Determining general insurance profit margins

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Synopsis

The paper notes the limitations of CAPM based approaches to insurance profit margin determination. Limitations discussed include difficulties in determining appropriate Liability βs and the issue as to whether diversifiable risk has value. Discussion of other factors effecting profitability including industry effects and market concentration are also included.

The competitiveness of the general insurance market in Australia and reasons for government intervention are discussed. Intervention is suggested to be a result of difficulty of loss assessment and a reduction in risk appetite, rather than a lack of competition. A brief discussion as to the merits of file-and-write is also included.

Several alternative frameworks for determining capital allocation and insurance profit margins are discussed including methods taking into account frictions and methods which value skewness or downside risk. Issues surrounding profit margins are detailed including the value attached to insurance risk and franchise value. Comments are also made on past and future expected general insurance company returns.

Methods for determining profit margins are discussed including the initial issue of what capital base should be used. An example of an Enterprise Value approach is given whereby a company's value is determined as a multiple of Net Tangible Assets. Discussion of the issues associated with determining the rate-of-return are made and a summary of the methods by which capital may be allocated is included.

Keywords

1. Introduction

1.1 Setting the scene

"For every human problem, there is a neat, simple solution; and it is always wrong."

H. L. Mencken (1880 - 1956), Mencken's Metalaw

This paper has been prepared to examine the topic of fair profit margins, an area of some considerable discussion in recent times. It is a subject that at first glance appears simple, but when examined more closely, opens a Pandora's box of possibilities.

This paper attempts to steer a practical path through the complexity. Whilst the author does not presume to offer all of the solutions on this topic, it is hoped that this paper can assist in understanding of the subject.

1.2 Validity of the CAPM approach

The CAPM approach is an often-used approach to determine fair profit margins. The limitations to this approach are however significant. These limitations include difficulties in determining the Liability β. There are also other non-CAPM effects on profitability that should be considered.

The CAPM limitations are discussed in detail in Section 2.

1.3 Profit margin regulation

General insurance in Australia as a whole is facing greater regulation. The increased regulation and ongoing interest of authorities has resulted in greater scrutiny of profit margin determination. The reasons for this regulation are examined in the paper. The competitiveness of the general insurance market is also examined including current barriers to entry in general insurance.

Insurance regulation and its effects on profit margin determination are discussed in Section 3.

1.4 Alternative frameworks

Several alternative frameworks have been proposed when determining fair profit margins. One method explicitly takes account of the frictions a company faces when underwriting insurance. Another methodology considers the premium a company should earn for the skewness of loss faced by underwriters.

Further discussion on these alternative frameworks is included in Section 4 of this paper.

1.5 Profit margin issues

Before deciding upon a profit margin method, several issues need to be considered. A decision needs to be made as to what is a reasonable return on equity and what is a reasonable company target. An insurer should also take into account whether their targets should include a margin for the downside risks that are a part of insurance operations.

Consideration should also be given as to what extent insurance risk has value. Finally consideration should be given as to the extent to which the insurance company's franchise value and business risks should be included in calculations

The above profit margin issues are discussed in Section 5.

1.6 Profit margin calculation

When determining profit margins in practice there are many decisions that need to be made as to the process that is to be adopted. Decisions firstly should be made regarding the capital base that is to be used. Whilst the use of balance sheet capital is the most common method, it may be appropriate to include hidden capital and/or various intangible assets in the capital base.

One method that can be used is to take a capital base that represents the total value of the enterprise. The considerations and a suggested approach for such a method are discussed in Section 6.3.

Discussion as to the issues surrounding the calculation of profit margins including the need to convert results from a cohort to financial year basis and the method of determination as to the actual return that should be selected. Finally a discussion of capital allocation methods is included.

More detail as to the practicalities of profit margin calculation is given in Section 6 of this paper.

1.7 Acknowledgments

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The views expressed in this paper are those of the author alone and do not represent those of any employer or other party. Any errors and omissions are the responsibility of the author.

2. Validity of the CAPM approach

2.1 The CAPM approach

The Capital Asset Pricing Model (CAPM) is described in significant detail in many other papers [5-8,14]. Only a brief description has therefore been provided in this paper.

The conventional CAPM can be expressed as follows:

$$E(R_i) = R_f + \beta_i[E(R_m) - R_f]$$

Where:

R_i	=	Return for security i
R_f	=	Risk free rate
R_m	=	Return for market
β_i	=	β of security i
	=	$Cov(R_i,R_m)/Var(R_m)$

The β of a security represents the correlation between that security and the market. One of the significant features of the CAPM is that the market does not give any premium for diversifiable risk, therefore such risk is effectively reduced to zero in the total market and has no risk premium attached.

In the insurance context the CAPM is often decomposed to describe the β of an insurance stock being composed of an Asset β (β_a) and a Liability β (β_l). The rationale behind this decomposition is the view of an insurance company as a leveraged security. The company effectively borrows money from customers in the form of premiums and invests the proceeds. The company then pays an uncertain series of liability payments in return in the future.

A company heavily invested in equities (such as a number of European insurers) will have a much higher β than a company invested primarily in fixed interest and cash (most Australian and US companies).

The Myers-Cohn approach is effectively an extension of the CAPM applying to insurance pricing. This approach relies upon the use of different discount rates for separate components of the premiums to determine the fair premium. The discount rate used for each component is based upon the respective component β.

CAPM is now of course a well-established model and is used as the basis for a large amount of modern finance theory. The question however is whether methodology based upon CAPM is a suitable and tractable approach to estimate profit margins for both insurance companies in total and individual product categories.

