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Financial distress, incentives and the value of corporate insurance

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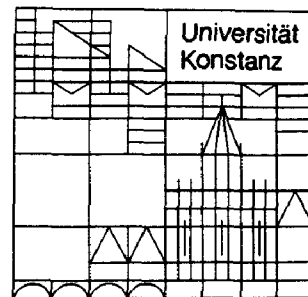
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wissenschaften und Statistik

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**Financial Distress, Incentives
and the Value of Corporate Insurance**

**FINANCIAL DISTRESS, INCENTIVES AND THE VALUE OF
CORPORATE INSURANCE**

Luc Grillet

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Abstract

Positive contracting costs (imperfect marketability), the impossibility of complete spanning of state spaces and other market imperfections explain the relevance of the corporate buying of property and liability insurance. For a corporation with diffuse ownership, risk aversion is irrelevant, since investors can diversify unsystematic (insurable) risks. Corporate insurance purchasing may enhance the market value of the firm via taxes, regulatory costs, contracting costs or the impact of financial policy on the firm's investment decision. Particularly in the case where financial distress depresses the market value of the firm, insurance hedging appears to be valuable. The magnitude of the insurance benefit is hypothesized to be positively correlated with the ratio of the firm's implicit over explicit claims.

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Financial Distress, Incentives
and
the Value of Corporate Insurance

by
Luc Grillet

Introduction

With perfect capital markets, it is difficult to talk about an optimal insurance contract. With no contracting costs, stock and bond contracting is costless and equally efficient. Their choice doesn't affect the market value of the firm. Hence, in corporate finance, with frictionless markets, the insurance policies observed in the real world and the existence of insurance institutions are irrelevant. There is no corporate demand for a resource-consuming insurance industry, since individuals can always achieve their desired consumption patterns by purchasing the appropriate combination of securities or adjusting their portfolios.

The corporate insurance decision is another illustration of the seminal contributions of Coase (1960) and Modigliani/Miller (1958), who assert that with zero transaction costs the optimal allocation of resources can always be achieved through market forces and in a perfect capital market framework the financing decisions of a firm are irrelevant in the sense that they do not affect its market value or the welfare of its security holders. The natural securities in such a perfect capital market are the state-contingent claims of Arrow (1964) and Debreu (1959). The packaging of securities is irrelevant, since with no transaction costs the set of available securities spans the relevant state space. This would imply that investors can costlessly duplicate the risk reducing effects of insurance through the management of their personal portfolios.

One can even reverse the argumentation: if the capital market is complete in the sense that it permits complete spanning of a firm by existing assets, it is always possible to

construct insurance portfolios that produce specific desired returns for specific states of nature. Managers can specify portfolios consisting of 'natural' insurance contracts whose values relate deterministically to all future values of what they know to be their firm. Costless contingent claim securities can then be thought of as pure, state-contingent insurance policies.

In reality, of course, the picture looks different. Capital markets are not perfect, since contingent-claim contracting is not costless and complete spanning of state spaces is impossible. Insurance contracts observed in the real world never offer complete spanning of state spaces. Contracts bundle insurance coverage for several subsets of states of nature and stipulate provisions such as minimums, deductibles, maximum coverage limits, etc. Positive contracting costs and other market imperfections may justify the demand for corporate insurance and the existence of a resource-consuming insurance industry¹. The real world exhibits several factors that violate the condition of perfect marketability (zero contracting costs), hence it is not surprising that most corporations are major purchasers of property and liability insurance.

This paper discusses the factors that provide corporations with an incentive for purchasing insurance. Part 1 investigates the relevance of risk aversion. Part 2 reviews the market imperfections affecting the corporate demand for insurance. Part 3 studies the value of corporate insurance when transaction costs of financial distress depress the market value of the firm. A résumé concludes the paper.

1. Risk Aversion and the Corporate Demand for Insurance

Recognizing that any insurable peril can be diversified in the investor's portfolio, Main (1982 and 1983) and Mayers/Smith

¹ See Mayers/Smith (1982a): "...a necessary condition for the insurance industry to increase social welfare is for there to be positive contracting costs in relevant markets."

