

# Chapter 2

## About Market Consistent Valuation in Insurance

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**Abstract** The latest developments of both prudential (Solvency II) and financial reporting (MCEV, IFRS) frameworks seem to consecrate market consistent valuation as a kind of paragon of insurance liabilities assessment. In this chapter, we initially try to analyze the underlying motivations of this evolution. We show that it results from an objective of harmonization of measurement of quite different insurance contracts. This heterogeneity being the result of heterogeneous national insurance regulations. In the second part, we analyze the limitations of this measurement principle. For that, we mobilize some of the arguments opposed to Fair Value Accounting. Moreover, we insist on the limitations resulting as well from the implementation issues as of their use in a risk management perspective.

### 2.1 Introduction

Since the late 1990s, insurers have had to deal with significant developments in the valuation standards of insurance liabilities. Whether their purpose is financial communication or to measure solvency, these valuation frameworks all rely on assessment principles of risks borne by insurers that are consistent with the market. Thus the objective sought is twofold. An investor's initial reasoning is: valuations based on market consistent assessments are supposed to provide information that is useful for making investment choices by rendering them comparable to other types of investments on the markets. The second objective is harmonization. Indeed, by requiring a market coherent assessment, the standard setter (whatever it may be) hits two birds

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with one stone: he avoids having to personally determine what is a proper measure of risk, and ensures, in theory, the consistency of this measure, therefore reducing the arbitrariness that would leave risk levels up to freedom of choice. On this second point, insurers intervening on the same market will observe the same market price and therefore, in principle, use the same measure in assessing these risks.

If this development is in line with the dual harmonization process and relies on the same observable market data used in accounting and, more broadly, in financial communication since the end of the 1970s, it leads, in the field of insurance, away from the pre-existing accounting valuation principles.

The problem for which we seek answers here is twofold. Initially we must try to understand the motivations that led the market consistency principle to appear as a kind of paragon of insurance assessment, following in a more comprehensive manner that of the fair value method. For this, we will review one of the specificities of the insurance business: its strict regulations. We will observe the consequences of its structure and the close link between regulations and local accounting practices. Beyond the criticism of market values, and more broadly fair value as a measure of economic activity, we will look at how the transposition of the coherence approach of the markets to the insurance business faces additional pitfalls.

## **2.2 A Business Structured by Regulations**

In this first section, we will try to explain the reasons that led to the advent of market consistent assessments to measure the insurance business. For this, we will review one of the specificities of the insurance sector in general, and specifically life insurance: its heavy regulation by public authorities. This has two major consequences: an overlapping of contract law, accounting and solvency regulations leading to significant diversity between various jurisdictions.

Indeed, given its role in economic development and safeguarding economic actors, the insurance business, regardless of which developed country, is subject to specific rules designed to ensure the strength of its players. Two complementary types of approaches to this regulation can be distinguished. The first consists of supply-side constraints, i.e. the definition of insurance products that may, or may not, be marketed within a given jurisdiction. The second involves regulating the organizations allowed to market these products. This second type of regulation can itself be subdivided into *a priori* restrictions (whether or not other commercial or financial activities may be offered, maximum exposure to certain market risks, legal form of the companies, and governance methods, etc.) or *a posteriori* restrictions linked to risk exposure measurements and their level of danger (the solvency margin of the European directives of the 1970s, America's Risk-Based Capital, and the solvency capital of Solvency II, etc.)

Some of these regulations, derived from prudential considerations, have led to a considerable structuring of the supply and functioning of insurance products. When these provisions stem from national legislation, they can lead to significant

discrepancies, depending on the jurisdiction, the product, the risks and more generally on the management of insurance companies providing basically similar products.

In this regard, a striking and perhaps the most vivid example is life insurance in the form of savings in euros.

### ***2.2.1 An Illustration of Life Insurance in Euros: The French Case***

Often referred to by the press as a Frenchman's preferred investment, life insurance represents more than half of all long-term savings (source: French Federation of Insurance Companies (FFSA) 2014 annual report) and more than 37 % of the financial wealth of French households (source: 2014 annual report of the Observatory of Regulated Savings); the mathematical provisions of life insurance contracts and their capitalisation alone represent over €1.3 trillion.

Having their own specific fiscal framework, these life insurance products in euros are subject to special regulations resulting in particular from prudential considerations. Savings and retirement contracts in euros provide guarantees in the event of life (regulation of savings over time or payment of a life annuity) and in the event of death (payment of savings made to beneficiaries and possibly premium death benefits for annuity contracts). They are taken out by the insured party from a long term investment perspective in order to benefit from a capital distribution or a life annuity (retirement supplement). One of the main expectations of policyholders is to see their savings increase under favourable tax treatment and the ability to redeem the contract at any moment. To provide this service, the amounts collected by insurers are invested on the financial equity and debt markets, as well as in real estate.

