



## Insurance Practices and Risk Control: Issues and Lessons for Property and Liability Insurers

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### Abstract

This article presents a comprehensive theoretical framework for property and liability insurance risk management and control mechanisms. It presents the rationale behind property and liability insurance's risk control measures. Further the article tries to describe and examine four main categories of property and liability insurance risk management and mitigation strategies / techniques, viz; maintaining the internal capital base, managing the asset risk exposure, managing by underwriting risks, and managing the covariance between asset and liability returns. The securitization of bad assets is specifically projected as a potential method for managing and underwriting risks. Finally, the article ends up with an outline of four key guidelines for the cost-effective and efficient risk management practices in the insurance sector.

### Introduction

Of late, the property-liability insurance market has witnessed robust changes in connection with the intense competition emanating from the alternative risk control mechanisms and techniques, such as large deductibles, retentions, and captive insurance firms. Moreover, the next decade promises to bring additional competition by attracting new players in the property and liability insurance industry, including the commercial banks and securities firms. In order to survive in this competitive landscape, property and liability insurers must be able to manage their total risk in a cost-efficient manner. This paper provides the rationale behind the property and liability insurance risk management and mitigation strategies, and then describes the four main categories of risk management and control mechanisms / techniques adopted by most successful insurers worldwide. Finally, the paper ends with some general guidelines for the cost-effective risk management and control mechanisms.

### Rationality

While the traditional financial theory gives emphasis that publicly owned institutions should be solely concerned with un-diversifiable or systematic risk; the modern portfolio theory connotes that corporate shareholders can eliminate unsystematic risk through portfolio diversification. However, the more recent risk management theories suggest, that all institutions - public and private - must manage their total risk, even after considering the benefits of individual diversification.<sup>1</sup> These new theories give much emphasis on the importance of internal cash flows as a source of financing, the implications of nonlinearity in the tax code, and the substantial costs of bankruptcy and financial distress. Further the financial firms, which include property/liability insurers, both stock and mutual, have three other unique reasons to manage their total risk for which their policyholders are exposed and insured against. The first reason stems from the minimum regulatory framework and solvency constraints that generally apply to all these types of businesses. For many financial firms, franchise value, the opportunity to invest in Positive-NPV comprises a significant portion of the firm's total value. If the firm's actual surplus falls below the minimum regulatory hurdle, most insurance firms risks losing a substantial amount of assets – its franchise value. Therefore, by limiting total firm risk to an acceptably low level, the firms protect this franchise value.

<sup>1</sup> The total risk includes both systematic and un-systematic risks

Secondly, by managing their total risk, the financial firms secure a higher price for their products in their target markets. This higher price results from the higher degree of security in the firm's promises. This second rationale, however, may be less important in the property/liability segment in some countries than others, where policyholders are often protected by state guarantee funds. Nevertheless, recent surveys suggest that competitive property/liability insurance premiums are negatively related to default probabilities, even in the presence of guarantee funds. Finally, customers of financial firms generally prefer not to share in the investment risks of their firm.

In general terms, customers, unlike investors in a share company, may prefer to have the payoffs on their contracts as insensitive as possible to the fortunes of the co itself. For instance, a customer who buys a warranty on his new car from the manufacturer requires the repairs paid for in the event that the car is defective and the manufacturer is financially solvent. In fact, the customer has a contract that pays for repairs in the joint contingency that the car is defective. Even if an actuarially fair reduction in the price of the warranty could be made to reflect the risk of insolvency, it is likely that the customer would still prefer the warranty with the least default risk.

### **Techniques for Property/Liability Risk Control**

Normally the property and liability insurance companies utilize a variety of methods and techniques in order to manage the total risk and exposure. These methods can be grouped into four broad categories, viz; managing the total amount of capital, managing the risk of the investment portfolio, managing the risk of underwriting the portfolios, and managing the differences (covariance) between the assets and liabilities.

**The insurance capital as a tool for managing risk:** Conceptually, the simplest method for managing the insurance co's total risk is to raise enough capital to reduce the probability of default to an acceptably low level. The literature reviewed gives much emphasis on three major costs to a property and liability insurer while raising and holding capital, viz; double taxation, agency costs, and asymmetric information.