(1982b and 1986) point out that risk aversion as the traditional explanation for the corporate purchase of property and liability insurance is unsatisfactory. Indeed, modern capital market theory dichotomizes total risk into company-specific (unsystematic) risk and market (systematic) risk. Specific risk concerns randomly occurring perils that are unique to a particular firm, such as fire, theft and product liability. Systematic risk refers to hazards affecting all economic agents, such as inflation, exchange rate changes, interest rate changes and so on. On the surface it would appear that, for a corporation with widely dispersed ownership², corporate insurance of unsystematic risks will not improve the welfare of the individual security holder, because any of these specific exposures can be eliminated by holding a well-diversified portfolio without paying an insurance premium.

Corporate insurance of unsystematic risks at actuarially unfair odds³ would represent a negative net present value project, reducing stockholder wealth. Assuming that an appropriate risk-adjusted discount rate can be found, the present value of the firm (V) can be written as:

$$V = \sum_{t=0}^{\tau} \frac{E[N\tilde{C}F_t - \tilde{L}_t]}{(1+R)^t}$$

where NCF_t is a random variable describing the net cash flows of the firm in period t , L_t is a random variable describing the losses or costs arising out of the firm's insurable exposures in period t and R is the risk-adjusted discount rate. Assume that the firm purchases insurance at a premium I which fully indemni-

² For individuals and most private or closely-held corporations, risk aversion is an obvious rationale for insurance purchases. The non-existence of limited liability clauses, the limited ability to bear certain risks or the large stakes of personal wealth invested in one firm or project make it impossible for them to fully diversify. See Mayers/Smith (1986).

³ This is the case when the insurance premium exceeds the expected loss.

fies against those random losses. The insurance strategy will be beneficial if it raises the firm's expected discounted net cash flows, or, if $I \leq E[L_t]$.

Assuming that the insurance company underwrites a large number M of more or less homogeneous risks⁴, then his underwriting policy will be profitable if $E[MI - ML_t] = M(I - E[L_t]) \geq 0$, or, if $I \geq E[L_t]$. In equilibrium, the insurance premium will equal the actuarially expected loss. At actuarially fair odds, however, the firm will be indifferent between insuring and not insuring. In reality, the insurance company charges huge loading fees. Apparently, this unfair-game premium would make insurance a negative net present value project for the firm.

Assuming a linear regression, the total risk or variance of a stock j can be written as

$$\sigma^2(\tilde{R}_j) = b_j^2 \sigma^2(\tilde{R}_m) + \sigma^2(\tilde{\epsilon}_j).$$

$\sigma^2(R_m)$ is the variance of the expected market return; b_j measures the extent to which market or systematic risk affects the riskiness of stock j and $\sigma^2(\epsilon_j)$ is the variance of random hazards or a measure of specific or unsystematic risk. However, if an investor holds stock j in a well-diversified portfolio, then this unsystematic risk will be eliminated. The relevant risk of stock j is not total, but systematic risk. As such, the market risk of stock j is $b_j \sigma(R_m)$ (in standard deviation form), where b_j measures the degree to which a given stock tends to move up and down with the market. Insurance of company-specific perils reduces the total risk of stock j . Investors will benefit from that only if they hold stock j in isolation. If they hold a well-diversified portfolio, however, the insurance purchase is not going to enhance stockholder wealth, since they can achieve

⁴ The Law of Large Numbers implies that, if the insurance company underwrites a large number of uncorrelated risks with the same frequency and size, the variance on the insurer's profits per policy will vanish.

the elimination of unsystematic risk through diversification without paying an insurance premium⁵. The premium payment would not induce a commensurate reduction in 'actual' portfolio risk⁶.

It should be stressed that some arguments relax the above reasoning. Not all insurable risks are entirely unsystematic and random company-specific hazards may, to some extent, be correlated with the state of the economy. If the cost of hedging by the firm's management is less than the stockholders' constructing a diversified portfolio, managerial hedging of unsystematic risks may be valuable. This is particularly true in the case where management has access to information not disclosed to the shareholders.

Main (1983) correctly argues that, if a firm cedes some of its 'systematic' risk to an insurance company, the latter may charge an insurance premium that exceeds the actuarially fair odds by a risk premium sufficient to justify holding such a diversified portfolio. This makes insurance a matter of no concern to the firm's security holder⁷. However, it should be noted that, if an insurance policy covers unsystematic risk that is partially positively correlated with market risk and if the premium cost is less than the expected value of loss, insurance

⁵ The actual riskiness of stock j is its contribution to the riskiness of a well-diversified portfolio.

