal contribution to the business (or while trying to extract the marginal damage which their departure may cause the firm). For example, key scientists in a high-tech company may feel under-compensated relative to their contribution to the business. The question is who is entitled to the extra value created by the key scientists? The scientists or the shareholders? What is the "fair" sharing rule of the value created?

In many companies, especially high-tech companies, employees are also compensated by employees' stock option within a given program (known as ESOP). The idea behind ESOP is to better align the interests of key employees and managers, by allowing them to share in the up-side potential. The higher is the price of the firm's shares, the more valuable the employees' options become. Holding options or warrants in the company makes the employees clear stakeholders in the company; their compensation is directly affected by the firm's performance. At the same time it may introduce an incentive to assume more risks in order to enhance the options' value.

Another potential source for a conflict of interest is the pension funding. The traditional pension plans in many corporations are the defined benefit plans which are funded and managed by the corporations. At the end of 2004 General Motors (GM) had benefits obligations due to pension plans in the U.S. of more than 89 billion dollars, another 18 billion dollars obligations to non-U.S. plans, and 77 billion dollars in other employee related benefits. In the balance sheet for December 31, 2004, GM shows liabilities of 281 billion dollars for "postretirement benefits other than pensions", and additional 9.5 billion dollars for "pensions". These numbers should be compared to 27.7 billion dollars of "total stockholders' equity".

Undoubtedly, the employees of GM, especially retired and veteran employees are major stakeholders in GM. The actions taken by management can affect the value of their plans. It should be remembered that the employees of Enron lost almost all their claims when the company was bankrupt. Employees of United Airlines are expected to lose a substantial part of their accumulated benefits due to the reorganization of the firm under Chapter 11.

In the Wall Street Journal of January 25, 2006, Jesse Eisinger (page C1, in the "Long and Short" essay), writes about a new approach to salvage GM: "What's needed is a radical solution that breaks the restructuring cycle and saves GM... So, here's another idea" Transform GM's workers and retirees into owners in exchange for benefit givebacks". Rod Lache, an analyst with Deutsche Bank, is credited with the idea of giving the approximately 600,000 GM workers and retirees \$20 billion in GM equity to cover part of the underfunded pension and health-care benefits. According to Lache "There is a universal recognition that the union already owns the majority of the enterprise". His proposal will crystallize it. The plan also calls for giving GM workers board seats and a say in the decision making process.

The above proposed solution is consistent with our approach. We show how to allocate board seats among the stakeholders of the firm, including shareholders, bondholders, and also when relevant, employees.

5. Our proposal for board composition

We suggest a normative model for board composition and demonstrate how the firms various stakeholders can attain representation on the board of directors and participate in the corporate decision making process. Our proposal is based on the contingent claims approach to corporate finance: The firm is viewed as a pie of future returns and risks, which are shared by all stakeholders.

In the real world, negotiations among the various stakeholders incur costs, as does the monitoring of corporate performance and activities. These costs fuel the “agency problem”. The mechanism of the board of directors is one efficient way to mitigate agency costs. The board has three major functions: 1. Approving a business plan and strategy for the corporation; 2. Nominating the CEO and chief officers of the firm; 3. Monitoring the performance of the firm. Representation of the various stakeholders on the board can significantly reduce agency costs.

The allocation of seats on the Board can be approached from many angles. In what follows we propose one approach which is consistent with economic optimization.

We later provide a numerical example to illustrate our approach, based on a simple capital structure comprised solely of debt and equity. In principle, our approach is based on estimating the “firm’s equivalent” (FE) for each claimholder. The FE is the “delta” of each claim or liability relative to firm’s assets. In other words, it represents the underlying asset component inherent in the contingent claim. It also reflects the short-term change in the claim’s value as a result of \$1 change in the value of the firm’s assets.

Our approach draws on the *marginal* impact on each claimant’s value as a result of a small change in the value of the firm to determine board representation. After elaborating our method, we compare it with another approach, which takes into account the market (or theoretical) value of each claim. We call this latter approach the “average impact approach”. We demonstrate how our marginal approach is preferable to the average impact approach since it is consistent with the principles of wealth maximization and with optimal project selection.

It can be noted that the USX Corp., before its separation into three companies, shared the voting power based on the relative market value of its three activities; steel, oil and natural gas. The voting rights were based on the relative value of each activity (derived from the market value of the tracking stocks) and not on the marginal impact as proposed in this paper.

To explain our approach we illustrate it with a very basic case of a levered firm, whose debt consists of a zero-coupon bond. We employ the contingent claims approach for a levered firm, with zero-coupon bond maturing at time T with a redemption value of F (which includes both the principle amount and the cumulative interest).