**Double taxation and Insurer's capital:** The property and liability insurers largely overcome the problem of double taxation through two investment techniques i.e offsetting taxable bond interest with insurance underwriting losses, thereby passing through the higher return on debt to the shareholder as a lower-taxed equity return; and, holding the taxable portion of the asset portfolio in tax-favored investments such as municipal bonds and common stocks, where applicable. The optimal asset allocation that maximizes market value depends upon the assumed relationship between the expected return on taxable bonds and common stocks of equivalent risk. In competitive property and liability insurance markets, prices adjust until insurance shareholders earn no more than a fair expected rate of return. Even then, the optimal asset allocation eliminates the burden of double taxation. One complication, however, may result from the nonlinearity, or convexity, of the corporate tax code. The convexity problem arises when the marginal corporate tax rate is an increasing function of the pre-tax value of an insurance company. In this case, the company's corporate tax liability becomes a convex function of pre-tax firm value.

**The agency costs and the risk of the free cash flow:** The agency costs of accumulating large amounts of cash within the organization are highly stressed upon by insurance practitioners and academicians alike. According to some, a corporation with excessive "free cash flow" usually fall prey to two temptations: investing in an empire-building, negative-NPV projects, and spending large amounts of cash on excessive perks.

### **The Asymmetric Information and Equity Issues**

Initially it has been presumed that the costs to a property and liability insurer of holding capital are relatively low. But if ex ante capital really is the most cost-efficient method of managing and controlling risks, an optimal strategy for risk management may emerge - the property and liability insurer should raise enough capital via seasoned equity offerings to lower the probability of default to a negligibly low level, thereby eliminating the need for reinsurance and other hedging strategies.<sup>2</sup> Yet, in reality, seasoned equity issues by insurers are rare while reinsurance may be common in some countries. According to the asymmetric theory, information asymmetries between managers and outside investors result in prohibitively high costs to issuing equity. The mere attempt to issue stock will cause share prices to fall, as investors assume that management feels the stock is overvalued at the prevailing price levels. Moreover, it's normally argued that asymmetric information results especially in regard to large issues by financial firms, including the property and liability insurers, with emphasis on the "opaqueness" on the part of the financial firms i.e the financial firm can quickly modify its total risk portfolio by changing its asset or liability composition; the investors may receive very little information about the financial firm's true operations, while the information published often gets quickly outdated in the minds of the investors.

Thus, in the presence of asymmetric information, ex ante capital becomes a scarce and valuable commodity to an insurer. The company's current stock of ex ante capital represents a relatively inexpensive source for managing risk, but

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<sup>2</sup> However Mutual funds do not issue equity but do have access to quasi-equity funding.

information costs may discourage the insurer from raising additional capital.<sup>3</sup> This situation may create the “pecking order” theory in the insurer’s risk management and control mechanisms - the insurers first utilizes their existing stocks of capital, then turns to other methods to eliminate residual risk.<sup>4</sup> But what are the empirical facts regarding the size and importance of information costs to the property and liability insurers remains to be a worrying issue. In other words, what are the actual market reactions to equity issue announcements by the property and liability insurers? Interestingly, the one comprehensive study published on the topic concludes that equity issues by property and liability insurers are unaffected by asymmetric information. In a study, Akhigbe, et al. concluded that there is no statistically significant market reaction in response to announcements made by property and liability insurers on equity offerings. The authors suggested that the unique operating environment for property and liability insurers produces unique market reactions to security offerings. Specifically, the necessity to support growth with adequate capital, lower agency costs, and market-driven capital requirements in the property and liability insurance market have been hypothesized to be the underlying factors contributing to these outcomes.

In addition, the authors performed a cross-sectional analysis which suggested that the abnormal returns associated with security offerings are driven to some extent by characteristics specific to the specific property and liability insurer. In other words, the significance of information costs may vary across the insurance firms within the insurance sector. However, those companies with well-recognized growth opportunities may be credible issuers of new equity, whereas more stable firms may be seen as capitalizing on information asymmetries.

### **The Common Fallacy and The Market Evidence on Capital Costs**

The foregoing review of literature concludes that the actual costs of internal capital are relatively low. The strongest evidence supporting this conclusion comes not from financial theory, but from the insurance market itself. If the actual costs of ex ante capital were relatively high, many insurers would be seen returning large amounts of capital to shareholders through stock dividends and buybacks, then aggressively utilizing other risk management devices, such as reinsurance and the cat options. In reality, stock dividends and buybacks by the property and liability insurers represent only a very small portion of the total equity market values. Yet, given the low costs of holding capital versus other risk management alternatives, why would the property and liability insurers ever offer stock dividends or buybacks? The answer may be related to the previous review on asymmetric information and their opaqueness. Since the only earning information that investors receive is usually delayed and very subjective, the property and liability insurers should invest their money where they should be to convince investors that their earnings are real and no need for worries. In other words, the investors view dividends and buybacks as a signal that their company’s earnings are genuine and realistic.

