

Risk-Adjusted Performance Measurements in a multi-standards environment

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Abstract

This paper is an introduction to risk-adjusted performance in a multi-standards environment. European insurers will measure soon different economic balance sheets (IFRS, Solvency 2, MCEV), and the various notions of performance and capital included in these standards will need to be reconciled. To illustrate this hot topic, we present the results of simulations performed with a portfolio of life saving participating contracts. While not intended to be exhaustive on this complicated issue, we propose basic principles to develop appropriate measures for senior executives' decisions.

Key words

Best estimate, capital requirement, discount rate, fair value, future premiums, IFRS, key performance indicators, MCEV, multi-standards, participating contracts, RAPMs, real world, residual margin, risk margin, risk-neutral, Solvency 2, VIF, volatility.

1. Introduction

This paper intends to present the issue of decision making process based on Risk-Adjusted Performance Measurements (RAPMs) in a multi-standards environment. It concerns particularly European life insurance companies that may soon apply Solvency 2 to measure economic capital, IFRS 4 Phase 2 to value insurance liabilities, while already applying local GAAP for statutory accounts and Market Consistent Embedded Value © to value the intrinsic performance of the company.

Senior executives usually agree that RAPMs should be key indicators in the decision process and Solvency 2 requires insurers to link capital requirement to business decisions. Yet, anyone can see that RAPMs are often the subject of skepticism.

Many insurers currently use performance indicators, based on statutory accounts, IFRS consolidated accounts, and most of the time not risk-adjusted by an economic capital measure. We also note that the day-to-day decision is made in a real world environment, pricing of product consider future business, and a large part of indicators produced is based on expert judgment.

This paper is an overview of the issue of RAPMs in a multi-standards environment where similar concepts are declined differently increasing the complexity to manage the activity based on those indicators. This work is still in progress and the different quantitative results presented are just here to illustrate the concepts which for most of them are not yet stabilized.

The article is organized as follows. Section 2 provides an overview of risk-adjusted performance measurements. Because of the wide range of indicators, we focus on the main ones. Section 3 presents the issue of the measurement of RAPMs in a multi-standards environment, comparing the different standards and showing that RAPMs may give misleading indications of value creation. These findings are derived from a quantitative research for a common profit sharing product, well known by life insurers in continental Europe. In section 4, we propose principles to measure RAPMs in a multi-standards environment.

While not intended to be exhaustive on this complicated issue, we conclude that if European insurers are all working on the different new standards, the necessary link between decision making and RAPMs produced in this new environment requires RAPMs based on an additional standard fully consistent with the management Board view and the reconciliation of the different indicators tailored to fit with their objectives.

2. General considerations regarding Risk-Adjusted Performance Measurements

RAPMs are based on the principle that shareholder value is created when income on invested capital exceed the cost of capital adjusted for risk and time.

RAPMs include mainly ROE (return on equity), EVA® (economic value added)¹, MVA (market value added)², RAROC (risk-adjusted return on capital), IRR (internal rate of return).

In this paper, we wonder what should be, in a multi-standards environment, the main characteristics of the numerator and denominator of the return on capital calculated as:

$$\text{Return on Capital} = \frac{\text{Income}}{\text{Capital}}$$

The table below presents common RAPMs:

RAPM	DEFINITION
Return on capital	$\frac{\text{Income}}{\text{Capital}}$
Economic value added ®	$\text{Income} - \text{Cost of Capital} \times \text{Capital}$
Market value added	$\sum_{t=1}^{\infty} \frac{\text{EVA}_t}{(1 + \text{Cost of Capital})^t}$
Risk-adjusted return on capital	$\frac{\text{Income}}{\text{Risk} - \text{Adjusted Capital}}$
Internal rate of return	$\text{IRR such that } \text{Capital} = \sum_{t=1}^{\infty} \frac{\text{Income}_t + \text{Release of capital}_t}{(1 + \text{IRR})^t}$

The results presented in section 3 are principally based on internal rates of return measured within different standards. Income corresponds to a variation of the net asset value of the balance sheet between two periods and the capital corresponds to the required capital under Solvency 2.

¹ See Desai (2006).

² For reconciliation between MVA and embedded value concepts, see Kraus (2011).

