BRIEFING
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THE SOLVENCY MARGIN SYSTEM

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This document is available in Italian (original), and in English.

Summary

The establishment of solvency margins – a supplementary reserve, over and above the amount strictly necessary to meet underwriting liabilities – is one of the cornerstones of the regulatory system governing European insurance undertakings. This Briefing outlines current EU legislation in the fields of both life and non-life insurance, and also recent Commission proposals for amendment. Two annexes describe the alternative "risk-based capital system" (RBC) used in the United States, and compare the two.

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Introduction

One of the most important legal instruments for the protection of EU consumers is the requirement imposed on insurance undertakings to establish an adequate solvency margin. This is a supplementary reserve, over and above the amount strictly necessary to meet underwriting liabilities, to provide against reductions in the insurance business or in investment yields.

The first EU directives on the subject were issued more than 20 years ago\(^1\). Since then the requirements in respect of the solvency margin have remained substantially unchanged. For this reason many of the parties involved have recognised a need to review the solvency margin and to harmonise legislation on the subject.

In 1994, the European Commission set up the "Müller Group" – named after the chairman of the working group and made up of insurance supervisory authorities of the European Union – which analysed the solvency margin system for three years (1994-1997) to evaluate its weaknesses and strengths. It also examined the alternative system applied in the United States - the NIAC's "risk-based capital system" (RBC) – see Annex.

In the light of this report, in 1997\(^2\), the Commission presented a report to the Insurance Committee on the need for further harmonisation of the solvency margin. On the basis of these two reports, over the last three years the Commission has conducted an in-depth analysis of the solvency margin and has presented proposals to improve the current system.

The solvency of insurance undertakings

One of the primary objectives of the management of an insurance undertaking is undoubtedly the survival of the undertaking itself: the preservation of its capital and its presence on the market.

The probability of survival or bankruptcy of an insurance undertaking can be analysed: on the one hand, as the total liability of the undertaking in respect of all the technical and financial risks; on the other as the availability of an adequate guarantee capital necessary to cover any losses arising and to survive crisis situations.

The European solvency control scheme based on the solvency margin, and the American risk-based capital scheme are founded on these basic premisses and both are inspired by the following criteria:

- measurement of the risk situations of the insurance undertakings;
- establishment of the amount of net assets necessary to cover the risk situations;
- verification of the amounts available to the undertakings;
- intervention of the supervisory authority if the capital falls below the minimum level.

The identification of risk situations which may endanger the solvency of insurance undertakings is a starting point for the definition of instruments capable of preventing business crises and of determining the minimum amount of regulatory capital.

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The main risks to which an insurance undertaking is exposed are:

- **Technical risks:** in insurance undertakings the characteristic inversion of the product cycle, with revenues preceding costs, entails higher levels of risk than for industrial undertakings, as the prices have to be determined before the exact costs are known, with evident difficulties for the use of pricing policies adopted in other areas of the economy. For this purpose the undertakings use statistical and actuarial methods. The aggregate premiums collected must therefore be set aside, through the establishment of so-called technical provisions, to cover future expenses for accidents and management costs, and invested in assets which meet the requirements of security, profitability and liquidity. For this reason most of the risks of insurance undertakings are associated with the fact that the technical provisions turn out to be insufficient and that the underlying statistical and actuarial bases for the calculation of the premiums are overtaken in reality by higher costs than originally anticipated;

- **Investment risks:** this type of risk is mainly associated with a possible loss of value of the undertaking's assets as a result of variations occurring in the financial markets (market risk) or of default on the part of the issuers (credit risk); also in this category are the liquidity risk and the risk associated with the use of derivative financial instruments;

- **Generic risks:** incompetent or fraudulent management, insolvency of debtors, guarantees provided in favour of defaulting third parties; or commercial risks: changes to the legislative framework, the economic and social context, business trends and the overall economic situation.

**The European solvency control system**

Risk situations which may endanger the survival of an insurance undertaking can be analysed not only in an economic context, but also with statistical and actuarial methods based on risk theory. The aim of this theory is to establish the size of the guarantee fund which an undertaking must set aside to cover any unfavourable economic results associated with the management of the aggregate premiums.

In the light of these studies, the first EEC directives on the subject of insurance (73/239/EEC Non-Life; 79/267/CEE - Life) introduced the requirement of the solvency margin, defined as

"a supplementary reserve (over and above technical provisions and of sufficient amount to meet their underwriting liabilities), represented by free assets, which insurance undertakings should possess in order to provide against business fluctuations".

The requirement that insurance undertakings establish an adequate solvency margin is thus one of the most important instruments for consumer protection, as in the event of a reduction in the insurance business the undertakings have a reserve of their own funds to protect the interests of their policyholders and to ensure that the supervisory authority and the management have a breathing space in which to solve the problems.

In the European legislation the solvency margin thus represents additional funds available to the undertaking, not required to cover specific liabilities, but to act as a safety buffer sufficient to provide against future commitments. As it is therefore in addition to the liabilities assumed by the undertaking, this reserve is a real guarantee for future creditors.

The first European directives on the solvency margin of insurance undertakings (73/239/EEC and 79/267/EEC) were later modified by the second directives (respectively: the Non-Life Directive 88/357/EEC and the Life Directive 90/619/EEC). These were concerned with establishing special provisions to develop the internal insurance market and to facilitate the free
supply of services. The third directives (respectively: the Non-Life Directive 92/49/EEC and the Life Directive 92/96/EEC) aimed at co-ordinating the legislative, regulatory and administrative provisions of the Member States in the field of insurance and, above all, in respect of the solvency margin.