In conclusion, the author highlights the common fallacies that underlie some of the mathematical models that attempt to compare the costs of reinsurance and the catastrophic options with the cost of capital. These models often incorrectly compare the net cost of reinsurance and the cat options with the gross cost of capital. The net cost of reinsurance and the cat options is the difference between the price charged for these contracts and their actuarially fair market values. Likewise, the net cost of capital is the difference between the actual (after tax) returns on the invested capital and the returns that shareholders would require from investing directly in an equally equivalent set of risk securities.

In the absence of double taxation, agency costs, and asymmetric information, the net costs of capital would be zero. Specifically, in the absence of these costs, the property and liability insurer earns an expected return on invested assets / securities that equals the shareholder’s required returns. As indicated earlier on, in a competitive market environment, the property and liability insurance prices may adjust itself until shareholders earn their required rate of return on underwriting. However, one may rightfully ask him/herself, whether property and liability insurance policies are truly bought and sold in a competitive market environment. After all, virtually every actuary who handles rate filings for a living – the author hereby concludes – may agree that regulators in certain countries suppress rates below their actuarial value for political reasons. To the extent that regulators effectively enforce such price ceilings; the insurance underwriters may on an average, be losing their propositions. Thus, managers of publicly-held property and liability insurers may improve their shareholders’ wealth by forgoing underwriting entirely – thereby returning the assets to shareholders and allowing them to invest directly in the capital markets. Only mutual insurers, whose economic objectives go beyond maximizing shareholder wealth, may survive.<sup>5</sup> However, in reality, publicly-held property and liability insurers have survived, and even thrived, for decades in some countries where such businesses flourish. In fact, returns on insurance stocks in such countries generally outperform the S&P 500 mark. While capital continues to flow to existing stock companies, and the most popular mutual funds rush to demutualize or form downstream stock holding companies. The bottom line is that no rationale investor would commit capital to an insurance company if he could earn a higher return by investing it directly by him/her self. Of course, the publicly-held property and liability insurers still face a variety of

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<sup>3</sup>Some other costs such as administrative and underwriting may also be substantial felt

<sup>4</sup> Thus this theory resembles the “pecking order” theory adopted in corporate capital structures

<sup>5</sup> If the resources devoted for underwriting could not earn a normal profits, publicly-held insurers would eventually be forced out of business by one of three mechanisms, viz; internal control

threats that may impact their future viability. For instance, the threat of increased regulation and increased federal taxation in most countries gives the property and liability run for their money. Adverse developments in these areas could still force stock insurers to exit the business, leaving the mutual funds and capital market instruments to pick up the stake. They should correctly recognize the distinction between net and gross capital costs by avoiding providing an exact estimate of the net cost of capital. If the resources devoted to insurance underwriting do not earn a normal profit, the publicly-held insurers would eventually be forced to exit the market by one of three factors, viz; internal control mechanism

### **The Management of Total Risk of the Investment Portfolio**

The second major aspect of the property and liability insurer's risk management techniques involves managing the total risk of the investment portfolio. The insurance management is often tempted to increase the riskiness of the investment portfolio in order to increase its expected returns. Yet, in perfectly competitive product and capital markets, the increase in expected returns is exactly offset by an increase in shareholder's required rate of return, leaving the firm's value unchanged. Moreover, in the presence of a risky investment portfolio, the amount of capital required to adequately manage risk depends on the variance of the assets, the variance of the liabilities, and the covariance between the returns on the assets and the returns on the liabilities. By investing in risk-free securities, however, the required capital depends only on the variance of the liabilities. Since it is very difficult for the property and liability insurers to achieve superior profits on the left hand side of the balance sheet, most of them strive for a conservative investment portfolio. Thus, by controlling risks for which there are no compensating rewards, insurers are able to make larger bets when the odds are in their favor, such as making a large underwriting commitment on a lucrative new product.