In this context, legislation has set conditions on what may be provided to the insured parties. In particular:

- These contracts may not benefit from a minimum guaranteed revaluation rate that exceeds 60 % or 75 % of the semi-annual reference to the average rate of government bonds<sup>1</sup> (C. ass., Art. A132-1) upon subscription;
- The insurer is required to use the statutory mortality tables or those based on the regulations (in the case of experience-based mortality tables) when setting tariffs (C. ass., art. A335-1);
- The compensation due to the insurer in case of early redemption of the savings may not exceed 5 % of the acquired savings and must be zero if redemption occurs over ten years after the effective date of the contract (see C. ass., Art. R-132-5-3).

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<sup>1</sup>More precisely, the rate of 60 % (with a maximum of 3.5 %) applies beyond eight years and, for the contracts with periodic premiums or variable capital, whatever their duration.

If the maximum adjustment rate constraints appear, at first glance, rather strong, it would mainly result in taking insurers out of the savings market if it was not supplemented by provisions for profit sharing (from regulations contractually more favourable) and the insurers' methods in this area. Indeed, in consideration of the limitations on the revaluation promises offered at the time of subscription, regulations require allowing the community of life insurance holders in euros to share in the technical and financial results (C. ass., Art. A331-3 et seq.). This obligation does not, however, provide any individual rights to the insured party.<sup>2</sup>

In particular, the insurer has a certain latitude in the way he can redistribute these profits to policyholders, both on the maturity and on the allocation between the various contracts. This results in a relatively widespread practice of providing more benefits to those with low guaranteed minimum rates to improve their overall valuations.

What interests us here is the close link, stemming largely from prudential considerations, between the contractual terms and conditions, the economy of the contract and the accounting. Indeed, there are no profits without an accounting system to determine its extent. In the case in question, these benefits are determined by the accounting benchmark—the French insurance accounting standards<sup>3</sup> (PCA).

We will not detail here the provisions of the PCA, instead we propose to focus on the main provisions of life insurance contracts in euros. They can be schematically summarized as follows:

Technical provisions are made up of mathematical reserves and a provision for profit sharing:

- The mathematical reserve provisions are individually determined and correspond to the acquired savings (sum of premiums paid net of fees, including the various annual revaluations, net of fee income, which were incorporated into the insurance contract—at the minimum these annual revaluations are equal to the minimum contractual revaluation rate) for savings contracts or expected present value of future benefits for pension contracts in service;
- The provision for profit sharing is broadly established and relates to amounts from the technical and financial benefits accruing to the insured parties but was not incorporated into the contracts;

Investments are recorded at their historical cost<sup>4</sup> or at their amortized value for amortizable securities.

To maintain an overall consistency, the regulations set limits on the assessment of the mathematical provisions. In particular, their evaluation must include certain

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<sup>2</sup>This was recently recalled by a judgment of the Final court of appeal (Civ. 2nd, March 5th, 2015, n° 14-13.130) confirming a preceding decision of Conseil d'État (CE, May 5th, 2010, n° 307089).

<sup>3</sup>Until 2015, the insurance accounting rules were part of the Code des assurances, like most of the above-mentioned regulatory or legislative provisions. From 2016 and the coming into effect of the new prudential framework Solvency 2, these rules will be transferred to the national accounting standard-setter (Autorité des Normes Comptables).

<sup>4</sup>This measurement is associated with impairment rules for financial assets whose value fell significantly to a point at which the perspective of recovering the acquisition value is unlikely.

assumptions (discount rates and mortality tables) consistent with those of the tariff. Thus, it follows that if the financial performance of the investments<sup>5</sup> is greater than the interest expense from the accretion costs of interest rates, this necessarily creates financial income from which the insured community can benefit for at least up to 85 %. The logic is the same regarding mortality assumptions: an overly conservative assumed tariff compared to the insured portfolio year after year will lead to mathematical reserve bonuses that will increase technical profits, which will return for at least up to 90 % back to the insured community.

The analysis of this regulation demonstrates the overall consistency of the system, especially the link between the insured party's contractual rights and the insurer's commitment to the insured community. The latter is more important than the sum of individual rights. Furthermore, its development is partly a consequence of the insurer's management of its investments (through their allocation, but also their timing) as well as the revaluations made beyond the guaranteed rates (i.e. the individual rights of the policyholders). All this occurs within a competitive environment with the possibility of policyholder redemption and could significantly penalise a low bidding insurer in terms of revaluations.

Another important aspect, which will be discussed later, is that through the accounting of the acquisition cost of investments and the provisions for profit sharing (which allows accruing policyholder profits for a maximum of eight years), this system allows the insurer to spread out redistributions. In practice, this allows the use of previously existing reserves to continue re-evaluating when the markets are down and offset policyholders benefiting from the lowest guaranteed rates, meeting certain expectations of investors as identified by Séjourné (2006, 2007).

### 2.2.2 *Comparative Analysis: The German Situation*

The German insurance market offers life insurance policies in euros very similar to those presented in the previous section: a guaranteed rate, a profit sharing clause, an annual ratcheting mechanism, and a similar redemption value to the mathematical reserve, etc. However, an analysis of their regulations enables us to highlight clear differences that lead to problems in Germany different from those encountered in France. The main provisions of these regulations are summarized in Kling et al. (2007), Maurer et al. (2013) and in Berdin and Grundl (2015). In particular, Berdin and Grundl (2015) presents the regulatory reform carried out in 2014.