These directives contributed substantially to the achievement of the internal market in the insurance industry, granting policyholders complete freedom to avail themselves of the widest possible insurance market. The objective of the third directives was to make it possible for policyholders to have recourse to any insurer with a head office in the Community who carries on business there, under the right of establishment or the freedom to provide services, while guaranteeing them adequate protection.

They thus introduced the so-called "European passport", through which admission to and pursuit of the insurance business became subject to a single administrative authorisation issued by the authorities of the Member State in which the insurance undertaking has its head office. Following such authorisation, an undertaking may now carry on its business anywhere in the Community, under either the right of establishment or the freedom to provide services. Thus the Member State in which an undertaking intends to open a branch or in which it intends to carry on its business may not require fresh authorisation of undertakings which have already been authorised in their home Member State.

The third directives (both in Title II) lay down the conditions for admission to the insurance business. They establish that such admission is subject to prior administrative authorisation granted by the authorities of the home Member State of the undertaking which intends to establish its head office within the territory of that State. This authorisation (which is granted for a particular class) is valid for the entire Community and permits an undertaking to carry on its business there under the right of establishment or the freedom to provide services. Thus the Member State in which an undertaking intends to open a branch or in which it intends to carry on its business may not require fresh authorisation of undertakings which have already been authorised in their home Member State.

It is granted, however, only if the applicant meets certain requirements.

1. It adopts a particular form defined by the directive for each Member State: in Italy, for example, it must be a public limited company (società per azioni), a cooperative (società cooperativa) or a mutual association (mutua di assicurazione).

2. It is run by persons with appropriate professional qualifications and of good repute.

3. It limits its objects to the business of insurance (to the exclusion of all other business).

4. It submits a scheme of operations (containing the nature of the risks which the undertaking proposes to cover, the items constituting the minimum guarantee fund, and the estimates of the financial resources intended to cover underwriting liabilities and the solvency margin).

The establishment of the European passport is undoubtedly positive because it is in the interest of policyholders to have access to the widest possible range of insurance products available in the Community, and to be able to choose that which is best suited to their needs. On the other hand, the differences (both economic and legislative) between the various countries can lead to forms of discrimination in favour of certain insurance products and against others. In certain Member States, for example, insurance transactions are not subject to any form of indirect taxation, while the majority of Member States apply special taxes and contributions, with structures and rates which vary considerably between one Member State and another. These differences could therefore lead to distortions of competition in insurance services between Member States.
5. It possesses the minimum guarantee fund provided for in Article 17 and Article 20 (respectively for the life and non-life classes) of the first directives.

6. It provides proof that it possesses the solvency margin provided for in the first directives.

Once the authorisation has been obtained, the financial supervision of the insurance undertaking is the sole responsibility of the home Member State. In particular, financial supervision includes verification of the state of solvency, of the establishment of technical provisions, and of the assets covering them in accordance with the rules laid down by the home Member State under provisions adopted at Community level.

To this end, insurance undertakings must provide the competent authorities of the Member States in which they have their head office with all the documents necessary for the purposes of supervision of the business carried on by the undertaking within and beyond their territory. In particular these powers of supervision enable the competent authorities to:

- make detailed enquiries regarding the undertaking's situation and the whole of its business, gathering information and documents or carrying out on-the-spot investigations at the undertaking's premises;
- take any measures with regard to the undertaking and the persons who control it, necessary to guarantee that its business complies with the laws, regulations and administrative provisions applicable to it in the various Member States, and in particular with the scheme of operation;
- ensure that these measures are carried out, if necessary by enforcement or with recourse to judicial channels.

The authorisation granted to an insurance undertaking by the competent authority of the home Member State may be withdrawn (with a ruling supported by precise reasons and communicated to the undertaking in question) when the undertaking:

- no longer fulfils the conditions for admission;
- does not make use of the authorisation within 12 months, expressly renounces it or ceases to carry on business for more than six months;
- fails seriously in its obligations under the regulations to which it is subject.

The competent authority of the home Member State notifies the competent authorities of the other Member States accordingly, and they must take appropriate measures to prevent the undertaking in question from commencing new operations within their territories, under either the right of establishment or the freedom to provide services.

One of the requirements an insurance undertaking must meet in order to carry on its business in the Community, under the right to free trade and the freedom to provide services, is that of having an adequate solvency margin. This is in accordance with Article 16 of Directive 73/239/EEC, as modified by Article 24 of the Third Non-Life Directive (92/49/EEC), and with Article 18 of Directive 79/267/EEC, as modified by Article 25 of the Third Life Directive (92/96/EEC).
Items constituting the solvency margin


"each Member State shall require of every assurance undertaking whose head office is situated in its territory an adequate available solvency margin in respect of its entire business at all times".

The amount of the solvency margin thus varies according to the volume of business carried on by the undertaking. This derives from the need for every undertaking to increase its net assets in proportion to the increase in its volume of business.

Such a directly proportional ratio between the solvency margin and the volume of business means that insurance undertakings have a different problem from the typical one in respect of the technical provisions. In fact, while the technical provisions are adjusted to keep pace with the premiums collected; the solvency margin, while it has to grow in step with the provisions, must be determined in relation to the anticipated future business, for which the revenues have still not been collected. It is therefore made up of the industrial profits and assets or, if these are lacking or insufficient, by new contributions of capital on the part of the shareholders.