2.2 Can the Liability Beta be measured?

A significant and non-trivial limitation of using CAPM for insurance returns is the difficulty in determining the Liability β. Studies on this subject have had generated inconsistent results. The main problems can be summarised as follows:

- Difficulty in measuring past βs due to the limited number of pure stockholder general insurers.

- Inconsistency between studies as to actual Liability β values.

- The fact that β changes over time and so an estimate of a prospective β is required.

- Doubt as to whether insurance risk is fully diversifiable and therefore valueless.

The above points are discussed further below.

Limited pure insurance companies

The lack of pure stockholder general insurance companies makes measurement difficult. The Australian market itself currently only has three (relatively) pure listed general insurance companies of substantial size (IAG, Promina and QBE), the remaining companies being either foreign owned or forming part of an overall conglomerate.

Of the three companies, QBE writes 80% of premium outside Australia making it less useful as a source for the assessment of Australian market βs. Promina having just been listed has a relatively short Australian market history and has significant funds management and life insurance businesses. This leaves only IAG whose business is mainly general insurance!

Obviously the US market has a larger sample size, but the need to separately discern the insurance β limits the size of any sample. Many US (and some Australian) general insurance companies are now part of financial service companies that include banks, life insurance and funds management.

Measuring past βs

The second problem is that the measurement of past βs has generally been quite inconsistent. The following quote summarises the problem well:

> "One way of validating the model might be to test how well the model can explain historic returns. The evidence is not reassuring. For example, Fama and French found that historic betas were not able to explain historic returns. They found that size and the book-to-market equity ratio have greater explanatory power than historic betas. Perhaps it is the investors' imperfect knowledge, which prevents returns from being fair games, that limits the ability of historic estimates of beta to explain returns in capital markets. Alternatively, Bernstein suggests that, "Despite all the mighty efforts of investment theory, we still do not have a firm handle on a

quantitative gauge of risk." Beta may be the proper theoretical measure of risk, but reliable estimates of beta may not yet exist" [10, p.313]

Even more surprising is the fact that even the workers compensation ratemaking bureau in Massachusetts has come to the conclusion that underwriting βs are of limited value [11, p.650]. Interestingly, the use of underwriting βs appears to have been abandoned by the very jurisdiction where the CAPM and Myers-Cohn were initially applied.

βs changing over time

The next problem faced by the CAPM insurance model is as Druissi noted:

> "…the CAPM actually requires an assumption regarding the *prospective* beta for the security, which may or may not be related to the measured *historical* beta." [8]

Whilst insurance βs may not vary enormously over time, the fact that they do change adds further difficulty to determining an appropriate margin to use in the insurance CAPM approach.

Diversifiable nature of insurance risk

The last area of difficulty with the method is the degree to which insurance risk should be considered diversifiable. Under CAPM, no premium is given to risk that is not correlated to the overall market. This is because such risk may be diversified away to nil by a portfolio of market securities.

Insurance itself is effectively based on the benefits of risk diversification. Insurance companies via the process of diversification of risk are able to profitably offer insurance at a rate only moderately above the total of expected costs plus associated expenses (company expenses, commission, taxes etc).

A significant proportion of certain insurance risks should be able to be diversified within individual insurance companies and should therefore not attract an additional risk premium. Collision losses within a personal lines Motor portfolio for example are likely to be relatively stable in total. Such losses may vary from year-to-year dependant upon weather and economic factors, but a large part of the risk will be non-systemic and therefore diversified away.

The question is however to what extent the remaining insurance risk (that is not diversified away within the company) is systemic and whether the non-systemic it is rewarded The author suggests that the combination of market imperfections and the skewed nature of insurance risk leads to non-systemic insurance risk having some value. Further discussion of this issue is made later in Section 5.1.

Conclusion

The above limitations on measurement of the Liability β apply significant limitations to the use of the CAPM model.

2.3 Insurance Betas by type of business

There have been a number of studies suggesting certain lines of business have positive βs. This could be the case with businesses such as CTP that tend to have higher driver exposure during stronger economic times. There is also the thought that other classes increase claims during harder times:

> "The conventional wisdom in the insurance industry is that theft, fire, and arson losses increase during times of high unemployment… Finally, catastrophes destroy business property and may depress economic activity from the resulting unemployment and business interruption." [10 p.325]

Other commentators however suggest that there is little connection between underwriting losses and market returns. The great difficulty in measuring β as discussed in the previous section makes measuring β by class even more difficult.

The attempts to determine βs by theorising as to the relationship between the claims and the economy have the problem that they ignore any effect of a premium cycle. Lower claims tend to lead to lower premiums and therefore a less strong relationship between the economy and insurance profitability occurs than one might expect.

2.4 Non-Beta profit margin effects

Buffet division

One problem with the CAPM is that long-term profitability of different industries may depend upon more than just their correlation to the market. Actual profit margins achieved by different businesses over time vary quite significantly because of other factors. Warren Buffet's division of businesses shows an example of these differences. Buffet [22, p87] divides businesses into two types:

- The basic *commodity-type* business, which he found consistently produced inferior results

- The *excellent business*, which possesses what Buffet calls a *consumer monopoly*

Buffet notes that the best asset is one where licences are supplied and restricted by the government, but profits are not (for example toll roads). The worst are commodity industries with many players and high fixed costs. Whilst there are issues of brand loyalty, distribution strength etc, general insurance in Australia would be closer to a commodity business than to an excellent business.

