

Solvency II and its influence on credit risk measurement and control systems in Credit Insurance

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What is the solvency II project?

The main purpose of the insurance sector's regulatory body is to ensure that, in the performance of their business activities, insurance companies are able to meet the undertakings they enter into (foremost among them being the payment of benefits to policyholders) and maintain their stability over time.

Since the end of the nineties, within the European Union, thought has been given to the need to update the solvency regulations applicable to insurance companies and their supervision, in order to adapt them to the new circumstances and harmonise the various national legislations, while at the same time correcting any defects identified in the current regulatory framework. Various reports have been written, in particular the Müller Report (1997) and the KPMG Report (2002), among others.

At that time, a similar review (solvency/supervision) relating to banks was already well advanced. This ended with the approval of the NACB (New Basilea Capital Agreement) in June 2004, also known as **Basilea II**, or simply BIS II. For the European Union, the corresponding directives which enable its provisions to be applied are pending approval.

Due to this coincidence of time and subject matter, Basilea II is significantly influencing Solvency II, which is still a **project**, currently in its second stage. This influence can be seen in the working method, the objectives and contents and even in the formal structure of the agreement.

Working method: the project is being carried out by means of preparatory documents which are disseminated as widely as possible to encourage discussion between companies in the sector, supervisory bodies and other interested parties. These intermediate documents will enable the insurance companies to continue making progress in adapting to the new requirements.

Principal differences in comparison with the current system

We have already seen how the initiative to reform the regulatory framework of the insurance sector came about and the principal objectives of that reform. We are going to see how the main differences lie within the new project's intention to correct the defects in the current system, some of which are related to the lack of adaptation to new circumstances brought about by changes in the situation affecting the sector.:

- ▶ It seeks the early detection of possible situations of default on the part of the insurance company. The current framework establishes minimum requirements in terms of technical provisions and solvency margin based on what happened in the preceding year and is proving to be incapable of predicting the future development of the companies and therefore, their financial capacity.
- ▶ It departs from the current common requirements for all companies and defines individual requirements for each company, taking into account various aspects of their management and profile of assumed risks.



- ▶ The new system not only takes financial aspects into account, as does the current one, but also considers all the risks which the insurance company faces.
- ▶ And in order to achieve its objectives, the activities that the Solvency II project will carry out alongside the three pillars of Basilea II, are:

Pillar 1.

The development and introduction of a new system for calculating the minimum capital and reserves which must be required of every entity according to the risks assumed and its management of those risks.

Pillar 2.

Changes in the supervision system (technical and human resources and supervisory regulatory framework).

Pillar 3.

Increase in the information that the companies must give the market in relation to their risk measurement and control systems.

Risks in Credit Insurance

The global approach that Solvency II is pursuing will be to require that an effort is made by the insurance companies to identify the risks they face – by producing risk maps and other tools – to quantify them and establish quantitative and qualitative controls for their management. For example, everything relating to the treatment of the operational risk will be new, including all those risks arising within the company and which are related to one-off or design errors in their processes, errors attributable to personnel, fraud etc.

Notwithstanding, this article concentrates on credit risk, which is the risk that can be directly insured against in credit insurance, regardless of whether a credit insurance company is affected by the many other risks common to the rest of the insurance sector (operational, investment, liquidity, provisions etc.)

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Credit Risk

As previously mentioned, credit risk or risk of payment default, **lies at the heart of the credit insurance business.**

It is also the principal risk for banks. Although also pursuing a global approach, **Basilea II** is also paying special attention to three of them: credit, market and operational. Credit risk is highly regulated within Pillar 1, introducing the advances made in the sector by the use of RAROC (Risk Adjusted Return on Capital) methodologies, in other words, those that link the profitability of operations with the risk assumed in conducting them and the use of capital that implies. They require the use of statistical techniques which make use of the data processing capabilities offered by the new information technologies.

In the initial documents of **Solvency II**, credit risk received secondary treatment. For example, the aforementioned KPMG Report (2002) defines credit risks, for non-life branches, as the poor valuation of investment and premium management risks by intermediaries, and distinguishes

it from underwriting risk. Both are included along with seven other types of risk within the so-called “non-systematic” risks (arising within the company), compared with “systematic” and “systemic” risks (see Graphic 1). This secondary nature, which occurs in most branches, is due to the fact that it only covers the risk of possible non-payment of intermediaries or companies in which investments have been made.