In practice, then, for insurance undertakings the margin represents an obligation to increase its fixed assets to counter the uncontrolled tendency to expand the insurance business and thus multiply the risks which could jeopardise the undertaking’s ability to cover its underwriting liabilities.

As regards the items constituting the solvency margin, Article 16 of Directive 73/239/EEC (non-life) states that every insurance undertaking must establish an adequate solvency margin in respect of its entire business, and corresponding to the "assets of the undertaking, free of all foreseeable liabilities, less any intangible items". In particular it consists of:

- the paid-up share capital (or, in the case of a mutual concern, the effective initial guarantee fund);
- one-half of the unpaid share capital (or initial guarantee fund), once the paid-up part reaches 25% of the entire capital subscribed;
- the legal, statutory and free reserves not corresponding to underwriting liabilities or adjustments;
- any profits brought forward;
- any claims which a mutual or mutual-type association with variable contributions has against its members, within certain limits (only for non-life insurance);
- at the request of the undertaking and with the agreement of the supervisory authorities, any hidden reserves arising out of the under-valuation of assets or overvaluation of liabilities, in so far as such hidden reserves are not of an exceptional nature;
- cumulative preferential shares and subordinated loans. These items were admitted as eligible for the solvency margin only in the third directives to enable insurance undertakings to benefit from instruments already used by other financial institutions in the constitution of their own funds. The inclusion of these new financial instruments is, however, permitted only on certain contractual conditions. It is also subject to limits on the amount, mainly according to the duration and terms of repayment of the loan, or – in other words – according to the anticipated length of time that such funds will be among the undertaking's assets.
From the total of the net asset items must be subtracted the intangible assets entered in the balance sheet (for example: industrial patents, copyrights, licences, trademarks, goodwill, own shares).

As noted above, this subject has already been studied in depth by the Commission, which has prepared a proposal for a directive amending Directive 73/239/EEC as regards the solvency margin requirements for non-life insurance undertakings.

**Box 1: Commission Proposals**

The Commission proposes the revision, in particular, of Article 16. This is in order to clarify and strengthen the definition of the asset items eligible for the available solvency margin in non-life insurance. It specifically states that the solvency margin must be available to the undertaking at all times and not just at the date of the last balance sheet.

The eligible items are divided into three categories:

1. **The items under Article 16, paragraph 2 are of the highest level of security and may be accepted without limitation.**
   
   In particular these include:
   
   - the paid-up share capital (in the case of mutual concerns, the effective guarantee fund);
   - reserves (statutory or free) which are not adjusting or anticipatory entries, that is to say, not corresponding to underwriting liabilities;
   - profits (or losses) brought forward after deduction of dividends to be paid in respect of the last financial year.

   Losses carried forward and dividends to be paid for the last financial year are deducted from the solvency margin. Own shares held directly by the insurance undertaking (in both life and non-life classes) are excluded (in the event of bankruptcy their value is likely to be zero in any case).

2. **The items under Article 16, paragraph 3 are subject to some limitations (in this case there are no significant changes):**
   
   - **Cumulative preferential shares and subordinated loans** were admitted as eligible for the solvency margin only with the issue of the third directives, to enable the insurance undertakings to benefit from new instruments already used by other financial institutions in the constitution of their own funds. The inclusion of these new assets among the items constituting the solvency margin is, however, permitted only on certain contractual conditions. It is also subject to limitations on the amount, mainly in respect of the duration and terms of repayment of the loan, or in other words according to the anticipated length of time that such funds will be among the undertaking's assets;
   
   - **Securities with no specified maturity date** and other instruments, including cumulative preferential shares, other than those mentioned in the previous point: up to 50% of the available solvency margin.

3. **The items under Article 16, paragraph 4 can be accepted only with the approval of the competent authorities:**
   
   - one-half of the unpaid share capital or initial fund up to 50% of the lesser of the available solvency margin and the required solvency margin;
   
   - any claim which a mutual association has against its members within the financial year, subject to a limit of 50% of the lesser of the available solvency margin and the required solvency margin and only with the prior approval of the competent authorities;
   
   - any hidden reserves arising out of the under-valuation of assets, provided that such hidden reserves are not of an exceptional nature.
The structure of the assets which are eligible for the composition of the solvency margin for life assurance (Article 18, Directive 79/267/EEC) is very similar to that for the non-life business: in effect the two lists are identical except for five items.

In particular, in the case of non-life insurance the following items are permitted:

- Any claims for contributions which mutual-type associations have against their members. These have always been considered an eligible item for the composition of the solvency margin: under the Commission proposal they will continue to be eligible but only with the approval of the competent authorities, who will be able to assess whether, in the event of difficulty, these contributions will in actual fact be available;

- Any hidden reserves arising out of the under-valuation of assets, in so far as such hidden reserves are not of an exceptional nature. This item was introduced in the third directive, but was not included in the Commission proposal;

- The discounting of non-life technical provisions (not yet in force as it is envisaged only in the Commission proposal). Up to now, for solvency margin purposes, undertakings discounting technical provisions have been treated more favourably by the Insurance Accounts Directive than undertakings not discounting. This paragraph (Article 16, paragraph 2) disallows the benefit of discounting and therefore establishes parity of treatment between undertakings discounting technical provisions and those not discounting.