⁶ For an equally weighted portfolio with $w_i = w_j = 1/n$, the risk or variance of the expected portfolio return equals

$$\sigma^2(\bar{R}_p) = \sum_{i=1}^n \sum_{j=1}^n w_i w_j \sigma_{ij} = \frac{1}{n^2} \sum_{i=1}^n \sigma_{ii} + \frac{1}{n^2} \sum_{i=1}^n \sum_{j=1, j \neq i}^n \sigma_{ij}.$$

It is clear that, as the number of portfolio assets becomes large, the variance term vanishes. The actual portfolio risk approaches the average covariance term and, provided that costless diversification opportunities and such a large market portfolio do exist, is equal to the average portfolio beta (b^2) times the variance of the market return $\sigma^2(R_m)$:

$$\frac{1}{n^2} \sum_{i=1}^n \sum_{j=1, j \neq i}^n \sigma_{ij} = \frac{1}{n^2} (n^2 - n) \bar{\sigma}_{ij} \text{ with } \lim_{n \rightarrow \infty} \left(\frac{n^2}{n^2} \bar{\sigma}_{ij} - \frac{n}{n^2} \bar{\sigma}_{ij} \right) = \bar{\sigma}_{ij}.$$

⁷ Insurance will not reduce the market's perception of its cost of capital or required rate of return.

could result in a beneficial reduction of systematic risk.

2. Market Imperfections

It has been demonstrated that risk aversion is quite an unsatisfactory argument for explaining the bulk of corporate insurance purchases. In reality, of course, management is often engaged in hedging activities directed towards the reduction of unsystematic risks⁸. Mayers/Smith (1982a, 1982b, 1983, 1986 and 1987) argue that, if corporate insurance buying affects the market value of the firm, it must do so via taxes, regulatory costs, contracting costs or the impact of financial policy on the firm's investment decision. Corporate insurance may reduce contracting costs by increasing efficiency in the allocation of risk bearing among the firm's claimholders, providing real service efficiencies in claims administration, lowering costs of financial distress, monitoring the compliance of contractual provisions and bonding the firm's real investment decisions. If the market value of a firm is sensitive to casualty losses⁹, the value of the firm will necessarily rise if these exposures are insured. The condition is that the insurance strategy raises the expected value of the firm. The market value of the firm is the sum of all future expected net cash flows, discounted by the investor's required rate of return. Assuming that investors can perfectly diversify insurable (unsystematic) risks, modern portfolio theory dictates that insurance should not have an effect

⁸ See, for example, Smith/Stulz (1985) and Rawls/Smithson (1990).

⁹ Sprecher/Pertl (1983) provide some empirical evidence on the negative impact of large losses on stock prices. Contrary to investigations of dividend announcements, changes in accounting procedures, mergers and stock-splits, empirical evidence on casualty losses should be more robust since the nature of those events is unlikely to allow for anticipation. It is quite obvious that the market value of the firm is adversely affected by casualty losses. More important is the extent of the stock price change based on the size of the loss.

on that discount rate ¹⁰. This boils down to a constant company cost of capital. The important message of this is that insurance can only increase the value of the firm by increasing the firm's expected net cash flows. So, if corporate insurance enhances expected net cash flows, then such an insurance policy must either reduce the firm's contracting costs or taxes or improve its investment decisions. Insurance should then be thought of as a special case of corporate financial policy.

Insurance may indeed enhance corporate tax-shields. Usually, tax laws enable corporations to use insurance as a tax minimization method of financing losses arising from insurable perils. Main (1983) and Mayers/Smith (1982b) analyze how insurance-related tax provisions might favor corporate insurance buying by reducing the corporation's expected tax liability.

Smith (1986) argues that the tax benefit is primarily due to the progressivity of the tax code. The firm's tax function can be compared with a call option (the tax schedule is more or less convex). The claim of the tax authorities, similar to a call option on the pre-tax income of the firm, becomes higher as the volatility of the underlying pre-tax income rises¹¹. Insurance will reduce the variability of taxable income. As a result, the expected tax liability will be lower and after-tax income will be higher¹².

Chen/PonArul (1989) examine the magnitude of the tax benefit with respect to the asset's life, the rate of inflation, the tax rate and the speed of depreciation. They conclude that this benefit only affects the corporate insurance decision at the margin, since they find the tax benefit to be relatively small compared to the average loading fees in the insurance contract.

¹⁰ This is the same as saying that insuring those risks will have no impact on the firm's beta.

¹¹ Using the Black-Scholes option-valuation model, this implies that the call value increases with the variance of the underlying variable per period.

