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**FREE COVER LIMITS AND GROUP UNDERWRITING IN SOUTH AFRICA**

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ABSTRACT

Both in South Africa and abroad, insurance companies follow a range of different approaches both in setting Free Cover Limits (FCLs) as well as the level of underwriting they do above the limit. In practice, most FCLs are quoted after a manual and subjective change to the "theoretical result", with FCLs as high as twice the "theoretical value" sometimes quoted.

This paper takes a critical look at current market standards, both locally and abroad, with a specific focus on different providers' views as to the appropriateness in terms of general approach, the level of FCLs and underwriting and competition in the market. A stochastic approach is used to evaluate various different FCL approaches and the underwriting done above it, based on a sample of actual group risk schemes.

The paper aims to provide the group risk market with an overview of the science and technical considerations behind FCLs and underwriting in the group market.

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## 1. INTRODUCTION

In the 2005 paper "Current Issues in South African Group Life Insurance" by Lewis et al the authors point out that group business has attracted little formal discussion in South African actuarial circles. Whilst this comment is certainly true, it is even more relevant as far as the topic of Free Cover Limits (FCLs) and underwriting in the group market is concerned. In fact, even on the international front, the subject of FCLs and optimal group underwriting has not been particularly well researched.

The question might well be asked why we decided to focus our research on what could be regarded a specialized area of interest. However, in the otherwise commoditised group insurance market, FCLs, together with quoted premium rates, play a key role in the decision-making process of where schemes are placed, usually because the decision makers are directly affected by the level of the FCL. The topic is therefore of direct relevance to any insurer who wants to successfully operate in the group space.

## 2. DISCLAIMERS

The purpose of our paper is two-fold. Firstly, we aim to provide an overview of current practices with regard to the underwriting-related aspects of group insurance. Secondly, using stochastic modelling techniques, we attempt to assess the value of underwriting and the merits of alternative approaches to underwriting in the group arena. Current practices in the South African environment are then discussed with commentary highlighting key learnings from the modelling we have done.

Any opinions expressed in this paper are our own, and do not necessarily reflect those of our employer, RGA Reinsurance Company of South Africa Ltd, or the Actuarial Society of South Africa.

## 3. WHAT IS A FREE COVER LIMIT?

FCLs are thresholds, set at scheme level, up to which individual scheme members can obtain group insurance without providing evidence of health. Any members with cover amounts exceeding the FCL will have to satisfy the insurer's underwriting requirements for the amount of cover in excess of the FCL. Such underwriting above the FCL is similar to the underwriting process used in individual life business, with the key difference being that a group life member cannot be refused any cover below the FCL regardless of his / her health status. The FCL is usually expressed as a monetary amount of benefit (or occasionally of salary).

The most widely used term in South Africa is "Free Cover Limits", however in other parts of the world other terminology is used, some of which perhaps describe the concept better (the cover below the FCL is after all not "free"). Alternatives include Automatic Acceptance Limit / Level, Guaranteed Issue Amount, Non-Medical Issue Amount, Evidence Free Limit and No-Underwriting Limit, among others.

4. PRINCIPLES UNDERLYING GROUP INSURANCE

Group risk insurance is typically known for its low levels of underwriting, enabling people of substandard health (who would find it difficult to take out an individual policy) to still obtain insurance. This meets a potential need for employers to offer attractive employee benefits, or to ensure dependants have at least some minimal level of support, but it can expose the insurer to the risk of anti-selection. The minimal underwriting used in group insurance can nonetheless be justified by considering the following fundamental requirements that have to be met before the risk can be taken on:

- **Nature of Entity:** Group insurance is generally only granted if the group was formed for another reason than to obtain risk insurance – the group's existence should therefore depend on a different reason. This is clearly the case for employer-employee relationships. This principle is less relevant as far as affinity groups are concerned, explaining the need for the stricter risk management approaches used in this line of business.

- **Eligibility Conditions:** Members of the group should not have any discretion as to whether they are to be covered or not. Eligibility conditions should be clearly set out in the rules of the scheme in order to avoid anti-selection on the part of members in poor health. Probably the most important eligibility condition is the actively at work requirement. Again, this principle gets more strained for affinity groups, especially groups like burial societies, where neither this nor the previous principle necessarily holds.

- **Size of Benefits:** There should be no subjective choice with regard to the determination of benefits per member as this could provide substandard lives with the opportunity to choose higher levels of coverage. Instead, members' benefits are to be determined on an automatic basis. In South Africa, a formulaic approach is usually used, e.g. for death and other lump sum products the benefit is usually expressed as a multiple of salary, and set at a sensible relationship to salary.

  In cases where the member is granted some choice as to the level of his / her benefits, the underwriting conditions have to be tightened in order to control anti-selection risk. This, together with the eligibility conditions, is precisely the reason for individual policies being subject to more rigorous underwriting than group policies. The same issues are relevant to voluntary benefits under a flexible risk benefits arrangement.

5. WHY IS EVERYBODY NOT UNDERWRITTEN?

Underwritten lives have lower average mortality than similar non-underwritten lives. By ensuring the amount of underwriting done is appropriate, i.e. by limiting the underwriting done to only those tests that can be done cost-effectively (see section 8), underwriting can

in most instances pay for itself and still result in cheaper rates overall. So, why is everybody not underwritten? There are several reasons why extensive underwriting is not done for group insurance:

- It is in the interest of all the parties involved – insurer, employer, intermediary, employee – that the process is kept as straightforward and simple as possible, as underwriting is a costly and time-consuming process.

- There may be a desire for the employer to ensure that all employees have some cover, even if this results in a higher rate than would otherwise be the case. Cover to all employees would not have been the case, had everybody been underwritten.

  o Such benefits to all staff help to avoid the situation where the employer feels obliged to provide some benefit in the case of an employee who died.

  o Alternatively, some group risk cover might be considered part of the essential minimum employee benefits package that all employees expect from an employer.

  o Another driver to provide cover for everybody from the employer's side might be possible employee concerns in terms of discrimination. This ties in with the pre-benefits testing vs pre-employment testing debate.

- There exists a host of alternative risk management tools that are used in group insurance, some of which are consequences of the nature of group insurance and not necessarily tools that are actively employed by group insurers. These serve to minimise the risk of anti-selection, reducing the need for underwriting. These risk management tools are discussed in section 7 of this paper.

- The waiver of underwriting below the FCL is "in the experience" and therefore reflected in the theoretical and / or experience-rated premium rates that insurers charge. Limited underwriting and the offering of FCLs have become the norm in the group insurance market and in order to remain competitive and participate in this commoditised market, individual insurers have to continue following this practice.

6. WHY DO SOME MEMBERS NEED TO BE UNDERWRITTEN?

There are two key reasons for underwriting:

1. To reduce the mispricing risk (the risk of misestimating the average experience for the group). Anti-selection is a prime example of something that can result in claims being different to what is expected according to the pricing basis, so removing or reducing anti-selection makes it more likely that the premium rate is right on average.

2.  To reduce the risk of volatility in claims experience.  Even with the correct premium rate, random fluctuations can result in claims in a given year being very different to the premium.  Reducing the variability in the amount of cover given to people without underwriting reduces the risk of large claims distorting experience.

Our modelling and research show that underwriting has significant value in reducing the former and limited success in reducing the latter.  The key reason for this is that material volatility can still occur after underwriting has been done, as underwriting cannot identify and remove or limit all large claims.  Some claims are difficult or impossible to predict (see section 10).

From a volatility perspective, even when a group scheme is compulsory for all members, and members do not have any discretion as to the level of their benefits, the risk still exists that the experience of the whole scheme can be adversely affected by the experience of a few of the top lives.  This is because group schemes typically have a skewed distribution of salaries, and therefore benefits, with a small proportion of the membership entitled to benefits that are significantly higher than the average.

Where members do have some control over the level of their benefits, the additional mispricing risk also needs to be managed.  Underwriting is a useful tool in doing so.  This is discussed further in section 15.

In order to remain both competitive and profitable, an insurer needs to ensure that premium rates charged are commensurate with the average level of risk taken on.  The group insurance pricing basis will inherently be based on an assumed distribution of health for the risk group concerned, for example that 80% is of better-than-average to average health, 15% should really be loaded, and 5% should really be declined (percentages just for illustration rather than realistic).  However, owing to random fluctuations, the risk remains that the distribution of any particular individual scheme will not conform to this assumption, with the result that the insurer's portfolio as a whole will not be aligned with pricing basis assumptions.  In order to better align the assumed and actual health distributions, it is necessary to carry out underwriting, the amount of which depends on, among others, the structure of each individual scheme, in particular:

•  the number of members;
•  the distribution of sums assured;
•  the age distribution of the top members (there is a bigger need to underwrite older individuals due to higher prevalence of health conditions); and
•  the differences between the covers of the top individuals (see discussion that follows).

