

EQUALISATION RESERVES ON A EUROPEAN BASIS

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Equalisation Reserves on a European Basis

The paper that follows is the product of our work so far. We hope to be able to update it with further research at the conference in November and look forward to comments on the paper. The DRAFT status of the paper must be emphasised, but we hope that the contents will serve to start a discussion.

The aims of the paper and the participants are listed at the start of the paper.

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INTRODUCTION

Terms of Reference

A paper on equalisation reserves was presented at the GISG Conference in October 1991. At the conference it was suggested that the paper should be followed up with a paper covering equalisation reserves on a European basis, to be presented at the conference in 1992.

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All meetings were held in the UK with some overseas members attending. All members were kept informed of progress and contributed by post.

Aims of the Working Party

1. To summarise systems of estimating transfers to and from equalisation reserves in use in Europe* at the present time
 - both statutory and non-statutory systems
 - both formal and informal systems (for example adding margins to outstanding claims reserves)
 - both catastrophe and business cycle reserves
2. To analyse and comment on the effectiveness of these systems in equalising results.
3. To consider the effect of the relevant tax treatment of equalisation reserves in each country.
4. To consider the extent to which equalisation reserves are used in Europe.
5. To gather information about any imminent changes in the calculation and tax treatment of equalisation reserves and to look at the development of these reserves.
6. To assess the current and potential use of the actuary in setting these reserves and calculating transfers to and from these reserves.

7. To consider what would be necessary regarding the treatment of these reserves, both in the UK and the rest of the EC to unify the calculation and tax treatment of these reserves.

- * The working party will concentrate initially on the following countries:

- Finland
- Netherlands
- Denmark
- France
- Italy
- Sweden
- Germany
- Spain
- UK
- Norway

1

THE PHILOSOPHY OF EQUALISATION RESERVES

- 1.1 Insurance itself is an equalisation process within society. It seeks to spread the losses of the few over the resources of the many. Adjustments are however usually attempted, based on assessed risk factors, to bring the contributions paid by participants more in line with their individual expected probabilities of claim.
- 1.2 There is no reason why this process of insurance should be an annual one. It has become contractually common for most policies to be renewed, and premiums to be paid on an annual or partly annual basis, while it is also common for the accounting and taxation of the insurance companies to be computed over a similar period. However, the underlying claims process itself, with many stochastic elements, does not fall into such neat time capsules.
- 1.3 Much is dependent on the frequency and size distribution of claims. There are considerable differences between the continual and repetitive world of motor accidental damage claims and the carrying of risk of a major Californian earthquake or a Western Chernobyl. In between lie a whole range of wind storm, catastrophe and other risk coverages, ranging from events as Hurricane Andrew and Piper Alpha down to the more frequent claims in employers liability, consequential loss and so on.
- 1.4 Given therefore that most risk processes are not in synchronization with the premiums being charged for them, the systems adopted in various countries to cope with this vary quite widely. Apart from the almost universal use of reinsurance and compliance with minimum EC solvency rules, the position in the UK lies towards one extreme, with an accounting and fiscal tradition for net provisions being set up only for incurred claims known or yet to be reported. No tax credit is allowed for accumulation of reserves to meet a future event beyond the timescale of the accounting period, although losses can be carried back for three years.
- 1.5 At the other end of the scale lie those countries with some kind of additional equalisation process built into their regulatory, accounting and fiscal processes. These countries include Finland, Germany, and Denmark and the various methodologies adopted are described in greater detail later in this paper.
- 1.6 From a philosophical viewpoint, the essential questions seem to revolve around whether to recognise the need for those companies at risk to accumulate specific reserves in advance of large but irregular claims; whether insurance profits should be viewed and smoothed over a timespan longer than one year, or whether all stochastic and periodic fluctuations should be borne on an annual basis, with deficits being met out of any surplus solvency funds retained in the company after tax and previous profit distributions.

2

ADEQUACY OF RESERVES

- 2.1** It is important that companies build up adequate reserves to cope with
- Mis-estimates of claims incurred, especially adverse developments through subsequent surges in inflation.
 - Claims cycles of longer than a single duration for years when premiums may not be adequate.
 - Infrequent but large risks and catastrophes.
 - Reinsurance and other management risks.
 - Investment risk.
- 2.2** Under the European Community regulations these risks are theoretically backed by the solvency margin which is largely common to every class except credit insurance where acknowledgement is made of the need for an additional equalisation reserve. However, the current minimum EC solvency margin is very arbitrary in its nature and does not take account of many of the risks particular to an individual company and its trading strategy. In particular the solvency margin is
- Broad brush
 - Not geared to the size of the individual company
 - Not geared to the types of risk being written
 - Not geared to risks of longer than one year's duration
 - Not calculated on a realistic scientific basis.
- 2.3** It is understood that the commission in Brussels are currently keen to bring more consistency into financial supervision. This report seeks to examine the practical and theoretical aspects of equalisation reserves, and the role that they can play in developing a sounder overall approach to the financial management of the insurance business.

- 2.4 An equally important principle is that the insurance industry should operate under a coherent set of supervisory, accounting and taxation principles. Thus if a move is made towards a more scientific basis for establishment and maintenance of adequate reserves for insurance purposes, then a wide basis for agreement is desirable on a European basis, given the interlocking and increasingly cross-border nature of the various European markets.
- 2.5 It is also necessary to address the issues of sensible minimum and maximum levels for such funds, transfer rules and so on.
- 2.6 Some of the questions that arise from this 'philosophical' review are therefore
- Should equalisation reserves be used only 'in extremis' or as a norm to smooth insurance results from year to year, as far as this can be achieved?
 - Should this smoothing include periodic, investment, management and other risk fluctuations?
 - Should equalisation reserves operate by class, sub-class, high risk subset, or at an overall company account level?
 - Can effective rules be established to determine maximum and minimum levels, and transfer rules that satisfy 'true and fair' accounting criteria?
 - How should equalisation reserves be integrated within a more realistic scientific assessment of overall solvency requirements?
- 2.7 We do not have answers to all of these questions. The purpose of this report is to report on the current position as we can best determine it, and to contribute to discussion and further development of this topic in a European context.

SECTION 2 SYSTEMS IN PARTICIPATING COUNTRIES

This section looks at each member country under the following headings:

- Description of system
- Effectiveness in equalising results
- Extent of use
- Tax treatment
- "Informal" equalisation reserves

Index to countries

- 2.1 UK
- 2.2 Finland
- 2.3 Denmark
- 2.4 France
- 2.5 Sweden
- 2.6 Germany
- 2.7 Spain
- 2.8 Norway
- 2.9 Netherlands
- 2.10 Italy

2.1 UK

Description of system

There is a very small amount of regulation covering equalisation reserves in the UK. They are only statutorily required for credit insurance - business authorised under DTI class 14. The Regulations specify four methods of calculating these reserves, of which two are fairly simple and

two have a statistical basis. A detailed discussion of this regulation was presented in the 1991 paper on equalisation reserves presented to GIC. In this paper it was mentioned that a very few companies use equalisation reserves.