It should be noted that Buffet's success is due to a combination of excellent stock-selection skill, a disciplined use of capital and selection/retention of appropriately motivated management. Berkshire Hathaway does in fact own at least two general insurance companies that have been able to achieve excellent returns. It is therefore perhaps more the case that it is companies rather than industries that can be divided into commodity or excellent businesses.

Industry application

Despite this limitation, there is still some application of the Buffet principles to industries as a whole. The most notable example is Buffet's comments on the long-term performance of the international airline industry. The industry has a high β, yet has consistently delivered under-market investment returns as a result of commodity nature of air travel and the fragmented airline market.

The general insurance industry in Australia has had some similar characteristics to the international airline industry in that traditionally there has been over-capitalisation and excessive competition. Both industries also share the characteristic that they are industries where management can more easily make short-term decisions that boost profits, but which are adverse in the long run for the company. Both industries therefore have problems aligning executive and shareholder interests. Both industries in general also have relatively weak barriers to entry.

It should be noted however that recently in Australia the effects of worldwide insurance capital losses, less capital and significant consolidation has resulted in a more favourable outlook for profitability.

Market concentration

Related to the previous point is the fact that profit margins and return-on-equity also tend to be significantly correlated to market concentration. As noted in Section 3.2, the increased concentration of players in the general insurance industry should act to increase previously poor margins.

The link between greater market concentration and higher profits is one reason for which companies seek to merge and a reason for which the ACCC at times restricts such activity.

Conclusion

Actual profitability of an industry may potentially depend upon not just the β of an industry, but also upon the nature of the business and the level of competition. The past poor profit margins in the insurance industry could therefore be seen to be a combination of a fragmented market and the commodity-type nature of the business.

The above comment is of course if somewhat of a generalisation as some areas of general insurance have had less competition in the past and certain areas are less commodity-like. Nevertheless there appears to be some relationship between these factors.

The question is therefore how should these issues be reflected in an assessment of fair premiums. It also raises the question as to the appropriateness of the CAPM in assessing appropriate profit margins. In particular, is it 'fair' for companies to earn higher rates of return given greater market concentration?

Alternatively, is it fair to penalise the insurance industry for being a difficult industry in which to make profits? It should be noted that insurer share returns in the US market have been close to market returns. Actual insurer profits are commented on further in Section 5.1.

2.5 Is CAPM a tractable method?

The lack of comprehensive alternatives makes it difficult to abandon CAPM totally. The evidence appears to indicate however that the CAPM approach has certain limitations when used as a basis for calculating insurance margins. The difficulty in determining appropriate parameter values and fact that CAPM does not capture certain factors affecting profitability are significant issues for this model.

3. Insurance and regulation

3.1 Why might profit margins be regulated?

Why regulation?

Insurance pricing restrictions have already been discussed in an earlier paper by the author [4]. The question as to why insurance and insurance profit margins are regulated is generally due to three factors. The first reason is that many insurance products are considered to be a public good [19]. Considerations such as affordability, 'fair' pricing, coverage, access, pricing stability and guaranteed payment are therefore considered important. Regulations designed to assist these considerations may have a direct or indirect effect on profit margins.

A second reason (which is related to the first) is that many classes of insurance such as CTP and workers' compensation premiums are seen as taxes. Governments are therefore seen to be directly responsible for premium levels. It is often politically easier to control rates, alienating only non-voting insurance companies, rather than benefits. Such an approach may however be detrimental in the long run.

The third major reason for regulation of insurance and particularly insurance profit margins is where the market is flawed. Flaws can include a lack of competition or the dominance of particular market participant(s), barriers to entry or market failure in one or more areas.

It is not the intention of this paper to discuss the pros and cons of regulation. It should be noted however that regulation frequently produces inefficiencies that are more undesirable than the disadvantages of not regulating. Ironically, further regulation may be seen to increase insurance company risk and therefore actually require higher profit margins.

Justification for margins

Insurance companies have been required to submit pricing details for CTP insurance since the inception of the privately underwritten NSW scheme and from 2000 for the Queensland scheme. Insurers are facing increasing filing requirements (including profit margin details) for Tasmanian workers' compensation business.

More recently companies have also been subject to ongoing scrutiny by the ACCC. It is also the case that public awareness of increased profit margins via higher insurance company profits is likely to lead to more scrutiny of company margins.

The result of this greater scrutiny is that companies may be required to better justify profit margins than has been the case in the past. Companies will therefore need to have a sufficiently robust and justifiable method for determining margins.

3.2 Current market competitiveness

An important concern in the debate regarding profit margin regulation is the extent to which competition is sufficient to ensure that reasonable, but not excessive returns are earned by the insurance industry. The current level of competition in the Australian market is discussed below. Appendix A lists the ACCC factors currently used to assess competition during a merger.

Market concentration

The general insurance industry has become significantly more concentrated over time, particularly in the last five years. The top five insurance companies now control 78% of all non-reinsurance premiums[1]. This figure of 78% is actually greater than the equivalent figure of 74% (measured by assets) for the banking sector[2]. In certain sectors market share is very heavily concentrated, one example being Queensland CTP where the top two companies have a total market-share of approximately 82% of the market.

The reduction in the number of players has inevitably reduced the amount of competition. The question is whether competition has reduced to an undesirable level. The answer to this question is significantly dependent on the barriers to entry for new players.