Where a material slice of cover is underwritten, underwriting is more cost-effective.  As such, setting the FCL in such a way that all members who need to be underwritten are underwritten for at least a material amount at risk is more sensible than setting the FCL R1 below someone's cover.  This suggests that FCLs should usually be set just above

some given member's cover, preferably where there is a material gap between that member's cover and that of the member with the next higher cover level.


7. OTHER RISK MANAGEMENT TOOLS USED IN GROUP INSURANCE

Given the low levels of underwriting done in group insurance, it is necessary for insurers to control the risk of adverse experience in alternative ways, the tools available being:

- **Pre-existing Conditions**: This is in essence underwriting that is only performed at claims stage, and is usually applied to disability related products such as dread disease and disability income. No benefits are paid if, during a certain period (usually 12 months) following a member's joining of the scheme, the member submits a claim as a result of any illness, injury or condition that was known to the member, or for which he was treated or diagnosed for or displayed symptoms of, within a certain period (usually 6 months) prior to the member's joining of the scheme.

  The condition is mostly not applied to death cover, due to:

  - the employer's desire to provide beneficiaries with at least some benefit for all members in case of death;
  - the fact that the deceased is not able to defend his / her lack of knowledge of the pre-existing condition (contrasted to the situation on disability);
  - the reduced moral hazard (again contrasted to disability, where the member stands to benefit more); and
  - competitive pressure (with these being done away with over time).

  Applying a pre-existing conditions exclusion reduces the need for upfront underwriting, and makes sense from a cost-saving point of view given that "underwriting" is only performed on potential claims, and not the significantly larger number of members exposed.

- **Actively at Work Clause**: The risk exists that a scheme is formed to obtain cheap risk cover for substandard lives. This risk is minimised by the actively at work condition. It also helps to reduce the risk that a very unhealthy individual, for example a family member of a decision maker, is deliberately added to an existing scheme to get insurance cover. The basic requirement is that an eligible employee should be actively at work on the day that his / her cover in the scheme commences, or on the day on which his / her increased cover (either due to salary increases or a change in benefit structure) first applies. This requirement significantly reduces the impact of anti-selection in the group market, as it can be reasonably assumed that all members will be of such a minimum health standard that they are at least able to perform active and permanent employment for a minimum number of hours per week.

In theory the actively at work requirement should be applied more strictly to smaller schemes. These schemes pose a relatively higher risk of anti-selection due to the employer knowing each employee better. The requirement would more likely be waived for bigger schemes as it places a relatively more onerous responsibility on them in terms of administering the process.

It is common practice for existing schemes that move between group risk providers to be exempt from fulfilling the actively at work requirements on transition for existing members, provided individual members' cover amounts remain the same. There are several reasons for this:

- Should the scheme have remained with the previous insurer, there would not have been such a requirement. Insurers therefore waive the requirement for competitive reasons.
- Interruptions in cover are avoided. These would be regarded as unjust for members who have no control over the scheme's transition.
- The onerous need to keep track of temporary absentees on scheme transition is removed.

- **Actively at Work Selection** (as opposed to the actively at work clause): Scheme design, in particular the combinations of benefits offered to employees, could have an impact on mortality experience. For example, in groups with GLA and TPD cover, the GLA experience might be better than would be the case where GLA cover only is offered, as the TPD benefits serve to remove the worst lives from the GLA exposure. Similarly, GLA experience should be better on schemes without the cover-to-continue option (for GLA cover) on PHI.

  Both situations mentioned above are examples of actively at work selection, in that the TPD and / or PHI without cover-to-continue serve to remove the substandard lives from the GLA exposure. Given the differences in experience highlighted above, it makes theoretical sense to analyse GLA experience separately depending on what benefits are offered in conjunction with it. Failure to do so could introduce cross-subsidies within the pricing basis that could expose the insurer to mispricing.

- **Reduced Choice / Compulsory Membership**: Individuals apply for employment at a specific company for reasons other than to obtain insurance. Their joining therefore rarely poses any anti-selection risk. In addition, membership of group risk schemes is compulsory for all eligible employees and there usually exists no discretion as to the type and level of risk benefit. This compulsory nature ensures that the overall risk exposure taken on by the insurer is balanced and includes all the above average individual risks. In cases where choice is granted (flexible benefits), a minimum level of benefit is usually compulsory for all members, and additional optional benefits are only available at life events, such as marriage and child birth, and / or subject to increased levels of underwriting.

- **Risk Spread**: Due to group insurance generally being one-year business, and covering a large group of individual risks with different levels of health, it can be expected that the group as a whole should reflect an average level of health, which should be broadly predictable. By the "Law of Large Numbers", the bigger the group, the easier it is to predict the experience. Group pricing therefore involves estimating the overall risk of the group and is not directly concerned with any individual member's health.

  The substandard risks that remain in the exposure due to lower levels of underwriting than used in individual life insurance can be spread over the remaining lives in the group, who should be standard and above standard in terms of mortality and morbidity risk.

- **Health Screening**: This risk management tool is closely related to the actively at work requirement and is used by some employers, particularly those who offer employment that involves strenuous physical activity. Like actively at work, it acts as a select effect to ensure an implicit minimum level of health.

- **Waiting Periods**: Anti-selection is reduced, and risk therefore controlled, by excluding any claims that arise from non-accidental causes during the waiting period. The application of waiting periods is closely related to the pre-existing conditions exclusion, the differences between the two tools being:

  - Waiting periods can more easily be applied to death cover.
  - Waiting periods can exclude significantly more claims than pre-existing conditions, as all claims from non-accidental causes are excluded and not only claims from pre-existing conditions.
  - Pre-existing conditions will require significantly more assessment work at claims stage due to the need to prove that the condition / illness / injury had been known.

  Waiting periods are not commonly used in the mainstream group insurance market; however it is a key risk management tool in the funeral market, and is sometimes used in the group market to control schemes with above average levels of risk, or where there are voluntary benefits.

- **Exclusions**: Limited exclusions are enforced in compulsory group insurance. South African group insurers typically exclude claims that are related to active participation in war, riot and terrorism, including atomic, biological and chemical causes. For disability related benefits there are sometimes additional exclusions, which could include causes such as crime, attempted suicide / self-inflicted injury, excessive alcohol consumption, undisclosed hazardous occupation / sport, failure to follow medical advice, etc.

Over the past few years, there has been a trend in the South African group risk market to gradually remove exclusions that are not key to controlling catastrophe risk, in order to be more competitive and provide employees with more comprehensive coverage (and then to rather price for such risks).

Other exclusions that are typically applied are those of Foreign Territories (sometimes also referred to as Territorial Limitations) and Temporary Absence. In these cases, members are usually not allowed to be covered for periods exceeding 12 months, although the length of this period varies between insurers.

## 8. UNDERWRITING

### Forward Underwriting

Employees who would like to be entitled to benefit levels above the FCL will have to provide medical evidence of their insurability. An important feature of group life cover is that it automatically increases as an individual's salary increases due to the cover usually being expressed as a multiple of salary (note that as group premiums are expressed as a percentage of salary, premiums will increase in line with cover).

Salary increases can pose an anti-selective risk if they are granted in order to obtain increased levels of group risk cover for substandard lives. On the other hand, salary increments in practice are usually reasonable and it would be impractical and unnecessary to do time-consuming and costly underwriting for justified salary increases. Furthermore, an above average salary increase could be due to the individual concerned having performed his / her job very well, which should suggest above average health (on the premise that individuals in poor health find it more difficult to be as productive as healthy individuals).

Another important factor to bear in mind when considering group underwriting is that the members affected are the top earners, which means that they are the decision-makers, and that the insurer therefore does not want to inconvenience them unnecessarily.

For these reasons standard lives are usually granted what is commonly referred to as *forward cover*. This allows for increases in the member's cover, usually subject to conditions to be discussed later in the paper, should he / she have been accepted at standard rates in the first place.

In theory, the implication of applying *forward underwriting* is that the medical evidence requested at initial underwriting stage should be based on the sum of the current entitlement and the expected amount of cover that will be granted in the future, and not only the current entitlement. Insurers have different ways in which they determine both the amounts to be underwritten and the amounts of forward cover granted. This will be discussed later in this paper.

## Medical Evidence Requirements

Due to the fact that most underwriting is done in the individual market, and matrices of underwriting requirements usually being developed for individual business, the easiest approach is often to use the same matrix of requirements on the group side.  It is important to note that this might not necessarily be perfectly suited to the group market. The typical approach is to use the same matrix for both death and disability underwriting, but this might not give optimal results either.

## Testing Thresholds

We used the approach suggested by Dr Braun to assess the value of underwriting in respect of each test:

$$\text{Testing Threshold} = \frac{\text{Cost of the Test}}{\text{Present Value Mortality Savings} \;\; X \;\; \text{Prevalence} \;\; X \;\; \text{Attributable Information}}$$

The "cost of the test" should include the cost of the associated underwriting time and other administration too, if underwriting is really expected to pay for itself.

