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OWNERSHIP CONSIDERATIONS IN A NEW LEGAL STRUCTURE OF LIFE INSURANCE COMPANY

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ABSTRACT

This paper analyses a situation where a mutual holding company shares with external capitalists the ownership of a stock insurance company. Potential wealth transfers from the mutualists to the capitalists are identified and valued. It is shown that these potential wealth transfers, whose structure is similar to that of a put option, decrease as the proportion of capitalists increases in the company. It is also shown that the probability of bankruptcy of the insurance company increases as the proportion of capitalist shareholders increases. A numerical illustration is finally presented.

The two main legal forms of insurance companies are stock companies and mutual companies. The main characteristic of a mutual company is that it is owned and controlled, at least in theory, by the policyholders. In a context of growth, one major handicap inherent to the mutualist form is its limited access to the equity market.

The relative advantages of these forms of insurance companies have been studied from different standpoints and, as such, contributions can be found in the actuarial, law and financial economics literature[1].

A new type of insurance organization was recently allowed in the province of Québec, Canada, so that an insurance company would have access to the equity market while preserving the mutualist philosophy.

According to this new scheme, policyholders become mutualist members of an upstream holding which must control the former mutual insurance company, which has itself become a stock company.

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[1]A selective bibliography is provided at the end of the paper.

An important feature of this new type of organization is the cohabitation of mutualist and external (or capitalist) shareholders. Therefore we shall hereafter refer to this new organization as the "dual company".

Figure 1 illustrates this type of reorganization.

INSERT FIGURE 1 ABOUT HERE

Such a reorganization took place on December 31, 1988. At that time it was presented to the policyholders as being mainly a cosmetic operation which would solve financing problems while keeping the control in the hands of the policyholders.

It is not the first time that mutualists and capitalists coexist in the same insurance organization. The North Western National Life, in Minnesota, has accommodated simultaneously mutualists and capitalists before converting fully to a stock company in 1988[2]. The company had a stock department which accounted for about two thirds of the enterprise, and a mutual department which controlled voting by about a nine to one margin.

The purpose of this paper is to analyze the financial implications of the coexistence of mutualist and capitalist shareholders in an insurance company. It will be shown that, since mutualists have a vested interest in the survival of the insurance company, there exists potential wealth transfers from the mutualists to the capitalists. It will also be shown how to value these potential wealth transfers whose structure is similar to that of a put option. Finally the relations between, on the one hand, the proportion of capitalist shareholders and, on the other hand, the magnitude of the wealth transfers and the probability of bankruptcy, will be analyzed.

The paper consists of four sections. The first one presents a simple model of the dual company. The second section suggests how to value the mutualists and the capitalists shares as well as the wealth transfers. The third section presents propositions relating the proportion of capitalist shareholders to the magnitude of the wealth transfers and the probability of

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[2]NWNL Looks at Life After Demutualization, Resource, Vol.14 No.4, July/August 1989, p.20-26.

bankruptcy. A numerical illustration is finally worked out in the last section.

I. The Dual Company Model

The cornerstone of this paper is the fact that the mutualists, as insureds, have a vested interest in the survival of the insurance company. Should the company go bankrupt, mutualists could face important external costs generated by their need to seek insurance elsewhere. Some individuals might even be non-insurable at that time!

Consequently, it is reasonable to assume that, in a period of hard times, the mutualists would be willing to make special concessions to the endangered company in order to avoid bankruptcy. Before such an extreme case is reached, they may, knowingly or not, have subsidized their company through lower dividends or slower upgrading of their insured capital. The magnitude of the contribution that the mutualists would be willing to make will depend on the costs of changing insurer.

It could also be argued that social motives can justify that insureds make additional concessions to help the insurance company survive. Some mutuals originated from fraternal societies, others were created to avoid hostile takeovers in order to keep the control within the community. Such mutuals could then be seen as part of the patrimony which could motivate concessions from the mutualists.

These concessions will constitute a wealth transfer from the mutualists to the capitalist shareholders which can be modelled in the following way.

Consider a mutual insurance company which was demutualized. Suppose that the mutualists decide to issue shares so that the total number of shares N is now divided between mutualists, which own NM shares, and capitalists which own NC shares.

Suppose also that the company is required by the regulating authorities to maintain a minimum value of L to be allowed to operate. At the end of the year, if the value of the company has dropped below L, the mutualists will contribute C dollars per share, up to a maximum of C_{max} dollars, to restore the value of the company to the required level L.