3. Income and capital measures in a multi-standards environment

We present in this section the different definitions of income and capital in a multi-standards environment. We define the multi-standards environment as the application of

- Statutory accounts (French GAAP) applied by each company especially to determine the amount of revalorization of the saving contracts and the amount of taxes ;
- IFRS (IFRS 9 for assets and the future IFRS 4 phase 2 insurance contract standard) for consolidating accounts ;
- MCEV © to measure the shareholders' economic value ;
- Solvency 2 for prudential purposes³.

When designing RAPMs in a multi-standards environment, insurers need to consider which profit and capital measure to base them on. Regarding the income:

- For one period, income includes local GAAP or IFRS income, and the variation of the net adjusted value of the economic balance sheet. This economic balance sheet can be realized under MCEV © or Solvency 2 principles. Specific treatment may be considered to distinguish operating profits and financial gains or losses (realized or not).
- For multi-periods, each standard contains the concept of discounted value of future profits (value of in force for MCEV © and Solvency 2, residual margin for IFRS 4 phase 2). For the ORSA, the value of in force can be projected through the business plan horizon. We can also mention the value of the new business under MCEV © (measured according to a stand-alone or a marginal approach).

Regarding the definition of economic profits, insurers have developed over the past years the embedded value, which represents shareholders' economic value of the in-force life and pension business of an insurance company. Future new business is usually not included. According to CFO Forum Market Consistent Embedded Value Principles © ("MCEV Principles"), the projection of assets and liabilities applying market consistent economic assumptions ensures a consistent valuation of assets and liabilities.

Regarding the measurement of the economic capital, due to the Solvency 2 reform, European insurers have concentrated their efforts on the measurement of economic capital with the standard formula, an internal model or ORSA techniques. This reform has highlighted that the required capital differs among the type of assets or business segments. This has thus reinforced the need to make business decision based on risk/return optimization.

Following the presentation of the performance measure in the multi-standards environment, we analyze the reasons and propose basic principles to develop another standard to derive an internal rate of return, in line with the Board management view.

³ Recent discussions of the IASB and EIOPA do not permit to confirm that the final accounting and prudential standards will follow the principles applied in this paper.

DIFFERENT DEFINITIONS OF INCOME AND CAPITAL

The table below summarises the different income and capital notions in the multi-standards environment.

STATUTORY NET INCOME	
Income over one period	Local GAAP may be required to produce statutory accounts. For instance, French GAAP net income is derived from assets and liabilities measured at amortized cost.
Income over multi-periods	See MCEV.
Capital	See Solvency 2.
IFRS NET INCOME	
Income over one period	Pending the final standard for insurance contracts, the IFRS net income suffers from the inconsistency between market value valuation of assets and liabilities measured at amortized cost. With the new standard, the IASB permits the use of fair value accounting for assets and liabilities, removing the concept of shadow accounting applied by continental European life insurers. Another question relates to the inclusion of short term financial markets variation in the IFRS net income. It should depends both on the intention of the entity to hold or not the asset and if the insurance contract provides surrender options.
Income over multi-periods	IFRS net income can be used in a MVA measure.
Capital	Equity corresponds to the amount of financial resources that exceed the liabilities.
MCEV	
Income over one period	MCEV variation over one period contains the net income of the year, including operational and economic variations that impact the adjusted net asset value. Moreover, the operating free cash flow indicator materializes the capacity of the insurance company to generate Free Surplus for paying its dividends and expanding by new business sales or through external growth operating.
Income over multi-periods	The value of in force equals the present value of future profits (PVFP), less the time value of financial options and guarantees (TVFOG), the frictional costs of required capital, and the cost of residual non hedgeable risks (CRNHR).
Capital	The adjusted net asset value is part of the MCEV. The required capital is measured according to regulatory required capital, rating agency required capital or economic capital.
SOLVENCY 2	
Income over one period	Solvency 2 level 3 requires among the different quantitative reporting templates an analysis of the change in value of the net asset value and the best estimate technical provisions.
Income over multi-periods	The value of in force (market value less the best estimate and the risk margin) covers the solvency capital requirement.
Capital	The solvency capital requirement provides an approximant 1 in 200 year level of protection. The SCR can be covered by committed capital, value of in force, debts. Moreover, the own risk and solvency assessment shall be an integral part of the business strategy and shall be taken into account on an ongoing basis in the strategic decisions of the undertaking.