The "attributable information" used in the formula refers to the contribution of the information of each test to the other two components in the denominator of the formula. For example, a fasting blood sugar and fasting cholesterol test together with an ECG might be required to reach the conclusion that an individual requires a +200% extra mortality loading.  The contributions / readings from each test will be weighted to reach a single decision regarding the individual's health status.

Consider the following example:

- o **cost of test and associated administration**:  R500
- o **present value mortality savings**: the test (in conjunction with other tests) reveals that the individual's true mortality rate is 30 per mille compared to the group's average of 5 per mille – the mortality saving is thus (30 – 5) / 1000 = 2.5%
- o **prevalence**: the test has a positive result in 2% of cases tested
- o **attributable information**: the test's weighting in reaching the decision regarding the individual's true mortality is 40%

The testing threshold for this specific test will then be 500 / (2.5% x 2% x 40%) = R2.5m.

Where anti-selection is possible, this threshold would clearly be reduced, as prevalence for such individuals is higher, and the potential mortality saving possibly larger.

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Relative Value of Underwriting Tests

From the formula above, the value of underwriting tests is highest where such tests:

- o are relatively cheap (e.g. HIV test / cholesterol test);
- o identifies a condition with a relatively higher prevalence (e.g. HIV);
- o result in claims savings rather than extra premiums, as that tends to lead to bigger savings (e.g. a declinature based on a positive HIV test is more valuable than raised cholesterol levels where only a mortality loading is applied); and
- o are sufficient to result in a material mortality saving on its own (e.g. a positive HIV test is sufficient reason to decline; however frequently multiple tests focus on liver disease so each test is less valuable on its own).

Underwriting requirements should in theory vary according to the risk characteristics of the individual concerned:

- o **Age:** The key reason is that prevalence of various conditions varies by age. A secondary reason is that the resultant mortality savings can also be different.
- o **Gender:** The same arguments as for *age* apply.
- o **Income:** Different income levels and socio-economic environments imply different prevalence levels for health conditions.
- o **Location:** Again, this can have an impact on relative prevalence levels of conditions.
- o **Occupation**: Where there is exposure to occupation-related diseases, e.g. asbestosis, using occupation as a differentiating factor can add value.

In practice, only *age* and *income* tend to be used, possibly with variation per coverage.

Converting our assumptions on the value of underwriting (by age) into a single "hit rate" per age (being the rate at which something is picked up during underwriting) gives the standardised hit rates shown below ... as intuitively expected it shows that the value of underwriting increases broadly exponentially with age.

*Graph 1: Underwriting hit rates (prevalence) varying by age.*

**Value of underwriting - Relative "hit rates" by age**
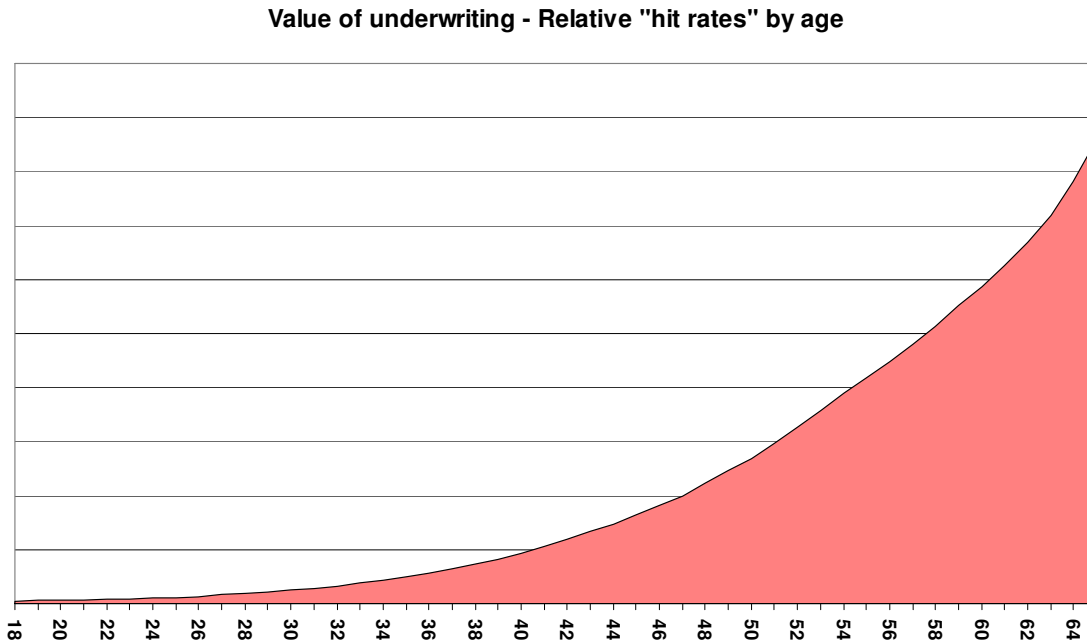


9.    UNDERWRITING CONSIDERATIONS

Amount of Underwriting

Although strong arguments exist for limiting the amount of underwriting done in group business, the fact remains that doing underwriting can almost always be justified from a pure cost – benefit perspective.  If one starts by assuming that underwriting tests will only be requested when they pay for themselves, then there exists some minimal level of cover beyond which the first test starts paying for itself. An HIV / AIDS test provides a relatively simple example to illustrate this: the cost of an HIV test is less than R200 per member, which means that for a group of 1000 lives the total cost of sending everyone for HIV underwriting is less than R200,000.  If the HIV test results in any claim(s) larger than R200,000 being avoided, which is likely,  the HIV testing was worthwhile.

The above example assumes it will result in declinature though.   Using the Testing Threshold formula described earlier in a case where
> o    the test shows someone should be charged 25 per mille compared to normal mortality of 5 per mille;
> o    the test has a hit rate of 1% of cases tested; and
> o    the test costs R200,
shows the test should be done where cover >= 200 / (2% x 1%) = R1 million, where the factor "Present Value Mortality Savings", which is 2% in this case, is calculated as (25-5) per mille.

A test resulting in a decline (say where mortality should be 105 per mille compared to base mortality of 5 per mille) with the same cost and hit rate should be done for cover amounts >= 200 / (10% x 1%) = R200,000.

Benefit Combinations

It makes sense to do more underwriting when benefits are offered in combination rather than in isolation, for example when both GLA and PHI are offered as opposed to GLA only.  This is because:

- o  Different underwriting criteria should in theory be used when considering different risks, in this example death versus disability risk.  To illustrate this: someone suffering from back pain might be admitted as a disability claim; however it is much less likely that the back pain will result in a death claim.  It is therefore not always appropriate to reach a disability underwriting decision based on a mortality loading or mortality focused underwriting framework.
- o  For a given test, a piece of information that would not have been "useful" for one benefit might turn out to be useful for another, increasing the value of the test (and thus reducing the testing threshold).

## 10.  PRICING CONSIDERATIONS

*For simplicity of discussion, the arguments in this section will refer to mortality (GLA); however the same or similar arguments apply to other decrements (disability / diagnosis with a dread disease).*

A discussion of pricing considerations is perhaps best introduced with an explanation of how group premiums are calculated and applied to individual schemes.  The final risk rate that is charged is usually a combination of a theoretical rate and an experience rate, with the former being more important for small schemes and the latter carrying more weight (credibility) for larger schemes.

The theoretical rate is calculated from the pricing basis for each member individually, and depends on factors such as age, gender, salary, industry and geographical location.  It is converted into a single premium rate for the scheme as a whole by aggregating individual premiums and dividing it by the total cover or salaries of the group.

For calculation of the scheme's experience rate the historic claims and exposure are considered, taking into account any changes that could have impacted on the experience differently in the past.

An Individual's Probability of Death

Mortality can be split by cause between accidental and health-related mortality, with AIDS-related mortality forming a material component of the latter at some age-income level combinations in South Africa.  It is mainly health-related mortality, including

AIDS, which can be reduced by means of underwriting in respect of health problems identified during the underwriting process (labeled "known" in the diagram below).

A simple diagram of an individual's probability of death ($q_x$) looks as follows:

<----Non-AIDS Health ---→  <----------- AIDS ---------→   <------- Accidents -------→

| Random | Predictable | Random | Predictable | Random | Predictable |
|--------|-------------|--------|-------------|--------|-------------|
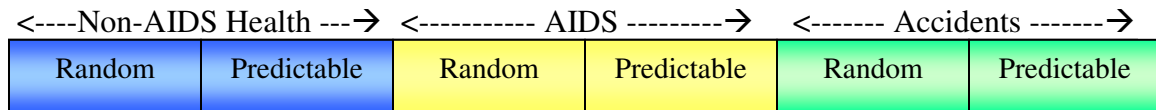
Another way of explaining this is in terms of awareness:

1.  Some parts of mortality are random in the sense that it is unexpected to both the insured and the insurer, even after underwriting. An example of this is a motor vehicle accident. Although certain factors can suggest increased risk of accidental deaths, for example drinking habits and smoking status, these are typically not used in the group space. Even if such underwriting is done, the occurrence of the accident remains random.