¹² Note that tax-loss carry-backs and carry-forwards will weaken the incentive for corporate insurance buying by reducing the non-linearity of the tax schedule.

Corporate insurance may reduce the costs of regulatory constraints. For unregulated competitive corporations, output prices and revenues are determined in the market, regardless of whether or not the corporation insures. Mayers/Smith (1981, 1982a and 1982b) suggest that firms subject to rate regulation, would buy more insurance since the insurance purchase can economize on the costs of assessing loss distributions and the loading charges of the insurance premium may be shifted from the firm's owners to its customers. Compulsory insurance laws provide another example.

With positive contracting costs, the firm's stockholders and bondholders have a comparative advantage in risk-bearing over managers, employees, customers or suppliers. As equity and debt claims are tradable and divisible, insurable risks can be diversified. Yet, the ability to diversify human capital claims is limited. Managers and employees have the majority of their wealth represented by the present value of expected future salaries. As such, their portfolios are largely undiversified¹³ and, as a result, they will use higher discount rates in setting their reservation prices, reflecting the relative uncertainty of their income stream. Allocating that risk to the equityholders and bondholders, who have a comparative advantage in risk-bearing, increases the market value of the firm. However, the amount of risk that can be allocated to the equityholders and debtholders is limited by the capital stock of the firm.

Mayers/Smith (1982b) argue that this provides the firm with a risk-shifting incentive for the purchase of insurance¹⁴. Shifting risk to the insurance company enables an efficient allocation of risk for the firm's other claimholders. It should be noted that this approach is consistent with the view of the firm as a contractual coalition that includes both investor and non-investor stakeholders. This approach is similar to Alchian/Demsetz (1972), who view the firm as a contractual structure that

¹³ Human capital introduces a non-diversifiable asset in their personal portfolios.

¹⁴ Stock options and incentive compensation plans may reduce this incentive.

commands resources by selling promises of future returns to its claimants. In addition, Cornell/Shapiro (1987) point out that stakeholders other than investors and management play an important role in financial policy and constitute a vital link between corporate strategy and corporate finance. The higher the ratio of the customers', suppliers' and employees' claims over the firm's output, the more likely the firm is going to benefit from insurance purchasing. The inclusion of additional stakeholders, in this case insurance companies, leads to new insights into the theory of finance.

Insurance companies have a comparative advantage in claims administration services¹⁵. Their real service efficiencies are due to their credibility and their special skills in pricing risks and in claim adjustments¹⁶. Their specialization in writing and enforcing contracts on low probability events allows for economies of scale and learning and their size is important for their credibility. This emphasizes the importance of transaction costs as determinants of corporate insurance buying. Packaging credibility, claims adjustment and pricing of liabilities in an insurance policy minimizes these transaction costs. Skogh (1989) concludes that this makes the transaction costs theory of insurance and the pooling-of-risks theory of insurance rather complementary than competitive. The former explains how insurance might reduce the contracting costs of risk-neutral agents, the latter explains how insurance might supply the risk-averse with a diversification tool.

Insurance contracts can lower agency costs by reducing the likelihood of discretionary behavior when conflicts of interest arise among the contracting parties of a firm¹⁷. Jensen/Meckling

¹⁵ This paper doesn't tackle the problem of internalizing the corporate insurance decision. Captive insurance and other self-funding mechanisms have, however, become an important phenomenon.

¹⁶ This is the case when insurers can settle claims at lower cost than the firms against which the claims have been filed.

¹⁷ See Smith/Warner (1979), Mayers/Smith (1982b), Mayers/Smith (1987) and MacMinn (1987).

(1976) and Fama (1980) view the firm as a nexus of contracts, where each claimant is vying to get a piece of the economic value of the firm. When conflicts of interest within the firm affect observed corporate behavior, agency costs will be created. Shareholders and managers as well as shareholders and bondholders have divergent interests.

Insurance may control the manager/shareholder conflict. Mayers/Smith (1982b) point out that the source of these conflicts lies in the difference in time horizons and in the way in which management is compensated. By postponing expenditures for positive net present value projects, such as hazard-reducing investments, management tries to increase its own overall compensation. With foregone positive net present value projects, shareholder wealth will be expropriated. Shareholders will anticipate those actions and calculate the corresponding costs into the compensation package of the managers. Management has an incentive to avoid these costs and to promise that it will not engage in such activities. The insurance contract is an effective mechanism to enforce the adoption of those hazard-reducing projects. As the insurance company has a comparative advantage in monitoring the maintenance of such projects, the firm will benefit from the purchase of insurance. The monitoring of contractual obligations that are imposed on management is shifted to a credible, specialized intermediary. Insurance hedging on the part of managers has a beneficial impact on shareholder welfare if incentive compensation contracts between managers and stockholders can anticipate the extent of managerial insurance hedging. However, Campbell/Kracaw (1987) prove that, if the expected loss for the insurable risk is dependent on managerial effort, there is an embedded moral hazard problem. This might induce management to under- or overinsure with respect to the optimal insurance coverage required by shareholders.