Barriers to entry

Insurance offers barriers to entry that vary in significance depending on the product involved. Such barriers include the need to:

- develop brand recognition (mainly consumer lines)

- develop intermediary relationships

- gain underwriting expertise

- set up a viable claims management operation

- gain sufficient and reliable data for pricing

- have computer and administrative systems to manage the product

- raise capital and meet minimum capital requirements

Whilst these barriers make it difficult for new entrants to start from nothing in a particular product line, the barriers are less significant for either an existing player looking to expand into a new line of business, or for an overseas player with international experience in a particular area. The barriers are also less significant for certain commercial classes and for top-end corporate business that may be able to insure via overseas domiciled insurance providers.

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[1] Calculated from June 2002 APRA General Insurance statistics. Allowance has been made for reinsurance within group companies.
[2] Source: APRA Banking statistics as at March 2002.

The last few years have seen a number of new companies registering to conduct general insurance business. These new entrants have generally been set up to write particular niches of the market. These insurers will not have the scale of the existing top five (at least initially). Nevertheless, the introduction of these new insurers is an indication that the barriers to entry are not preventing market entrance.

Another indication that the level of competition in general insurance is sufficiently robust is the ACCC's acceptance of recent mergers within the industry. The acceptance of the purchase of the Australian operations of CGU by IAG indicates the ACCC's view that despite increased concentration competition is still sufficient.

It is interesting to note that historically insurance margins have been poor [18]. Poor profit margins are a classic indicator of high (or excessive) competition. Recent reported results have generally been much better than past periods, perhaps as a result of reduced competition. It is not clear however whether this is the start of a sustained period of better capital return, or simply an intermission, after which insurance industry returns will again be relatively poor.

Market failure and intervention

Intervention may be required in the circumstance of market failure. Market failure occurs when the market is unable to reasonably supply a good or service. Intervention is often required in this circumstance.

It is the author's observation that government intervention in the general insurance market has been significantly due to circumstances where insurance costs have become both very high and/or difficult to calculate. As noted below in Section 3.4, the principles of insurance require losses to be assessable and capable of definition.

Recent examples of government intervention include reform in the areas of medical malpractice, public liability, professional indemnity, builders warranty and terrorism insurance. In each of these cases, intervention has come about due to an unwillingness of insurers to commit capital to coverage areas that were perceived to have uncertain and/or excessive claim costs.

The issues are generally therefore a combination of high underlying costs, difficulty of loss assessment and a reduction in risk appetite, rather than a lack of competition. With greater market concentration however, reduced competition may become a more significant issue going forward.

Conclusion

Whilst competition has reduced, the general insurance industry is still highly competitive and sufficiently open to new entrants such that regulation on the basis of insufficient competition should not generally be required.

3.3 File-and-write

File-and-write is a method used in many jurisdictions to control and influence prices. It is the author's observation that file-and-write requirements have generally led to more stable markets in these jurisdictions. This in turn has limited the extent of irrational behaviour and generally led to higher profits (or lower losses). The more stable profitability (See [18]) is significantly a result of the disciplined pricing process which file-and-write enforces upon insurers, thus preventing extreme examples of over/under-pricing.

File-and-write does however have the disadvantage that it restricts an insurer's ability to react to market conditions. File-and-write also depends upon the regulator appropriately balancing public and company needs. Despite these above disadvantages, the file-and-write benefits of intelligent and informed competition generally outweigh the problems.

3.4 Can everything be privately insured?

The current IAA General Insurance textbook defines an insurable event as having a number of characteristics including:

> "…The frequency and magnitude of the expected loss must be assessable …The circumstances of a loss must be capable of definition…" [21]

As noted earlier in Section 3.2, the causes of insurance crises are often due to insurance costs being high and/or difficult to calculate. When regulation is being applied, the above quote should be borne in mind, as not every potential event of loss may be able to be efficiently covered by a private insurance company.

It should be noted that if the above conditions are not met, certain types of insurance might still be viable as long as the loss costs are not excessive. The main difficulty when the above conditions are not met is that insurers may either over-price, reaping excessive profits, or under-price and risk financial ruin and non-payment of claims.

4. Alternate frameworks

Below are a couple of alternative frameworks for determining appropriate capital allocations and profit margins. These frameworks are not a definitive examination of the capital allocation field, but rather a couple of ideas from my examination of the literature.

4.1 Allowance for friction

The frictions approach attempts to explicitly calculate the inefficiencies of the risk diversification process. These inefficiencies or 'frictions' are one explanation as to why insurance companies require more than the risk-free rate of return. Frictions in general insurance include the desire to avoid costs of financial distress (offset by the value of the default option), agency costs (lack of transparency) and regulatory restrictions.

Note that the actual cost of reinsurance could also be considered a friction, but is generally more thought of as a cost. Due to information asymmetry and inefficiencies in risk diversification, the actual cost of reinsurance is often higher than the theoretical price.

Taxation could be considered a friction but is also more generally treated as a cost. Models are generally done on a net of tax basis, thereby accounting for this 'cost' of doing business.

Advocates of the frictional approach state that frictional costs are "…not explicitly captured by CAPM." [1, p.14]. The difficulty with the view that additional return is required for frictional costs is that it may be thought that the frictional costs mentioned are costs that are also faced by other industries (to a lesser or greater extent). These costs and risks it could be argued should therefore be taken into account in the returns that the market allows general insurance shareholders.

4.2 The value of skewness

Investors and skewness

Several approaches have arisen in recent times giving some value to the skewness of insurance risk. It has frequently been noted that investors dislike negative skewness and put significant importance on the avoidance of losses. The majority of people are risk-averse and are therefore generally keener to avoid a loss than to make an equivalent profit.