First of all, let us look at guaranteed rates. For this purpose, Eling et al. (2012) proposes a comparison of regulations on the matter between jurisdictions in the US, Germany, Austria and Switzerland. Regarding Germany, the Federal Ministry of Finance determines the maximum technical interest rate pursuant to

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<sup>5</sup>In our schematic approach the financial incomes thus consist of the incomes from amortizable assets and the dividends and gains or losses on ceded non-amortizable assets.

Directive 92/96/EEC, on the basis of 60 % of the average of the rates on government bonds. However, there are, as is also the case in France, specific provisions for certain contracts. For example, for single premium savings contracts,<sup>6</sup> the maximum guaranteed rate over eight years is 60 % of the historical average rate of German government bonds (bond maturities between 9 and 10 years). Until the late 2000s, this average was based on a ten year track record. This has been reduced to five years to better reflect the lower interest rates.

Up until the sovereign debt crisis, the practice of German insurers was, as Berdin and Grundl (2015) recall, to guarantee the maximum rate permitted by law.

These regulatory provisions, combined with the practices of the insurance market, put the German life insurers into a difficult situation when interest rates fell. That is the finding made in particular by Kablau and Weiss (2014). They show in particular that at the end of 2012, the market's average technical interest rate was 3.2 % when the average rates of German sovereign debt stood at 1.3 %.

These contracts also contain profit sharing provisions (at 90 %), mortality (at 75 %) and management (at 50 %). The amounts attributable to policyholders can be directly incorporated into contracts to the allocated or non-allocated provisions. Reference should be made to Maurer et al. (2013) for details of the profit sharing mechanism. These provisions are supplemented by the sharing of at least 50 % of unrealized gains on investments (valuation reserve) representing commitments to policyholders leaving a mutual insurance company.

On aspects of profit sharing and unrealized capital gains, the 2014 reform had two significant impacts. The first was to increase from 75 to 90 % the rate of technical profit sharing. The second was to limit the proportion of capital gains on bonds within the base of the valuation reserve. Indeed, only capital gains on bonds, in addition to those required for future compliance with the guaranteed rate commitments, are now integrated in the profit sharing when exiting a contract.

The comparison of French and German regulatory provisions calls for several comments.

The first is the similarity of the existing relationship between accounting provisions (how investments are valued, recorded results) and the economy of the contract. This makes it difficult to define a common accounting framework to act as a national accounting framework, to prepare financial statements and to define profit sharing between insurers and policyholders.

The second comment observes that, although the general logic is the same in both jurisdictions, setting parameters, in particular the maximum interest rate that the insurer can guarantee, leads to rather distant problems in terms of risks. If in 2014 three quarters of the technical life insurance rates are zero and more than 85 % below 1 %, <sup>7</sup> then the average guaranteed rates in 2014 on the German market are greater than 3 %. <sup>8</sup>

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<sup>6</sup>These rules also apply to annuity contracts with no surrender options.

<sup>7</sup>Source: *Étude sur les taux de revalorisation des contrats individuels d'assurance - vie au titre de 2014*, Analyse et synthèse n° 47, ACPR, juin 2015.

<sup>8</sup>Source: Moody's.

It follows that if one of the major concerns of French life insurers is maintaining the competitiveness of life insurance while the projected financial returns of their investments decline as a result of the prolonged low interest rates, their German counterparts are more concerned about their ability to immediately honour their guaranteed rate commitments to their policyholders. This results in insurers and supervisors increasing their spending on research and development. Analysis and modelling of policyholder redemption, payments and arbitration behaviour is now an area of particular interest among French life insurers. Expectations made in this area help to determine revaluation policy. A key question is that of the market's elasticity to interest rate variations and, in particular, to offers that reflect the rate at the time proposed by banks (savings accounts, term accounts, etc.) This question is much less central in Germany, where the main problem appears to be that of optimizing financial management (allocation, realization of capital gains) to reduce risk while meeting commitments. A second stage is the changing regulatory framework, as illustrated by the 2014 reform (lowering of guaranteed rates, limiting the rights of redeeming policyholders to valuation reserves) or the transitional measures obtained on the implementation of Solvency II (a sixteen-year transition period obtained by the German market to converge with the best estimate market consistent provisions).

## 2.3 Fair Value and Its Criticism

At this stage, it appears useful to us to reconsider the concept of fair value which was essential in past decades in the accounting countable frameworks (IFRS and US GAAP in particular) and which provides the conceptual background to the market consistent measurement of insurance portfolios. The use of fair value to measure balance sheet items (assets and some liabilities) has been increasing to culminate at the time of the financial crisis of 2008. The description of this historical movement through accounting frameworks is beyond the scope of this text. The reader will be able to refer in particular to Power (2010), Emerson et al. (2010) and Richard et al. (2014). These authors propose a historical overview of the advent of fair value and analyze the reasons for its rise to power.

In this section, after having pointed out what fair value is and how it is put into work in accounting frameworks, we will give an overview of those criticisms which are opposed to it.