The identification of the most appropriate income and capital measure is challenging. There are many key questions and we only focus on the consequences of a multi-standards environment on RAPMs. We thus do not go in detail regarding the following questions:

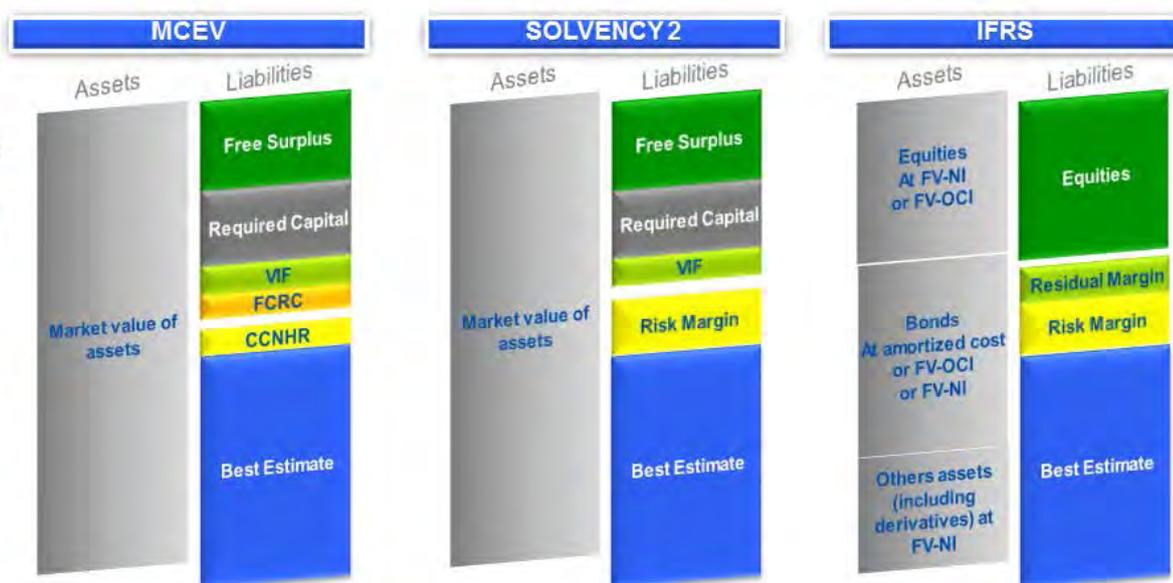
- Shall the income measures be pre or post-taxes?
- What risk capital measures shall be selected? There are many measures of risk capital⁴ that we do not discuss in this paper. The different results shown hereafter are based on the standard formula of the Solvency 2 pillar 1 i.e. capital requirement is defined as the 99.5% VaR of the available capital over 1 year.
- How to take into account diversification within product lines or within entities part of the same company?
- How to allocate capital to the different business units of the entity?
- The level of target capital that should be held (above the required capital)?
- What is the amount of cost of capital?

⁴ See Goldfarb (2010).

DIFFERENT BALANCE SHEET FOR DIFFERENT PURPOSES

To understand the effects of the different standards on the perception of the performance of the insurance company (or a business segment), we propose first of all to present the main differences to establish the balance sheet in each standard. The following elements are particularly succinct and result of our understanding of the ongoing discussions on the IFRS and prudential reforms. While remaining realistic, assumptions set out to illustrate our analysis are deliberately amplified.

- Frictional cost of required capital is only measured for MCEV.
- VIF covers the solvency 2 required capital.
- Under IFRS4 Phase 2, the residual margin (premium less best estimate liabilities and risk margin) avoids the recognition of a day one profit. We believe that it is similar to the VIF (but not identical).
- The CCNHR is conceptually similar to the risk margin.
- The valuation of the best estimate liabilities might be different.