Whilst people dislike negative skewness, they are actually attracted to positive skewness. The popularity of lotteries and casinos demonstrates how positive skewness attracts a premium. The same desire for positive skewness can be seen in the popularity at times of internet and small mining stocks. These stocks in total may have poor future earning prospects compared to other investments, but offer the possibility of great gain if the right stock is selected.

Insurers and skewness

Methodologies valuing skewness for insurers are demonstrated in several papers including Kozik [13]. Empirical evidence of the value of skewness includes:

> "Harvey and Siddique conclude…that "Systematic skewness is economically significant and commands a risk premium, on average of 3.60 percent per year…systematic skewness is not only statistically significant but also economically significant."" [13]

The value of negative skewness is shown by the reinsurer charges made for catastrophe premiums. Actual experience shows that reinsurers charge significantly higher profit margins for higher coverage layers. In part this may be due to the higher capital requirements of such contracts, but it may also be a result of the highly skewed outcomes to which the company is exposed.

Insurance is of course a business with significant negative skewness. Positive operational 'surprises' are the exception, rather than the rule. As Warren Buffet noted:

> "When a claim manager walks into the CEO's office and says "Guess what just happened", his boss, if a veteran, does not expect to hear it's good news. Surprises in the insurance world have been far from symmetrical in their effect on earnings." [25, p.11]

Benefit change and runoff risk

A particular source of skewness for insurers risk is the introduction of additional benefits into a long-tailed insurance class after premiums have been paid for the exposure. The risk of benefits changing materially every 10 to 15 years is a potential risk for which no allowance is generally made in pricing. It is often the case that changes made to prospective claim costs have significant retrospective reserving effects.

Runoff risks are also significant and pose many risks for an insurer. Runoff portfolios as a rule tend to have much more downside than upside. Problems in managing such a portfolio include the difficulty in gaining and motivating staff. There is also the problem of limited governments interest in restricting runaway claims costs for what closed business.

The cost of asbestos-related claims in both workers' compensation and product liability is one example of significant escalation in runoff costs. Both the old NSW CTP and NSW workers' compensation schemes (for non-asbestos claims) are examples of runoff portfolios where costs have silently escalated for many years.

A premium for skewness?

The question is therefore how one should reconcile the apparent premium that individuals place upon skewness versus the CAPM view that such premiums should not attract a higher return on capital unless the risk is non-diversifiable.

If one invests in enough general insurance companies, the asymmetric nature of the loss distribution should be removed via application of the central limit theorem. It may however be the case that not all downside risk is fully diversifiable, therefore some of the risk may attract a premium, or alternatively not all investors may be able to fully diversify.

5. Profit margin issues

The practical determination of profit margins should take into account several considerations and issues when determining final figures. Some of these factors are summarised below.

5.1 Insurance company profits

A relatively recent Sigma [27] report estimated the total returns in the non-life industry averaging 12.3% (including unrealised capital gain appreciation and presumably after-tax). This compares closely to the average ROE of the S&P 500 of 13.3%. Another source estimated the overall ROC of US corporations for the last 30 years to 1996 as being 12% [22, p.262]. It is interesting to note that the ROE of the insurance industry appears to have been comparable, but slightly lower than that of a reasonable proportion of the overall financial markets. Under a CAPM framework the above result would be the observed result of an insurance β that was slightly negative.

It should be noted that the above estimates do not cover include the effects of September 11, which would presumably reduce the non-life industry's ROC, nor the higher profitability that has been earned on business since September 11 as a result of worldwide rate rises. They also do not take into account the general stock market's fairly parlous returns since 2000.

Another consideration is that from 1985 to 2000 we have probably seen the world's largest stock market bull market. It may be the case that the last 20 years are not representative of the next 20 years!

Whilst therefore one should be careful of drawing conclusions from the above data, it can probably be said that general insurance stockholder returns are comparable to returns from other stockholder companies.

5.2 Corporate aims and reality

Druissi and Collins [8] noted that the majority of companies had target after-tax ROC rates ranging from 10% to 18%. Historically at least there is a moderate gap between desired and achieved ROC. The Sigma [27] study quoted above estimated that companies had actually achieved an average return on equity of 12.3% (including unrealised capital gain appreciation).

It is interesting to note that after-tax ROC targets of circa 15% are set in many other industries. These targets are however only infrequently met due to the competitive nature of many industries.

One suspects that the reason for the past targeting shortfall in general insurance in Australia has been significantly due to the industry (historically at least) being a fragmented commodity industry as noted in Section 3.5 earlier.

The under-performance may also be due to the various unexpected (and perhaps underestimated and under-priced) events that effect insurance companies. It may well be the case that to achieve a particular ROC, a higher rate should be targeted to allow a margin for the unexpected.

5.3 Insurance risk and diversification

Insurance risk value

One of the central issues as to the appropriateness of the use of the insurance CAPM relates to the question as to whether insurance risk is fully diversifiable and therefore has value. Evidence that this risk is not fully diversifiable is partly suggested by investors' treatment of skewness as discussed in Section 4.2 above and has been discussed earlier in section 2.2.

The CAPM view that non-systemic risk has no value is harder to apply on a company level. Whilst reinsurance is able to greatly reduce and spread risk, the purchase of reinsurance is not a perfectly efficient process.

Individual insurance company management tend to make decisions on the total risk held by the company, rather than making distinctions between diversifiable and non-diversifiable risk. Methods that allocate capital within an insurance company also do not make this distinction.

It is the need to reconcile the differences between the macro view of CAPM and the micro view of company capital allocation that is one of the most significant issues of capital allocation and profit margin determination.