The firm’s balance sheet at time zero appears as follows:

Assets		Liabilities and equity	
Risky assets	V_0	Equity	S_0
		Debt	B_0
	V_0		V_0

where S_0 and B_0 represent the present values of equity and debt respectively and the current value of the firm’s assets is denoted by V_0 .

Fama and Miller (1972), following M&M propositions, present the objective function of the firm as the maximization of its NPV, and the marginal, necessary condition for maximization is $\frac{dV}{dI} = 1$, where V is the value of the firm, dI is the marginal investment, and dV is the change in the value of the firm. In this simple case the present value of the firm V_0 , is equal to $S_0 + B_0 = V_0$. Therefore, the necessary condition for the maximization of V is:

$$\frac{dV}{dI} = \frac{\partial S}{\partial V} \frac{dV}{dI} + \frac{\partial B}{\partial V} \frac{dV}{dI}$$

Based on the contingent claim approach to value equity and debt, as proposed by Black and Scholes (1973), Merton (1974) and Galai and Masulis (1976), we can define and estimate a measure for the firm’s equivalents for equity (FE_S) and debt (FE_B).

The firm’s debt has face value of F , maturing at time T . We assume that V_T , the future value of the firm’s assets, is log-normally distributed, with the standard deviation of the rate of return denoted by σ .

For such a case it was shown³ that

$$S_0 = V_0 \cdot \text{FE}_S - F e^{-rT} \cdot \text{RNP} \quad (1)$$

³ See Merton (1974), and Galai and Masulis (1976).

and

$$B_0 = V_0 \cdot FE_B + Fe^{-rT} \cdot RNP \quad (2)$$

where FE_S and FE_B are the firm equivalent of equity and debt respectively and RNP is the Risk Neutral Probability of the firm to be solvent at time T . Here FE_S , FE_B and RNP are all non-negative numbers between 0 and 1. The term e^{-rT} is the risk-free discount factor, at rate r for horizon T .

Eq. (1) can be interpreted as follows: When there is certainty, and the firm is sure to pay all of its obligations to the debt holders, then $FE_S=1$ and $RNP=1$, and hence the current value of equity is equal to

$$S_0 = V_0 - Fe^{-rT} \quad (1*)$$

i.e., to the current value of assets minus the present value of the face value of debt. If corporate debt is risky, then $RNP < 1$ and it is a measure of the risk-neutral probability of the no-default scenario. Based on Eq. (1) we focus on the expression FE_S , which reflects the *marginal* portion of the firm “belonging” (in present value terms) to the shareholders. The term FE_S is measured by the change in the value of equity for a small change in the value of the firm,

$$FE_S = \frac{\Delta S}{\Delta V}, \text{ and } 0 \leq FE_S \leq 1 \quad (3)$$

Where Δ denotes the change operator.

Now it can be shown for a risky bond that $V_0 \cdot FE_B$ describes the equivalence of the firm’s assets “belonging” to debtholders. FE_B is measured by the change in the value of the bond for a \$1 change in the value of the firm’s assets. In the case of only two stakeholders, bondholders and shareholders, the total value of assets is equal to the total value of debt plus the equity. A \$1 change in the firm’s value will be shared by the change in value of equity or debt, accordingly, so that

$$FE_S + FE_B = 1$$

We propose to use this equation to determine the allocation of voting rights on a board of directors comprised of representatives of all corporate stakeholders, meaning that stakeholders will have the same percent of votes as their Firm’s Equivalent — FE.

An important feature of the proposed rule is that it can be adjusted to accommodate shifting asset values. As the probability of bankruptcy decreases, the FE_S increases and the FE_B declines, but the sum of the two is always 1. Therefore, if the value of the firm increases, more voting power is automatically transferred to shareholders, since debt is relatively safer. If the board decides to switch to riskier assets, the effect will be an increase of FE_B and decrease of FE_S . Similarly when the value of total assets is low and there is a significant probability of not repaying the debt our model automatically confers more voting power to the debtholders at the expense of shareholders. Accordingly, our approach creates a built-in mechanism to mitigate conflicts of interest between various stakeholders. Under this model, the latter are compensated for increases in the risk profile of their claims.

The equity and debt trade-off equivalence constitute the foundation for our proposal. If, for example $FE_S=0.9$ then $FE_B=1-FE_S=0.1$. We propose that in such circumstances, equity-holders command 90% of the board’s seats, while bondholders receive the remaining 10%. In the cases in which bankruptcy risk is zero, shareholders will retain exclusive voting rights. As the bankruptcy risk rises, voting power is shifted to bondholders. So if FE_S decreases to 0.7, bondholders will be entitled to 30% of the voting rights on the board.