Let S^a be the adjusted value of the shares, after the mutualists have made their contribution. We then have the following situation:

1) $N S > L$, then $C = 0$ and $S^a = S > L/N$ (1)

2) $N S < L$, two cases are possible

A. $(L-NS)/NM \leq C_{max}$, then $C = (L-NS)/NM$ and $S^a = L/N$ (2)

B. $(L-NS)/NM > C_{max}$, then $C = 0$ and $S^a = S < N$ (3)

and the company ceases to operate.

The amount that the mutualists pay in (2) to restore the value of the company to L implies a wealth transfer WT to the capitalists. Define WT as the difference between the adjusted share price and the share price, which is the amount required to bring the share value to the minimum level L.

$$WT = \mathrm{Max}\ [\ (L - N\ S)/N\ ,\ 0\ ] \qquad \text{for } C < C_{max}$$

$$WT = 0 \qquad \text{otherwise.} \qquad (4)$$

Potential wealth transfers are illustrated in Figure 2 which depicts the adjusted share value as a function of the value of the insurance company shares before the mutualists contribution is made. Whenever the share value drops below the required level L/N the mutualists will contribute to restore its value to L/N. It is interesting to note that the payoff structure of the wealth transfer is similar to that of a put option.

INSERT FIGURE 2 ABOUT HERE

The maximum contribution that the mutualists are willing to make determines the threshold below which they will not help the company. From (2), this threshold S^* is given by

$$S^* = (L - NM\ C_{max}\ )\ /\ N \qquad (5)$$

II. Valuing the Wealth Transfer

One convenient way of valuing the wealth transfer WT is to regard it as a contingent claim, the underlying asset being the value of the shares, and compute its value using a risk neutral valuation relationship(RNVR).

A RNVR is said to exist[3] if the value of the contingent claim at the beginning of the period $V(S_0)$ may be written as a function of the value of the underlying asset, where

$$V(S_0) = (1+r_f)^{-1} \int_{-\infty}^{\infty} g(S_1)\ \bar{f}(S_1|S_0)\ dS_1,$$

r_f is the risk-free rate and the following notation is used:

- S_0 : beginning of period value of the underlying asset;
- $g(S_1)$: end-of-period payoff on the contingent claim as a function of the end-of-period value of the underlying asset;
- $\bar{f}(S_1|S_0)$: density function of end-of-period underlying asset value given its initial value, whose mean is $S_0(1+r_f)$ where r_f stands for the risk-free rate.

The value of the contingent claim is then the present value of the expected payoff discounted at the risk-free rate of interest.

Note that, although this valuation relationship is the same as if all investors were risk neutral, universal risk neutrality is not a *sine qua non* requirement here. For instance, an RNVR would hold under continuous security trading and non satiety of investors; under discrete time trading, some distributions and risk preferences assumptions would be required.

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[3]See Brennan [2, p.57]

Assume that the price dynamics of stock is described by a diffusion processes of the type

$$dS/S = \mu dt + \sigma dZ$$

where S is the current price of a stock, μ the expected rate of return per unit time, σ the standard deviation of the return per unit time and dZ a standard Gauss-Wiener process.

This implies that the price of the stock at the end of the period, given the current stock price S_0, follows a lognormal distribution, or equivalently that its logarithm (ln) is Normally distributed with constant mean and variance[4].

$$\ln(S_1) \sim N(\ln(S_0)+(\mu-\sigma^2/2)t, \sigma^2 t) \quad (7)$$

Assuming that a RNVR holds, the value of the wealth transfer V(WT) could be found by solving

$$V(WT) = (1+r_f)^{-1} \int_{S*}^{L/N} [L-NS_1] \, d\bar{F}(S_1) \quad (8)$$

This value can be computed using numerical integration. A somewhat simpler procedure is to use the fact that the structure of the wealth transfer is similar to that of a put option. Equation (8) can be rewritten in the following way

$$V(WT) = (1+r_f)^{-1} \int_{0}^{L/N} [L-NS_1]/NM \, d\bar{F}(S_1)$$

$$- (1+r_f)^{-1} \int_{0}^{S*} [S^*-NS_1]/NM \, d\bar{F}(S_1)$$

$$- (1+r_f)^{-1} \quad [L-S^*]/NM \, \bar{F}(S^*)$$

The first two terms are now easily evaluate with the Black-Scholes formula since they represent put options. The last term is also easily evaluated using standard statistical tables.

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[4]See, for instance, Hull [3,p.84].

III. Propositions concerning the ownership structure

From the previous analysis a number of propositions can be derived which shed light on the implications of the coexistence of mutualists and capitalists in the same insurance company.