2.  Some parts of mortality are unexpected for the insured but not for the insurer. For example, the insurer could learn during the underwriting process that the applicant suffers from a heart condition that the applicant had not been aware of. If this is not communicated to the applicant, he / she will continue to remain unaware of it.

3.  Some mortality components are unforeseen for the insurer but not for the insured. This could be either due to non-disclosure or due to the fact that certain aspects are not underwritten, for example the insured knows that he / she regularly drives under the influence and was not required to disclose this.

4.  Finally, there are parts of mortality that are known to both parties (the insured and the insurer) for example when disclosure was required or when underwriting identifies a condition and the results are shared with the applicant.

For purposes of modelling, these categories can be grouped into those the insurer can underwrite for (labeled "predictable" above) and those which are considered purely random (labeled "random" above).

Comparison to Individual Life Mortality

Compared to individual business, there are broadly two main differences that impact on the mortality levels relative to group business: selection and underwriting. The underwriitng and selection tend to work in opposite directions:

•   Less underwriting increases group mortality relative to individual mortality.
•   Selection (most notably actively at work selection and the reduced scope for anti-selection) reduces group mortality relative to individual mortality.

To the extent that group lives are underwritten, there is some overlap between the benefit underwriting provides in terms of mortality and the benefit actively at work provides (e.g. cases where underwriting would have removed anti-selection that is already removed by the actively at work selection).

Experience Analysis

Experience analysis is done both for setting a pricing basis and calculation of an individual scheme's experience rate, with the insurance company's whole portfolio of group life business and the scheme's own historic information used respectively. In both cases the experience consists of non-underwritten experience (cover below the FCL) and underwritten experience (cover above the FCL).

Past FCL levels should in theory be taken into account when experience analysis is done, as they impact on past claims levels through restrictions and past premium rates through loadings. Care needs to be taken when calibrating to actual experience in deriving a pricing basis, as increasing FCL levels over time could result in the pricing basis underpricing future business that is subject to less underwriting. However, group risk providers in the South African market might not keep sufficient detail to enable such analysis, or if they do, they probably do not include it in their analysis.

The effect of underwriting can be evaluated separately by including past FCLs at member level when analysing the experience. However, due to a much greater proportion of cover being underwritten at the highest income levels compared to at lower income levels, the relationship between observed mortality and income includes socio-economic, occupational and underwriting effects. The observed underwritten mortality (above the FCL) also includes the impact of actively at work selection, which could mean that group experience for cover above the FCL could be better than individual experience due to it 1) possibly being equally well underwritten, 2) being less anti-selective, and 3) having the requirement that the member should be capable of performing his / her daily job duties.

Cross-subsidies

Group insurance works on the basis that all members pay the same premium rate, regardless of their individual risk profiles. This single premium rate is typically expressed as a percentage of salaries rate or unit rate (rate per mille), and for the percentage of salary rate the calculated premium per individual is related to the size of his / her benefit through the link between salaries and benefits.

It is interesting to consider the implications of charging a single premium rate for all lives. Individual mortality rates vary significantly by salary, so by charging an average premium rate for all members, the top lives overpay and the lowest earners pay less than their true risk rates. Effectively, the top earners subsidise the lowest paid employees.

Note that top earners are frequently older than the average scheme member (and a greater proportion of them tends to be male). However, their mortality is generally still lower than that of the average member. One of the main reasons is that the average age of the top earners tends to be in the 45-50 range, compared to the average age of all scheme members being in the 40-45 range. This relatively small age gap means that the higher mortality due to age and gender is more than offset by the reduced mortality due to the income differential, especially when AIDS mortality is also considered. (AIDS mortality reduces over the ages concerned, as well as with income). There might be schemes where this does not hold (e.g. where the scheme predominantly has young female members, while the top earner is a 65-year old male), but for most schemes considered it held true.

Underwriting the top lives affects the extent of the cross-subsidy:

- o If the life is found to be standard mortality (or better), you now not only have average mortality for the top earner resulting in a cross-subsidy to the rest of the group, but also the additional cross-subsidy from actually needing to compare underwritten top earner mortality to average group rates.

- o If a life above the FCL is found to be substandard, cover above the FCL is either declined or loaded.
    - o In the case of the cover being loaded, a key factor is which rates the loading is applied to. If the loading is applied to aggregate group rates, the cross-subsidy above gets exaggerated.
    - o In the case of the cover being declined on a scheme where the premium is expressed as a percentage of salary, it is interesting to note that if his premium is not reduced then the premium that such a life is being charged could have secured a significantly higher amount of cover, considering his / her individual risk, than is actually granted. (This is normally not a problem where the scheme is charged on a unit rate basis - the unit rate *is* typically applied to the reduced cover).


## 11. THEORETICAL CONSIDERATIONS

In setting the FCL and deciding on the medical evidence that will be requested, the ultimate aim is to do this in as optimal a way as possible. But what does "optimal" mean? In this section we will be discussing three different measures that could be used to maximise the value that the underwriting process contributes to the overall risk.

Limiting Fluctuations in Profitability

The biggest contribution to fluctuation risk comes from the larger sums assured, which can have a disproportionate effect on the experience of an entire group. The greater the amount of underwriting above the FCL, the less volatile the emerging experience above the FCL should be. Underwriting above the FCL acts as a filter that will only let through risks that are of a required minimum level of health. This results in a smoother emergence of experience above the FCL. However, it is not a perfect filter, as accidental

risks and health risks not identified during underwriting remain in the exposure above the FCL. Also, even if these risks are assessed to be severely worse than standard, they will still be covered up to the FCL.

Fluctuations can be limited on scheme level or on portfolio level. In South Africa, most insurers' FCL formulae take sum assured into account, which means that it attempts to minimise fluctuations within a scheme. However, on risk umbrella type arrangements, the FCL formula is often only dependent on the number of members within a participating employer, with the result that the focus is on minimising fluctuations within the portfolio rather than within each participating employer.

Another tool available to insurers to aid in limiting fluctuations is of course reinsurance, especially if an excess of loss structure is used. Both underwriting and reinsurance come at a price, and to find the optimal balance between these two risk control measures can prove to be difficult.

Cost-Benefit Analysis

The claims experience of a particular company is a function of the amount of past medical testing that has been done. Less underwriting means less underwriting expenses but higher expected claims costs. In theory, the FCL and limits for medical evidence should be set at levels such that the costs of collecting and assessing the medical evidence are equal or lower than the resulting saving that is made on claims.

It is perhaps useful to have a discussion of what exactly is meant with "cost" and "benefit" in this optimisation exercise:

**Cost**

The underwriting process results in expenses from:

- actual cost of the test, e.g. drawing the blood and having it examined, or a doctor's consultation fee;
- facilitation fees, e.g. transport and service fees of paramedical companies;
- administration expenses; and
- assessment of the medical evidence, e.g. underwriters' salaries.

**Benefit**

The savings that the underwriting process accomplishes is the present value of:

- future claims above the FCL that are removed (in case of decline); and
- risks above the FCL that are appropriately rated (i.e. loading charges) (albeit quite small in the South African context).

The benefit of underwriting is much larger where it also reduces anti-selection, as more cases will have future claims avoided or additional risks being loaded. Philosophically, there is also the question whether the presence of some underwriting results in reduced moral hazard (from key decision makers not even attempting to anti-select). This is not expected to be particularly material in the group space, but this has not been assessed for purposes of this paper.

Underwriting will not exclude all future claims from conditions that were tested, as it can only remove those with the particular condition existing at the time of applying for cover above the FCL. In addition, the test might not always be 100% efficient, for example a medical questionnaire could contain elements of non-disclosure or misrepresentation that would still not result in a claim being declined.

Probability of Ruin

The probability of ruin is the likelihood that an insurance company will become insolvent given a certain level of surplus capital available. This is an extreme example of fluctuation risk across a portfolio.

In simple terms, the surplus capital grows with premium income and reduces with claims outgo. Underwriting serves to boost the surplus capital's level over time in that it:

- increases premium income through loading charges; and
- reduces claims outgo by restricting benefits for substandard lives.

On the other hand, the cost of underwriting reduces the surplus levels.

In theory, the optimal level of underwriting can be found where the probability of ruin over a given timeframe is at an acceptable level for the company. Clearly, different companies have different surplus levels and appetites for risk, implying that the optimal FCL, at least using Probability of Ruin as criterion, should be different for different companies. Alternatively, the FCL formula should include the particular insurer's surplus capital level and risk appetite as parameters.

Our expectation was that the application of FCLs would have a relatively small impact on the actual required capital levels of an insurer, given:

- the required size of the insurer's capital relative to fluctuations in experience; and
- the fact that most group insurers are also doing significant volumes of non-group business, much of which serves to diversify risk (and so reduce the probability of ruin from group business materially).

This has been borne out in our analysis, which suggests that this issue can for practical purposes be ignored in the setting of FCLs in the South African context for all but extremely small insurers (who would presumably not be likely to secure schemes with large covers anyway).