But, there is one exception, the credit insurance branch, in which risk underwriting is basically measurement of the credit risk, although in this case non-payments do not occur to the insurance company but to the insured who took out a policy to cover his credit sales. In other words, the credit risk exists as stated in the Solvency II project, but in addition, the underwriting risk is given by the measurement of the Credit Risk as seen by BIS II.

For this reason, I believe that there is a high probability that Solvency II will transfer a large proportion of the provisions of Basilea II on credit risk to credit insurance companies. If the intention is to make progress in risk measurement and control in order to determine the risk profile assumed by a company it does not seem logical to waste the opportunity to use such exhaustive regulations from the banking world, although with the necessary adaptations, which as we shall see later, would be numerous and far-reaching, especially from the point of view of methodology.

In addition, the importance of the co-ordination of the supervisory authorities of insurance companies and banks must be taken into account, helped by the existence of large conglomerates which perform both functions, a subject which is highly topical.



But, to complete our understanding of the implications of credit risk in our business and the need for its regulation within the framework of Solvency II we must again refer to the basics. Within these, the first pillar is the calculation of the minimum level of capital and reserves in order to guarantee the company's solvency.

In order to determine these, we must analyse the possible risks that may arise in an insurance company. (See graphic 1).

Analyses carried out on the causes of insurance company insolvency in Europe, among which the Müller Report stands out, conclude that the causes of insolvency are due to a combination of factors set against a background of poor risk management, especially underwriting risks and poor pricing and loss reserving policies. Hence, the importance that credit risk has in determining the minimum capital in the credit insurance sector in order to determine the solvency of companies within this new regulatory framework; because the underwriting risk, pricing and to a large extent the loss reserving policy depend on its measurement.

For these reasons, it would appear appropriate to develop the concepts which are at the core of advanced credit risk management and the provisions of Basilea II.

New Credit Risk Management systems on the threshold of this new regulatory framework

Against this background, and since the end of the nineties, credit risk management has experienced a true revolution. There are two reasons which have driven this development. On the one hand, the data processing capabilities now provided by information technologies combined with the fact that banking supervisors have promoted the modernisation of internal risk analysis and control models with Basilea II, the definitive document of which was approved last June.

On the other hand, two circumstances have combined, outside the regulatory project, in the credit insurance industry which are making us progress ahead of this project:

- ▶ The need for permanent operational improvements by optimising the risk analysis processes, accompanying economic globalisation, the opening of borders and the dynamism which is affecting world trade
- ▶ The new and incipient orientation of companies in developing management methodologies based on risk adjusted profitability measures (RAROC).

And, strangely, although the motivation for both initiatives did not have the same origin, we can say that they are in complete harmony and therefore the definitive new regulatory framework will be born in a very favourable environment; in fact, a large number of credit insurance companies will have their adaptation timetables planned and partially implemented when the new framework arrives.

Economic capital and RAROC: a new approach to credit risk analysis and pricing

As we have seen, one of the basic pillars of the Solvency II project is the requirement for insurance companies to develop calculation systems to determine the capital and reserves required according to the risks they assume and their management.

From the point of view of Business Management and Management Control, we could change from calculating the return on investment in terms of ROE to doing it in terms of economic capital (RAROC), in other words, taking into account the minimum capital that the regulator requires for the risk profile assumed and the management carried out, what level of profitability has to be required of that business model.

Graphic 1: types of risk affecting insurance companies





Total capital and return would be the sum of capital used and returns generated by units, products, policies, with different RAROC rates, and this would enable us to use RAROC for pricing, applying higher rates to policies with poorer quality risks and vice-versa.¹

Therefore, the application of the RAROC model assumes requiring a return on capital and reserves dependent on the risk assumed, so that the greater the risk the higher the return required with uniform quantitative measurement criteria which must be perfectly reflected in the price (premium). (See Graphic 2).

We shall give a quick explanation of these concepts.

Calculating the expected loss (E.L.)