Insurance may solve the conflict of interest between bondholders and stockholders¹⁸. The conflict between these two types

¹⁸ The insurance purchase may also aggravate the bondholder/stockholder conflict. This is particularly true in the case where managerial slack affects the materialization of the

of claimants results from the different nature of their claims. Debtholders hold fixed claims whereas equityholders hold claims that are equivalent to a call option on the value of the firm¹⁹. Bondholders bear most of the downside risk and to stockholders accrue the upside gains. Managers, acting as the agents of shareholders, will maximize stockholder wealth. Managerial actions can induce underinvestment or asset substitution. Underinvestment occurs when management passes up positive net present value projects for which the benefits would primarily accrue to bondholders. Asset substitution is the (ex post²⁰) substitution of high risk for low risk projects. The value of the fixed claims of bondholders declines, because the ex ante contracted risk/return conditions are violated by the new investment policy. Yet, bondholders will anticipate this discretionary behavior and its corresponding bonding costs and, as a result, the debt price will be lowered. Insurance can reduce these costs by bonding the firm's real investment decisions.

Corporate insurance may lower expected transaction costs of financial distress. This paper focuses next on how the addition of insurance contracts might lower those costs and thereby increase the market value of the firm.

insured loss or the restrictive imposition of unflexible insurance programmes triggers incentives in an undesired direction by increasing fixed costs unnecessarily.

¹⁹ The shareholders are residual claimants.

²⁰ After the bond sale.

3. Financial Distress and the Value of Corporate Insurance

3.1. Financial Distress

Modigliani and Miller's famous "Proposition I" states that financing decisions do not matter in perfect markets. The overall market value of the firm (the value of all its securities) is independent of its capital structure (the mix of its securities), as long as the firm's investment decisions are taken as given. Any shift in capital structure can costlessly be duplicated or repackaged by investors on their own accounts. In practice, market imperfections are likely to make a difference, including taxes, costs of financial distress²¹ and other contracting costs. Part 3 studies the impact of insurance policy on the firm's costs of financial distress. The point to be made is that, if costs of financial distress affect the value of the firm, the addition of insurance contracts to the firm's nexus of contracts may lower those costs and, hence, increase its market value.

Costs of financial distress are those costs that arise when promises to creditors are broken or honored with difficulty. Expected costs of financial distress cover the direct and indirect costs of bankruptcy²², as well as the costs of financial distress without bankruptcy. Even though this distinction may be straightforward, it will prove to be particularly useful for evaluating financial distress as a determinant of corporate insurance buying. Cornell/Shapiro (1987) view the firm as a contractual coalition of both investor and non-investor stakeholders. These stakeholders possess implicit and explicit claims. The firm's mix of those claims will be important for estimating its degree of financial distress. Consequently, stakeholder theory will play an important role in the insurance policy of the firm.

²¹ Financial distress (the precursor of default) occurs when a firm's income is insufficient to cover its fixed claims.

²² The transfer of ownership from stockholders to bondholders under default is costly.

Direct costs of bankruptcy are the costs of using the legal mechanism which allows creditors to take over when the decline in the value of assets triggers stockholders to exercise their right to default. Trustee fees, legal fees and other third-party costs of liquidation or reorganization are claims that consume a portion of the remaining value of the firm's assets if it defaults. Indirect costs of bankruptcy reflect the difficulties²³ of the firm that go with the bankruptcy procedure. These costs may be substantial and depend to a large extent on the nature of its assets and claims. Yet, even short of bankruptcy, financial distress can impose substantial indirect costs on the firm, costs which arise from contracting disruptions²⁴.

Increased leverage has an immediate effect on the expected costs of financial distress. As a firm borrows more, it must promise more to bondholders. This increases the probability of default, the value of the courts' and the lawyers' claims and the incidence of indirect costs.