## 12. DIFFERENT STAKEHOLDERS' CONSIDERATIONS

*For simplicity of discussion, the arguments in this section will refer to mortality (GLA); however the same or similar arguments apply to other decrements (disability / diagnosis with a dread disease).*

Group Risk Schemes

The different stakeholders involved in a company's group risk scheme from the scheme's side could include the employer, trustees and employees.

Of main concern to the scheme is to provide employees with the best value for money in terms of risk benefits, and to minimize fluctuations in premium rates due to fluctuations in claims experience. Premium fluctuations are of greater concern to small schemes due to more volatile claims experience.

To illustrate how claims volatility can affect premium rates, consider the following: a single claim could potentially convert to an associated credibility as high as 10%, and such claim could easily result in claims experience being 50% worse (even on relatively large schemes the highest single sum assured is sometimes equivalent to several multiples of the total annual premium from the scheme). Applying the credibility to the experience rate will mean a 5% premium increase the following year due to a single claim.

By having an appropriate FCL, the scheme effectively buys some insurance against a premium rate increase as a result of a single large claim. Note though that large claims are not entirely eliminated above the FCL, due to causes unaffected or less affected by underwriting, such as motor vehicle accidents.

An alternative to having a FCL could be to agree upfront that only individual sums assured up to a given size will be included when the experience is analysed, along with the corresponding premiums. Any cover above the claims experience cut-off level could be insured in a separate risk pool across schemes, effectively forming a surplus arrangement. This approach will effectively split the conventional group scheme into two separate schemes, with the bulk of the members belonging to the ground-up scheme, and only the highest earners forming part of the portfolio-wide surplus scheme. By grouping different schemes' highest covers on portfolio level, the individual scheme's exposure to extreme volatility is reduced, as the average experience of the surplus scheme can be blended with the ground-up scheme, instead of extreme volatility on a handful of lives. Essentially, cover above a certain level is reinsured (or notionally reinsured) and the reinsurance premiums and claims deducted from the total experience being analysed.

Such surplus pool would likely insist on underwriting if only one member from a group joins the pool, in order to control anti-selection. However, the members of the surplus pool could prefer to be underwritten in return for getting lower premiums.

The scheme's philosophy on cross-subsidies and equity between members, together with its appetite for risk, could be the determining factors for its preferences in terms of underwriting:

- If the scheme's approach to risk benefit provision is underpinned by a strong belief in the concept of pooling of risks, then non-underwritten cover for all lives makes sense, and FCLs should not be applied. This approach works best if a one-size-fits-all philosophy is supported. In this framework lives of above standard mortality will subsidise non-standard lives.

- If the scheme has a stronger belief in individual members paying premiums that are commensurate with their mortality risk, this could be achieved by offering a base level of cover (containing cross-subsidies) in conjunction with fully underwritten flexible benefits above it. This approach has the additional benefit that it can be customised according to each individual's risk cover preferences.

- If the scheme is merely concerned with controlling anti-selection risk, appropriately set FCLs to manage anti-selective behaviour are suitable. (See the Insurance Companies discussion below.)

Given that FCL levels directly impact on schemes' premium rates and equity between members, it makes sense that employers or trustees should be involved in deciding on the amount of underwriting that is done, rather than it being an exclusive insurer / broker / consultant decision. This might require additional education of the scheme's decision makers with regard to the implications of differing levels of underwriting; however it should result in an approach that is more aligned with the scheme's unique preferences and beliefs.

Insurance Companies

The insurance company is mainly concerned with managing anti-selection risk, which in a group risk set-up is typically posed by the decision makers of the scheme. Anti-selection exposes the insurer to the risk of inappropriately charging for the risk assumed i.e. the risk of pricing assumption error, for which additional capital could be needed.

As discussed earlier in the paper, anti-selection risk is generally higher for smaller schemes, as such schemes are easier to set up and have fewer decision makers (often only the MD / CEO) with regard to benefit size.

For larger schemes, the insurer could best manage the anti-selection risk by identifying the individuals who have authority in terms of scheme design and benefit size for underwriting. Such individuals could include, among others, human resources managers, trustees and executive management members. However, because it may be difficult and impractical to identify such decision makers, rules that select the most highly-paid individuals (who are more likely to be part of this group) are most sensible in practice, although it creates a far from perfect fit with the risk.

Regardless of scheme size, the insurer's key objective remains the identification of anti-selective behaviour, examples of which include unusually high salary increases for potential decision makers and implementation of a benefit design where decision makers get proportionately higher benefits than ordinary staff members.  Such behaviour could be identified by strict application of the 20% rule (refer to Glossary for definition), which will automatically result in any unusual sum assured increases being underwritten.

As discussed above, FCLs have little effect on the probability of ruin, with the result that this is usually not an important consideration for insurers.

The risk associated with fluctuations in profitability is only really relevant for small insurers, and FCLs do not control this risk particularly well, due to the residual accidental risk volatility, and some residual health risk volatility, that remains despite underwriting.  Nonetheless, modelling can be done on scheme or portfolio level to assess the volatility in results for different levels of FCLs.  Choosing optimal levels for FCLs will then be based on a decision regarding acceptable profit fluctuations, in particular reductions in profit.

From a profitability fluctuations perspective, a good approach to FCL setting would be to compare the scheme's highest individual covers with the scheme's total annual premium.  An effective way of reducing volatility in premium rates going forward is to underwrite the individual covers that could result in the most material variation in experience.  This ties in with the arguments above that it is mainly the scheme's stakeholders who are concerned with premium fluctuations, and that such individuals should therefore be involved in the deciding on the optimal FCL level.

Other (possibly more appropriate) ways for managing fluctuation risk include maximum allowable covers in respect of individual risks, and individual excess of loss reinsurance.

Reinsurers

Similarly to the direct insurer, the main underwriting consideration from a reinsurance point of view is anti-selection.  This is due to the typical group reinsurance structures where top earners, and therefore decision makers, are reinsured.

The bulk of group risk business is reinsured on an (individual member) excess of loss basis.  Due to the relative levels of FCLs and individual reinsurance retention limits in the South African group market, most reinsured group business is underwritten and reinsurance rates are therefore quoted accordingly.  Insurance rates, on the other hand, reflect a different mix between underwritten and non-underwritten experience, with more being non-underwritten.  The implication of this is that reinsurance risk rates are typically lower than direct insurance rates.

Assuming the direct insurer has set their pricing basis on total past experience, their rates will be appropriate for the total risk (on the assumption that past levels of underwriting

continues into the future). Very few insurers adjust their rates along with adjusting their FCLs though.

This leads to an interesting market dynamic, in that having a lower FCL makes sense for the reinsurer (to avoid mispricing or to increase profitability if reduced) and perhaps the insurer (to avoid mispricing or to increase profitability if reduced, but only to the extent that such risk is not reinsured). However in the absence of such a link between rates and FCL levels, schemes could push for a higher FCL and get charged a rate that assumes a higher level of underwriting than what will actually happen.

In the light of the above discussion, it is clear that the removal of the FCL should result in a premium increase. Considering the generally high levels of capital available to insurers and reinsurers, both the reinsurer and the insurer could potentially cope with the associated increased volatility, provided anti-selection risk can still be managed in another way.

With the individual excess of loss reinsurance structure, there is usually no quota share split below or above the individual retention. The implications of this are that:

- The reinsurer does not have any interest in the individual risk below the retention.
- The insurer does not have any interest in the individual risk above the retention.

As discussed previously FCLs are usually the second most important consideration (after premium rates) for decision makers when placing group risk schemes. The insurer is therefore incentivised to increase FCLs in the interest of winning the scheme, and once the FCL is beyond the retention, tends to be indifferent as to the effect this will have on the resultant experience. The insurer and reinsurer's interests are therefore not aligned.

One of the ways in which to overcome this misalignment of interest is to introduce some quota share exposure above the excess of loss retention for the insurer. Such exposure will enable reinsurers to grant insurers more (although not total) freedom with regard to FCL setting. On the other hand, this will leave insurers with a larger potential exposure to a single life than would otherwise have been the case. In light of the comments above on probability of ruin and limiting fluctuations, this should not be so concerning as to eliminate the possibility of requiring insurers to retain some quota share exposure above their retention.

Regulators

In some countries, FCLs are regulated. The regulator will support an underwriting approach that aids to accomplish its goals.

Depending on whether the regulator supports a cross-subsidised system or charging risk premiums that are in line with individuals' own mortality risk, it can influence group risk providers to follow a one-size-fits-all approach or apply underwriting to a greater extent in order to charge risk-appropriate rates.

13. INTERNATIONAL PRACTICES

FCLs can be determined using either a FCL formula, with parameters such as scheme size and average sum assured, or a FCL table where the FCL is looked up from a table that varies according to similar parameters.

The majority of countries investigated use a table approach to FCL setting, and the general practice is to follow reinsurers' FCL approaches in the various markets.

In Canada, most insurers quote pre-determined (set) FCLs for each combination of number of members and average sum assured. Groups as small as five members can qualify for FCLs as high as 2.5 times the average sum assured. For group life cover, the standard tables allow large schemes to get up to CAD1.5m free cover.