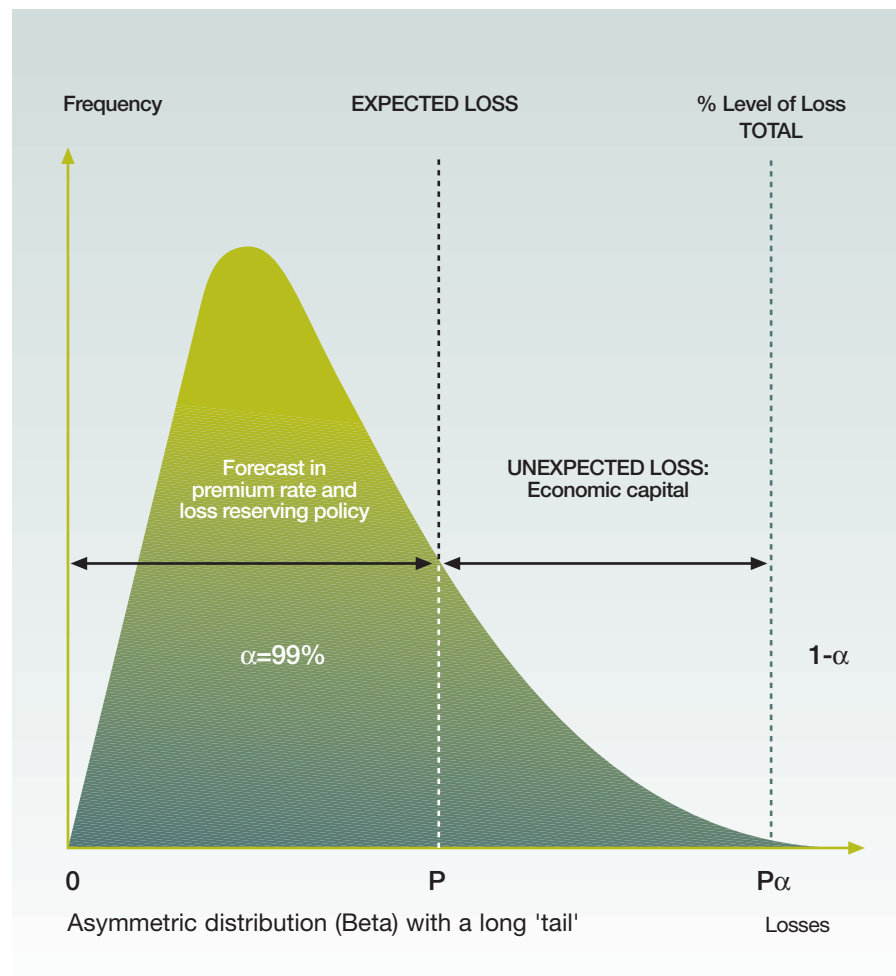
As intuition leads us to expect, quantifying losses by claims experience enables companies to measure the profitability of their portfolios and within them their customers, more accurately, enabling them to apply a pricing policy, on the basis of the targeted profitability and a specific risk policy, which ensures the losses are covered and makes it possible to distinguish between customers, benefiting the good ones and penalising the bad ones, either through prices or by adapting the selection criteria in analysing their risks.

By calculating the expected loss we will get the actual loss for the claims experience that the insurance company will

Graphic 2: Profitability required in terms of economic capital

$$\text{RAROC} = \frac{\text{Risk adjusted profits}}{\text{Risk adjusted capital}} = \frac{\text{PREMIUM: Expected loss - Costs}}{\text{Unexpected loss}}$$

Graphic 3: Credit Risk probability distribution



¹ Of special interest is the practical application of RAROC for Credit insurance pricing. While it is true that this is the only branch in which it has been applied, due to its peculiarities, results are spectacular, from both the operating and technical points of view. In other insurance branches, the complexity of calculating the economic capital for each policy is enormous, and is therefore not appropriate in practice; although it does serve as a method for comparing the validity of pricing systems at product or branch level for example.



incur within a given period. This loss estimate will be duly reflected in the price (premium) as a cost (see Graphic 3).

To calculate this, we break it down into three elements, which are those established by Basilea II; although as we shall see, identifying the main disadvantages for calculating it in credit insurance companies, there are major differences in comparison with the calculation performed in financial entities. (See Graphic 4).

Probability of Default (P.D.)

This is obtained from *scoring* or *rating* models which calculate the probability that a debtor (credit purchaser of our insured) will not pay his business debt within a fixed time. But in calculating this, we must not forget that the event that we want to model is the probability of a debtor defaulting on a business debt and we know that there are non-payments that we can call technical which have nothing to do with the debtor's solvency, but which are due to commercial disputes or disagreements related to the quality of the goods received, delivery times, discounts given, overriding commissions etc. Here

lies the main difference with modelling in banking, in the definition of "default", which complicates the methodology.

Exposure at Risk (E.A.R.)

This is the expected use of the commercial credit assigned to the debtor at the time of non-payment. Here we encounter several problems stemming from the fact that the insurance company does not know the level of use ("use factor") until the default takes place.

Together with other insurance company members of PASA (Pan-American Surety Association) we are currently financing a study on "PML" (Probable Maximum Loss) which will try to determine the probable maximum loss for a debtor or portfolio, the results of which will be very useful in supporting this component part of the formula (see Graphic 5).