Effectiveness in equalising results

The regulations were only introduced in September 1990 and therefore it is hard to see the effects they have had so far. Some simulations were performed for last year's paper.

Extent of use

As far as we are aware no companies in the UK have yet set up reserves under these regulations.

Tax treatment

At present these reserves are not allowed for tax. The statutorily required reserves are required by the DTI and are completely separate from any tax regulation.

Informal reserves

Companies in the UK may hold margins in their outstanding claims reserves, which may decrease or increase according to the experience. It would be very difficult to quantify the amount of reserves held in this way. Reinsurance is also used to equalise results.

2.2 FINLAND

Equalisation systems in use

Claims expenditure is mainly equalised by an equalisation reserve (ER).

The ER should be constrained by an *upper limit* so that no more than what reasonably can be expected to be necessary to meet future adverse fluctuations can be transferred to it. Furthermore, the annual underwriting result is divided into a consolidated part and random part. The former corresponds to a long-term (trended) average level and the latter to the annual deviations from this. The transfers are limited to the random part. It is determined by a priori given *transfer rules*.

The Insurance Department has provided a *standard model* for insurers have to test whether the standards fit their business, and, if necessary, construct variants for their particular use.

Equalisation of the return on investments. Finnish insurers are permitted to retain the book values of their assets at the historic values which were paid at their acquisition and to take certain depreciations. When the market values grow, for instance owing to inflation, an undervaluation ensues. It will serve as a buffer if the asset values are depreciating.

The insurers can build, in limits set down in legislation, a provision for depreciations and losses in assets as well as for unpaid premiums.

Effectiveness

The system has proved to be effective in smoothing the claim expenditure.

Tax treatment

The transfers as well as the ER are free of taxes so long as the limits and the transfer rules are strictly followed.

It is not permitted to bury any extra provisions into the ordinary technical reserves as "informal equalisation". Such were common and fairly sizable before the introduction of the ER. Today the reserves are to be calculated according to good actuarial prudence.

Extent of use

The system is statutory and covers all classes of business.

2.3 DENMARK

Description of system

In 1989 Danish legislation regarding non-life insurance companies' public accounts was changed and, among other things, tax deductible equalisation reserves were introduced. The legislation wording gives rise to a very broad interpretation. It only states that equalisation reserves are funds used for equalisation of claims expenses over a period of time, when experience shows that the annual claims expenses fluctuate. Furthermore, it is stated that the equalisation reserves are not permitted to exceed the necessary amount. It is apparent that the vague wording is insufficient.

Effectiveness in equalising results

As there is no formal system and the system was only recently introduced it is hard to see what effectiveness these reserves have had in equalising results.

Extent of use

As all transfers to these reserves are allowed for tax, it seems likely that the use will be widespread.

CURRENT AND POTENTIAL USE OF ACTUARIES IN THIS FIELD

Currently there is no obligation for companies to use actuaries to define equalisation reserves and transfer rules. The actual use varies according to companies' policies and organisations, and actuaries are involved in some companies.

Equalisation is legally defined in a narrow sense, including only fluctuations of claims expenditure. The introduction of a state governed flooding fund demonstrates a public awareness of the desirability of catastrophe funds. So, there may be a scope for introduction of requirements based on transparent risk theoretical considerations, when regulations are further developed.

The present world wide crisis of reinsurance catastrophe covers may open a further potential.

Tax treatment

All transfers to these reserves are allowed for tax. It is expected that the Danish tax authorities will make adjustments if the use of equalisation reserves assumes *inordinately large proportions*.

2.4 FRANCE

Description of system

Equalisation reserves rules have been established by the Tax Authorities. The regulations allow Insurance and Reinsurance Companies to build up a Fund which is tax free for classes of business for which balanced results cannot be obtained on a one year basis.

The amount of money allocated to the Fund is limited to a percentage of the last year's premium income net of reinsurance for specified classes of business.

Since 1975:

- 200% for Hail business
- 300% for other Natural Events
- 500% for Nuclear Risks
- 500% for Liability caused by Pollution

Since 1987:

- 300% for Spatial Risks

Since 1991: for Credit Risks

- The basis for the calculation is very easy and not very actuarial: 75% of the technical profit of the class of business can be added to the reserve

On the tax side, allocations to the reserve which have not been used after a ten year period have to be credited back to the operating balance. Tax regulations are very precise concerning the way accounts are to be drawn.

The same situation applies for reinsurers. The regulations for these companies do not work at all. Reinsurance companies underwriting non-proportional business with an exposure over 1000% of their premium income cannot be satisfied by these regulations.

A meeting took place in 1977 at the French Reinsurers Syndicate. Some proposals were made in those days but since that time, nobody came back to the topic.

Effectiveness in equalising results

We have no information on this.

Extent of use

The system has been created for very specialised companies such as insurance companies underwriting only Hail business. It is not surprising to observe that only small and medium size companies use the equalisation reserves.

Equalisation reserves are found in some regional companies, the bigger ones or the average sized not using this facility.

Two reasons may explain this situation:

- Bigger companies are rich enough not to worry about such small reserves.
- Bigger companies are maybe further from the risk approach (mainly for storm) than more regionally located ones.

For Credit Insurance, we may observe at once a problem connected with the way the reserves are built up. Only technical profit can be allocated to these reserves. In that particular class of business the profit comes from investment income which is on average much higher than the technical loss.

Tax treatment

After ten years the reserve not yet used is credited back to the operating balance. Ten years is a short period of time, but this drawback has still not been really acknowledged by insurers because of the experience.

In fact, the first reserves were built up for Hail Insurance in 1975. In 1983 and 1984 Hail business recorded loss ratio over 100% so, profit allocated for the first years (1975-76) was used to strengthen the accounts of 1983 and 1984 rather than credited back to the operating balance in 1986 and following years.

2.5 SWEDEN

Description of system

The system in Sweden was revised in 1991. The equalisation reserve is calculated as a proportion of premium plus a proportion of claims reserves, where the proportions used depend on the class of business. It is called a 'safety reserve'.

Effectiveness in equalising results

The aim of this reserve is to equalise small and middle sized risks. Large ones should be equalised by the use of reinsurance.

Extent of use

This reserve is statutory.

Tax treatment

This reserve is allowed for tax.