### **The Management of the Total Risk Of The Liabilities**

Traditionally, the insurance business is based on the theory or the law of large numbers. In theory, if all policies are independent, the insurance business can practically eliminate risk by underwriting a enough volume of business. Unfortunately, within a given coverage and territory, independence is rarely achieved due to the presence of external background factors that affect all policies (such as economic conditions, weather patterns, etc.). As such, the law of large numbers does not hold as the size of the portfolio increases. Still, the property and liability insurers can obtain the benefits of diversification by expanding into new coverage or geographical territories. For instance, consider a property and liability insurer that offers only commercial general liability and business auto policies. One would expect, a priori, that the experience under environmental impairment liability policy would bear only a slight correlation to the experience on the existing portfolio. Hence, by offering the environmental impairment liability coverage, the insurer could achieve greater diversification, and thus reduce the risk of its total underwriting portfolio. Similarly, an insurer offering property insurance only in one region can expand into the other regions as well. However the property and liability insurers are often reluctant to diversify in such manner. In our previous example, the first insurer may enjoy a competitive advantage in underwriting the standard commercial liability policies; at the same time, one would expect that underwriters trained in CGL and business auto would lack the necessary expertise to handle pollution business. Likewise, the second insurer may lack the necessary marketing and distribution facilities in other areas. Hence, the practical value of diversification may be highly limited. Generally the property and liability insurers must look for other methods of handling correlated risks in order to survive in a competitive business environment.

One other obvious method of managing the total risk of liabilities is to reduce the amount of premium underwritten in relation to the current capital base. This is really the flip side of raising capital in order to manage risks. Thus it's clear that managing risk by eliminating profitable business is not the most preferred alternative for the property and liability insurers in most country for obvious reasons.

The remaining part of this paper compares the relative efficiency of the traditional reinsurance practices and the newer catastrophic hedging tools in dealing with the problems, viz; the basis risk, moral hazard and credit risk; and, the federal income taxes. Lastly, the paper ends with a highlight of the place of mergers and acquisitions in managing liability risk.

### **Reinsurance Versus Securitization**

The larger portion of the available literature on the latest catastrophic hedging tools describes their relative efficiency, versus traditional reinsurance, in dealing with the problems of basis risk, moral hazard, and credit risk. Traditional reinsurance involves very little basis risk. There is no basis risk, for instance, in proportional (quota share) reinsurance. Unfortunately, this lack of basis risk also leads to a high cost of moral hazard, which increases the transaction costs of reinsurance. In addition, traditional reinsurance often entails high credit risk. Conversely, cat options and cat bonds that are based on industry indices may possess significant basis risk, especially for insurers with a typical distribution of business. This increased basis risk lowers the cost of moral hazard. Moreover, those instruments can be designed with low credit risk.

In sum, the high moral hazard associated with traditional reinsurance leads to a higher transaction cost. But traditional reinsurance usually offers a better hedge and is therefore more effective at lowering the required amount of internal

capital. For the insurers with high costs of raising and holding sufficient capital e.g, insurers suffering from the problems of convexity and asymmetric information, the higher transaction costs of reinsurance may be justified. But for insurers with low capital costs, cat options and cat bonds may represent a cost-effective alternative. Meyers provides a mathematical model that compares the net cost of reinsurance to the net cost of options on a catastrophic index.

### **Reinsurance and Taxes**

The reviewed literature gave less attention to the relative efficiency of the new cat hedging options in dealing with the issue of federal income taxes. Harrington, et al., point out that “profits on futures positions are taxed directly, but there is no double taxation.” Offsetting this presumed tax advantage are the taxes paid on investment earnings from the investor’s margin account. These arguments miss an important component that traditional reinsurance holds over cat options and bonds. Specifically, cat options and bonds are priced to offer a positive expected return where the entire return will be taxed at the investor’s marginal tax rate, which varies from zero to 39.6% for individual investors. On the other hand, traditional reinsurers can manage their asset allocation and dividend strategy to minimize total corporate and personal taxes. In fact, as competition from newer hedging devices intensifies, reinsurers are forced to efficiently manage taxes in order to survive.