From equation (5) we note that, as the proportion of capitalists increases, or equivalently as the proportion of mutualists decreases, the value of S^* increases. Under the assumption that N, the number of shares is being kept constant, the following propositions hold.

Proposition 1: The probability of bankruptcy increases as the proportion of capitalists increases.

The probability of bankruptcy is given by $F(S^*)$. Since S^* increases as NC increases the result follows immediately.

Proposition 2: The value of the potential wealth transfers from the mutualists to the capitalists decreases as the proportion of capitalists increases.

This result obtains from the differentiation of (8).

IV. A Numerical Illustration

Table 1 illustrates the present value of the wealth transfer per share, as computed from (8), for different government requirements L/N and maximum mutualists contributions C_{max}. The insurance company is assumed to have 1000 shares outstanding, with an initial price S_0 of \$20, 900 of which are owned by mutualists, the rest belonging to capitalists.

INSERT TABLE 1 ABOUT HERE

In the first part of the table, it is assumed that over the coming year the stock has an expected return of 15% and a volatility of 10%. From (7) the end of the year distribution of the stock price S_1 is lognormal with mean 23.24 and standard deviation 2.33.

In the second part of the table, the volatility of the stock price is increased to 30% which increases the standard deviation of the end of the year stock price to 7.13. The introduction of new lines of business or the acquisition of subsidiaries could easily explain higher stock price volatility.

It is interesting to note that, for smaller maximum contributions, the value of the wealth transfer for the less risky company can be larger than that for the more risky company. This is due to the fact that the riskier company has a higher probability of bankruptcy in which case no wealth transfer would occur. It is also interesting to observe, for larger maximum contributions, the increase in the magnitude of the potential wealth transfer as the riskiness of the stock increases.

V. Conclusion

This paper analyzed a situation where both mutualists and capitalists cohabit within the same organization. It was shown that this situation implied potential wealth transfers from mutualists to capitalists because mutualists had a vested interest in the organization that provide them services. It was also shown how to value these potential wealth transfers, which could be helpful in setting an appropriate price for shares to be sold to capitalists.

While this paper dealt with an actual insurance organization, a similar analysis could be done for organizations where cooperative and capitalist interests coexist.