PURPOSE	Measure the shareholders' value	Protect policyholders with sufficient capital	General purpose accounts (net asset value and performance of the entity)
REQUIRED CAPITAL	Regulatory capital / Target capital / Economic capital	Economic capital : SCR & MCR	CAPITAL = Assets – BE – Risk Margin – Residual Margin
FCRC	The FCRC consists of the projected tax to be paid as well as fees for the management of the assets backing the RC	N/A	N/A
RISK MARGIN	No prescribed method	Cost of capital method (6% of cost)	No prescribed method (but publication of the quantile level of the BEL + risk margin)
FUTURES PREMIUM	New business excluded and future premiums usually limited to recurring premiums	Limited to risk group and saving contracts with significant guarantees	Similar to Solvency 2?
DISCOUNT RATE	Swap rates + liquidity premium	Swap rate (+ adjustment premium?)	No prescribed rate (but risk free) and a specific mirroring approach principle for participating contracts
EXPENSES	Expected ongoing expense levels required to manage the in-force business	Best estimation of expenses	No inclusion of overheads expenses and specific treatment of acquisition costs

On the asset side of the balance sheet, for Solvency 2 and MCEV purposes, assets are measured at fair value, while IFRS give the possibility of a measurement at amortized cost, or fair value through net income or through other comprehensive income.

On the liability side of the balance sheet of each standard, insurance contracts liabilities shall be based on estimated and discounted probable cash flows (best estimate) to which is added a risk margin expected to reflect possible deviations from the average estimate. IFRS liabilities include a residual margin that is recognised through net income when the service is rendered. These principles regarding the valuation of liabilities are similar but not identical to the Solvency 2 prudential rules. The main differences might concern contract boundaries (the inclusion of premium might differ among the different standards), the discount rate (IFRS 4 will not prescribe a discount rate), the amount of expenses included in the best estimate or the methodology to measure the risk margin.

Moreover, if European insurers should build on work done in connection with the introduction of prudential reform, the new IFRS add a specific set of problems that relates to the ability of insurers to maintain a low sensitivity of the net income to current financial market environment, constraint that usually affects all kind of RAPMs over time.

CONSEQUENCES FOR RAPMS OF THOSE DIFFERENCES OF STANDARDS

Using a modelling tool, we have measured the different balance sheets as of 31 December 2011 for a portfolio of participating contracts with guaranteed rates (whose liabilities amount to €10 billion)⁵. The Black-Scholes model, the Libor Market Model and the Vasicek two-factor model are respectively used for modelling equities, nominal and real interest rates. Best Estimate is established in a stochastic environment, in which the assets have been risk-neutralized.

Whatever the standard, our simulations carried out through the considered portfolio of participating contracts show the risk of high volatility of the net income (or variation of the net asset value between two periods) mainly produced by economic mismatches (e.g. gap duration between assets and liabilities, inadequate coverage of options and guarantees) or IFRS accounting mismatches (i.e. inconsistencies in accounting for assets and liabilities).

The study also shows that the amount of MCEV, Solvency 2, IFRS best estimate and risk margin might be significantly different⁶.

The performance has been measured through different indicators: VIF (or IFRS residual margin + net income) on Solvency 2 required capital, and the internal rate of return of the portfolio (supposing that the solvency 2 required capital is invested by the shareholders). In our multi-standards scenario, the profitability of the contract illustrated by the internal rate of return (measured in a risk-neutral environment) amounts to 10% under MCEV, 3% under the Solvency 2, while it is 31% under IFRS. We can also mention that the VIF/ required capital ratio amounts to 146% under MCEV, 90% under Solvency 2 and 500% under IFRS.

31/12/2011	VIF (or Residual Margin)	S2 required capital	S2 coverage ratio	VIF / CR	IRR
MCEV	214	146	357%	146%	10%
SOLVENCY 2	132			90%	3%
IFRS	730			500%	31%

⁵ This study has been realised with the actuary Yeriel Dynovisz of the University Louis Pasteur of Strasbourg.
⁶ The different balance sheets are presented in the appendix.

If those results depend significantly on the hypothesis retained to illustrate the standards requirements, they highlight the complexity to understand the insurer commitments and the resulting profitability. More precisely, this survey leads to the following conclusions:

- Contract boundaries: the introduction of future premiums (or renewals) may have a significant multiplier effect (as illustrated by the IFRS profitability for which future premiums on existing contracts have been taken into account). It involves additional profits if the contract is beneficiary or additional losses for onerous contracts. If we believe that the introduction of future premiums is necessary, it introduces additional volatility of RAPMs and gives rise to the question of the measurement of future premiums payments in different economic environment. We also observe that the IFRS income pattern is significantly different with the introduction of future premiums changing the pattern of recognition of the residual margin (if one considers that it is correlated to the pattern of paid benefits).