### **Mergers and Acquisitions**

As mentioned earlier, insurance firms are often reluctant to diversify across coverage and territories because the necessary underwriting and marketing expertise is often lacking. Mergers often overcome this hurdles by providing both diversification and new areas of expertise. The pure financial motive for mergers and acquisitions has been suggested for nonfinancial Cos i.e conglomerate mergers diversify the firm and reduce the probability of default. This allows the firm to take on a higher debt ratio and thereby benefit through the tax advantages under corporate borrowings. For the property and liability insurers, the diversification resulting from the merger will also lower the probability of default. This allows the insurer to reduce its reliance on other risk management techniques, such as reinsurance and internal capital. To the extent that these alternative techniques are costly to the company, the merger may create value. There were two most popular mergers in the property and liability segment in the US, which suitably illustrates the diversification benefits of combining two Cos – one offering geographic diversification and the other providing diversification by coverage. First, the nationwide unsolicited takeover of allied mutual funds was primarily motivated by country’s desire for geographic diversification. Traditionally, country’s substantial personal lines portfolio has been heavily weighted in the geographic region east of the Mississippi. Conversely, the allied mutual funds possessed a strong personal lines market position and valuable network of agents in the western region. As such, the takeover promised to provide the country with a wider geographic spread and substantial diversification benefits.

Second, the St. Paul’s multi-billion acquisition of USF&G offered the company a broader range of specialty lines coverage. The company coveted USF&G’s profitable specialty operations in surety bonding, reinsurance and alternative-risk transfer to complement its medical malpractice dominance. Of course, not all mergers are motivated primarily by diversification. Even the St. Paul and USF&G specialty operations overlapped significantly in certain areas, such as technology and financial institutions. Here, any diversification benefits are muted by the common external background factors highlighted earlier. In this case, the primary motivating factor for merging is not diversification, but achieving greater economies of scale.

### **Managing the Difference Between the Assets and Liabilities**

As already indicated, most property and liability insurers often manage the total risk of their investment portfolio by holding a large proportion of risk-free assets. In theory, by removing the variance from the asset returns, the covariance between the assets and liabilities is eliminated. Unfortunately, the uncertain payment date for liabilities creates covariance problems even in the presence of a risk-free investment portfolio. These covariance problems emanate from the well-known issues of interest rate risk and reinvestment risk. In response to interest rate risk, the property and liability insurers utilize various asset/liability management strategies. To the extent that asset/liability management is possible, it reduces the required capital – which can be important for insurers with positive costs for raising and holding capital. In practice, however, two fundamental issues arise with regard to asset/liability matching. First, given the highly variable nature of the amount and timing of insurance payouts, many writers have seriously questioned whether asset/liability management is even feasible. Second, one must determine exactly what to hedge, which is certainly not a trivial issue. If the major risk of the insurer’s bond portfolio is uncertainty in the real interest rate, asset/liability matching represents the safest strategy. Conversely, if the major risk is uncertainty in the future inflation rate, short term investing is the safest approach. Until these issues are resolved with more certainty, the asset/liability management will not effectively reduce the risks.

### **Guidelines for Effective Risk Control**

In a wider sense, the “fair” asset/liability insurance premium can be given by the following formula: fair premium = discounted value of expected losses and expenses + risk management costs. In this formula, risk management costs

include all the net costs of managing total risk. For instance, assuming that the insurer manages risk by holding internal capital and purchasing reinsurance, the total risk management costs would include the net cost of capital necessary to support the policy (i.e. double taxation, agency costs and asymmetric information) as well as the net cost of reinsurance. This pricing procedure highlights the critical importance of cost-efficient risk management, in which an insurer that efficiently manages total risk possesses a pricing advantage over other insurers. Moreover, the increased competition from advanced risk management techniques, such as self-insurance and captives, forces the equilibrium prices to come down. At the limit, the competitive asset/liability insurance price for many lines<sup>6</sup> will simply become the capitalized value of expected losses and expenses under the policy i.e. the insurance will become a zero-NPV transaction for the buyer. However, producing a quantitative model for minimizing net risk management costs is difficult. For instance, how does one quantify the net costs of agency issues or asset/liability management? Moreover, these costs will certainly vary considerably across companies. As such, this article does not attempt to derive a quantitative solution, but does offer some general guidelines for maintaining a low risk management cost structure. The first three guidelines apply to individual insurers; the fourth is an industry-wide guideline.