2.6 GERMANY

Description of system

The current system was established in 1978. Before this there was another system to equalise results, but this was less sophisticated. The reserve is based on deviations from an average loss ratio over a period of 15 to 30 years depending on the class of business. A multiple of the standard deviation from the average claims ratio is the required amount of the fund. If the actual claims ratio is higher than the average claims ratio, then money can be transferred out of the reserve. 3½% interest is assumed in calculating the equalisation reserve and this has to be transferred in each year.

Effectiveness in equalising results

The system has been used for 14 years now and is effective in equalising results.

Extent of use

The reserve is statutory.

Tax treatment

The reserve is allowed for tax.

Informal equalisation reserves

There is some implicit equalisation from using unrealised gains on assets. In general it is claimed that there is no over or under reserving on claims reserves and the IBNR calculation is fairly restricted. Outstanding claims tend to be estimated on a case by case basis.

2.7 SPAIN

Description of system

Equalisation reserves are cumulative and must be increased each year by a minimum amount.

If there is a loss in one year on a class of insurance, the company is allowed to offset the loss using the equalisation reserve.

Companies have to increase the equalisation reserve each year by the amount of the security margin included in the pure premiums. The minimum for this is 2% of the commercial premiums (market premiums). For credit the minimum is 75% of the positive technical result. Technical result is not defined, but everybody understands that it is premiums less claims and increase in Reserves.

There is also a maximum amount of the total reserves above which the companies are not obliged to provide more funds. These limits are:

- Crops: two times claims paid in the last five years
- Credit: 134% of the average of net premiums for the last 5 years
- Nuclear Risks: 300% of year's premiums
- Motor insurance: related to the average of premiums for the last 3 years

Actuaries

The transfers to and from the equalisation reserves are estimated by an actuary and must be explained to the DGS (the equivalent of the DTI). There is no law saying that, but it is a market practice. So when companies need to transfer from Equalisation Reserves to offset bad results, there is an actuary who certifies and signs the specific "paper" included in the returns to be sent to the DGS.

Different classes of business for which these reserves are required

- Third party liability arising from nuclear risks
- Third party liability arising from motor insurance
- Credit insurance
- Risks to crops (freeze, hail, floods, wind, etc)

Effectiveness in equalising results

- Crops: there are cycles of losses and cycles of profits. At the moment, there have been some good years with profits. When the bad times arrive, the equalisation reserve disappears immediately. Nevertheless losses bigger than 95% of the premiums are covered by the Consorcio de Compensacion de Seguros (State owned company)
- Motor insurance. Because the claims ratio is very high and increasing every year, everybody makes a loss each year. Therefore, companies do not set up equalisation reserves and have used up any reserve that they had set up.

Extent of use

The regulations encourage companies to set up equalisation reserves for all classes of insurance, but due to the tax problems, they only establish the reserves for the classes for which it is mandatory to do so.

Tax treatment

The annual increase in the equalisation reserves is a deductible expense if it is:

- The amount required
- Not greater than the maximum
- Only for the obligatory classes of insurance.

For 1991 and earlier years, the increase in the equalisation reserve was not a deductible expense, but the whole equalisation reserve was considered to be company capital and part of the company's solvency margin. From 1992 onwards, the equalisation reserve is treated as a technical reserve, and not part of the solvency margin, so the company must have sufficient capital to cover the reserve. But, on the other hand, now is considered as a deductible expense.

2.8 NORWAY

Position has changed and is still changing.

Description of system

There is no statutory requirement to hold equalisation reserves in Norway.

Effectiveness in equalising profits

Not applicable.

Extent of use

Not applicable.

Tax treatment

Not applicable.

2.9 NETHERLANDS

Description of system

Dutch do not use explicit equalisation reserves.

Effectiveness in equalising results

Not applicable.

Extent of use

Not applicable.

Tax treatment

Not allowed for tax which is probably why they are not used explicitly.

Informal systems

This may exist but it is very hard to establish.

2.10 ITALY

Description of system

There is no statutory requirement to hold equalisation reserves in Italy.

Effectiveness in equalising results

Not applicable.

Extent of use

Not applicable.

Tax treatment

Unlikely to be allowed for tax.

Informal systems

No information so far.

SECTION 3 CASE STUDY - FINLAND

Origin

Up to year 1953 no standards or generally accepted rules were in existence. 'Informal margins' in the technical reserves were common. From the point of view of both the supervisors and industry the situation was diffuse and a danger was imminent that the taxation authorities would intervene and, in lack of clear legislative guidance, would apply a reserving definition 'in narrow sense' (see Appendix 1, paragraph 1.3). In order to get the situation in a proper and decent control, the supervising office (Insurance Department in the Ministry of Social Affairs) contacted Taxation Department. A solution could be found which also satisfied the fiscal interests. An equalisation reserve (briefly ER) should be established but in a strictly controlled form. The size of the ER should be limited so that only an amount which can be evaluated to be necessary for cover of adverse fluctuation is permitted. Furthermore, to prevent the insurers from manipulating the taxable profit a uniquely definable transfer rule was also required.

For the purpose a special prescription was inserted into Insurance Company Act in 1953 according to which the claims reserve should include *an amount of equalisation calculated according to risk theory for years with a high loss of frequency*.

Implementation

The Insurance Department has provided directives and a standard model (Appendix 1, paragraphs 2.4 and 3.2). However, the insurers have to test

whether the standards fit their business, and, if necessary, to construct variants for their particular use.

In order to get full efficiency from the very beginning the insurers could move understatements in assets to the ER as an initial capital.

Because the operating of the ER as well as simultaneously established solvency tests require familiarity to *practical risk theory*, the training of the actuaries was reformed.

Experiences have been favourable. In fact, the ER has become an important pillar of the *financial strength* of the insurers. Its flow is depicted in the diagram below. Note the cycling shape, the technique which was created also allows for provision against business cycles which had ben proved a major problem if this kind of long-term equalisation has not been available.

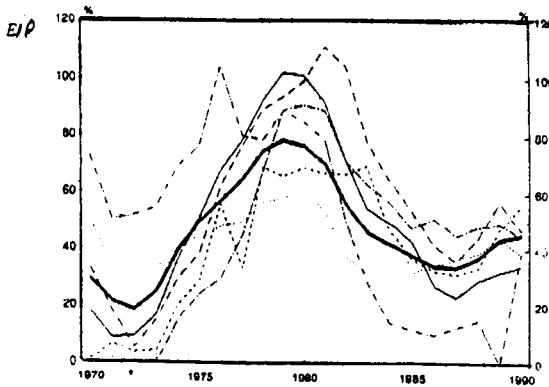


FIGURE 1 The flow of the ERs of largest six Finnish non-life insurers in percentage of premium income.