6. A numerical example

Let us illustrate our approach with a detailed numerical example with the following parameters: the firm’s current value is $V_0=100$, the face value of (zero coupon) debt $F=60$, the debt is for $T=5$ years, the risk-free rate is $r=5\%$ per annum and the standard deviation of the rate of return on the firm’s assets is $\sigma=30\%$. We also assume for simplicity of exposition that the firm does not expect to pay dividends over the life of the debt and that the debt is comprised entirely of a zero coupon bond, with no interim interest payments.

Fig. 1 shows the value of equity S_0 and debt B_0 for the above parameters, as functions of the current value of the firm's assets.

S_0 and B_0 are both increasing functions of V_0 , but while the former (S_0) is a convex function the latter (B_0) is a concave function.

For these parameters, we show that $FE_S = 92.9\%$ and $FE_B = 7.1\%$. Accordingly, shareholders are entitled to hold 92.9% of the voting rights, while debt holders hold 7.1% of the voting rights. These ratios reflect the current “marginal economic claim” on the firm's assets of each claimholder.

The alternative “average impact approach” to sharing voting rights, based on the relative market value of equity and debt, render dramatically different results. This approach suggests 56.1–43.9% division between shareholders and bondholders respectively. The latter approach reflects the average rather than marginal claim and hence can be considered a less equitable solution from an economic standpoint. Based on the relative market value, bondholders should control almost 44% of the voting rights which makes it unacceptable for shareholders.

Fig. 2 and Table 1 illustrate the sensitivity of the two approaches to changes in parameters:

Fig. 2 depicts the FE_S and FE_B as functions of the current asset value of the firm. The values behind Figs. 1 and 2 are provided in Table 1. Table 1 shows that even if the current value of the firm's assets decreases to 50, FE_S declines from 92.9% to 66.9%, while FE_B increases from 7.1% to 33.1%. So even if asset value falls by 50%, from 100 to 50, shareholders still control more than 50% of the voting rights. In contrast the market value of equity decreases from 56.1 to 14.4 and the value of debt decreases from 43.9 to 35.6. The relative market value of debt increases to 71% ($35.6/50$), leaving shareholders with only a minority interest in the firm.

In Table 1, columns (3) and (5) provide the values of FE_S and FE_B respectively, while columns (6) and (7) show the relative value of equity and debt for the corresponding values of the firm. The numerical differences between the two approaches, the marginal and the average impact, are starkly significant. We favor the marginal approach since optimality conditions for investment, are also determined by weighing marginal benefits against marginal costs.

It is difficult to imagine shareholders investing in a risky project, having a right solely on the residual claim and allowing the debtholders to control more than 50% of the board. This is precisely the scenario suggested by the average economic claim approach, as witnessed in the numerical example above. In contrast, shareholders can reasonably be expected to relinquish 13.6% of the voting rights to bondholders as suggested by the marginal economic claim approach as asset value is cut in half. At the same time, shareholders are aware that they will continue to lose voting rights to the debtholders if they increase the leverage ratio or the risk profile of the company's assets, or if they allow the value of the firm to decline even further.

7. The impact of volatility

Fig. 3 depicts FEs for $\sigma = 30\%$ (the base case) but also for $\sigma = 15\%$ and $\sigma = 45\%$ as a function of total assets value. While FE_S is an increasing function of V_0 for all levels of risk, the rate of increase varies greatly. In general, the increase of FE_S is faster for low values of V_0 for low volatility projects relative to high volatility projects.

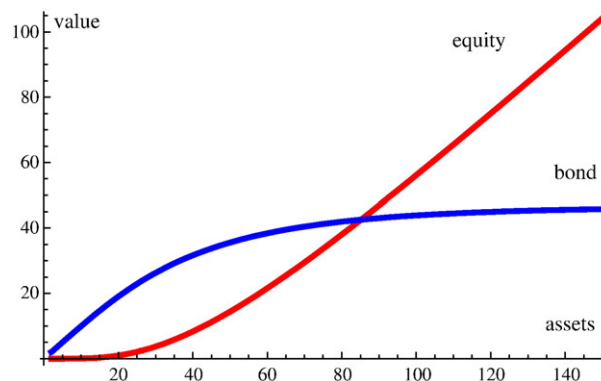


Fig. 1. Value of stakes: equity and bonds as a function of total assets.