In times of serious financial distress, the interests of bondholders and stockholders may be in conflict. Leonard/Zeckhauser (1985) point out that the limited liability of equityholders produces an asymmetry in payoffs around the point of bankruptcy. Management, acting on behalf of the shareholders, may induce risk-preferring behavior, reflecting gambles involving a mean-sacrificing spread of outcomes. Bondholders will anticipate those additional costs. The debt will be priced lower or more precisely, a higher promised payment will be required for the amount borrowed. If the firm wants to reduce these agency costs of risky debt, the imposition of specific governance structures

²³ Shareholders suffer opportunity losses when corporate resources are diverted to the debt restructuring process from more productive uses.

²⁴ Warner (1977a) suggests that the direct costs of bankruptcy are pretty small in relation to the market value of the firm, but the indirect costs of financial distress appear to be significant (see Warner (1977b)). Altman's (1984) empirical results, though, show that both types of costs are nontrivial: prior to bankruptcy the average ratio of direct bankruptcy costs over market value equals 6.0% and the estimate for indirect bankruptcy costs approaches 17%.

will be required.

With increasing costs of financial distress, the market value of the firm will fall. Bondholders, at the time of the issuance of the debt, will anticipate those costs and correspondingly discount the expected value of their claim at maturity into the price they are willing to pay for the debt. As a result, the equityholders bear the burden of those costs. The traditional writing on financial distress suggests that the optimal capital structure of the firm is reached when the marginal value of the firm's tax shield due to additional borrowing is offset by the marginal value of the expected costs of financial distress. However, other factors, such as reputation or perquisite consumption by management, may alter this theoretical optimum.

3.2. Insurance Hedging of Financial Distress

The probability of financial distress is a positive function of the variance in the distribution of pre-tax cash-flows and, hence, firm value is a decreasing function of the expected transaction costs of financial distress. Insurance hedging will decrease those transaction costs by providing the firm with a hedge portfolio that pays positive amounts (insurance indemnifications) when the firm would face financial distress without hedging. The probability of incurring those costs of financial distress will be lowered by shifting the financial burden associated with specific perils to the insurance company. The shareholders capture the proceeds of this insurance hedge since bondholders will now underwrite the debt issue at a higher price.

To see how insurance hedging of financial distress works, consider the following model²⁵. Let S be the set of all states of nature i ²⁶ and B_L^U is the insolvency set of the levered unin-

²⁵ The model draws on MacMinn (1987) and Smith/Stulz (1985). Contrary to MacMinn's model, though, the impact of taxes is also considered here.

²⁶ The number of all states of nature is assumed to be finite.

sured firm²⁷ with $S \supset B_L^U$.

Suppose that the costs of insolvency equal c , with $c > 0$. Now, the value of the levered uninsured firm equals

$$V_L^U = \sum_S P(i) V(i) + \sum_{S-B_L^U} P(i) \tau D - \sum_{B_L^U} P(i) c,$$

where $P(i)$ denotes the present value of a monetary unit in state i , τ is the tax rate, D is the face value of the firm's debt issue and $V(i)$ is the after-tax value of the unlevered firm in state i . It is clear that the first term corresponds to the present (market) value of the firm in the absence of leverage and insolvency, the second term equals the present value of the tax shield of debt financing and the last term is the present value of the insolvency costs. Note that the corrected version of MM's Proposition I would hold if insolvency were costless ($c=0$) or if the set of insolvency states of the levered uninsured firm were empty. However, with costly financial distress, insurance hedging can now be analyzed.

Let B_L^I and B_L^U denote the insolvency sets of the insured and uninsured levered firms, with $B_L^I \subset B_L^U$. The value of the levered insured firm equals now

$$V_L^I = \sum_S P(i) V(i) + \sum_{S-B_L^I} P(i) \tau D - \sum_{B_L^I} P(i) c,$$

As a result, the increase in firm value, because of insurance, can be written as:

²⁷

A further assumption is that, whatever the hedging or financing policy of the firm, the investment policy of the firm remains constant. This means that the market value of $V(i)$, i.e. the present value of the after-tax value of the firm if all-equity financed, is the same for all states i .

$$V_L^I - V_L^U = \sum_{B_L^U - B_L^I} P(i) \tau D + \sum_{B_L^U - B_L^I} P(i) C.$$

It can easily be seen that the increase in market value of the insured firm is equal to the present value of the additional tax shield differential plus the present value of the reduction in expected transaction costs of financial distress. This is the case since insurance reduces the insolvency set of the levered firm.