As a consequence of the enhanced underwriting capacity the ceded reinsurance premiums which were 29% of the premiums of non-life insurance in year 1951, had been reduced to the level of about 13% in 1961. This, together with other ER features, contributed to the enforcement of the financial position of the insurers which reflected in increased taxes (notwithstanding that the ER is allowed for taxes) and reduced rates of direct written business.

Return on investments is not included into the ER, instead the asset valuation system gives some chance for equalisation as is discussed at Section 5 of Appendix 1.

Future developments - No need for any substantial changes is seen. The EC membership might require changes in handling of the assets, but it will not have any significant influence to the current practices.

It is worthwhile discussing whether the equalisation of the return on investments, including the moving in asset values, should be taken into consideration as well as the interplay of the asset and liability related income and expenditure items.

SECTION 3.2 CASE STUDY - GERMANY

Until 1978 the German system for equalisation reserves allowed transfers of 75% of technical profit to the reserve and 100% of losses to be equalised. This system did not work. The German insurers proposed a more statistical method of calculating equalisation reserves based on a paper written in 1974 by Dr C Veisse. Negotiations were with the tax authorities rather than the regulatory authorities and once agreement had been reached with the tax authorities the ideas were presented to the regulators.

The principles presented to the authorities were that insurance is a pooling of risk over many people, many policies and over time. This means that equalisation reserves are needed and it was also emphasised that actuarial involvement was needed in their calculation. The tax authority accepted these principles and the parameters for calculation of the reserves were established by "horse trading".

The method has worked well over the last 14 years. The last two to three years when experience has been bad have been overcome fairly easily. It is felt that using equalisation reserves aids premium rating and raises consciousness of the risks actually written. The tax authority's situation has improved as their tax income is smoothed and this helps them to plan.

The old East Germany did not have any equalisation reserve regulation, as all insurance was provided by the State. Post reunification has meant larger equalisation reserves and there is more business.

There is no pressure for change in Germany, although membership of the EC is having an effect. Potential harmonisation between EC member states may affect the rules used.

Another potential effect is the increasing fluctuations caused by, for example, more catastrophes.

The use of reinsurance has stabilised, not reduced, but it has made it more difficult to change the reinsurance programme. There is nothing analogous in other industries, only insurance companies have this type of reserve.

One desirable change might be to have an emergency brake on transfers to the fund. In theory transfers to the reserve could bankrupt a company, however this is unlikely unless they only write one class of business.

Equalisation reserves

Case history Denmark

Up till 1990 Danish insurance companies had the facility of tax-exempted security funds, build up by retained earnings. They were regarded as a part of companies equity and solvency base. At the end of 1990 these security funds amounted to DKK 14 mia. of a total equity of DKK 43 mia. Each security fund in a company was required to have its statutes approved by the regulatory office (Finanstilsynet) under the general objective to be of "the benefit of the insureds". Any extract from the security funds had to be approved explicitly by Finanstilsynet. For a period in the 80'ies tax authorities considered to review the tax exemption, but this seems to have been abandoned following uses of security funds during the crisis of American reinsurance in 1985.

In 1990 the security funds were deleted from the insurance company act. This meant existing funds could be brought forward, but no new contributions could be made.

The security funds were replaced by equalization reserves, also tax exempted. The legislation wording gives rise to a very broad interpretation, as it only states that they are used for equalization of claims expenses over time, when experience shows annual claims expenses to fluctuate. Furthermore, it is stated that the equalization reserves are not permitted to exceed the necessary amount. The new law required claims reserves to be unbiased, ruling out hidden reserves.

For credit insurance and workmens' compensation special rules apply. The credit insurance equalization follows the EEC rules, and workmens' compensation is strictly regulated as a result of public attention to profitability.

Being technical reserves, the equalization reserves are not included in the solvency basis of the company, and there are no rules for their use in an insolvency situation. In the first year of operation 1990, equalization funds were build up to a total of DKK 1.4 mia. It is apparent that the vague wording is insufficient, and the introduction of stricter rules is anticipated. To inspire future regulation, a working party of Den danske Aktuarforening in 1990 produced a report on equalization systems based on simple risk theoretical considerations. An english version of the report was presented to the ASTIN meeting in Stockholm in July 1991.

A very special case of public attention to equalization is presented by flooding exposure to homeowners. Only a few areas are exposed, and insurance conditions exclude flooding. During decades, flooding events stirred up public criticism of the insurance industry following press reports of victims of each flooding event. This last happened at the winter storms in 1990, and as the insurance industry failed to come up with a solution, a law was passed in 1991 requiring a yearly contribution of DKK 10,- of each and every fire policy to a state governed fund toward flooding.

It may be noted that the present Danish regulation defines equalization exclusively in terms of fluctuating claims expenditure, i.e. in a narrow sense in the terminology of the technical appendix. Equalization of premium rates and loss ratios are regarded as usual operational conditions of industries, and not as a particular aspect of insurance.

SECTION 4 ATTITUDES OF INDUSTRY BODIES

We have written to various industry bodies and have so far received the following replies:

Lloyd's View of Equalisation Reserves

We would like to thank Martin White for his comments.

Lloyd's have no implicit equalisation reserves.

As Lloyd's is about to write credit insurance, equalisation reserves will have to be set up under the Credit Insurance Regulations 1990. We understand that part of any profit, set in accordance with the regulations, is added to the reserves required for solvency purposes. This reserve will effectively be held at the name level and not within the syndicate. The reinsurance to close will not be affected and hence the tax and profits will also be unaffected.

The Rowland Task Force Report recommended that name level equalisation reserves be introduced across the entire market. The intention here was that the amount of profit set to equalisation reserves would not be taxed but that drawdown from the reserve would be taxed. Lloyd's are looking into this issue and the three main factors affecting it are:

the fact that tax will be payable ultimately

the fact that profits distributed to names will be reduced as the fund builds up

potential inheritance tax problems

There is also the complication that overseas names might in some circumstances be taxed on their entire profit with their home government effectively ignoring transfers to and from equalisation reserves. Thus such names could find themselves paying tax on income they had not actually received.

It may be that the Revenue would be keen to see these reserves as compulsory if there is to be any favourable tax treatment. Some names already effectively have equalisation reserves and some managing agents recommend that at least half of any year's profits are held back.

INLAND REVENUE VIEW OF EQUALISATION RESERVES

We would like to thank Mr Rob Gill of the Inland Revenue for his help.

Current Situation

The basic aim of the UK tax system is to have a broad base for taxation at low rates. Special reliefs will thus be an exception, but will be considered if there is good cause.

The UK tax system has no equivalent to equalisation reserve relief. However, the Revenue are not persuaded that the UK system is unfair compared to the systems in the rest of the EC.