Why not liquidate?

A significant argument against the view that diversifiable risk attracts no value is that this implies there is no incentive to participate in the business of insurance. Any rational owner of an insurer of diversifiable risk would do better by simply liquidating their business and investing the proceeds in the market.

The fact that investors do not generally take this alternative suggests that either diversifiable risk has value, the majority of investors are deceived about their ability to earn appropriate profits through insurance, or that insurance company investors perceive insurance companies have a slightly negative β and are willing to accept below market returns.

The truth is probably a combination of the first and third reasons. The existence of franchise value (further discussed below) allows a firm to charge for at least some diversifiable risk. The evidence from Section 5.1 suggests insurance firms may have a moderately negative β, although the significant limitations expressed in Section 2 should be noted.

The second proposed reason that the majority of investors are deceived with respect to insurance companies has some appeal. However whilst equity markets are clearly not efficient in many respects, it is perhaps less likely that investors have been deceived about the insurance industry over the long run.

Conclusion

In practice insurance risk is never fully diversified, as not all investors and companies are able to fully diversify their holdings. The frictions mentioned in Section 4.1 and the franchise value mentioned in Section 5.3 result in a higher return. Non-diversifiable insurance risk may therefore attract some value.

5.4 Franchise value

A particular problem with calculating margins on insurance (and for other industries) is the issue of intangible assets such as brand and relationships. These may represent expensed costs that have residual value, or alternatively they may represent intangible value created by company management. Calculations of general insurance profit margins often are based only on the balance sheet capital of an insurer. The traditional insurance CAPM ignores the value of these assets.

The majority of listed companies trade at a premium to their Net Tangible Assets (NTA). The gap between market value and balance sheet value could be considered to be hidden capital and should therefore be included in some way in the profit margins capital base.

Advocates of the frictional costs view discussed in Section 4.1 regard a significant part of the intangible as representing the value of the company arising from the frictional costs involved in transacting insurance.

One approach to including these components is to capitalise the difference between an average market and balance sheet value [7, p.12]. This Enterprise Value (EV) should consist of the balance sheet capital, plus a margin for the business value of the firm. The difference between the balance sheet and stock market valuation of a firm is the franchise value or hidden capital.

One issue with this approach is that market values can vary quite dramatically over time, thereby generating significantly different answers. A related issue is that the use of franchise value can lead to a circular argument. A higher margin over NTA is normally given to companies that are earning higher profit margins. The extra margin over NTA then justifies a higher level of profit margins.

5.5 Operational and other risks

A consideration when determining appropriate profit margins is the need to allow for risks other than those directly related too claim variability. These additional business risks are not generally reflected in individual profit allocations. The type of operational risks faced include:

- General business risks include expense blowouts, theft, IT system problems etc.

- Regulatory risk and other legal related risks.

Regulatory risk is not insignificant and can occur in many ways. The introduction of the GST is one example of this type of risk. The GST led to a significant one-off increase in the cost to settle outstanding claims for which only partial offsetting benefits were offered.

6. Profit margin calculation

6.1 Introduction

Set out below is a discussion of some of the issues involved in determining profit margins for a general insurer. Some suggestions have been made as to a practical approach to the task.

These suggestions have more been provided as an example and illustration rather than a definitive approach to this problem. The author acknowledges the large number of potential approaches available to solve this problem. It is hoped that the following may be useful as a basis for further discussions and developments in this area.

6.2 Estimating the capital basis

What is the appropriate basis?

One issue faced when determining profit margins is the actual capital base to be used for calculation. As noted earlier in Section 5, some consideration needs to be given as to any franchise value, intangible value and/or hidden capital.

Consideration also needs to be made as to whether excess balance sheet capital should be recognised and/or rewarded. In some cases the appropriate capital base may be decided on the basis of meeting a particular external requirement. A company may for example be committed to maintaining a particular rating agency level, keeping a fixed percentage above the APRA minimum capital requirements and/or meeting a parents capital requirements.

The decision as to what is the appropriate amount of capital to use for a base is harder when determining fair profit margins. The capital strength of the average insurer could be used for the calculation, however the calculation would then ignore the benefit that accrues to policyholders in having the security of additional capital.

Enterprise value

The decision becomes more complex when one considers that the balance sheet capital should probably form only part of the capital base. A number of companies when determining their required return will use an approach which calculates return on a capital base which has some relationship to the company's share price.

The rationale behind this method is that over the long run, the share market should reasonably value the additional hidden capital and other intangible assets of the company. This value may be defined as the company's Enterprise Value (EV).

This approach has been used in the example in this paper as the author. It is not the only approach and has significant limitations, particularly with respect to the fluctuations and over-shooting of markets, but nevertheless has some merit.

6.3 Enterprise value approach

Ratio of NTA

Enterprise Value can be estimated by examining the long-term average ratio of market price to NTA. Such an average could form a starting point to assess total company value. Selecting the actual value to be used should not be a mechanical process, but should significantly take into account the individual company characteristics.

The table below shows the Price/NTA ratios of the two (relatively) pure general insurance stocks listed on the Australian Stock Exchange. The figures used were based on share prices as at the 11th of July 2003:

Company	NTA per share	Price per share	Price/NTA
	$	$	
Insurance Australia Group	1.41	3.53	2.50
QBE	3.96	9.14	2.31
Average			2.41

Note that Promina has not been included above as the stock had just listed. Note also that Promina is part general insurance, part life insurance and part funds management. The average from the above table is a figure of 2.41. Note also the limitation that QBE has a majority of business written overseas. IAG has some non-general insurance business, but this is a relatively minor part of the groups business at present.