An interesting case is that of Mexico, where quoted FCLs are currently governed by the country's group insurance regulation. All insurers are obliged to quote FCLs based on prescribed multiples (maximum 10) of the average sum assured. The country is in the process of changing this practice, with draft regulation awaiting formal approval, after which insurers will be free to quote FCLs as they deem appropriate.

In India the market norm is to use a table approach, with FCLs depending on the average sum assured and factors increasing by the number of members. Some players use formulaic approaches. The market is very competitive in terms of FCLs, with the result that there is often a need for manual overrides of the standard approaches.

In Spain most group risk providers also use the table approach for FCL setting, with the FCL depending on the average sum assured and number of members in the group. Very large groups can obtain free cover levels of up to 3,500,000€.

In Australia, FCL's are commonly referred to as Automatic Acceptance Limits. These are usually quoted according to a standard table which depends on the average sum assured and factors increasing by the number of members.


14. OVERVIEW OF PRACTICES IN THE SOUTH AFRICAN GROUP RISK MARKET

Tools used

The tools used to assess the South African group risk market's practices include a survey conducted across the industry's major group risk insurers, and stochastic modelling to assess the merit or impact of various practices.

*Industry Survey*

In order to be able to provide a comprehensive overview of the South African group risk market's approaches to FCL setting and group underwriting in general, a survey was

conducted among the bigger insurers by premium income. There has been a 100% participation rate by the nine insurance companies that were approached.

*Modelling*

Stochastic modelling was done using Excel with VBA functionality. The general approach was to simulate claims assuming independent Bernoulli trials with the risk rate (probability of claim, possibly split by broad cause of claim) as parameter, separating out the claims that could have been prevented through underwriting. For some of the modelling this was done considering various underwriting tests separately. All deaths below the FCL were included, and deaths above the FCL were only included where such claims would not have been declined through the underwriting process as used at or above the different assumed levels of FCL. The underwriting process' output was assumed to be an accept / decline decision.

The inputs to the modelling consisted of the following:

- A view on the value of underwriting by age per test, compared to health and AIDS mortality. Strictly speaking these values should also have varied across other rating factors. The graph below shows mortality by age compared to non-AIDS mortality by age, separately for the health, accidental and AIDS mortality components (as discussed in section 10 above). The portions referred to as "uw effect" are the proportions of "predictable" mortality which was assumed removable via underwriting, while the "after uw" portions are the parts of "predictable" mortality that remained even after underwriting together with "random" mortality.

*Graph 2: The effect of underwriting on risk rates by age.*



**Effect of underwriting on risk (Relative to non-aids risk)**
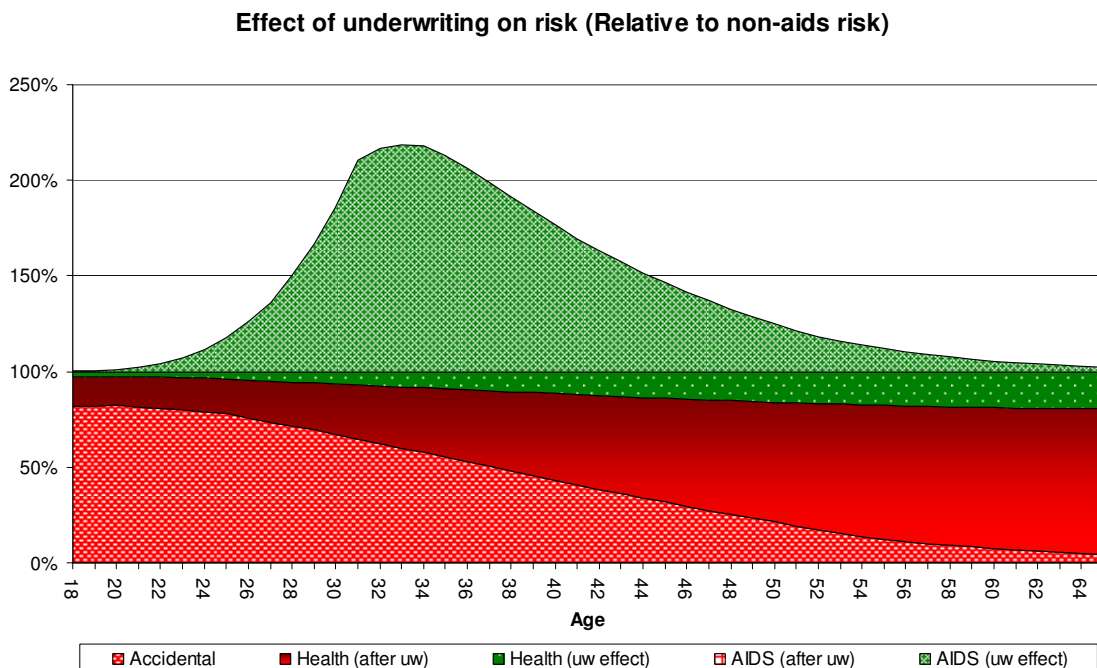
- A set of risk rates by age in respect of each individual for whom claims were modelled. These risk rates were split into:

  - AIDS mortality (to assess the value of HIV tests), which was split between AIDS mortality removed by HIV tests and AIDS mortality not removed;
  - health mortality (to assess the value of other underwriting), which was split between health mortality removed by other underwriting and health mortality not removed; and
  - accidental mortality (this was assumed not to be affected by underwriting, even though, as discussed earlier in the paper, there might be "second order effects" causing marginal reductions in accidental mortality in practice, e.g. removing liver disease might also reduce the risk of motor vehicle accidents whilst driving under the influence).

- The time horizon used for the modelling was one year. Although the underwriting process' benefit exists for longer, it reduces over time. It is much simpler to only model the first year, and due to the declining value of underwriting over time, this assumption is not unreasonable. There exists a risk for the insurer who tries to determine the optimal amount of underwriting done based on the benefit across multiple years, in that they could lose the scheme and so end up having paid for underwriting that another insurer stands to benefit from.

Stochastic modelling was done, as we were interested in:

- assessing the volatility of claims across sample schemes that were provided to insurers (as part of the survey) for each insurer, given each insurer's approach to FCL setting;
- assessing the underwriting efficiency for each insurer / sample scheme based on our view of the value of the various tests at various ages;
- assessing the volatility in claims experience for schemes as the level of the FCL changes, as well as the probability of a premium increase of a given size (5% / 10% / 15% / 20%) being required given such FCL levels; and
- assessing the value of doing optimal underwriting above the FCL versus doing more / less underwriting respectively.

Our learnings from the modelling are given as commentary on the survey results in the sections that follow.

Survey Results with Commentary

We have not provided complete insurance company feedback (on an anonymous basis) in this paper, based on concerns from some participants. However, high level summaries are provided below and in Appendix A.

*Formulae Used*

The majority of South African insurers use FCL formulae to set FCLs, with the different formulae in use displaying variation, but generally incorporating number of members and sum assured as parameters. Table approaches are used by a limited number of insurers.

Both the formula and table approach to FCL setting have advantages. A formula will provide a smoother progression of FCLs across scheme sizes, and will therefore overcome discontinuity problems for schemes that change size over time. However, it can provide anomalous results at the extremes (very high or very low parameter values), as it tends to be "calibrated" better to desired / appropriate FCL levels at the more regular parameter values.

The table approach usually also uses scheme size and sum assured in the determination of the FCL. However, due to it being scheme size-banded, it is prone to discontinuities in this regard. It tends to work better with extreme parameters as there tends to be an implied cap on number of members or average sum assured.

Either a formula or table could be used as a proxy for selecting individuals with the highest covers for purposes of reducing anti-selection. Clearly highly paid individuals (those with smaller supply or greater demand for their skills) are more likely to be in a position to get their salaries adjusted in light of their health status, as they are more likely to regularly work with other high income earners that would have the authority to provide such adjustments.

Both the formula and table approach can result in inconsistent risk management approaches for schemes with very different risk characteristics, where such schemes have similar factors / formula results for either the table or formula approach. (Most formulae used contain the square root of the number of members as part of the formula, despite the theoretical basis for it being far from clear.)

For example, consider the FCL formula *square root of number of members * factor * average sum assured* for two schemes of similar size but different sum assured distributions. In the table below, the small employer group displays much larger variation around the average sum assured than the executive scheme where all members have sums assured equal to R2 million. In theory, in order to control anti-selection appropriately, the executive scheme should be underwritten to a much greater extent, as a greater proportion of the membership could be anti-selecting. In the small scheme, it is likely that only the MD (plus maybe one or two others) has choice with regard to risk benefit design, and should therefore require underwriting. However, the FCL formula suggests much higher levels of non-underwritten cover for the executive scheme than for the small employer scheme.

| | Small employer | Group of executives |
|---|---|---|
| **ASA (average sum assured)** | R 250,000 | R 2,000,000 |
| **scheme size = n** | 100 | 100 |
| **sqrt (n)** | 10 | 10 |
| **Factor** | 0.3 | 0.3 |
| **FCL formula result** | R 750,000 | R 6,000,000 |

*View of Market Free Cover Limits*

The majority of the market is of the view that FCL levels in South Africa are very high, with a very small minority indicating that they regard the levels as appropriate or with scope for further increases.