Comparison is difficult because all systems have their own unique features and the benefit of special reliefs may be counterbalanced or outweighed by other aspects of the system. The Revenue have made a study of regulatory and tax rules in the EC, purely as a data gathering exercise in order to inform the debate about the extent, if any, to which UK non-life insurers are handicapped by UK tax rules in competing for business in the Single Market.

As is well known, the whole subject is widely discussed at present. The publication of Professor Carter's report may lead to further discussion between the interested industry bodies.

Problems with implementing such a relief

Under current UK tax law relief is not due for future losses. All businesses which wish to provide for such eventualities must do so out of taxed profits. Legislation would be required if any exception were to be made for the insurance industry enabling them to build up equalisation reserves out of untaxed profits. It is open to question whether the volatility of underwriting profits is such that insurers are uniquely deserving of a special relief.

The ability to carry back trading losses over a 3 year period, and forward against future profits without a temporal limitation, conferred by the 1991 Finance Act must go a long way towards ensuring that the losses incurred as a result of volatile trading conditions are immediately relieved.

The averaging relief available to farmers is an example where UK tax law recognises fluctuations of profits, though only over a 2 year period.

**SECTION 5 CURRENT AND POTENTIAL USE OF ACTUARIES IN
THIS FIELD**

SECTION 6 ANALYSIS OF THE EFFECT OF DIFFERENT TAX AND ACCOUNTING REGIMES

Method

A spreadsheet model of very simple reserve accounts, profit and loss accounts and balance sheets. The spreadsheet has been distributed to all members of the working party to adjust for the reserving and accounting practices in their countries. These models were then adjusted for the tax regimes in these countries.

A specification of the model is in Appendix 3.

The testing of each system will look at:

Cyclical underwriting cycles

- start point
- average loss ratio
- peaks and troughs

Random loss ratios (to simulate catastrophe claims)

Investment income

The aim of the testing is to assess each system on two counts:

Effectiveness of equalisation - does the system have desirable qualities

Effect of tax regime

Things the model will be tested for:

- 1) Does it reduce to zero at some point?
- 2) Does it smooth fluctuations in profit?
 - underwriting
 - insurance
 - distributed (dividends)
- 3) Does it make the company insolvent?
- 4) Are transfers to and from it well defined?
- 5) Does it cover cyclical and catastrophe events?

SECTION 7 FISCAL NEUTRALITY IN THE UK

APPENDIX 1
TECHNICAL FEATURES

APPENDIX 1

**Technical features concerning
equalisation reserving**

by

Teivo Pentikainen

1. Definitions

- 1.1 Purpose of the ER** Insurance business is extremely volatile. There are years of good or bad profitability. A vital condition for healthy running, in fact for survival, of the company is to find means to overcome the adverse periods. An important technique is to store profits, to be available to help to cover likely future losses. Equalisation reserves (ER) are aimed at offering a technique for equalisation of the results between subsequent years.

One should appreciate that the ER's are only one of the methods of equalisation, other approaches are eg reinsurance, resilience in asset and liability assessments (hidden reserves), the latitude in risk selection, premium and reserve rating as well as in the control of expenses, etc. All of these have their merits and demerits and are partly subject to serious constraints in size, cost and time. No one alone is sufficient, therefore

and a major problem is to find a workable combination of them. however, we limit the consideration to ER in this appendix.

Note that beside equalisation the ER can and should have another function as well. It can be one of the pillars upon which the solvency of insurers lies.

1.2 **The scope of ER.** The ER can equalise:

- underwriting results
- return on investments or
- both of them, ie the insurance (trading) result.

Furthermore it can be limited to some particular classes of business, eg credit natural catastrophes, etc, or rather cover the whole business.

The main focus here will be on the underwriting result alternative, notwithstanding that the asset side will be important. However, as far as the author is aware, the later is still very little studied and is waiting for further research efforts. Therefore, it will be covered with brief comments in section 5 below.

1.3 **Definition of the technical reserves** closely affects both the need for an ER, as well as its design and, therefore, warrants a reference. Internationally and traditionally there are two, crucially differing definitions.

- a) Wide sense. The total technical reserve V_w (subscript w for wide) should be sufficient to cover future requirements in every case, so

that the insurer is able to pay at all time (see The Actuary, March 1992, p.22 for the definition proposed by the Angerer Working Group 1979). This definition considers the insurance business as a stochastic process, the annual result of which fluctuates. The reserve V_w must or at least can be dimensioned according to the expected average course of the underwriting results (claims, etc) *plus a provision according to the range of the probable adverse fluctuation.*

- b) Narrow sense. The reserve V_n (subscript n for narrow) should correspond to the identified individual debts (outstanding claims by case and the IBNR's + unearned premiums). This conceptually only corresponds to the mean value of insurance commitments (calculated by a prudent actuarial adjustment). It considers the technical reserve as a debt in conventional meaning. A debt can exist only with the proviso that there is both a debtor and a known or still unknown but identifiable creditor.

Both of the definitions have been in use and continue to be in different countries. The wide definition may seldom have been defined in legislation, rather it is based on traditional understanding between the insurers and regulators.

If the taxation authorities do not impose any constraints, the definition in wide sense is, indeed, ideal from the point of the insurers and makes a special ER unnecessary. It is a competitive advantage compared with the cases where the narrow definition is to be obeyed or only a regulated ER is permitted.

On the other hand, if the taxation or other regulation or potential accounting conventions require the (strictly) narrow definition, then serious problems may arise, because the narrow definition does hamper the equalisation of the underwriting result. A great need may emerge to find some technique for the purpose. This explains the birth of equalisation reserves. Obviously, owing to the varying requirements laid down by taxation legislation they vary widely in different countries as can be seen from the national reports in the body of the paper.

1.4 **Requirements.** If the ER is recognised in legislation or otherwise laid down in regulation, there are commonly two features required in their construction.

- a) The size is limited to correspond to the need for equalisation.
- b) The transfers to and from the ER are regulated, usually so that a well defined random profit is added to the ER and a loss deducted therefrom.

In practice, these conditions have arisen as a compromise between the insurance interests and fiscal interest, eg the transfer rule might uniquely define which part of the annual pre-tax result is permitted to be allocated into the ER so preventing the insurer from manipulating the taxable income.

These conditions have, however, other important motives as well, or at least consequences. For example, during the high phase of an underwriting cycle they prevent the insurer from delivering the

occasional excessive profit as dividends or bonuses or wasting them eg by increased marketing, etc. They are signals to both to the management and the shareholders about which part of the notional profit and accumulated reserves are freely available and which are locked in to maintain the company's future viability.