The following items are, instead, permitted only for life assurance:

- profit reserves: when they are authorised under national law (Article 18, paragraph 2 (d);

- an amount equal to 50% of the undertaking's future profits (Article 18, paragraph 4 (a);

- the adjustment for Zillmerising (Article 18, paragraph 4(b). In particular for life assurance, with the approval of the competent authority, the calculation of the solvency margin may also take into account, within certain limits, the difference between a non-Zillmerised or partially Zillmerised mathematical reserve (determined, that is, on the basis of the pure premiums, net of any reinsurance). In Article 18, paragraph 5, the Commission proposal for a directive permits amendments to all three categories of eligible items in accordance with the procedure laid down in Article 2 of Directive 91/675/EEC.

While the previous list of eligible items for the composition of the solvency margin was "open", in the sense that in theory any type of asset could be included, the new list is "closed": the only items eligible are those included in one of the three categories envisaged (under Article 18, paragraphs 2, 3 and 4). However, as financial innovation is increasingly rapid it is likely that in future it will become necessary to include new items among those eligible for the composition of the solvency margin.

The intangible assets entered in the balance sheet (for example industrial patents, copyrights, licences, trademarks, goodwill and own shares) are deducted from the total net asset items.

Calculation of the solvency margin of non-life insurance undertakings

For non-life insurance undertakings, under Article 16, paragraph 2, of Directive 73/239/EEC, the minimum solvency margin is determined on the basis either of the annual amount of premiums or of the average burden of claims for the last three financial years (the last seven years if the insurance covers the risks of credit, storm, hail or frost. Hence the solvency margin is calculated on the basis of two formulae: one based on premiums and the other based on claims, and the minimum margin must be at least equal to the higher of the results obtained applying by the two methods.

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4 Article 60, letter g) of Directive 91/674/EEC
5 A Zillmerised mathematical reserve is one determined on the basis of the pure premiums, plus the amount for depreciation of the acquisition costs included in the premiums.
6 Under the terms of Article 16, paragraph 2, of Directive 73/239/EEC.
In the method of calculation based on premiums, the amounts of the premiums (or contributions) and of ancillary charges in the last financial year in respect of direct and indirect business are aggregated. From this sum are deducted the total amount of the premiums or contributions cancelled during the period, and the taxes and levies considered in the aggregate. The amount so obtained is divided into two portions to which different rates are applied. The first portion extends up to ECU 10 million (the Commission proposes, however, to increase this to €50 million) and the second comprises the excess; 18% and 16% of these portions respectively are calculated and added together.

The sum so obtained is adjusted to take into account the amount of reinsurance cover. For this purpose the sum itself is multiplied by the so-called maintenance ratio for the last financial year, determined on the basis of the amount of claims remaining to be borne by the undertaking after deduction of amounts recoverable under reinsurance divided by the gross amount of claims. This ratio may in no case be less than 50%.

One of the most important innovations introduced in the Commission's draft directive is the enhancement of the premiums according to the class. This enhancement maintains the simplicity of the existing methodology, at the same time increasing the required margin by 50% (in both methods of calculation) for certain classes with a higher level of risk: that is to say for classes 11, 12 and 13, corresponding aviation; sea, lake, river or canal vessels; and general liability respectively. These risks are universally recognised as more volatile in nature.

The method of calculation based on the average burden of claims takes into account the claims paid in the past financial years (three or seven in the case of risks of credit, storm, hail or frost) in respect of direct and indirect business, and the technical provisions (in respect of allocations for claims outstanding) established at the end of the last financial year. From this sum are deducted the recoveries and the initial claim reserves.

The amount so obtained is divided into two portions: the first, up to ECU 7 million (the Commission has proposed to increase this figure to €35 million), must be multiplied by 26%, and the excess by 23%.

The sum so obtained is adjusted by the amounts recoverable under reinsurance (but the ratio between claims remaining to be borne after reinsurance transfers, and the gross amount of claims may in no case be less than 50%).

The main changes introduced in the Commission proposal for a directive are:

- an increase in the thresholds on which the calculations for both systems are based (to €50 million and €35 million respectively) to take account of inflation, and of the replacement of the ecu with the euro.
- the introduction of Article 16a which, in paragraph 5, establishes that

  "if the required solvency margin, calculated on the basis of the two criteria above, is lower than the required solvency margin of the year before, the required solvency margin shall be at least equal to the required solvency margin of the year before multiplied by the ratio of the amount of the technical provisions for claims outstanding at the end of the last financial year and the amount of the technical provisions for claims outstanding at the beginning of the last financial year".

This is because the system based on premiums and claims, while it has operated satisfactorily up to now, encounters problems when an undertaking starts to write a significantly lower volume of business. In fact, in the most extreme situation, that of an undertaking about to cease trading where no new business is being written, the existing formula can produce a zero solvency margin. For this reason the Commission has tried to correct the deficiency by
requiring a minimum solvency margin based on the previous year's required solvency margin reduced by the proportionate reduction in the level of technical provisions. The advantage of this method is that for undertakings about to cease trading, the base level of the required solvency margin is determined first by the existing method and subsequently adjusted to the amount of the technical provisions remaining.

**Calculation of the solvency margin of life assurance undertakings**

The formula for the calculation of the solvency margin of life assurance undertakings is different from that for life insurance. For life business, in fact, the margin is based on the amount of the technical provisions.