### 2.3.1 *One Fair Value Principle, Several Valuation Techniques*

The last definition of fair value appears in IFRS 13, published in May 2011 by IASB at the conclusion of a collaborative work with the American accounting standard-setter (FASB), leading to a single definition and a common practice.

This IFRS defines fair value as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.

This definition is supplemented by provisions on the transaction concerned:

A fair value measurement assumes that the asset or liability is exchanged in an orderly transaction between market participants to sell the asset or transfer the liability at the measurement date under current market conditions.

A fair value measurement assumes that the transaction to sell the asset or transfer the liability takes place either:

- (a) in the principal market for the asset or liability; or
- (b) in the absence of a principal market, in the most advantageous market for the asset or liability.

We have to consider several cases in the effective measurement of an asset at fair value.

The first situation, the simplest, is that of a financial asset which is indeed exchanged, under normal conditions, on an active market. In this case, the fair value corresponds to the value of exit (exit been worth) without adjustment due to costs of transaction (which are in the scope of other IFRS).

When the considered asset is not in this situation, the fair value will have to be estimated by means of techniques of evaluation. It is thus advisable here to recall that the fair value is therefore not synonymous with market value on an active market. In particular, this allows a financial asset which was not systematically exchanged on an active market (at acquisition) to see its value annihilated in the balance sheet of the company, when there are no more exchanges on this security. The standard specifies that the three most widespread techniques of evaluation are: approach by the market, approach by the costs, and approach by the result. Whatever the technique(s) used, the objective of the evaluation remains to estimate the price on which the participants in a normal transaction of sale of the asset would have agreed. This scenario is directly inspired by the neo-classical economic theory as underlined in Richard et al. (2014).

The approach by the market consists in being based on the prices and other observations generated by market transactions on identical or comparable assets. The approach by the costs consists in determining the replacement cost, at the date of evaluation, which would make it possible to replace the value of service of the asset considered. Finally, the approach by the result consists in estimating the value which the market would grant to future amounts (future flows of treasury or products or loads). It is this last approach which will be of interest to us, taking into account its conceptual proximity with the market consistent valuations required to measure insurance portfolios.

Whatever the adopted approach, IFRS 13 requires us to detail in the appendices the fair values obtained, segmented according to a hierarchy (level 1 to 3) corresponding to the informational characteristics of the data used to carry out the evaluations. Thus the data input of level 1 correspond to directly accessible information on active markets, like market prices. The data input of level 2 correspond to

information other than the market price, but which remains observable (directly or indirectly). Finally, Level 3 corresponds to the unobservable data. This hierarchy obviously presents the order in preference to considering the data simultaneously, for example, level 2 and 3 data are available at the same time. As an illustration, the corrected estimate of the price of the risk of expected inflation that allows us to estimate the observation of the price of the sovereign obligations indexed on inflation will take precedence over the need to estimate of the fair value which in turn takes precedence over estimates of the chief economist of the company.

In summary, it is advisable to recall that there is not a strict equivalence between fair value and market value. In the situation where there is no value of active market, the fair value is the solution of the problem which consists in determining what this price would be, taking into account available information.

### 2.3.2 *The Criticism*

The criticism of the use of fair value in accounting is registered on several levels. The first attempts to express doubts on the relevance of the use of market values (or resulting from observations of market) to reflect the good vision of the financial situation and the performance of a company. The second is that of the complexity of implementing the valuation methods and the lack of objectivity which can result from their use. The third level, most recent, concerns the macro-economic impact and the consequences on global financial stability. The objective of this section is to give a short outline of these criticisms. We will see in the next section which of these criticisms also hold for market-consistency of insurance portfolios.

Regarding the first register of criticisms which one can address to fair value, one can count, initially, the more general objections opposed to the neo-classical theory and its developments (cf. for example Orlean (2011) or Walter and Brian (2008)) on which rests the principle of fair value. In particular, Orlean (2011) and Walter and Brian (2008) detail how the market value can move away from the (non-observable) fundamental value. This divergence can take several forms.

The first of these forms are market noises caused by an informational asymmetry or disturbing agents which do not behave rationally (as assumed in the efficient information theory). In the long term, one would expect these disturbances to disappear.

A second phenomenon, perhaps more problematic, comes from the historical observation of financial bubbles. These would come in particular from the phenomenon of *prophétie auto-réalisatrice*. This concept is easily illustrated by means of the stock exchange quotations. Since the expected income of an investor on a stock primarily comes from its resale, rather than from the future dividends (as in the model of Bachelier (1900)), the maximization of the profit comes more from the anticipation of the evolution of the market value of the stock than from real economic outlooks for the company. Thus an investor who estimates (at the conclusion of a financial analysis, for example) that a title is overpriced may rationally find it beneficial to be a purchaser of the title if it anticipates that the other agents on the

market will invest on the title. This mechanism of intersubjectivity is particularly well described in Orlean (2011).