2. **The upper limit**

2.1 **The upper limit E_{max} formula 1.** First, it is useful to state that the business results of insurers can be understood as superimposition of a) short-term fluctuation (usually described by mixed compound Poisson in the terms of risk theory), b) cycles and c) trends. Fig. 1 demonstrates a real-life outcome.

The role of cycles is striking. Similar experience are available from numerous other countries as well (eg SIGMA-Bulletin). On the other hand, there are classes of business where cycles are not observable or are only in limited degree (the fact may partly depend on the fact that the disclosed results are 'equalised' by letting the valuations resiliently move).

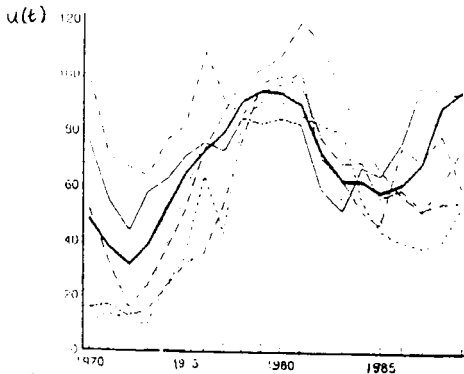


Figure 1. Solvency ratios $u(t)$ of the largest six Finnish non-life insurers and their joint flow; $u=U/P$, U being the solvency margin (without the understatements in asset values) and P the premium income.

The permitted range of the ER should be large enough to allow for the total fluctuation of the solvency ratio. The above observations suggest a composition set out in Fig.2. The total range R_{tot} is composed of a maximal height R_c of a cycle added by the ranges R_a and R_b for the short-term fluctuation plus an extra reserve C_{tr} for potential risk cumulations:

$$\text{Formula I } R_{tot} = R_c + R_a + R_b + C_{tr} \quad (2.1)$$

Equation (2.1) can be used as guidance in finding a rule for an upper limit for the ER. The cycle range R_c is to be derived from empirical observations either case by case or, perhaps as an industry-wide standard for various classes of insurance (see below paragraph 2.4). The short-

term range R_A and R_B can be obtained by using well-known risk theory formulae; a short-cut approach is referred to in paragraph 2.4.

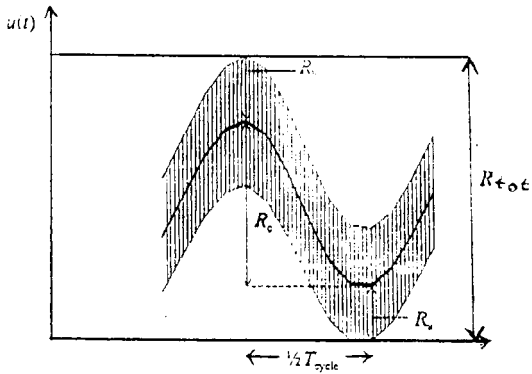


Figure 2. A schematic composition of the variation range of the FR consisting of a fictitious cycle and an area for the short-term fluctuation (shaded) inside of which the solvency ratio can be expected to fluctuate.

The auxiliary C_{\pm} is intended for the cases where the insurer is engaged in business where a risk of a very large but seldom occurring claims is

possible or where other special risks are involved, such ones the affect of which is not coming to affect the 'normal' range revaluation.

For a large portfolio $R_{\omega} \approx R_B$, but for small and heterogeneous portfolio the former may be larger owing to the skewness of the claims expenditure.

- 2.2 **Formula II.** In some countries, as well as in some of the EC-directives for the ER of credit insurance, the upper limit is based on the standard deviation, σ_x , of the claims ratio:

$$\text{Formula II } E_{\sigma_x} = 6 \times P \times \sigma_x \quad (2.2)$$

The formulae I and II may often give results of the same order of magnitude if the standard deviation is derived from a long period (the directive prescribes at least 15 years and at most 30 years). Formula I is easier to adjust to changing external and internal circumstances. It can also benefit industry-wide standards if necessary (more in paragraph 2.4).

- 2.3 **Formula III.** A simple formula defines the upper limit proportional to the premiums:

$$\text{Formula III } E_{\sigma_x} = e \times P \quad (2.3)$$

The coefficient e may depend on the class of the business. For example, it is 1.5 in the EC credit insurance directive's method 1.

2.4 **Formula IV.** This is an approximation for the formula I (in current use in Finland).

$$\text{Formula IV } E_{max} = aP + \sqrt{(b_1 x \sigma_x^2 + b_2 x \sigma_{\rho}^2 P^2)} + C_{\pm} \quad (2.4)$$

where the first term of RHS introduces the effect of cycles, a standard value of the coefficient a being 0.9. Further

$$\sigma_x^2 = \sum_j \sigma_{xj}^2 = \text{variance attributable to compound Poisson variation} \\ (2.5) \text{ summed over the } j \text{ classes of insurance covered}$$

$$\sigma_{\rho}^2 P^2 = \sum_j \sigma_{\rho j}^2 \cdot P_j^2 = \text{the variance component provoked by the mixing} \\ \text{(structure) variable summed over the } j \text{ classes. (Mixing variable} \\ \text{introduces the effect of short-term variation in the propensity of} \\ \text{risk such as caused by weather conditions or the booms or} \\ \text{recessions of the national economies)}$$

C_{\pm} is a special term for overseas ^{risks} (to be determined by the appointed actuary individual company by company (see paragraph 6.2)

The standard values of the coefficients b_1 and b_2 are 288 and 230 respectively.

The compound Poisson variance can be written in form.

$$\sigma_{xj}^2 = \beta_j^2 P_j x M_j' \quad (2.6)$$

where M_j^* is the maximum EML retained in class j . The auxiliary coefficient β_j is $\beta_j = a_2/M_j^{*2}$ where a_2 is the second moment about zero of the claim size distribution (see eg Risk Theory by Beard et al (1984) pp. 52-54. It is of dimension 0 in respect to the monetary unit, hence being immunised against inflation it can be used for a long time without the need to be reviewed annually. β_j depends on the class j of business and the retention limit M_j^* . The supervising office had given standard values for it in a tabular form as well as the values for the mixing variance, σ_{kj}^2 .

The derivation of these formulae are given in Pentikainen and Rantala (1982) Vol.II As was seen from the formulae, the ER is assumed to include several or all classes of the portfolio and the upper limit E_{max} was constructed for the total ER.

Note that the upper limit E_{max} also depends on the retention limits M_j^* .

Even though this formula may look complicated, it is convenient to use when the standard values for β_j and σ_j are given (or are once derived).

3. The transfer rule

- 3.1 The purpose of the transfer rule is, in one way or other, to recognise whether the underwriting result is good or poor and accordingly to provide a transfer to or from the ER.