Another source of the Price/NTA value is the ratio for which companies will pay for acquisition. The following figures have been taken from a past paper [26]:

Aquirer	Target	Price/NTA
AMP	GIO	2.30
IAG	SGIO	3.40
HIH	FAI	1.43
Allianz	MMI	1.56
Average		2.17

Interestingly, despite the takeover premium that tends to be paid in such acquisitions, the average of the above table of 2.17 is actually lower than the average of 2.41 from the previous table. The difference is probably explained by two facts.

Firstly is the observation that general insurance company shares have been rated more highly in recent times. This is as a result of the market observing the effects of more rational pricing in the market. This more rational pricing is in part a result of greater recent market concentration.

The second reason was that MMI and FAI were recognised as being inferior assets at the time of their takeover. The weaknesses of these companies were therefore to some extent already reflected in their valuations. Both GIO and FAI were subsequently found to have significant issues after purchase, but that is another story!

The final determination of the Price-to-NTA ratio will be a matter of judgement. The determination will need to be tailored to the individual company circumstances and adjustment made for individual accounting issues. This method has the disadvantage that share prices vary considerably over time, thereby generating significantly different margins at different dates.

It is interesting to note that some techniques of equity market 'value' investing use the ratio of market assets to net tangible assets as one of several value criteria for both individual stocks and markets as a whole.

Estimating the Balance Sheet Capital

The next step of the process is the estimation of the NTA or Balance Sheet Capital (BSC) of the company. The BSC for general insurance companies is generally quite close to the capital base used for solvency purposes, with modifications.

The BSC should exclude excess capital not required by the business and intangible assets. The BSC may be estimated by several methods including:

- APRA minimum capital basis, plus a percentage to form a safety buffer above the minimum.

- Dynamic Financial Analysis (DFA) model (whether used for APRA solvency purposes or not).

- Rating agency capital requirement. A company may wish to retain a level of capital that retains an 'A' security rating.

- Overseas parent capital allocation model (which may use one of the previous methods listed above).

One company may have to match several of the above capital bases, making the determination of the final method difficult.

Once the BSC and Price/NTA value has been selected, the EV is estimated as simply the multiple of these two figures.

6.4 Rate of return required

Financial year versus fair return

One issue that needs to be taken account of is the difference between the balance sheet return on capital and the return on capital of a cohort of policies.
The fair value of premiums and profit margins are generally calculated on the expected cash flows of a policy. The return on equity of a company however is based on the profit earned during the calendar year.

For a company that is in a steady state the difference in results between these two methodologies may be fairly small. A company that is growing or reducing a particular line-of-business will however have similar results. The reason for this difference is that each product will have a particular 'profit signature' that will not normally release profit evenly over the term of the policy. A policy will normally have an initial new business strain followed by a series of profit releases over time.

One approach to overcome this would be to estimate the required profit margin as the average of the profit releases applying across the term of the policy cash flow dates weighted by the relative proportions of business currently at each date. This calculation will require estimation of the profit margin and signature for each product.

Issues in determining the return

The required company rate-of-return is a more difficult factor to estimate and the factor most open to differences of opinion. It has been shown in Section 2 how it is difficult to use the CAPM approach to estimate return. The question of what premium for risk should by added for owning stock in an insurance company nevertheless needs to be answered.

It firstly should be noted that the rate of return calculated should depend upon the base used for capital. The rate will vary depending upon whether balance sheet capital or the EV of the company is selected. Note that if EV is used as the capital base, the profit margin calculation will need to take into account the increase in franchise value as well as the insurance profit and investment return.

Secondly a decision needs to be made as to what return can be reasonably expected relative to any market return. Historically it appears reasonable to assume either the average market return, or a figure that is slightly lower.

Thirdly consideration should be given as to the actual advantages or disadvantages a company actually faces in its current position. The extent to which this should be considered will depend upon the purpose of the analysis. If the analysis is to determine fair premiums, then this may be irrelevant, but if the purpose is to measure management performance then this adjustment is highly significant. A company should have higher expectations for a business unit with a strong brand and dominant market position.

Finally consideration should be given as to whether the returns of recent years are a reasonable guide for future years. It may well be the case that the high stock market returns of the past few years may not be maintained [29]. This may result in lower market returns in general and lower expectations for non-life insurance companies.

Example of return calculation

The market rate of return may be calculated as the risk free rate plus the equity risk premium. If one assumes that current risk-free rates are 5.8%[3], and assuming an equity premium of 4.5%, this would result in a market return of 10.3%.

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[3] Based on RBA 10 year bond rate statistics for 13 July 2003.

If alternatively the CAPM framework was adopted and it was assumed that general insurance companies had a β of –0.2, this would result in a required return of 9.4% on balance sheet capital.

6.5 Profit margin allocation

Profit margin basis

The profit margin should be equal to the difference between the required return on capital and the expected return from associated investments. Assuming an appropriate capital base, required return and investment return is selected, the next step is to allocate the capital by product and determine individual product profit margins.

The conventional method for expressing profit margins is as a percentage of premiums. A more accurate and correct allocation method is to allocate premium as a percentage of claims costs. Although there is some variability in expense levels, the profit margin is effectively required to meet the claims uncertainty.

Variety of approaches

The purpose of capital allocation by product is that it ultimately allows appropriate profit margins to be calculated on a per product basis. There are a large number of methods to determine capital allocation.