Beyond these considerations relating to the quality of the stock exchange prices, to give a faithful impression of the value which one describes as fair, the question of the relevance of a value of exit arises to measure the financial situation of a company. One of the major arguments in favour of fair value rests on the assumption that the principal recipient of the financial statements is the investor. Thus evaluations based on observations of market must make it possible to lead to values comparable with the other types of investment (of market) which it can choose. For this purpose, it should be noted that if the investors appear indeed, in principles IFRS, like the paramount users, the fair value is used in other countable reference frames (ex: US GAAP) without the things being also clear. Thus, it is interesting to note that, as regards development of accountancies (cf. Richard et al. (2014)), the exit value was initially essential in measurements of solvency: if the company must fulfil its commitments today, does it have the assets enabling it to do it? If this question interests the investor, one might doubt that it constitutes the alpha and the omega of its criteria of appreciation. In particular, Holthausen and Watts (2001) estimate that, compared to what one can expect from an accounting framework, the fair value has a very moderate explanatory power (more particularly when used to measure non-financial assets).

The second register of criticisms is that of the distrust that investors may have regarding values obtained by means of valuation techniques. The issues in this respect are double.

The first kind of issue is that of the comparability of the amounts obtained by means of these techniques of evaluation. One single asset could be evaluated by several techniques (cf. the previous section) which, themselves, can be supplied with different data. Mary Barth, member of IASB during the year 2000, underlines in Barth (2006) the conceptual limits of this possibility and the difficulties which result from it for the users from financial statements.

The second kind of issue results from the phenomenon of moral risk. The share left with the models of evaluation as far as the fair value (when the asset is not directly traded on an active market) may give a manoeuvre margin to handling. It is imagined that this can be the case when, for example, the no-claims bonus or the promotion of the leaders of the company or the people in charge of these evaluations is conditioned by the results of the company (or of one of its segments). A historical example is that of Enron, whose financial statements had been artificially inflated by means of generous estimates of fair value of assets. This case is studied in particular in Haldeman Jr. (2006), Benston (2006) and Gwilliam and Jackson (2008). Beyond the identified behaviours (a posteriori), these authors point out the unreliability of the evaluations of fair value (including those done by external cabinets) and the strong asymmetry of information between the management and the users of the financial statements.

Finally, the last register of criticisms is that of procyclic financial stability and the character lent to the fair value. It is underlined in particular by the political world at the time of the meeting of G20 in London in April 2009, which requires an

accounting global framework where the fair value is less prevalent and measurements of depreciation are less violent (cf. Azzaz et al. (2015) for details of the impairment methods of IAS 39 with regard to depreciation of actions accounted at FVTOCI). This in particular led IASB to re-examine the standard on the financial instruments and to publish IFRS 9, whose first application is scheduled for 2018.<sup>9</sup> IFRS 9 leads to a slackening of the strong constraints which meant IAS 39 was able to use the amortized value and refer to the concept of business model of the entity to decide if the titles (which are eligible for amortized value measurement) are measured at amortized cost, fair value through own-funds (FVTOCI) or fair value through income statement (FVTPL). On the other hand, it imposes measurement at fair value through P&L for the other categories of financial instruments (stocks, funds, etc.)

The reproach of procyclicality relies on the following consideration. The use of fair value results in reflecting in the assessments (and partly in the result) the variations noted on the markets. In particular, in the event of crack stock exchange, the image reflected by the use of fair value is affected in that the role of the fair value in the financial crisis of 2008 could be qualified as a catalyst in the transmission of the financial crisis to the real economy. In particular, Plantin (2008a) illustrates the effects of contagion that Fair Value accounting of Financial Institutions can produce. It is, however, interesting to note that they do not grant, on the matter, a better virtue to the historical cost accounting. Overall, it arises from work of Plantin et al. (2008), Laux and Leuz (2009–2010) and Jaggi et al. (2010) that if the use of fair value in times of crisis accentuates the problems of implementation and potential heterogeneity already mentioned, it is more its use at prudential ends for the banking institutions than its accounting purposes which could contribute to the effects of contagion to the real economy.

In summary, one can conclude that the benefits of fair value accounting are tarnished when they result from entity-specific techniques not easily controllable by the users of financial statements. This problem is accentuated in crisis periods (where the active character of certain markets is called into question) and can involve an increased distrust of the investors with respect to the financial institutions. However, as pointed out in Laux and Leuz (2009) and Plantin et al. (2008a), the alternative of the historical cost (coupled with measurements of depreciation) does not seem to be more relevant to the matter.

## 2.4 The Delicate Transposition to the Field of Insurance

The use of valuations relying on consistency with market observable data is in line with the introduction of fair value, particularly the IFRS. In this regard, it should be recalled that the first major principles of the Embedded Value benchmark (European

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<sup>9</sup>This standard is currently under examination by the European authorities and has not yet been adopted by the European Union.