Severity or 'Loss Given Default' (L.G.D.)

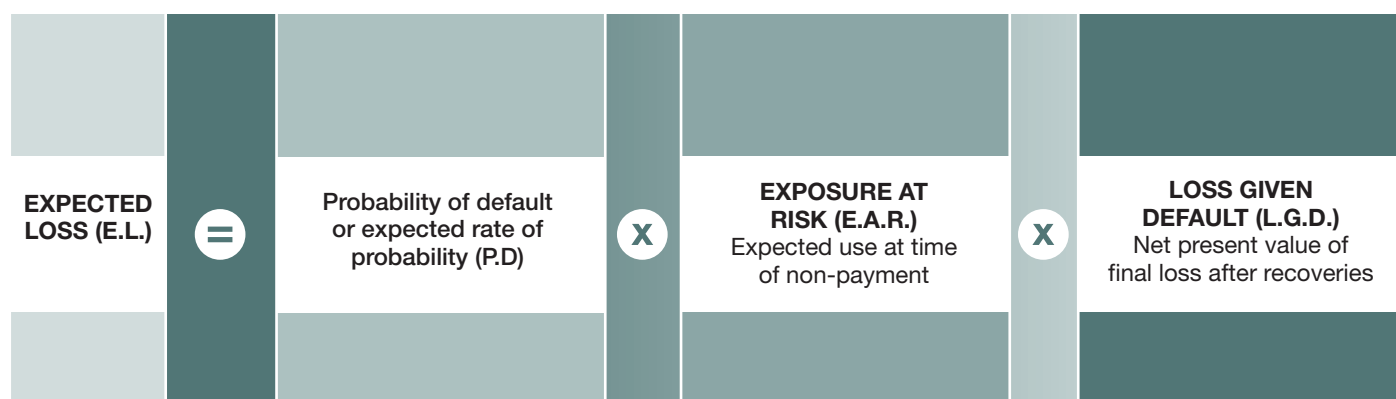
This is the Net Present Value (NPV) of the final loss after recoveries, in other words the non-recovered portion,

including recovery costs and the expediency cost (recovery flows must be treated at present value).

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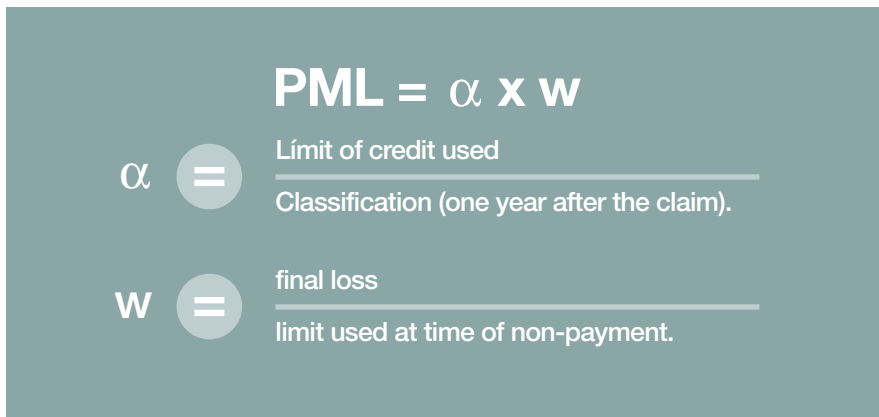
In the financial system it is dependent not only on recovery costs, type of customer and amount unpaid, but also, and in particular, the type of product and associated cover which as a general rule are formalised in all operations, which implies a strong recovery capability. However, in credit insurance, formalising cover is very infrequent, due to the very dynamics of the business; so that the outcome will depend almost exclusively on the insurance company's ability to recover unpaid debts on the basis of its structure, organisation, processes and resources assigned to that purpose, optimising the structural cost – management result relationship.