The risk factors of life assurance undertakings are: the risks associated with investment, death and management.

The solvency margin is calculated differently according to the presence of these risks in the different classes of insurance underwritten.

**Different kinds of life assurance**

For the different kinds of life assurance (especially including assurance on survival to a particular age, on death, on birth, on marriage, etc.) the margin must be equal to the sum of 4% of the mathematical reserves and 0.3% of the positive capital at risk (to cover the death risk).

The death risk factor is differentiated for temporary assurance on death according to the term: for those with a maximum term of three years the factor is reduced to 0.1%, for those with a term of more than three years but not more than five years it is 0.15%.

Both components of the margin are reduced to take account of the reinsurance cessions: the values obtained from the application of these rates are multiplied by the ratio, for the last financial year, between the mathematical reserves (capital at risk) gross of reinsurance and the mathematical reserves (capital at risk) net of reinsurance (i.e., after deducting the reinsurance transfers and retransfers). This limit (or ratio) may not, however, be less than 85% for the mathematical reserves and 50% for the capital at risk.

**Supplementary insurance**

For supplementary insurance (that is to say, insurance against personal injury, against death or disability resulting from an accident, against incapacity for employment, etc. underwritten in addition to life assurance) the margin is calculated in the same way as for non-life insurance (on the basis of the premiums).

**Permanent health insurance**

For permanent health insurance not subject to cancellation and for capital redemption operations, which do not involve the assumption of death risks, the solvency margin must be equal to 4% of the mathematical reserves (reduced to take account of the reinsurance transfers, with a minimum maintenance limit of 85%).

**Life assurance**

For life assurances linked to investment funds and for pension fund management operations, the solvency margin to be constituted to cover the investment and management risks equals:

- 4% of the mathematical reserves if the undertaking bears an investment risk;
- 1% of the mathematical reserves if the undertaking bears no investment risk provided that the term of the contract exceeds 5 years; and
- the allocation to cover management expenses set out in the contract is fixed for a period exceeding five years.
To this must be added the solvency margin necessary to cover the death risk which is equal to 0.3% of the capital at risk. As with the other contracts, a reduction factor is also applied to take account of the reinsurance.

The Commission proposal for a directive makes a series of improvements to Article 19 of the first directive.

The most significant changes with respect to the previous legislation involve life-based permanent health insurance not subject to cancellation. For this the required solvency margin is equal to a fraction of 4% of the technical provisions (reduced to take account of reinsurance transfers, with a minimum maintenance limit of 85%), plus (and this is the innovation) the required solvency margin for non-life based permanent health insurance (under Article 16a of Directive 73/239/EEC).

More important is the fact that paragraph 7 of Article 19 of the Commission proposal specifies the required solvency margin for assurances linked to investment funds, group pension funds and other types of funds. This is given by the sum of a fraction of the technical provisions (4% if the company bears an investment risk and 1% if the company bears no investment risk), of the capital at risk (0.3%) and of the overheads (25%); so that the initial definition has been made more precise and compatible with the approach adopted for the investment funds.

**Guarantee funds**

A proportion of one-third of the solvency margin constitutes the "guarantee fund". This may not be less than a certain limit, known as the "minimum guarantee fund". It is designed to ensure that insurance undertakings always have adequate resources available from the moment they are established; and that in the course of their business the solvency margin never falls below a minimum level of security.

The solvency margin is thus made up of a fixed portion (the guarantee fund) which constitutes an absolute minimum and is determined according to the different risk profiles of the different classes of insurance; and of a variable portion, which increases in proportion to the volume of business.

Until now the guarantee fund has been set at a fixed amount, with no adjustment possible for inflation. This was one of the main reasons for criticism of the system. For this reason the new proposal provides for an annual adjustment of the euro amounts of the guarantee fund to take account of changes in the European Index of Consumer Prices comprising all Member States as published by Eurostat. The automatic adjustment of the fund in line with the consumer price index (a change made, however, only in the event of a variation of more than 5% in the index) thus strengthens the solvency margin considerably, maintaining the real level of the relevant amounts. If this measure had been introduced at the outset there would have been no need to increase these amounts today.

In this area there are some differences between the life and non-life businesses.

Under the terms of Article 20 of Directive 79/267/EEC one-third of the minimum solvency margin constitutes the guarantee fund. At least 50% of this must consist of higher quality items.

The fund must be at least ECU 800 000, while for mutual associations any Member State may provide for the reduction of the guarantee fund to ECU 600 000.

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7 The items under Article 18 points 1 and 2 of Directive 79/267/EEC are higher quality items, namely: the share capital or paid-up share capital, one half of the unpaid share capital or of the initial fund, reserves (statutory or free) not corresponding to underwriting liabilities, any carry-forward of profits, cumulative preferential and subordinated loans, securities with no specified maturity date, and profit reserves.
Commission proposal (2000) 617 introduces several amendments:

- first, it establishes that 100% (and no longer 50%) of the guarantee fund must consist of the higher quality items (under Article 18, paragraphs 1 and 2). However, to guarantee uniformity between the different accounting methods, the hidden reserves (under Article 18, paragraph 4c) are also declared admissible for the guarantee fund.

- secondly, the minimum threshold of the guarantee fund is also increased to €3 million (from the previous level of €800 000) to take account of inflation.