3.2 **Formula I.** The transfer depends on the amount by which the claims ratio $x(t) = X(t)/P(t)$ (incurred claims/earned premiums) deviates from its average level \bar{x} .

$$E(t) = (1 + i)^t E(t-1) + a[\bar{x}(t) - x(t)] P(t) + C(t) \quad (3.1)$$

The coefficient $1 + i$ provides the yield of interest for the ER carried from the previous year (standard value $i=0.035$ in Germany, 0.05 in Finland).

\bar{x} is a moving average of the latest $x(t)$ values calculated from a reference period of T years (eg 10 years in Finland and at least 15 and at most 30 years in the ER credit rules).

The factor a is 0.75 for the EC credit methods 1 and 2 and a unit for the methods 3 and 4 as well as in the Finnish and German (???) schemes. It regulates whether the total deviation from average claims ratio or only some specified part thereof is to be equalised.

$C(t)$ is a correction term providing a growth for the ER and preventing it from exhaustion, for example,

$$(3.2a) \quad C(t) = e E_{max} \text{ (EC credit method 3, having } e=0.035)$$

or

$$(3.2b) \quad C(t) = p.P(t) \text{ (Finland, having } 0 < p < 0.15 \text{ upon the choice of the insurer)}$$

The transfer will be truncated if it $E(t)$ passes the upper limit or if it is exhausted (the total ET may not turn negative).

In the multiclass case each class can first be calculated separately and the results are then summed up to arrive at the total ER of the company. Another approach is to handle the whole business as one block.

Note that this formula implies that the underwriting result moved to the profit and loss account after its equalisation is smoothed to correspond to the average level of loss ratio \bar{x} . Hence, the equated loss ratio need not be strictly equal from year to year, because the moving average \bar{x} varies, but the range of the variation is dumped about in the ratio $1:\sqrt{T}$, i a damped residual fluctuation still remains.

- 3.3 **Formula II** is the same as formula I but the moving average x is replaced by a prefixed constant

$$\bar{x} = \text{constant} \quad (3.2)$$

This variant may be appropriate in the case where the moving average is too volatile or is not at all reliably available. According to this formula the equalised claims ratio will be the same from year to year, no residual fluctuations remains (so far as $E(t)$ is inside its limits)

- 3.4 **Asymmetric formula.** The ER is increased by moving some part of the underwriting result into the ER, the example.

$$\Delta E(t) = p.P(t) \quad (3.3)$$

each year until an upper limit is reached. The coefficient p is a prefixed constant. In the case of an abnormally severe loss ratio the excessive loss is covered from the ER. Hence, this formula does not equalise the results in normal or good years.

This kind of system was referred to in the ER-Working Party's report submitted to the GISG-convention in Llandrindod Wells in 1991, though not specifying the formula nor strict conditions.

- 3.5 **Open and half-open transfers.** The transfer might not have been strictly regulated in all countries. It can be left totally open or obligatory transfers are required only in a case where the loss ratio deviates excessively from its normal values. For example, the outlined Danish system might be of this character as well as the Swedish one (???). Of course, the equalisation effect is left defective, if there are claims ratio outcomes which are not permitted to be equalised. On the other hand, if the insurer may freely assess the transfer, the system may be very expedient. In fact, other fluctuations than those inherent from underwriting can then be equalised and the reported result in the profit and loss statement can be determined as the management deems suitable in that time situation.
- 3.6 **Special rules.** It is technically possible to add to the standard transfer rule, for example, to the Formula I, special extra modules which are activated if the ER considerably deviates from its target level. If $E(t)$ is approaching its upper limit, a special extra release can be triggered in order to prevent an imminent 'collision' with the upper limit and the ensuing irregular impact to the profit and loss account. Similarly, if $E(t)$

is in danger of being totally exhausted, a special extra increase can be programmed to the model to enforce the ER. Detailed information can be found in Pentikainen and Rantala (1982) section I, 7.5

4. **A lower limit**

At some of the EC-credit insurance ER rules a particular non-zero lower limit is prescribed below which the ER is not permitted to fall. The rationale might have been to keep some part of the ER to support the solvency of the insurer.

In the Finnish scheme the lower limit is normally zero, but a positive lower limit is required in the case where a deficit in the (ordinary) required solvency margin occurs. ie if the solvency margin, in which the ER is not included, undercuts the limit laid down for a required margin. The shortfall is compensated for by a necessary part of the ER.

5. **Equalisation of the return on investments**

Because the total financial position of any insurer depends both on assets and liabilities and on fluctuation in both of them, the equalisation of the return on investments consisting of cash income and changes in the value of assets may be equally justified as in the equalisation of the underwriting result related to the liability part of the business. Unfortunately, this topic, as far as the author is aware, is not studied nor experimented with in practice. The existing ER's are limited to the liability side only as was the foregoing.

One kind of equalisation effect on the asset side is achieved in those countries where it is permitted to keep assets in their 'historic' acquisition values (often still subject to depreciations). When owing to inflation and other reasons the values of eg equities and real estate increase, a difference emerges between the market values and book values. This undervaluation (a part of the conventional hidden reserves) is a buffer against the eventually that market values might fall in future.

A variant of the above approach is the system where the difference between the market value and book value is assigned to a special disclosed reserve in the liabilities.

The problem of equalisation of the return on investment as well as the interplay with underwriting process is waiting for future research efforts and finding appropriate practical application.

6. **Features and discussion**

In this concluding section some special features and experience of ER's will be elucidated and some comments made to the recent discussion, which was initiated at Llandrindod Wells convention.

- 6.1 **Multiclass portfolios.** A natural approach is to first calculate the transfer separately for each class and finally to sum up the class transfers.

The upper limit should apply to the total ER.

It might be practical to unite the smallest classes as one composite class in the ER handling.

The class transfers which are intermediate items in the ER calculation can be utilised to serve the profit centre analyses, if such are performed. It may be useful also to keep (informal) accounts of separate ER's for the classes just for profit centre purposes eg to verify whether some centres are subsidised by the others. In this context also negative class ER's can be useful notwithstanding that the total ER must always be non-negative. A negative class ER's would mean a credit and indicate either poor profitability or bad random luck!

Note, that the ER can also be interpreted as an 'internal reinsurance' and its spreading to the classes will extend it to the profit centres so that their results are reinsured in the ER, which functions as the company central fund. The class ER's correspond to the accrued reinsurance saldos in the transactions between the class and the company.

- 6.2 **Catastrophic and long-tailed classes.** The transfer formulae which are based on average loss ratios are not suitable for the type of business where very large claims are possible but occur very seldom. Then the fixed level formula II is appropriate. In fact, it accumulates provision for the potential catastrophic claim during a long time period, ie in those 'normal' years when no very large claims occurs. It is advisable to separate this kind of business as a class of its own in ER handling. Possibly the upper limit formula needs an auxiliary term for the catastrophes (term C_{ℓ} in (2.1)).