Capital allocation by product should be determined after the appropriate capital base is selected. It should also be made after adjustment is made for differences between margins determined via the policy cohort approach compared to the financial year margins which are to be determined. It should be noted that the methods noted below are generally applied to balance sheet capital, as allowance for hidden capital and/or franchise value is often difficult in practice.

An excellent survey of capital allocation methods is made in Venter [23] and has been used as the basis for commentary in this section. Venter notes a total of four approaches for capital allocation as follows:

1. Selecting a risk measure and an allocation method and using them to allocate all capital.

2. Comparing actual versus model pricing by business unit.

3. Computing the cost of the marginal capital needed for or released by target strategies

4. Evaluating profitability in comparison to a leveraged mutual fund.

The first set of approaches is a relatively popular method of allocating capital. The second method includes the CAPM approach and has the limits thereof. The third and fourth methods whilst useful are less well known.

The CAPM approach is valuable in that it relates returns to the market and to the universe of securities. It is this macro view that makes CAPM popular for overall required returns.

Risk allocation measures are more popular within companies. These approaches in contrast to CAPM do not distinguish between diversifiable and non-diversifiable risk. The risk allocation methods include the more traditional methods of capital allocation. These methods are commented on in further detail below.

Risk allocation approach

Ventor divides risk allocation approaches into two parts, the first involves deciding which risk measure is to be used, the second involves determining how to allocate the risk measure across the company's products.

The risk measure is the quantification method that is used to determine the relative riskiness of different lines of business. Ventor's measures may be allocated into four types. The first group of risk measures described are those related to Value-at-Risk (VaR). The VaR measure is generally the expected loss for a particular percentile of loss. Such measures are used significantly in banking, but to a lessor extent in insurance companies.

The second group of measures are those based upon deviation, including standard deviation, variance and semi-variance. These measures are generally the most popular ones for capital allocation. The last two types of measures are the Cost of Default Option and the Mean of Transformed Loss. These measures are less frequently used.

Allocation measures

There are several allocation methods once the risk measure is determined. Further detail is given in the Ventor paper, however some of the issues of these methods include:

- Whether to allocate on a proportional basis or a marginal basis. If a marginal basis is used the question is whether you use the marginal cost of adding an additional policy, or the marginal cost of adding the product to the mix of other products.

- How to allow for different types of risks that might have different distributions of outcomes.

Several good papers have been prepared which detail the methods by which the capital allocation and resultant profit margins may be determined. One good paper is "Reinsurer Risk Loads from Marginal Surplus Requirements" [14] by Kreps. Another good source is "Capital Allocation for Insurance Companies" [30] by Myers-Read

Other allocation issues

It has already been noted in Section 6.2 how the overall allocation of capital may be affected by APRA, rating agencies and/or parent capital requirements. These affects may also need to be considered when allocating capital to individual products.

It is preferable that the internal allocation of capital should not be too different to these external standards. If differences are too great, then it may result confusion as business decisions meet one allocation standard, but fail to meet another.

7. Conclusion

7.1 CAPM and regulation

Regulation of insurance pricing occurs both due to perceived market flaws and because insurance is seen as a public good. This regulation often requires actuarial assumptions to be declared and the profit margin justified.

The determination of insurance profit margins using CAPM based approaches has the significant limitation that the key assumption of the Liability β cannot be reliably determined. The method also does not take into account other factors affecting industry profitability. These significant limitations should be borne in mind when using CAPM for determining insurance profit margins.

7.2 Calculating profit margins

It is the author's view that whilst in theory, risks which are able to be fully diversifiable against the overall market should have no value, in practice, the limited depth of the market, and the inefficiencies of practical diversification mean that some value is given towards this risk.

The author believes that the determination of profit margins may be improved by taking into account at least some of the franchise value of the company. This approach is however more difficult to apply due to difficulties in estimating what basis should be used. It is the authors understanding that many companies are already using such a process internally.

Historically the returns earned by insurance companies appear either similar or slightly less than for the overall market. The determination of the required return for an individual company should only however use such figures as a starting point. The final selected return should take into account many other issues. Consideration should be given to targeting a profit margin higher than required to compensate for unexpected events.

The types of risks covered by insurance companies and their downside nature make the determination of insurance margins a particularly difficult task. Any method used to determine profit margins therefore requires significant judgement. The final result of any method needs to be reasonable compared to both market returns and corporate practice.

7.3 Final Comments

> *"I have yet to see any problem, however complicated, which, when you looked at it in the right way, did not become still more complicated."*

Poul Anderson (1926 -)

This paper was commenced in an attempt to better understand and improve the determination of profit margins. The universe of knowledge in this area is both substantial, complex and in some cases contradictory. It is hoped that this paper has contributed positively to the estimation of such margins.

Appendix A: ACCC Merger Factors

ACCC list of requirements with respect to mergers[4]:

5.25 In evaluating whether a merger is likely to have the effect of substantially lessening competition in a substantial market, section 50(3) requires regard to be had to a non-exhaustive list of 'merger factors':

a.   the actual and potential level of import competition in the market;
b.   the height of barriers to entry to the market;
c.   the level of concentration in the market;
d.   the degree of countervailing power in the market;
e.   the likelihood that the acquisition would result in the acquirer being able to significantly and
f.   sustainably increase prices or profit margins;
g.   the extent to which substitutes are available in the market, or are likely to be available in the market;
h.   the dynamic characteristics of the market, including growth, innovation and product differentiation;
i.   the likelihood that the acquisition would result in the removal from the market of a vigorous and effective competitor;
j.   the nature and extent of vertical integration in the market.

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