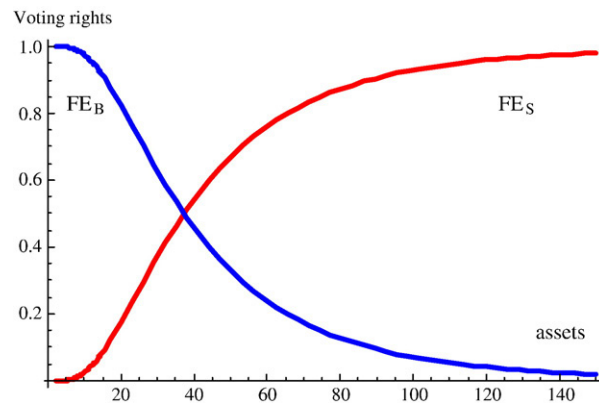


Fig. 2. Proposed voting rights as a function of total assets.

For $V_0=100$, switching from less risky projects ($\sigma=15\%$) to riskier projects ($\sigma=45\%$) will cause an immediate drop in shareholder voting rights from 99.3% to 89.6%. This is a desirable result since, other things being equal, increasing the risk profile of the firm, while increasing the value of equity (at the expense of bondholders value) reduces the voting rights of the shareholders.

This last result does not hold for low firm values. In our numerical example, when $V_0=50$ or below, increasing the riskiness of the firm precipitates an increase in the value of equity and an increase in FE_S . For $V_0=50$, when $\sigma=15\%$, then $FE_S=64.4\%$, but when $\sigma=45\%$ the firm's equivalent for the shareholders increases to $FE_S=71.6\%$. In other words, when the risk of bankruptcy is high, increasing the risk of assets shifts voting power (and values) to shareholders from bondholders.

It should be noted, that under the alternative approach of basing voting rights on the value of debt and equity, other things being equal, any increase in the risk of the firm generates an increase in shareholders voting rights as well as the value of equity at the expense of the value of debt. In the marginal approach, an incentive for shareholders to increase risk exists only for very low asset values. For this reason debtholders are forced to demand and enforce strict debt covenants which can severely restrict corporate activity, especially when the firm loses value and approaches bankruptcy. It can be also seen that when the firm continues to lose value, debtholders obtain control of the board, as FE_B exceeds 50%. Debtholders obviously have no incentive to further increase the risk of the firm's assets.

8. Implementation problems

Our approach can be generalized to differentiate between junior and senior debt if the two classes carry different economic rights. It can also incorporate more sophisticated capital structure, including for example convertible instruments. Of course, the more complicated the capital structure the more complicated the required calculations. This

Table 1

The basic case: $T=5$ yr, $r=5\%$, face value of debt $=60 \cdot e^{rT}$, $\sigma=30\%$, no dividends

V_0	S_0	FE_S	B_0	FE_B	YTM	S_0/V_0	B_0/V_0
30	3.717	37.3%	26.283	62.7%	16.5%	0.124	0.876
40	8.320	54.1%	31.680	45.9%	12.8%	0.208	0.792
50	14.403	66.9%	35.597	33.1%	10.4%	0.288	0.712
60	21.575	76.1%	38.425	23.9%	8.9%	0.360	0.640
70	29.525	82.6%	40.475	17.4%	7.9%	0.422	0.578
80	38.029	87.2%	41.971	12.8%	7.1%	0.475	0.525
90	46.926	90.5%	43.074	9.5%	6.6%	0.521	0.479
100	56.105	92.9%	43.895	7.1%	6.3%	0.561	0.439
110	65.487	94.6%	44.513	5.4%	6.0%	0.595	0.405
120	75.019	95.9%	44.981	4.1%	5.8%	0.625	0.375
130	84.660	96.9%	45.340	3.1%	5.6%	0.651	0.349
140	94.383	97.6%	45.617	2.4%	5.5%	0.674	0.326
150	104.167	98.1%	45.833	1.9%	5.4%	0.694	0.306

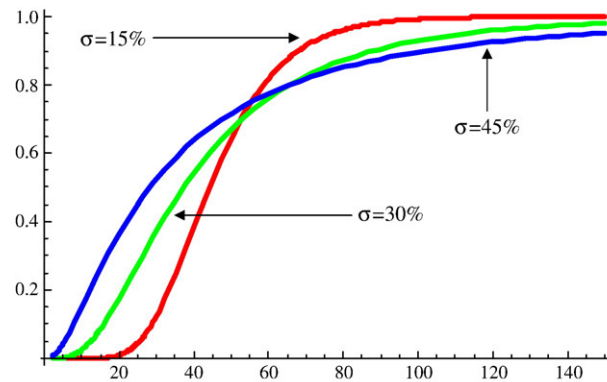


Fig. 3. The effect of riskiness on voting rights of shareholders.

brings us to the discussion of some of the problems encountered in implementing our normative model. Valuation and the frequency of adjusting board composition constitute the two key operational issues.