Mayers/Smith (1982b) note that insurance has a beneficial effect on financial distress as long as this gain from insurance exceeds the insurance contract's loading fees²⁸. For a one-period firm, which purchases insurance against losses, this condition can be formalized as follows:

$$\theta - \sum_{i=1}^n |\min(\Pi_i, 0)| p_i P(i) \leq \sum_{B_L^U - B_L^I} P(i) \tau D + \sum_{B_L^U - B_L^I} P(i) C,$$

where θ denotes the insurance premium, Π_i are the profits that occur in state i , p_i denotes the probability that state i occurs and $P(i)$ is the present value of a monetary unit in state i . Logically, the benefit from insurance hedging is a decreasing function of the insurance contract's loading costs. To the extent that insurance lowers the probability of financial distress and its associated costs, shareholders will seize the proceeds from the hedging policy²⁹. Yet, shareholder wealth can only be increased if the firm can convince potential debtholders that it will actually hedge after the sale of the debt. Ex post, however, it might be that insurance hedging is not in the best inte-

²⁸ The loading fees of an insurance contract are the portion of the premium that pay for the insurer's expenses and profits.

²⁹ Since Warner's (1977a) empirical evidence indicates that bankruptcy costs are less than proportional to firm size, Smith/Stulz (1985) and Mayers/Smith (1982b) suggest that small firms would engage relatively more in insurance hedging than large firms would.

rest of shareholders. It might redistribute wealth from stockholders to bondholders in a way that makes the former worse off. The solution is to impose a governance structure³⁰ that triggers the incentives for shareholders to undertake the right action.

One way to make the intended hedging policy credible is by imposing bond covenants. A restricting covenant to protect bondholders can stipulate the required purchase of insurance coverage. Smith/Warner (1979) point out that a covenant requiring the purchase of insurance protection will make the debt issue safer and cheaper. The secured debt may force the firm to alter its investment policy and insurance hedging will reduce the probability that those restrictive covenants become binding. A further point is that the bond provision can force stockholders (or managers acting as their agents) to engage in the optimal³¹ amount of loss control projects.

Nevertheless, reputation may act as an 'implicit' contract that curtails moral hazard without writing an 'explicit' contract. John/Nachman (1985) put forward that this is consistent with the observation that the higher rated bonds of reputable firms carry less restrictive provisions in the bond covenants on dividend payouts or minimum investment than those of lower rated debt. Applied to an 'implicitly' required purchase of insurance, the bond market would act as a price-rating arbitrator. An unfulfilled insurance requirement would induce the bond market to revise its expectations and would elicit an appropriate price reaction. Though, if asymmetric information about the true going concern value allows shareholders to squeeze arbitrage profits, part of bondholder wealth may still be expropriated. Haugen/Senbet (1988) argue that the best solution is to internalize the cost of verification. The inclusion of simple (in this case) insurance covenants prohibits free riding. If the required a-

³⁰ For a survey of governance structures that protect bondholders from wealth expropriation, see McDaniel (1986).

³¹ The 'optimal' amount of loss control projects is defined as the amount for which the marginal cost of loss control investment equals the marginal value of real investment and loss ratio improvements.

mount of insurance coverage is not purchased, the covenants become binding and stockholders will bear the associated costs.

Yet, insurance covenants should not be too restrictive. Applying the implications of Ravid's (1987) model, the covenant provisions should be designed as 'safety first' provisions. The explicit constraints should take into account the stochastic nature of the market characteristics and cost structures of the firm, especially if closely related to the insured exposure. With changed market conditions and cost structures, too restrictive insurance covenants might create incentives in an undesired direction by increasing fixed costs unnecessarily, in the worst case precipitating insolvency. If the stochastic nature of the firm's business seriously affects the relevance of the imposed insurance program, the covenants should allow for flexibility by including the appropriate contingencies.

The firm's optimal choice between these two contractual alternatives finally reflects a trade-off between the inefficiencies of rigid bond insurance covenants and the agency costs of hiring a delegated monitor (credit rating agency).

3.3. Implications of Stakeholder Theory

Stakeholder theory suggests that non-investor stakeholders play an important role in financial policy. Non-investor stakeholders possess both explicit and implicit claims. Explicit claims are claims such as wage contracts and product warranties, implicit claims³² are claims such as a promise of continuing service to clients, timely delivery or continuing a relation with a supplier. Implicit claimants can be viewed as outside owners of organization-specific assets.