- finally, Member States are given the option of reducing the minimum guarantee fund by a fourth for mutual associations and mutual-type associations, in order to lighten the burden of the asset requirements for small mutual associations.

As far as non-life insurance is concerned, under the terms of Article 17 of Directive 73/239/EEC, one-third of the solvency margin constitutes the guarantee fund, which may not be less than a certain threshold, differentiated according to the class of insurance involved. If the business of the undertaking covers several classes or risks, only the class or risk for which the highest amount is required is taken into account. Member States may also provide for a one-fourth reduction of the minimum guarantee fund in the case of mutual associations and mutual-type associations.

Commission proposal (2000) 634 brings the rules on the items eligible for the minimum guarantee fund for non-life insurance in line with that for life assurance. It establishes that 100% of the guarantee fund must consist of higher quality items and that the hidden reserves may be included in the fund in order to guarantee uniformity between the different accounting methods (book value and market value).

The main difference between life and non-life insurance is that, while for the life business there is a single guarantee fund, in the non-life sector the amount of the fund varies according to the class of insurance. Until now there have been four levels of guarantee fund for non-life insurance; the Commission proposal reduces them to two: one for classes 10 to 15 and one for all the other classes.

Moreover, the fund threshold is increased to €3 million (for classes 10 to 15) and €2 million for all the other classes: this increase, which is substantial and goes well beyond the rise strictly necessary to adjust to inflation, is justified by the increase in the level of claims and of overheads in the last 25 years or so. It thus reflects the real increase in the level of risk.

As in the case of life assurance, Member States are given the option of reducing the minimum guarantee fund by one-fourth for mutual associations and mutual-type associations, in order to lighten the burden of the asset requisites.

**Minimum harmonisation**

A further innovation introduced in the Commission proposal for a directive is that the harmonised rules on the solvency margin must be considered as a minimum: Member States are free to set stricter rules for the undertakings they authorise. This approach takes account of the existing differences between the systems and allows national authorities to further strengthen the solvency margin according to the particular features of their national markets.

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8 Article 17: 400 000 in the case of classes 11, 12, 13, 14 and 15; 300 000 in the case of classes 1, 4, 5, 6, 7, 8, 16; 200 000 in the case of the remaining classes.
Annex 1: The American solvency control system: the NAIC's "risk-based capital system" (RBC)

In the American legal system the possession of a minimum security capital is verified by means of the risk-based capital (RBC) system introduced by the National Association of Insurance Commissioners (NAIC), a private non-profit association, founded in 1871, which brings together the insurance regulatory authorities of the 50 federal States.

Variants of the RBC system are also used by ratings agencies for the evaluation of the financial stability of American insurance companies and are increasingly applied, with some adjustments, to European insurers.

The RBC System was adopted by the NAIC in the years 1992-1993 in view of the high number of bankruptcies recorded in the insurance market at the end of the 1980s and of the clear limitations of the previous system of solvency control.

The RBC formula aims to identify the minimum capital necessary for an insurance company to sustain its overall business, depending on the quantity and nature of the risks borne.

The required capital cover is determined for each type of risk.

The calculation is performed by multiplying the so-called "base values" (coinciding with certain asset items and varying according to the different types of risk) by a percentage factor set by the NAIC.

The minimum capital so obtained is compared with the undertaking's own capital. There are four levels of action by the supervisory authorities, calibrated according to the seriousness of the risk situation of the undertaking.

The level of capital expressed by the formula is not a target, but a minimum capitalisation threshold. That is to say, the RBC system requires of the undertakings a minimum level of resistance to risk, identified according to uniform criteria, but allows them, above this minimum level, to operate freely according to a capital target determined by the market, the management, and the shareholders.

The system was designed to enable the identification of undertakings whose level of capitalisation required more careful supervision.

The RBC formula for life assurance

For life assurance the NAIC has divided the risks into four classes: asset risk, insurance risk, interest rate risk and business risk.

1) **Asset risk:** this is the most significant component of the formula and represents about two-thirds of the total RBC for life assurance. It consists of the risk that the value of the assets will fall and become insufficient to cover the underwriting liabilities. The calculation is based on the book value of the assets\(^9\) to which are applied different risk factors according to the types of assets and risks to which they are exposed. Thus the higher the risk profile of the portfolio and the lower the diversification of the investments, the higher the amount of capital necessary to absorb the risk.

2) **Insurance risk:** this is the risk that, owing to unfavourable differences between the expected mortality and the experienced mortality, the level of claims is higher than estimated when the premiums were set. The base value is represented by the capital at risk; while the risk rates are identified by means of statistical simulations based on the expected mortality rates,

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\(^9\) In particular the calculation is based on: securities (United States treasury bonds are considered absolutely risk-free - factor 0% - other bonds are divided into 6 classes defined by NAIC according to the creditworthiness of the issuer), shares, real estate, and other assets.
on the expected withdrawal rates and on the effects produced by specific unforeseeable events. The simulations were conducted on portfolios of 10 000, 100 000 and 1 million people and showed that exposure to the insurance risk decreases with the increase of the portfolio.

3) **Interest rate risk**: this is the risk of losses due to changes in interest rate levels in the event of a mismatch between the financial flows generated by the assets and by the liabilities. If the incoming cash flow (represented by the return on investments) is closely correlated to the outgoing cash flow (associated with the payments by the company to its policyholders) the interest rate risk is insignificant. Vice versa, if the degree of matching between assets and liabilities is low, the interest rate risk becomes significant, as the value of the assets will fluctuate with respect to the value of the liabilities. On this basis the factors identified by the NAIC aim to determine the capital necessary to provide for a lack of synchronisation of asset and liability cash flows following changes in interest rate levels. The base value on which the risk factors are applied is represented by the mathematical reserves net of reinsurance and of any loans against the policies.