Comments about high FCL levels include, among other:

- "FCLs are high and usually only restrict outliers."
- "Very high. As a form of risk management (which is a FCL) has almost been removed particularly on the GLA."
- "The levels of FCL quoted should be more practical." This comment specifically relates to cases where FCLs far in excess of maximum sums assured are quoted.
- "The FCLs in the market are often higher than preferable."
- "FCLs are generally too high on smaller PHI schemes."
- "In general our market is too liberal when it comes to FCLs, with competitiveness driving FCLs up to very high levels. This is exacerbated by the odd multi-national pooling arrangements."
- "Appropriate but increasingly generous."

The result of the above is that, in order to remain competitive, many insurers adjust FCLs upwards in order to meet market demands, often to levels with which they are not necessarily comfortable from a risk management point of view.

When we started our modelling we expected FCLs to have relatively little impact on probability of ruin, but suspected that FCLs would serve the dual purpose of materially reducing both anti-selection and volatility. Modelling results suggest though that, even

with the current high levels of FCLs, unacceptable results in terms of both volatility and probability of ruin are relatively rare, and volatilities and ruin probabilities are generally at levels that should be acceptable to all larger group insurers. For any given insurer, there also appeared to be material differences across schemes in terms of the level of volatility implied by the level of the FCL.

This suggests that the primary value of current FCLs is to reduce anti-selection, as a material reduction in FCL levels would be needed to cause a noticeable reduction in volatility, assuming other risk mitigation strategies such as excess of loss reinsurance stay in place.

Follow-up research with group insurers could confirm whether the industry does indeed regard the FCL as a tool that should predominantly manage anti-selection. If this is the case, future research could specifically focus on finding ways to better target group underwriting to potential anti-selection and more focused modelling of the anti-selection risk. However, if the FCL is also intended to function as a meaningful volatility management tool, insurers would presumably exert downwards pressure on FCL levels.

*Minimum Scheme Size and Free Cover Limits*

Most insurers require a minimum of 10 members before they will grant a non-zero FCL. Two insurers are prepared to quote FCLs to groups of five and more, and the most conservative insurer in this respect requires a minimum scheme size of 15 members before quoting free cover. Only two insurers are willing to grant free cover to groups smaller than five members.

Considering the potential for anti-selection, we believe it would rarely make sense to provide FCLs to groups smaller than 10. For small arrangements, probability of ruin is mostly irrelevant but volatility becomes more material. However, the primary reason for the lower FCLs is presumably still related to anti-selection.

*Pricing Considerations*

The question was asked whether companies base their pricing for individual schemes on:

- full potential sums assured regardless of knowledge of past underwriting results, or
- restricted sums assured based on knowledge of past underwriting results.

Five of the respondents indicated that pricing is always based on full potential sums assured. The rest of the companies vary their approaches according to various factors, for example according to whether it is new business or not.

The past FCL levels of a particular scheme should have an impact on its historic claims experience: the lower the historic FCLs, the better the substandard lives' claims experience was controlled, and therefore the better the overall historic experience should be. To the extent that current or future FCLs are higher, this should imply some

underpricing if pricing is based on unadjusted past experience. The question was therefore asked whether past levels of FCLs are taken into account for experience rating. Insurers were unanimous in their response in that none of them consider past FCLs when experience rating.

Perhaps this result is not surprising: in order to make accurate adjustments for past FCLs, knowledge about the underwriting status of past claimants (most notably, extent of loadings and the extent of claim reductions where cases were capped at a given FCL) is required in order to assess whether such claims would have occurred regardless of underwriting, or whether large claims could have been capped at the FCL. When an insurer is quoting on existing business that is insured with another provider, this information is clearly not available. For renewals on existing business for a particular insurer, such information should exist, however it might not be readily available, or it might be regarded as an unnecessary complication of the experience rating exercise.

At current FCL levels, the adjustments to rates needed to adjust for past FCL level variations are so small as to make this issue relatively academic.

*Underwriting Matrices*

The majority of insurers differentiate underwriting requirements according to the sum at risk band above the FCL and age band of the member. There exists considerable variation in:

- the age bands

  Number of age bands used varies from two to four, with the ranges of age bands also displaying much variation.

- sum at risk bands

  Number of sum at risk bands varies from two to six, which clearly implies that their ranges display significant variation. As an example, the lowest sum at risk band's upper bound varies by as much as R1.75m between insurers.

- the medical evidence that is required per age – sum at risk cell

  It flows logically from the previous point that, due to the large variation in the ranges of sum at risk bands, underwriting requirements per band will be different.

It is clear from the immense variation in underwriting done and the results of our modelling that underwriting for most insurers could be further optimised. This can be done either though additional underwriting for the lives already covered where such additional underwriting would still pay for itself, or by reducing the level of underwriting done in such a way that the cost saving is larger than the increase in claims because of the reduced underwriting. Another clear area for improvement exists for those insurers still using one underwriting algorithm to come to both a mortality and morbidity decision.

**Medicals**
These range from a personal medical declaration completed by the member for the lowest sum at risk band, to medicals completed by general practitioners and, only for a few insurers, a requirement for a physician specialist to perform the medical in the higher age / sum at risk bands.

**Blood Tests**
Most insurers require an HIV test for the lowest sum at risk bands, however there are a few notable exceptions where this is not required. At the higher age / sum at risk bands, it is fairly standard to require HIV, cholesterol, Gamma GT and blood sugar to be tested, although there are cases where cholesterol, Gamma GT and blood sugar tests are not required, even for the highest sums assured, when medicals are conducted.

**Other Tests**
Most, but not all, of the insurers require effort ECGs for the bigger risks. Only a few insurers insist on liver and pulmonary function tests at the high sums assured.

The collective result of the above variation is that there are significant differences in the amount of underwriting that is done between offices. Based on our assessment of the value of underwriting, this should have a material impact on the claims experience for cover above the FCL, although the effect will be much smaller once aggregated with the rest of the scheme's experience. In theory, underwriting approach could therefore usefully be taken into account when experience rating existing schemes that move between insurers, depending on whether the quoting office's underwriting process is more or less onerous than the previous insurer's. It is possible insurers may have over time learnt rough "rules of thumb" (e.g. be more aggressive when quoting against X) but further research would be needed to confirm whether this is the case or not.

*Forward Underwriting*

**Forward Cover Period**
Most of the group providers offer forward cover for a maximum of five years, although there are notable exceptions where the forward underwriting period is not restricted to a finite number of years, but rather forward underwriting elapses when the forward amount underwritten is reached.

**Annual Increase Cap**
One of the ways to control risk when forward cover is granted is to cap the amount by which the individual's cover can increase over a set period. Among the survey's respondents, roughly half of them indicated that they cap annual increases in cover amounts at 20%, whilst the other half only applies an aggregate 100% cap over the 5-year period.

It is our view that a 100% cap over five years is less sensible than a 20% cap per year, due to the increased ability to manage anti-selection in the latter case.

*Underwriting Methodology*

**Amount Underwritten**

The majority of the respondents base their medical evidence requirements on the member's current entitlement and therefore forward cover is not specifically underwritten.

Where forward cover is to be underwritten, this should affect the extent of underwriting done. It is possible to have a sensible underwriting matrix in both scenarios, with a key difference being the time period over which the value of underwriting is to be considered.

**Underwriting Decisions**

Only a third of the respondents indicated that they apply loadings for substandard lives. The rest strive to either accept or decline, however:

- in some cases these companies continue to apply exclusions;
- the extra mortality / morbidity loadings at which lives are declined differ significantly between players; and
- some companies accept only the current cover (therefore no forward cover entitlement) if the life is non-standard, but not restricted.

Where loadings are applied to substandard individuals' cover, the approaches followed by companies differ as to what premium rates they pertain to. Different companies apply underwriting loadings to:

- aggregated group premium rates, i.e. the cross-subsidised, average premium rate that applies to the scheme as a whole, for example the percentage of salary rate;
- the individual member's contribution to the group premium rate, i.e. effectively still a group rate, but reflecting the individual's own risk characteristics, in other words the individual's premium rate as calculated according to the group pricing basis; or
- the true individual risk premium rate, i.e. the premium rate at which the individual would be able to secure individual life cover.

Loadings are normally only applied from the scheme's following policy anniversary onwards, by taking the individual loadings into account when the scheme's premium rate is recalculated. However, in some cases insurers provide schemes with a choice as to whether the loading is covered by the scheme overall or by the member himself.

From an anti-selection point of view, the logic of only applying increases from the next policy anniversary onwards can be justified given the resulting simplification in administration and the fact that the severely substandard cases are declined, so the impact of anti-selection is already materially reduced. The individuals who would be loaded are individuals with cover above the FCL, who tend to be those with higher incomes and lower than average risk rates. This means that, even with worse than average health status, their loaded risk rates might still be better than the average for the scheme.