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Figure 1

Comparaison of the ownership sctructure of the Mutual and Dual companies

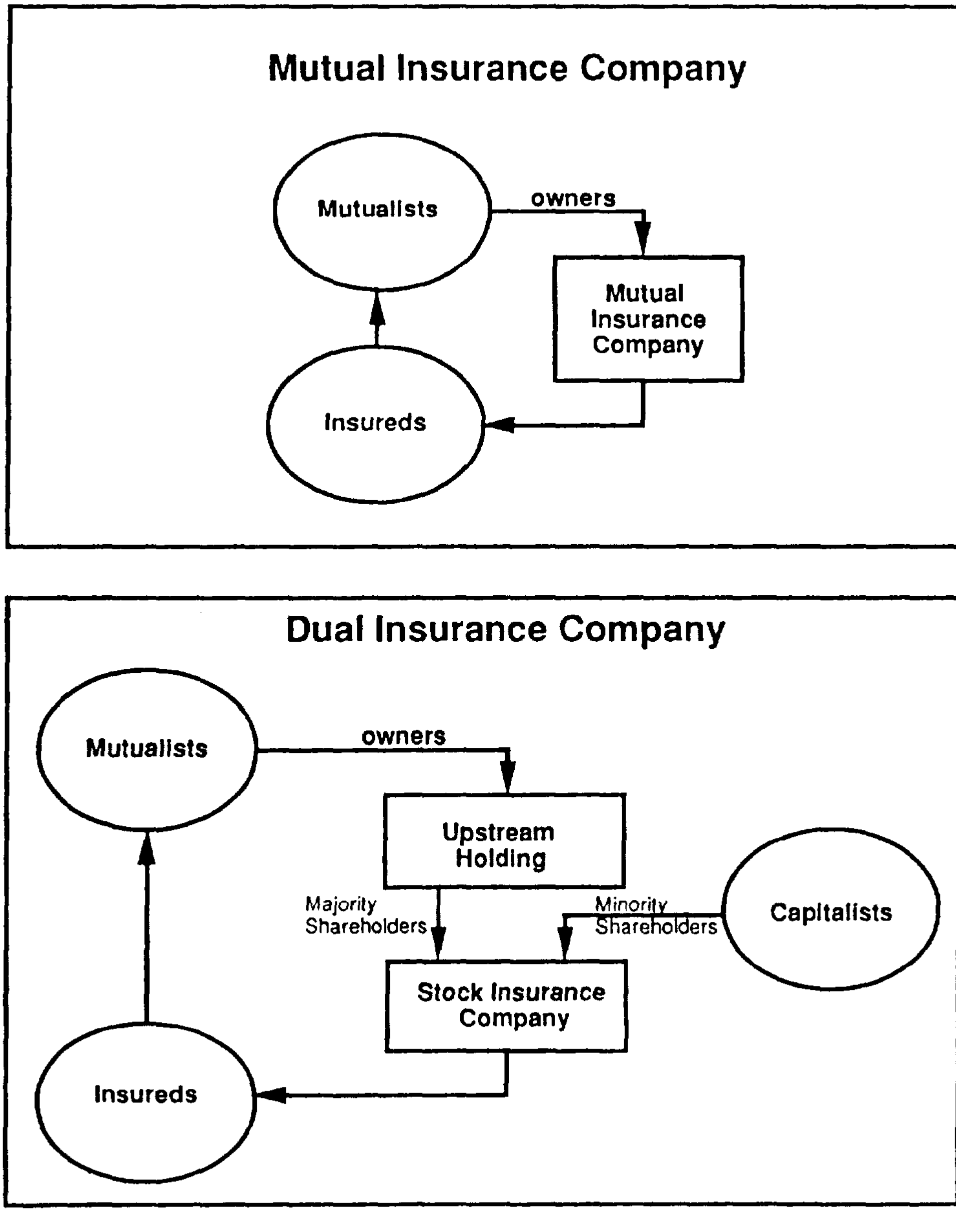
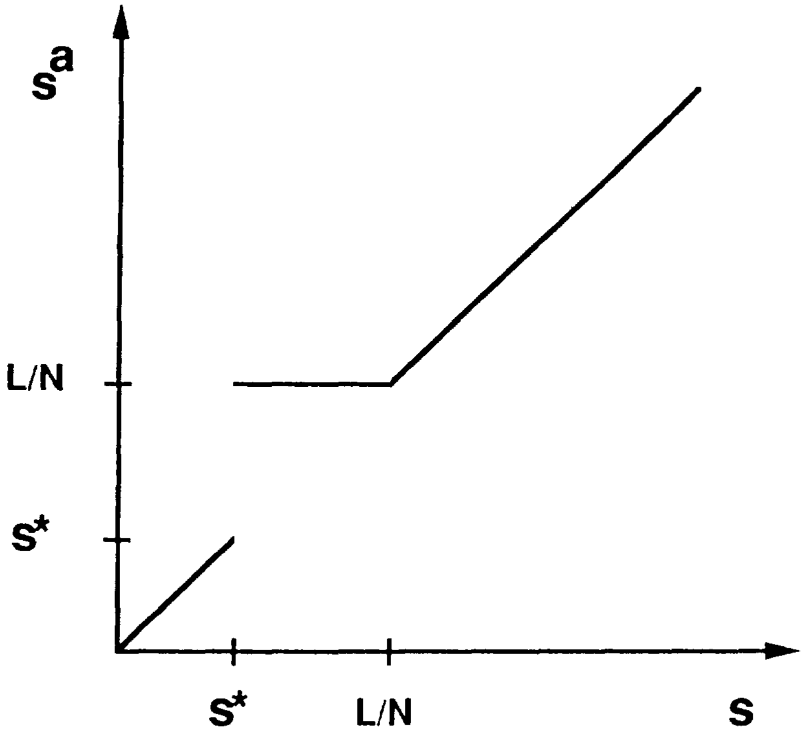


Figure 2

Adjusted Value of the Share Price as a Function of the Unadjusted Value



$S^* = \text{Max}(L - NM\,C\text{max}, 0) / N$

TABLE 1

Value of Potential Wealth Transfers
for Different Parameters Values

S_o = 20$

N = 1 000
NM = 900
NC = 100

a) $r \sim N(.15, .10)$

$E(S_1) = 23,24$
$\sigma(S_1) = 2,33$

C_{MAX}		0	2	4	6	8
L/N	22	0	,25	,64	,78	,79
	21	0	,17	,36	,41	,41
	20	0	,10	,16	,17	,17
	19	0	,04	,06	,06	,06

b) $r \sim N(.15, .30)$

$E(S_1) = 23,24$
$\sigma(S_1) = 7,13$

C_{MAX}		0	2	4	6	8	10
L/N	22	0	,09	,39	,85	1,38	1,87
	21	0	,09	,38	,81	1,06	1,62
	20	0	,09	,37	,74	,92	1,34
	19	0	,09	,34	,65	,91	1,06