Embedded Value) were published by the CFO Forum in May 2004. The period is significant insofar as the IASB published in July 2004 an exposure draft (ED5 built on the current IFRS 4: Insurance contracts) on insurance confirming the path chosen in 2002 for the 2005 objective: a temporary short-term solution for the measurement and recognition of insurance contracts. The ambition to form a satisfactory accounting framework for insurance liabilities was postponed until 2007. Such, in any case, was the objective of the IASB at the time. At the time of writing, the new IFRS insurance standards (phase 2) have still not been published and will not apply before 2019. The use of Embedded Values for financial reporting remains topical for life insurance groups. Thus harmonizing practices through precise principles was required, giving rise to European Embedded Values to be supplemented in June 2008 by the publication of the principles of Market Consistent Embedded Value, which underwent a revision in October 2009 (financial crisis requires it).

Over the same period work started on the new European prudential framework: Solvency II. At the initiative of the European Commission in 2002, the project launch, in its initial specifications, relied on IAS/IFRS standards that were subject to a regulation on adoption, (see Regulation (EC) no. 1606/2002 of the European Parliament) and of the Council of 19 July 2002 on the application of international accounting standards. This was a delicate exercise for the regulator since IFRS 4 is a standard that derogates from the IFRS Framework allowing the continuation of local practices (with some adjustments) in terms of insurance contract accounting. In this exercise, the various quantitative impact studies (QIS) take up a number of expressions (Current Exit Value, Current Value Fulfilment) or principles (on contract limits) stemming from IASB discussions on phase 2 of the insurance standard. As work on phase 2 of the IFRS for insurance was not going anywhere, the QIS5 specifications published in July 2010 significantly stray from the phase 2 insurance ED published that month, in terms of evaluation principles of the technical provisions. Schematically, we can say that if Solvency II specifies the principles of valuation of investments and technical provisions, the prudential benchmark uses the IFRS assessments for other asset and liability items, with adjustments if IFRS principles have amortization processes to smooth the impact on the income statement. The fact remains that, ever since the QIS2 was published in 2006, Solvency II provides that the evaluation of the best estimate of technical provisions should be market consistent.

The resumption of work of IASB on standard insurance (phase 2) was concretized by the exposure-drafts of 2010 and 2013 and the standard is expected for the end of 2016. There still (cf. the appendix) the required evaluation of insurance portfolios must be coherent with the market data. It is, however, advisable to note that the concept of current fulfilment been worth is not exactly equivalent to that of fair value. In particular, the notion of transaction or transfer is replaced by that of execution of the commitments. Moreover, it is explicitly a question of measuring the current value of future flows of treasury necessary for the achievement of the commitment of the insurer towards the policy-holders. One thus finds here explicitly a technique of evaluation based on flows (cf. the preceding section on the various techniques of evaluation of the fair value), even if the standard authorizes

approaches of replicating portfolio type. There is no longer a reference to the market, in the spirit of the equalizer, ensuring comparability and coherence with the financial placements, themselves primarily measured with the fair value.

The principles of evaluation of these three reference frameworks are given in the appendix.

### ***2.4.1 The Implementation***

The search for a model allowing an analytical valorization of the contracts of life insurance has been at the core of academic actuarial work in the last few decades. Brennan (1976) opened up the way for the financial techniques of valorization on unit-linked contracts. As regards contracts of savings in euro, one can in particular quote the works of Briys and de Varenne (1997a), Bacinello (2001), Grosen and Jorgensen (2000), Ballotta (2005) and Planchet et al. (2011). All of these nevertheless run up against the complexity of the accounting mechanisms which we have described in the first section, such as the necessary modelling of the behaviour, both of the management of the company of insurance and of the policyholders (cf. in particular, regarding lapse behaviour of policyholders, Sejourne (2006), Planchet and Thérond (2007), Loisel and Milhaud (2011) and Borel-mathurin et al. (2015)).

It results from this that, concretely, most insurers use Monte Carlo techniques by means of stochastic models of projection in which these various behaviours are modelled.

Market consistency of these evaluations is assumed to be ensured by the coherence of the economic scenarios projected with the noted prices of the financial placements held by the insurers to whom the collective right of the policy-holders to the participation in the profits applies. Other risks, i.e. those which are not implicitly integrated in the estimate obtained by these techniques, are taken into account ex-post by the addition to the market of a consistent best estimate of an allowance for risk (risk margin of Solvency II, risk adjustment in IFRS or cost of the non-hedgeable risks in MCEV) of which the concept varies according to the framework. This segmentation is described in more detail in Thérond (2008).

These reference frameworks thus operate a segmentation in the manner of treating the risks according to whether or not they can be measured by means of market data. In the second case, a measurement of risk (freely selected by the company in IFRS or constraint in Solvency II) must make it possible to reflect the allowance for risk which the market would require for the transfer or the elimination of these uncertainties.

If one again takes the grid of analysis of the fair value (in terms of techniques of evaluation and hierarchy of fair value), these evaluations use a technique based on cash-flows with data input of the various levels presented to the previous section. A simplified nomenclature is as follows:

- Level 1 data: the price of the financial placements (when they are quoted on an active market, which is generally the case taking into account the existing prudential constraints on the choices of investments of the insurers).
- Level 2 data: the interest rate curve obtained by the observation of the price of the products of interest rate (if liquid maturities are long enough compared with the duration of insurance liabilities), parameters of volatility and dependence of the stochastic models used to project various risks (interest rate, actions, etc.)
- Level 3 data: the modelling of the behaviours of the company (financial management, discretionary part of the revalorization of the savings) and of policy-holders (payment of the bonuses for the contracts with periodic bonuses, repurchase, death, etc.), the modelling of future costs (internal and external) the entity will have to support in order to fulfil its commitments towards the policy-holders, etc.