4) **Business risk**: this is a residual category which includes all the risks not included in the other categories, such as incompetent management, the pressure of competition and the risk of incurring higher operating expenses than originally estimated. The calculation is based on the premiums, to which a factor of 2% is applied.

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**Box 2: The final RBC (life)**

The formula for obtaining the final value of the RBC is not a simple sum of the four RBC components determined for each risk category, but instead incorporates a covariance adjustment in recognition of the fact that not all the risks can cause losses at the same time.

It is therefore assumed that the asset risk and the interest rate risk are correlated, that the insurance risk is not correlated to the first two and finally that the business risk is correlated to the other three risks.

This covariance adjustment is expressed by the following formula, which determines the final RBC:

\[
RBC = C_4 + \sqrt{C_2^2 + (C_1 + C_3)^2}
\]

where \(C_1 = \text{asset risk}, C_2 = \text{insurance risk}, C_3 = \text{interest rate risk} \) and \(C_4 = \text{business risk}\).

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**The RBC formula for non-life insurance**

The process of defining the non-life formula was longer and more complex than that for the life formula and was accompanied by heated discussions on the types of risk to cover and the level of assets required.

For non-life undertakings the formula also distinguishes four risk categories: asset risk, credit risk, underwriting risk (with two components, the reserving risk and the pricing risk), and off-balance-sheet risk.

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10 The covariance is a parameter, which, besides describing the dispersion of the variables, also expresses their relation. In particular the covariance of independent random variables is zero, while it is not zero if there is a relation which links the variables considered. But covariance also characterises the dispersion of random variables: thus if one of the variables of the system differs only slightly from its expected value, the covariance will be small whatever the degree of linkage between the two variables. Covariance is therefore used whenever it is necessary to analyse the effect on a variable of factors measured in the experimental design and, at the same time, there is an association between this variable and another of a continuous type (a covariate) for which homogenous classes cannot be defined.
As can be seen, the formula does not include the category of interest rate risk. Although the American Academy of Actuaries Risk-Based Capital Task Force has recommended several times its inclusion in the non-life formula, the NAIC has so far postponed the decision in order to evaluate more carefully the significance of interest rate risk for non-life companies.

1) **Asset risk:** although the definition of the risk is the same as in the life formula, the classification of the assets is more detailed and in some cases the factors are different. Investments can be divided into three subclasses: equity and bond investments in non-affiliated companies; equity and bond investments in affiliated companies; real estate, loans, and other assets.

2) **Credit risk:** i.e. losses deriving from the insolvency of reinsurers and other debtors. For reinsurance, which is the greatest source of risk, the basis of calculation is the amount of credit with reinsurers, to which a factor of 10% is applied. This solution was the object of criticism on the part of companies and reinsurers, above all in respect of the level of the risk factor, considered so high that it would discourage the use of reinsurance. For credit relating to the collection of interest, dividends and rents the risk factor is 1%; while for all other credit it is 5%.

3) **Underwriting risk:** this is the most significant component of the formula and represents about two-thirds of the total required RBC for non-life insurance. The underwriting risk is divided in two subgroups:
   - the pricing risk (the risk deriving from setting premiums too low) and
   - the reserving risk (the risk deriving from inadequate reserves).

The possibility of covering the risk is based on the ability of the undertaking to cover, through correct policies on pricing and reserves, the worst market result in the last 10 years in terms of the run-off ratio (as regards the reserving risk) and the loss ratio (in relation to the pricing risk). Briefly, the method takes account of the worst scenario experienced in the market in the last decade, comparing the position of the undertaking to this scenario and increasing the capital requirement in proportion to the undertaking's deficiency with respect to the average in the industry.

3) **Off-balance-sheet risk:** this includes potential risks not apparent from the balance sheet values. The following risks must be indicated in the notes to the financial statements:
   - risks associated with non-controlled assets (for example, purchase commitments deriving from the issue of options); and
   - risks associated with guarantees provided for affiliates and contingent liabilities (or liabilities not sufficiently defined to require inclusion in the balance sheet).

For these risks an RBC factor of 1% is applied to the respective amounts.
Box 3: The final RBC (non-life)

In the non-life RBC formula – unlike the life formula, in which the four risk categories are combined in a single final RBC – certain risk profiles are removed from their original categories and combined differently to form new categories, according to the following scheme:

R0 = RBC requirement for investment in affiliated insurance companies and for contingent liabilities;
R1 = total RBC for the investment risk of bonds and short-term investments, taking account of the adjustment for the risk of concentration;
R2 = total RBC for the investment risk of shares and real estate, taking account of the adjustment for the risk of concentration;
R3 = 50% of the total RBC for the credit risk;
R4 = R3 plus the RBC for the reserving risk;
R5 = RBC for the pricing risk.