However, it is important that such loadings are kept small enough, with larger required loadings resulting in declines.

The logic of only accepting or declining is sensible. Not only does it simplify the administration and premium calculation of the scheme significantly, but the arguments discussed in the previous paragraph support a scenario where severely substandard risks are declined and the rest accepted at average rates.


15. FLEXIBLE RISK BENEFITS

In Section 4 of this paper we discussed the reasons for a reduced need for underwriting in compulsory group business, mainly because there is less anti-selection risk due to prescribed eligibility conditions and benefit size. As soon as the member is entitled to some choice with regard to the size of his benefits, it not only significantly complicates the administration of the scheme, but the need for risk management and underwriting increases.

The most commonly used approach to flexible risk benefit provision in South Africa offers employees a minimum, compulsory level of benefit, called the *core benefit*, together with the option to buy additional cover, referred to as *flex benefits*, up to a maximum overall benefit entitlement. A typical package would be a core benefit of 2 times annual salary with flexible benefits available in units of 1 times annual salary each, up to a maximum overall benefit of 6 times annual salary.

In deciding on the amount of underwriting to use, the rationale for group benefit provision should be kept in mind: accessible, affordable cover for all employees with a strong focus on ease of administration. This means that extensive underwriting for all members who choose flex benefits is usually not an option, especially if (as is often the case) the scheme moves from a compulsory / traditional risk benefit structure, where members are entitled to benefits on specific terms and conditions, to a flexible structure.

The optimal amount of underwriting for a flexible benefit design is not only a trade-off between cost of underwriting and a reduction in anti-selection, but a third factor needs to be taken into account, namely the proportion of lives who exercise the option to flex up. It can be argued that the bigger the take-up ratio, the smaller the need for underwriting.

Other risk management tools often used in flexible risk benefit provision include:

- Members can only change the size of their risk benefits at certain fixed times, for example once a year or at life changing events such as child birth and marriage.
- Benefit increases can be limited in some way, for example to either a proportion of existing cover or multiples of 1 times annual salary at each increase.
- A time limit is imposed for members to exercise their choices, for example new members need to submit their decisions within 1 month of joining the company.

- Actively at work conditions can be imposed for benefit changes, with requirements ranging from the day on which the decision is made through more onerous requirements such as a month or longer prior to decision-making.
- More exclusions than in compulsory group insurance can be applied, for example the suicide exclusion which is applied for individual policies.

16. CONCLUSION

FCLs continue to play an important role in group risk business and are the source of strong competition between different group risk providers. At their current market levels in South Africa, they have no noticeable impact on probability of ruin. Whilst they do assist in controlling volatility risk marginally, their main purpose seems to be to control anti-selection risk. Further research focused more specifically on the value of FCLs in restricting anti-selection and better targeting of FCLs for that purpose is indicated.

Scope exists for better use of FCLs to more effectively manage volatility and control group risk costs; however these goals are often not aligned with the scheme's desire to keep processes simple and provide employees with adequate levels of cover.

GLOSSARY

| | |
|---|---|
| Anti-selection | Those who have most to gain are more likely to take out contracts or exercise guarantees / options, as they believe their risk is higher than the insurance company has allowed for in its premiums.  Such actions are possible due to an imbalance of information between the individual and the insurer. |
| GLA | Group Life Assurance |
| PHI | Permanent Health Insurance, also referred to as Disability Income or Income Continuation Benefit (ICB) |
| TPD | Total and Permanent Disability |
| 20% rule | This rule applies to forward underwriting where the maximum allowable annual increase in cover is capped at 20%. |

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APPENDIX A

## Company free cover limits

| SAMPLE SCHEMES | Number of members | Average salary | Average benefit | Benefit standard deviation |
|---|---|---|---|---|
| Scheme 1 | 25 | R 772,831 | R 6,569,062 | R 3,494,627 |
| Scheme 2 | 6320 | R 100,096 | R 808,871 | R 866,252 |
| Scheme 3 | 6202 | R 187,253 | R 822,156 | R 779,416 |
| Scheme 4 | 244 | R 37,352 | R 74,705 | R 112,134 |
| Scheme 5 | 24 | R 158,826 | R 317,653 | R 304,359 |
| Scheme 6 | 63 | R 134,913 | R 674,566 | R 770,779 |
| Scheme 7 | 1705 | R 37,901 | R 113,704 | R 21,597 |
| Scheme 8 | 222 | R 510,064 | R 1,623,255 | R 2,613,863 |
| Scheme 9 | 942 | R 350,649 | R 3,679,202 | R 3,401,328 |
| Scheme 10 | 1380 | R 148,686 | R 725,445 | R 704,231 |
| All | 17127 | R 148,774 | R 902,949 | R 1,355,871 |

**FCLs set**

| | Co A | | | Co B | | | Co C | | | Co D | | | Co E | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | FCL | # mems uw | % cover uw | FCL | # mems uw | % cover uw | FCL | # mems uw | % cover uw | FCL | # mems uw | % cover uw | FCL | # mems uw | % cover uw |
| Scheme 1 | R7.2m | 4 | 12% | R7.2m | 4 | 12% | R7.0m | 6 | 13% | R7.2m | 4 | 12% | R7.2m | 4 | 12% |
| Scheme 2 | R7.5m | 13 | 1% | R7.5m | 13 | 1% | R10.0m | 6 | 0% | R7.5m | 13 | 1% | R7.5m | 13 | 1% |
| Scheme 3 | R6.5m | 3 | 0% | R6.5m | 3 | 0% | R7.0m | 3 | 0% | R6.5m | 3 | 0% | R6.5m | 3 | 0% |
| Scheme 4 | R0.3m | 5 | 10% | R0.6m | 3 | 4% | R1.0m | 0 | 0% | R0.6m | 2 | 3% | R0.3m | 5 | 10% |
| Scheme 5 | R0.9m | 3 | 5% | R0.6m | 3 | 19% | R1.2m | 0 | 0% | R0.6m | 3 | 17% | R0.4m | 4 | 27% |
| Scheme 6 | R2.4m | 3 | 3% | R2.0m | 7 | 9% | R2.0m | 7 | 9% | R2.5m | 3 | 3% | R2.0m | 7 | 9% |
| Scheme 7 | R0.2m | 6 | 0% | R0.2m | 0 | 0% | R0.2m | 0 | 0% | R0.2m | 0 | 0% | R0.2m | 0 | 0% |
| Scheme 8 | R6.6m | 27 | 8% | R2.0m | 46 | 57% | R4.0m | 39 | 33% | R5.5m | 34 | 18% | R3.5m | 41 | 39% |
| Scheme 9 | R12.5m | 17 | 3% | R12.5m | 17 | 3% | R12.5m | 17 | 3% | R12.5m | 17 | 3% | R12.5m | 17 | 3% |
| Scheme 10 | R4.9m | 1 | 0% | R5.5m | 0 | 0% | R6.0m | 0 | 0% | R6.0m | 0 | 0% | R3.5m | 29 | 2% |

| Continued | Co F | | | Co G | | | Co H | | | Co I | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | FCL | # mems uw | % cover uw | FCL | # mems uw | % cover uw | FCL | # mems uw | % cover uw | FCL | # mems uw | % cover uw |
| Scheme 1 | R7.2m | 4 | 12% | R7.2m | 4 | 12% | R4.5m | 23 | 33% | R10.0m | 1 | 7% |
| Scheme 2 | R7.5m | 13 | 1% | R7.5m | 13 | 1% | R8.5m | 9 | 1% | R12.0m | 3 | 0% |
| Scheme 3 | R6.5m | 3 | 0% | R6.5m | 3 | 0% | R8.5m | 2 | 0% | R10.0m | 0 | 0% |
| Scheme 4 | R1.0m | 0 | 0% | R0.3m | 5 | 10% | R0.5m | 4 | 5% | R0.4m | 5 | 7% |
| Scheme 5 | R0.6m | 3 | 17% | R0.6m | 3 | 17% | R0.7m | 3 | 15% | R0.5m | 3 | 20% |
| Scheme 6 | R2.5m | 3 | 3% | R2.0m | 7 | 9% | R1.7m | 9 | 15% | R2.0m | 7 | 9% |
| Scheme 7 | R0.2m | 0 | 0% | R0.2m | 0 | 0% | R0.2m | 0 | 0% | R0.2m | 0 | 0% |
| Scheme 8 | R5.5m | 34 | 18% | R5.5m | 34 | 18% | R6.5m | 28 | 9% | R8.5m | 0 | 0% |
| Scheme 9 | R12.5m | 17 | 3% | R12.5m | 17 | 3% | R8.5m | 61 | 7% | R12.0m | 20 | 4% |
| Scheme 10 | R6.0m | 0 | 0% | R6.0m | 0 | 0% | R8.0m | 0 | 0% | R8.0m | 0 | 0% |