Consequently, this kind of measurement stands in the field of the criticisms arising from the asymmetry of information between the entity and the user of the evaluations, as presented in the previous section. Nevertheless, it is advisable to recall that, as for accounting financial statements, embedded value calculations are the object of a review of an independent cabinet and the Solvency II evaluations are controlled by the prudential supervisors.

## ***2.4.2 Limits of the Approach***

To evoke the limits specific to the insurance of such an approach, it is advisable, initially, to delay on the recipients of such financial statements.

For Solvency II, this is usually the supervisor. Also, the vision of type value of exit is understood relatively. This makes it possible to define the level surplus (equities) on a current and coherent basis with the prices to which the financial placements could be yielded. One could nevertheless regret the absence of a prospective size of this measurement, but this point is assumed to be regulated by the requirement of capital (Solvency Capital Requirement). It remains the case, however, that this measurement, by construction, takes into account the volatility of interest rates and the markets action, itself very volatile. This can result in unseating leaders and supervisors who see the tests of solvency increase or decrease in one period and in a consequent way in the other. The difficulty lies, in particular, in the analysis of this evolution resulting from the evolution of the portfolio, the concrete actions conducted by management and of course of the conditions of market.

Anti-cyclicality features have been implemented since the financial crisis to try to limit the effects of unfavourable conditions of market: volatility adjustments to reflect, in the technical provisions, bonuses of illiquidity of the market or effects of attenuation of the loads of capital for equity risks. In particular, the integration of a spread for illiquidity (whatever its name according to the reference frame considered) thus led to a projection, in so far as the insurer can hold his placements in the

duration, of higher incomes than those which would have been obtained without taking it into account. That led in particular to outputs (thus countable) which more easily make it possible to respect the contractual commitments (guaranteed rates) and the satisfaction objectives of the customers (revalorization beyond the guaranteed rates to be used as a target rate of revalorization).

Some of the quantitative reporting statements of Solvency II are nevertheless public. They will thus be added to the publications of embedded been worth and IFRS financial statements in the double sack of the investors. For those dimensions the *black box* image of the evaluation models poses the problems already mentioned in Sect. 2.3. In particular, the level 3 data presented in Sect. 2.3. Indeed, they can be portfolio-specific (e.g. the mortality or the surrendering behaviour of the policy-holders) and thus it is difficult to compare them. It can be a question of choice, modelling some financial variable with some given model. They can also reflect the future intentions of management. In this case, management may not wish to communicate them, especially as they could hypothetically lead to the creation of new commitments (within the framework of increasing jurisprudence in favour of the protection of the policy-holders). The investor thus finds himself with an extraordinary mine of information (much more than with national accounting) for which he will have to define the level of credibility that he grants to them.

Another major limit of the approach lies in the following paradox. If these various normative reference frames are based on a financial valorization, if it is not economical, it is necessary to precisely define what is evaluated and what is not. In accounting terms, it is a question of defining what does and what does not cause a liability. The been worth embedded, with its comprehensive view of the current value of the future profits intended for the shareholder under the portfolio of contracts in force, gives a coherent answer to this question, though raising more convention than prediction. Indeed, the scenario is like that of the absence of future production and thus of the assignment only to the policy-holders in force, at the date of evaluation, of part of the future results. In practice, as we saw in Sect. 2.2, things are more complicated because of intergenerational mutualization. One can indeed wonder about the relevance of this scenario which would lead the insurer to project structures of costs quite different from those that he knows and, in particular, to pose the question of a minor revalorization of the contracts.

This paradox is thorough with its paroxysm in IFRS, where the unit of account is the technical provision defined by the current value of the commitments towards the policy-holders under the contracts in force. It seems to us that the vision of IASB based on the legal commitment under the individual contract with the policy-holder plays a crucial role in the difficulties that meets IASB to work out and finalize standard IFRS insurance (phase 2). This reasoning is reconciled with difficulty with the provisions as regards participation in the profits and their properties of smoothing between the generations presented in Sect. 2.2. The level of pregnancy of these provisions under the current market conditions perhaps also explains the geographical heterogeneity of the degree of acceptance by the insurers of the proposals of IASB on the contracts known as participative.

## 2.5 Annex

This annex aims to provide the reader with a direct reading of the valuation principles consistent with market observations found in the benchmarks of Market Consistent Embedded Value, Solvency II and the IFRS insurance standard (phase 2).

### 2.5.1 *Market Consistent Embedded Value (MCEV)*

The principles below are extracts from the European Insurance CFO Forum Market Consistent Embedded Value Principles, published in October 2009.