8.1. Valuation models

Our approach requires calculating “firm equivalent” ratios for all stakeholders. These calculations are dependent on economic models of contingent claims and on statistical estimations of some major parameters, such as the volatility and value of the firm. The basic model was proposed by Merton (1974) and Galai and Masulis (1976) based on the Black and Scholes (1973) options pricing model. Many variants to the basic model have been considered, many generated by changing some of the assumptions such as the triggers of bankruptcy. See, for example, Galai et al. (2007) for a review of the literature and a more general model.

It is true that the reliance on different models may yield somewhat different results. We believe that despite these differences, the estimations of the firm equivalents will be quite robust and will render good first-order approximations. This can contribute to the creation of more effective corporate governance and regulatory regimes. Estimation errors should not provide an excuse for ignoring the insights attained through this application of contingent claims theory.

While acknowledging the limitations of simplification the firm must accept a certain model for determining board composition. The model should be maintained over time, until agreement is reached on replacing it with a better, more accurate model.

The same argument applies also to statistical estimation issues. Different estimation procedures may lead to different results. However by accepting a basic approach, or even better, outsourcing this task to an investment bank (or a firm specializing in statistical estimation of financial parameters), companies can resolve potential conflicts of interests.

8.2. How often to update the board composition?

The contingent claims approach provides a dynamic framework for corporate governance. While the calculations for the allocation of voting rights can be conducted continuously, it does not make sense to alter the board too often. One practical solution is to update the calculations on a quarterly basis, preferably in response to the publication of the quarterly earnings reports, which facilitate the monitoring of changes in the capital structure of firm based on fresh information.

Adjustment of the composition of the board and the allocation of voting rights need not occur every quarter. To be practical, changes should be made only if there is a material change in the FE's. For example, assume that for every 10% of FE the claimholder is entitled to one seat on the board of directors for a board with 10 members. Let us assume that at the beginning of the year the board had 8 board members representing shareholders (since FE_S was, say, 77%) and the bondholders held 2 seats (with FE_B was 23%). Due to the discrete number of board members, the FE's must be rounded to trigger a change in the board composition. Therefore if at the end of the quarter FE_S was estimated to be 76% ($FE_B=24\%$), there is no need to revise the board composition. Only if FE_S falls below 75%, do shareholders forfeit one seat to the debtholders.

8.3. Which stakeholder should be considered?

The more stakeholder classes are included, the more complex the model becomes. In principle, the FE should be calculated for each party whose claim changes with the value of the firm. Employees should be considered as stakeholders if they have legal claims on the future cashflow of the firm, or in the case that they make a unique contribution to the value of the firm that can not be replaced immediately and without a significant cost. For example, if all employees can be fired without an advance notice and replaced with no major cost, and all their compensations are fully funded, their stake in the firm value is negligible. However, in a high-tech company the R&D team may possess a major stake in the firm. Another example is General Motors, where the employee's pension claims constitute a very significant portion of the company's liabilities. The pension claims at GM are approximately three times the market value of equity.

The company can decide which benchmarks are used for entitlement to representation and how materiality is determined to justify revisions to board composition. Claimants FE of less than, say, 5%, may have no representation. Alternatively, the company can decide that various claimholders can pool their interests to attain representation on the board. Once again, for the sake of practicality, minor or frequently changing stakeholders can be ignored.

9. Summary and conclusions

In this paper a new approach to board of directors' composition is proposed. The idea is based on the contingent claim approach, where the composition is defined by the marginal value of each stakeholder due to a small change in the value of the firm. The value of the firm, however, is defined broadly to include the combined values of all stakeholders. In such a way the agency and monitoring costs of the various stakeholders can be reduced and all the conflicting interests can be better aligned. This approach can lead to the achievement of better economic decisions from social welfare point of view. Also, it is consistent with the maximization of the total value of the firm to all the stakeholders, including shareholders, debtholders, employees, and others.

This approach is a normative approach. We acknowledge some implementation problems. However, using some approximations can be "second best" solution since it can lead to a better alignment of interests of the various claimants. By better alignment of interests we mean that the interests of various stakeholders are better represented on the board and they are, therefore, better informed about the performance of the company and their views can be heard in major appointment decisions. The suggested scheme is also dynamic, so that, in each period stakeholders with greater marginal stake have greater influence on the critical decisions of the firm.

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