These new aggregations of risks are combined in the formula:

\[ RBC = R0 + \sqrt{R1^2 + R2^2 + R3^2 + R4^2 + R5^2} \]

It is thus assumed that the five components under the square root are statistically independent of each other and that their sum is completely correlated with the risk source R0 placed outside the square root. It has been estimated that this type of formula determines a final RBC value one-third less than would result from the simple addition of the components of the formula.
Annex 2: Comparison between the systems

A comparison between the solvency margin system and the risk-based capital system reveals the logic common to the two models: both aim to identify, according to the risks to which the undertaking is exposed, the minimum capital necessary to support the development of the business.

The two systems differ significantly, however, in the process of measurement of the risks.

The solvency margin system is based on a flat-rate calculation: flat rates are applied to specific calculation bases. The system does not measure single risk profiles, but identifies the total level of assets needed to guarantee the overall equilibrium of the insurance business.

The risk-based capital system, instead, adopts a more analytical approach to the measurement and coverage of risks. The range of the calculation bases is wider:

- in life assurance use is made of the investments (to cover the asset risk), the capital at risk (to cover the insurance risk), the mathematical reserves (for the interest rate risk) and the premiums (for the business risk);
- in non-life insurance the investments (to cover the asset risk), the credits (for the credit risk), the off-balance-sheet assets (for the off-balance-sheet risk), and the claims and premiums reserves (for the underwriting risk) are used.

The factors applied to the calculation bases differ according to the different risk profiles.

In this way the system identifies the specific capital requirements to cover the single risks and adds them together, adjusting them according to the correlation of the risks, to finally determine the minimum level of total capital.

The most significant criticisms of the RBC system expressed by American experts are:

- first, the excessive influence which the system can have on the management policies of the undertaking. The need to reduce the adverse consequences associated with the application of the risk factors could lead them to concentrate on business with a lower level of risk.
- secondly, it is impossible to determine the right amount of capital by means of a formula, since the risk of insolvency depends on factors which cannot easily be quantified.
- finally, an RBC system which is not capable of determining the exact levels of capital necessary for a competitive environment could lead to a series of unnecessary costs for insurers and policyholders. This could raise the cost of capital, hinder the collection of new capital and damage the image of the undertakings.

There are also, however, drawbacks to the European system.

For example, it has been noted that, owing to the rigidity of the flat-rate calculation, the solvency margin does not allow the minimum capital requirement to be calibrated to the specific risk profiles to which the individual undertakings are exposed. In fact, the methods of determining the margin are based exclusively on the size of the insurance portfolios, without attributing any significance to their specific qualities.

In sum, it is clear that the RBC system has the virtue of greater flexibility in measuring risk. But this is counterbalanced by greater complexity in the practical application of the model, and consequently a higher management cost for the undertakings which have to apply the formula and for the supervisory authorities which have to verify its correct application.
Contrariwise, the solvency margin has the virtue of the simple application, and easy "legibility" of the system and of the results, including for third parties (policyholders, agents, brokers, etc.), offset by a certain rigidity.

The solvency margin system, however, has a further advantage: the more public nature of the information. In Italy the legislation requires the solvency margin schedule to be attached to the financial statements, ensuring in this way that the information is made public. In the American system, instead, the only element made public is the final ratio between the shareholders' equity and the total RBC, while the data used by the undertaking in applying and developing the formula are reserved exclusively for the NAIC and the State regulatory authorities.

Another difference between the two regulatory systems is the degree of flexibility of intervention of the supervisory authorities provided for in the legislation in the event of a failure to observe the minimum capital standards.

In the European system two kinds of intervention are provided for: a request for a recovery plan and for a short-term financing plan. However, an analysis of cases of insolvency involving European undertakings (Müller, 1997) showed that only in a few cases were the difficulties accompanied by a failure to observe the minimum levels of capitalisation. This highlighted the need for financial crises to be identified and tackled by the supervisory authorities in advance of the extreme case of breach of the capital requirements. For this reason the Commission proposal grants the competent authorities the power to require insurance undertakings to present a financial recovery plan if they consider that the rights of policyholders are at risk, even though the quantitative capitalisation thresholds are still fully respected.

In the RBC system, instead, a net equity situation which falls below twice the minimum level is considered a first warning signal.

On the question of the efficacy of the two systems as indicators of the solvency of the undertakings, the European supervisory authorities and the NAIC both agree that both the solvency margin and the RBC method fulfil a useful function as early warning systems against the risk of insolvency. Neither can, however, on their own prevent cases of insolvency. It is essential for the solvency margin to be accompanied by other instruments that will allow timely and flexible intervention on the part of the authorities.

Overall, the current EU system for monitoring the solvency of insurance undertakings was judged to be satisfactory by the Müller Group. It was adequate as regards both its simplicity of use and its general capacity to satisfy the public interest, and therefore did not require at the moment a radical change in its structure.

The Müller Group also analysed cases of deficiencies of insurance undertakings in the European Economic Area over the past twenty years. This showed that bankruptcies often could not be attributed to weaknesses in the margin, but rather to the non-observance of other requirements to which insurance undertakings are subject.

The solvency margin, in the European model, needed only to cover risks, which are not covered by other precautions. It was to be considered a supplementary warning and safety system which:

"cannot replace an effective company analysis and even less a prudent calculation and coverage of the technical provisions".

According to the Müller Group, the superiority of other existing solvency control systems, and in particular the American system, had not been demonstrated in practice, even though they are characterised by greater complexity.
For this reason the Commission proposal for a directive, in line with the conclusions of the Müller Report, has not radically amended the legislation but has only introduced certain adjustments to strengthen the protection of policyholders.

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