Value of in-force covered business

Principle 6: The value of in-force covered business (VIF) consists of the following components:

- Present value of future profits (where profits are post taxation shareholder cash flows from the in-force covered business and the assets backing the associated liabilities) (PVFP)
- Time value of financial options and guarantees as defined in Principle 7
- Frictional costs of required capital as defined in Principle 8
- Cost of residual non-hedgeable risks as defined in Principle 9.

Principle 7 specifies the nature of the link between valuation methods that must be retained and observations on the markets.

Financial options and guarantees

Principle 7: Allowance must be made in the MCEV for the potential impact on future shareholder cash flows of all financial options and guarantees within the in-force covered business. The allowance for the time value of financial options and guarantees must be based on stochastic techniques using methods and assumptions consistent with the underlying embedded value. All projected cash flows should be valued using economic assumptions such that they are valued in line with the price of similar cash flows that are traded in the capital markets.

### 2.5.2 *Solvency II*

Article 76 of Directive 2009/138/EC states the principle of consistency with the information available on the financial markets.

Directive 2009/138/CE—Article 76 General provisions

1. Member States shall ensure that insurance and reinsurance undertakings establish technical provisions with respect to all of their insurance and reinsurance obligations towards policy holders and beneficiaries of insurance or reinsurance contracts.

2. The value of technical provisions shall correspond to the current amount insurance and reinsurance undertakings would have to pay if they were to transfer their insurance and reinsurance obligations immediately to another insurance or reinsurance undertaking.
3. The calculation of technical provisions shall make use of and be consistent with information provided by the financial markets and generally available data on underwriting risks (market consistency).

It is complemented by Article 22 of the Delegated Regulation (EU) 2015/35 of the Commission.

Delegated Regulation 2015/35—Article 22—General Provisions

3. Insurance and reinsurance companies determine assumptions about future scenarios and parameters of the financial markets that are appropriate and consistent with Article 75 of Directive 2009/138/EC. When insurance or reinsurance companies use a model to forecast future scenarios and parameters of the financial markets, it must meet all the following requirements:

- (A) It generates asset prices consistent with those observed in financial markets;
- (B) It does not assume any arbitrage opportunities;
- (C) The calibration of parameters and scenarios is consistent with the curve of the risk-free rate used to calculate the best estimate referred to in Article 77, paragraph 2 of Directive 2009/138/EC.

### 2.5.3 IFRS Insurance Contracts (Phase 2)

The excerpts below are taken from the exposure draft of 2013 (updated preliminary decisions of the IASB through June 2015).

Future cash-flows

§22. The estimates of cash flows used to determine the fulfilment cash flows shall include all cash inflows and cash outflows that relate directly to the fulfilment of the portfolio of contracts. Those estimates shall:

- (a) be explicit (i.e. the entity shall estimate those cash flows separately from the estimates of discount rates that adjust those future cash flows for the time value of money and the risk adjustment that adjusts those future cash flows for the effects of uncertainty about the amount and timing of those cash flows);
- (b) reflect the perspective of the entity, provided that the estimates of any relevant market variables do not contradict the observable market prices for those variables (see paragraphs B43–B53);
- (c) incorporate, in an unbiased way, all of the available information about the amount, timing and uncertainty of all of the cash inflows and cash outflows that are expected to arise as the entity fulfils the insurance contracts in the portfolio (see paragraph B54);
- (d) be current (i.e. the estimates shall reflect all of the available information at the measurement date) (see paragraphs B55–B61); and
- (e) include the cash flows within the boundary of each contract in the portfolio (see paragraphs 23–24 and B62–B67).

Time value of money

§25. An entity shall determine the fulfilment cash flows by adjusting the estimates of future cash flows for the time value of money, using discount rates that reflect the characteristics of those cash flows. Such rates shall:

- (a) be consistent with observable current market prices for instruments with cash flows whose characteristics are consistent with those of the insurance contract, in terms of, for example, timing, currency and liquidity; and
- (b) exclude the effect of any factors that influence the observable market prices but that are not relevant to the cash flows of the insurance contract.

These principles are supplemented in the annex by the following paragraphs (excerpts).

Uncertainty and the expected present value approach (§22)

§B40. The objective of estimating cash flows to measure the fulfilment cash flows is to determine the expected value, or statistical mean, of the full range of possible outcomes. Thus, the starting point for an estimate of the cash flows is a range of scenarios that reflects the full range of possible outcomes. Each scenario specifies the amount and timing of the cash flows for a particular outcome, and the estimated probability of that outcome. The cash flows from each scenario are discounted and weighted by the estimated probability of that outcome in order to derive an expected present value that is consistent with market variables. (...)

Market variables (paragraph 22(b))

B44. Estimates of market variables shall be consistent with observable market prices at the end of the reporting period. An entity shall not substitute its own estimates for observed market prices except as described in paragraph 79 of IFRS 13. In accordance with IFRS 13, if market variables need to be estimated (for example, because no observable market variables exist), they shall be as consistent as possible with observable market variables.

B45. Market prices blend a range of views about possible future outcomes and also reflect the risk preferences of market participants. Consequently, they are not a single-point forecast of the future outcome. If the actual outcome differs from the previous market price, this does not mean that the market price was 'wrong'.

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