### **Restricting / limiting the Net Costs of Capital:**

In theory, if the net costs of raising and holding capital were non-existent, the insurer could eliminate the need for other risk management methods. For instance, there would be no benefit to underwriting diversification, either through mergers, amalgamations or otherwise. Any additional capital needed to mitigate risk in the undiversified firm would have a net cost of zero. While it may not be possible to completely eliminate the net cost of capital, an insurer or reinsurer can still take action to significantly limit these costs. Of the three potential sources of capital costs, two can be largely reduced, namely double taxation and agency costs. Asymmetric information is largely outside the control of the individual insurer. First, double taxation can be managed by prudent investment strategies. As indicated earlier on, it is possible to devise an optimal asset allocation to eliminate the effect of double taxation (by ignoring convexity problems for extremely volatile lines of business). Moreover, most of the taxes paid by the property and liability insurers in recent years are voluntary taxes i.e. insurers are often motivated to realize investment gains unnecessarily to dress up the income statement. There is information of an insurance company that sold a portfolio of bonds and stocks at a profit at year-end, paid taxes on the gain, then repurchased substantially the same portfolio. In order to compete with efficient insurance alternatives (namely, self-insurance and large deductibles for primary insurers and cat options and bonds for reinsurers) insurance companies must end the obsession with accounting earnings and focus instead on economic value. Second, the property and liability insurers must establish effective internal controls to reduce agency costs of capital. In today's active market for corporate control, insurers with ineffective internal controls and high expense ratios will quickly become targets for takeover. In other words, if insurers don't reduce their agency costs, capital markets will.

### **The Bigger the Size the Better**

For the last few decades there has been witnessed an inexorable consolidation in the financial and insurance segments in different countries. The review of literature in this article mentioned two possible reasons for the mergers and acquisitions wave, viz; gaining the benefits of diversification and achieving economies of scale, although there could be limits to the potential economies of scale. Still, perhaps new computer and communications technologies have increased the minimum efficient scale for the property and liability insurance companies, with the insurers scrambling to achieve this new efficient size. As such, the insurers should not rule out merger opportunities, especially opportunities that offer both scale and added diversification.

### **Comparing Reinsurance with Cat Options and Bonds**

For the volatile lines of business, the convexity costs of holding capital are often substantial. The property and liability insurers should then look to traditional reinsurance, cat options, or cat bonds to mitigate the volatility of such coverage. As with many other purchasing decisions, it pays to shop around. The property and liability insurers with relatively typical loss portfolios may lower credit risk and moral hazard costs by purchasing cat options. If traditional reinsurance is selected, the ceding company should look for a reinsurer that successfully manages its tax liability; hence, the importance of managing double taxation becoming especially important for reinsurers.

### **The Threat of Increased Federal Taxes**

The Tax Reform Act modifies the property and liability insurance segment's tax structure by introducing proration of tax-exempt bond income, discounting of loss reserves, and the alternative minimum tax. As already indicated, in order to compete effectively with newer, tax-efficient rivals, such as self-insurance (primary insurers) and cat options (reinsurers), the property and liability insurers should maintain a low tax burden. Unfortunately, policymakers in most countries continue to look for more methods to extract higher tax receipts from the industry. In the US for instance, President

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<sup>6</sup>Some lines, such as property cat coverage invariably require positive net risk management costs i.e. the convexity problem for the coverage require some combination of costly internal capital, reinsurance, or cat options.

Clinton, proposed increasing the proration rate on tax-exempt bond incomes from 15% to 30%. Even more worse one can envision political proposals for taxing property and liability insurer's unrealized capital gains or limiting their use of tax carryovers.

In order to remain relevant and maintain a level playing field, the property and liability insurers need to push for a favorable tax structure. In addition to resisting political proposals to increase the effective tax rates for insurers, the industry should push for positive reforms as well e.g the idea of allowing insurers to accumulate tax-sheltered reserves to finance catastrophic losses. It is often pointed out that such changes would reduce the tax costs of holding capital and mitigate problems associated with possible loss of tax shields. The insurance industry must actively push for such proposals, and make sure that its side is heard in the political arenas wherever and whenever it happens.

## Conclusion

The significance of the cost-effective risk management techniques to insurers will continue to grow as competition intensifies from both within and outside the sector. The property and liability insurers that implement and maintain cost-effective risk management strategies may achieve a better pricing advantage in the marketplace. For those insurers plagued with tax-inefficient investment techniques and agency costs will not survive in the long-run. This article has tried to highlight both the rationale and an impetus for property and liability risk management efforts for modern insurers. Moreover, the four major classifications of risk management and control have been lucidly presented and evaluated. However, this article failed to present a practicable framework for risk management, but only highlighted the conceptual framework and a set of general guidelines for the relevant insurance practitioners to adopt. In order to develop a more formal, testable theory, more practical research-oriented works must be undertaken on the critical issues such as optimal property and liability insurance, asset allocation and classification, the significance of agency costs, and the role of mergers and acquisitions in trying to reduce risk exposure.

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