Graphic 4: Formula for calculating expected loss





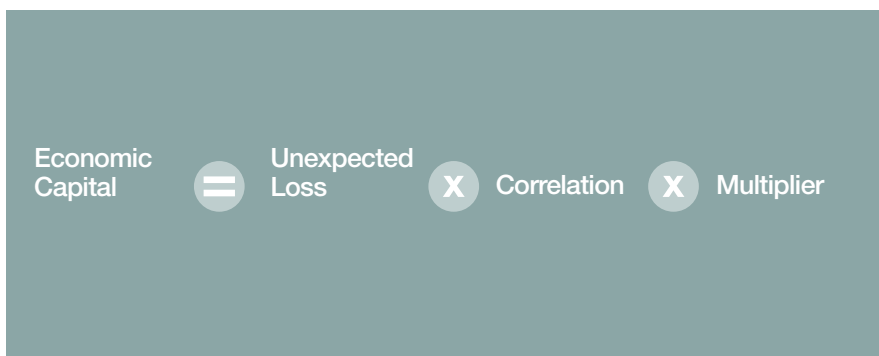
Graphic 5: Calculation of Probable Maximum Loss (PML)



As we have seen in Graphic 3 there is the possibility of incurring very significant losses although the probability is low. A high correlation increases the probability of these catastrophic claims occurring with the consequent errors in estimating unexpected losses.

“It is logical to think that the supervisor will take into account protection policies by means of reinsurance in determining the methodology for calculating the minimum capital requirement and its composition”

Graphic 6: Calculation of economic capital



Economic capital and unexpected loss

Knowing the expected loss, we must analyse the amount of any possible shortfall in order to calculate the capital required to cover us in a hypothetical situation of maximum payment arrears. In other words, to determine what capital I need, in my business and with my risk management policy, to cover the maximum loss I could incur in any possible event to avoid the company going bankrupt. This figure is called the economic capital. It is calculated within a degree of certainty so that the probability that we are protected with the capital which

is determined is for example 99% (α in Graphic 3).

The **unexpected loss** would be the total loss minus the expected loss, and the total loss is the standard deviation of the expected loss during a complete economic cycle.

Having calculated the unexpected loss of a portfolio we must estimate its correlation. In other words, what probability is there that all customers (purchasers/debtors) in the portfolio default on payment at the same time. It will depend on diversification and concentration (sectors, countries etc.). The greater the diversification (or the lesser the concentration), the lower the correlation.

There is a general correlation stemming from the economic cycle, but in addition a company's various portfolios may have strong correlations due to other circumstances. For example, an agricultural credit bank in the Jerte valley will have a slow payment rate which is highly dependent on the cherry harvest. If there is little diversification, it is very easy to stray from the mean, having some very good years but also some very bad ones.

The **multiplier** of the capital or the boundaries of the period of trust will be determined by the regulator, in terms of minimums. It attempts to decide the number of times we want to cover the unexpected loss with capital or what is the maximum admissible probability of incurring a loss in excess of the calculated capital.

But in the same way that we outlined the differences between our sector and the financial sector in calculating the expected loss, there is an enormous and significant difference in calculating the unexpected loss which in this case,

comes out in favour of the credit insurance sector. This enormous advantage is due to the existence of reinsurance. So as not to excessively complicate the analysis, we have not considered the effect of this practice on portfolio diversification and reducing maximum potential losses

("mitigation" of the risk, to use the expression employed in Basilea II) and therefore on the calculation of the minimum capital. However reinsurance represents an excellent solution to the problem of risk diversification and protection of the sector. It is logical to think that the

supervisor will take into account protection policies by means of reinsurance in determining the methodology for calculating the minimum capital requirement and its composition, a factor which does not exist within the framework of Basilea II. ■

Advantages for the sector and necessary changes

Throughout the report we have been able to point out many of the advantages that these new risk management systems will have for the sector. But adopting this framework will require (and is already requiring) major changes to the sector's business models which will affect not only the companies' strategic planning but also and in particular their structures and systems.

► **Structures**, because of the changes that it will mean to business processes, from customer selection – marketing – customer loyalty, pricing, to risk analysis – classification – necessarily imply changes to the management structure of those operations and this means changes not only in the size of the

teams, but also in the profiles of the people in those teams.

► It will also have a **decisive influence on the policy of protection by means of reinsurance** (retention strategy, policies and types of protection and selection of reinsurance companies and distribution of quotas), and because of that it will affect the **determination of the financial structure** of the companies and in particular their level of capitalisation.

► **Systems**, because the incorporation of these risk quantification methodologies requires the availability of advanced information systems capable of extensive mathematical calculations and statistical analyses and with storage capacity for an enormous volume of data.

The effort of analysis, conceptualisation, redesign of operations and no doubt the investment effort are in our case already substantial; but the adoption of these new models will amply compensate for this and their benefits will be significantly increased for those companies which have anticipated these changes.

While the change in the regulatory framework provided in the Solvency II project will represent an historic milestone for the insurance sector, for credit insurance companies it will mean their movement towards a new paradigm, with a decisive influence on business models and service focus which will give rise to major changes in products and the "value proposal" for the customer.