Cornell and Shapiro (1987) argue that to the extent that the value of the firm depends on its ability to sell implicit claims, financial distress is likely to be particularly costly, even in the absence of bankruptcy. The explanation is that in

³² Implicit claims are obligations that are too complicated and state contingent to reduce to writing at a reasonable cost. Their legal enforceability is very limited.

times of financial distress the prices of implicit claims will drop, since the stakeholders involved expect reduced payouts on their implicit claims. They may even refuse to buy claims at all. Customers, suppliers and other business partners are no longer prepared to do business on the same terms. Explicit contracts might have to be written at highly inflated cost to convince stakeholders to stay in business with the firm. Shocks, such as product recalls, litigations and environmental difficulties will seriously jeopardize the value of the firm, more than the direct cash drain would indicate. The value of the firm's implicit claims will fall and the price of new explicit contracts will rise.

Stakeholder theory provides an interesting avenue for explaining the relevance of insurance hedging of financial distress. For a firm that issues a lot of implicit claims the indirect costs of financial distress are likely to be huge. This should induce the firm to choose an insurance policy that signals its intent to make payments (insurance indemnifications) on implicit claims. The possibility of large casualty losses placing a drain on the firm's already reduced liquidity may bring about a substantial incentive for such a firm to insure. Product liability insurance is a good example: for a firm with financial problems, the product liability insurance coverage will weaken its problem of selling implicit claims to non-investor stakeholders.

Jarrell/Peltzman (1985) provide some empirical evidence on the impact of auto and drug recalls on the shareholder wealth of the selling firms. They find that the drop in stockholder wealth is 12 times the size of the direct³³ costs of the recall. As drug companies and car manufacturers sell a lot of implicit claims, this is not a surprising result. The recalls substantially reduced the value of the firms' implicit claims and adversely affected the firm's goodwill.

In summary, it may be said that highly levered firms and/or firms with volatile income streams are likely to benefit from

³³ The costs of destroying or repairing defective products.

insurance hedging of financial distress. Insurance will act as a device of corporate financial policy directed at lowering the costs of covering the potential future cash outflows arising from implicit claims. The insurance hedge is going to be more valuable if the firm provides a lot of warranties or service agreements, produces credence goods, requires tailored service from suppliers, trains workers for firm-specific jobs or uses special labor services. The value of these firms depends heavily on growth opportunities, goodwill and intangible assets. Serious financial distress may quickly erode those organizational assets. For firms that possess a lot of net organizational capital (i.e., the value of the firm's organizational assets exceeds the value of its organizational liabilities), the announcement of a defective product or other shocks will quickly damage the perceived value of implicit claims across the entire firm and hence precipitate financial distress.

Insurance might hedge some of this spillover risk. The spillover exposure is likely to be severe, if the firm produces a lot of related products, sells these to the same customer basis, uses common supply and labor inputs. Though, for firms issuing a lot of implicit claims, borrowing less and sticking more to internal finance is likely to be part of the recommended strategy. This means that stakeholder theory is highly compatible with Myers' (1984) pecking order theory of capital structure (first internal financing, then debt and finally equity). Firms that choose equity funding today will tend to have less expensive funding available in the future. As a result, less mature firms with high levels of net organizational capital should be predominantly equity financed and engage more in insurance hedging.

Résumé

With perfect capital markets, the existence of insurance contracts is irrelevant, since investors can costlessly duplicate the risk reducing effects of insurance by holding the appropriate portfolio combination of stock and bond contracts. In reality, perfect marketability doesn't exist. Positive contracting costs, the impossibility of complete spanning of state spaces and other market imperfections may create a corporate demand for insurance contracts.

This paper reviewed the extent to which the addition of insurance contracts to the firm's nexus of contracts enhances the market value of the firm. For a corporation with diffuse ownership, risk aversion was proven to be irrelevant, since investors can diversify company-specific (insurable) risks. It appeared that the firm's insurance policy may be beneficial for all its stakeholders by lowering the firm's tax liability, increasing efficiency in the allocation of risk bearing among the firm's claimholders, providing real service efficiencies in claims administration, monitoring the compliance of contractual provisions, bonding the firm's real investment decisions and reducing the transaction costs of financial distress. As such, insurance increases the value of the firm's cash flows.

The paper focused on the impact of insurance hedging on costs of financial distress and derived some important implications of stakeholder theory for the magnitude of the insurance benefit. It hypothesized that firms with high levels of net organizational capital should be predominantly equity financed and engage substantially more in insurance hedging.

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