A similar procedure might be useful also for business where other special risks are involved, eg in a form of a very long run-off tail which is not possible to evaluate in any reliable way.

6.3 **Residual fluctuation.** The formulae which apply the average loss ratio as a basis for transfers do not fully eliminate the fluctuation in the underwriting result. A residual fluctuation remains. Penttinen and Rantala (1982) investigated the problem by simulation. Fig. 3 is taken from that study. As can be seen, the residue fluctuation is greatly damped. The damping of the market cycles depends on the lengths of the postulated cycle (12 years in the figure) and the length of the reference time T from which the average loss ratio is calculated. In the special case where these time horizons are equal (or multiple), the equalisation is perfect (apart from the short-term random 'noise'), otherwise cycling residual fluctuation remains.

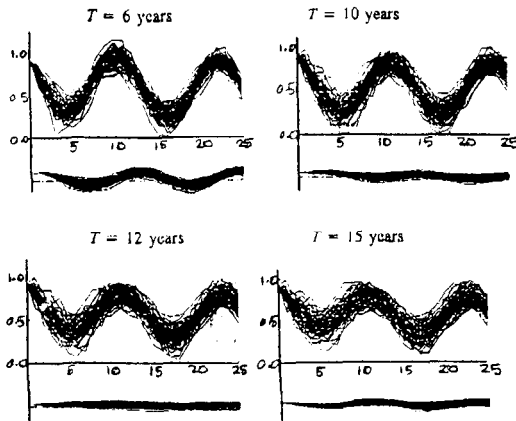


Figure 3. Unequalised and equalised fluctuation of the solvency ratio. A claims cycle of length 12 years was assumed and the reference time T of the moving average as it shown in the diagram. The upper bundle of the simulated realisations represents the unequalised flow of the solvency ratio (including the ER) and the lower bundle the residual fluctuation which is carried forward to the income statement after an equalisation according to the formula (3.1).

- 6.4 **Reflection on business behaviour.**Self-evidently the ER, if properly arranged and used, greatly enhances the financial strength of the insurer. The capacity to accept business is increased allowing for enlarged net retention and for writing new business (an example is quoted in the 'Case Study of Finland').

Of course, there are also other tools to maintain financial strength, as was listed in paragraph 1.1 above. They do not exclude each other, on the contrary they are mutually supporting, but the ER has some benefits eg compared with equalisation by using after tax-reserve funds.

It is asked whether the ER might affect competition in insurance market. One can assume that the locking of the random profits may restrict the (unsound) competition during the high phase of a cycle. On the other hand, in the long run, the enforced financial strength increases the competitive capacity of the companies which have succeeded in achieving a good growth in their ER's.

The influence on dividends is stabilising and in the long run will increase them, if the enhanced strength is successfully used to improve the profitability, for instance by acquiring new sound business, by profitable investments etc.

- 6.5 **Who owns the ER?** If the ER is arranged so that its use is strictly regulated and it is allowed for taxation, it has features which are typical for technical reserves. Therefore, the interpretation has obvious justification that the ER belongs to the portfolio rather than to shareholders. Accordingly in Finland, on the request of the supervising office, the practice is assumed that when a portfolio (or and part of it) is transferred from a company to another the ER should follow.

A further question is should the ER be accepted to be a part of regulatory required solvency margin in those cases where the requirements are not fully satisfied by other capital. In Finland it is accepted, but then the relevant part of the ER is locked from its normal equalisation function by the lower limit rule which was referred in section 4 above.

Note that it would be a peculiar situation if an insurer should be deemed insolvent notwithstanding that he has a large ER which, according to the regulation it not permitted to be taken into account as part of the required solvency margin.

On the other hand, when the financial strength of an insurer is evaluated, the ER can be taken into account, because it is available to

meet underwriting risks, notwithstanding that the shareholders have no access to it.

- 6.6 Disclosure.** It is an open question whether the ER should be disclosed or 'silently' kept inside the technical reserves.

In Finland the ER as well as the current size of it in ratio to the upper limit ($=E(t)/E_{max}(t)$) are disclosed in the context of the annual report of the company. Having regard to the fact that no overstatements over a prudent actuarial evaluation are permitted in the technical reserves, this practice greatly facilitates outsiders' abilities to evaluate the prosperity of the company and to make comparisons between insurers.

- 6.7 ER and asset matching.** The fact that ER is intended to cover fluctuation in business outcomes suggests that corresponding amount of assets should be invested in relatively liquid objects. However, it is not necessary to ' earmark' any special asset items for the ER. It is sufficient that cash management is planned to meet all kinds of varying and fluctuation commitments, including those related to the ER. For the purpose the insurers might commonly operate a special 'cash budget' in parallel with a 'profit and loss budget'. The actuarial risk theory technique can render service in construction of both in finding proper ranges for the expected variation of the relevant amounts.

APPENDIX 2

TECHNICAL BIOGRAPHY

We have attempted to list all useful publications in each member country. The language is that of the country unless otherwise indicated.

UK

1991 GIRO Paper

1980 GIRO Paper

GERMANY

Schwankungsrückstellung und Grossrisikenrückstellung nach versicherungsmathematischen Grundsätzen.

FINLAND

Solvency of Insurers and Equalisation Reserves (English) Vols I & II.

APPENDIX 3

DESCRIPTION OF MODEL

Technical Details

The spreadsheet was written using Lotus 1-2-3 version 3 and is saved as both a version 3 and version 1 file. These sheets are:

Revacc. Wk1

Revacc. Wk3

Description

The model is a simple profit and loss account and balance sheet model. It is intended to assume just one type of business.

Assumptions are given in rows 1 - xx of the spreadsheet and will be changed during the testing process.

For each individual country the following will be changed:

Tax rate

Tax calculation

Unearned Premium Reserve calculation

Under/over reserving factor

Discount rate

Equalisation reserve calculation

**APPENDIX 4 LEGISLATION IN EACH COUNTRY COVERING
EQUALISATION RESERVES**

UK	-	Credit Insurance Regulations 1990
Finland	-	Insurance Company Act (1953)
Denmark	-	1989 Legislation
France		
Sweden	-	Standard Regulations
Germany		
Spain	-	Insurance Law No 33/2 - August 84 (Article 24)
	-	Real Decreto 1348 (Article 60)
	-	Real Decreto 2329 (Crops)
	-	Real Decreto 1042 (Taxes)
Norway	-	None
Netherlands	-	None
Italy	-	None