Future premium in the cash flows may also increase the risk of experience adjustments. The risk margin shall also be increased. At last, if the premium adjustment added to the risk free discount rate under Solvency 2 depends on the asset liability mismatch, the increase of the liability duration may reduce the adjustment premium.

- The use of different discount rates significantly modifies the different indicators of profitability. In our survey, we have applied a counter-cyclical premium to the discount rate used to derive the Solvency 2 best estimate technical provision, a liquidity premium for MCEV and IFRS purposes. If this is not surprising, it shows that we should carefully select the discount rate to measure the performance of the business when measuring RAPMs for the business driving process. Discount rates shall also be different between real and risk-neutral worlds or may simply be derived as an internal rate of return (once the capital and the cash flows have been measured).
- The use of different measurement of lapses changes significantly the time value of the surrender option and thus the value of in force of the portfolio of profit sharing contracts measured. One can argue that there is no reason to implement different policyholder's behaviour to measure the best estimate liabilities for each standard. Our theoretical scenario supposes for instance the publication of a recommendation of a national supervisor regarding the measurement of surrenders to apply under Solvency 2⁷.
- The value of the risk margin significantly impacts the level of performance indicators of each standard. Indeed, although the risk margin represents a very low amount compared to the best estimate (of the order of 1% in our IFRS balance sheet), the risk margin reduces the amount of profitability measured i.e. in our case the value of in force (or residual margin). Moreover, the use of the residual margin as a "shock absorber" in the IFRS can limit the income volatility. However, if the performance measure corresponds to the sum of the income and the residual margin, we note that the volatility remains high (in different economic environments).

Once the difference of the standards highlighted and the impacts of those differences on RAPMs illustrated, we note that insurers are facing challenging issues:

- How to reconcile the performance of each standard?
- Shall we measure unique RAPMs in a multi-standards environment and manage the entity based on them?

⁷ For our simulation under Solvency 2 standard, we have for instance applied the surrender pattern recommended by the French supervisor for the quantitative impact study (QIS 5). For MCEV and IFRS 4 Phase 2, another pattern of surrender less severe has been applied.

4. The use of RAPMs in the strategic planning processes

In a multi-standards environment, the use of RAPMs could be jeopardized by the multiplication of performance indicators.

Yet, there are many potential uses of RAPMs. We propose in this section a non exhaustive list of potential uses of RAPMs and different principles to develop appropriate measures for senior executives' decisions.

POTENTIAL USES OF RAPMS AND MAIN CRITICS

RAPMs can be applied throughout the insurance company for:

- pricing of products;
- capital allocation for business development;
- investment decisions;
- performance measurement and financial communication;
- employee compensation.

Most insurers are developing RAPMs based on Solvency 2 measures comparing value of in force to required capital (under the pillar 1 or ORSA measures). Similarly to MCEV VIF, this approach to measure futures profits takes into account partially senior executives' own view of the world. For instance, investment returns does not include risk premiums (except if the new Solvency 2 concept of matching premium is applied), best estimate technical provisions are measured without future premiums (including renewals⁸) and future profits are not adjusted with frictional costs of capital.

Those measures are furthermore considered as complex, too sensitive to market volatility, and finally not consistent with the decision process for the long term activity of life insurers⁹. Non explained volatility of RAPMs (or due to market volatility and the long term nature of the insurance business) undermines the confidence of Management Boards in RAPMs, and more generally in stochastic market consistent standards that may be considered complicated to interpret. This leads executive managers to prefer traditional performance measures to take decisions (e.g. IFRS return on equity over one period). To avoid this situation, and even if RAPMs shall be tailored for their specific uses in the multi-standards environment, common basic principles to develop appropriate measures are necessary.

⁸ We believe that both indicators with and without future contracts and premium shall be provided to senior executives.

⁹ H. Gründl, H. Schmeiser (2002) explain that with traditional RAPMs and capital allocation methods, it is not possible to derive any credible information that would help in making decisions about future direction of the firm.

PRINCIPLES TO DEVELOP APPROPRIATE MEASURES

We present in the table below few principles to develop RAPMs¹⁰:

MAIN CRITICS	BASIC PRINCIPLES FOR RAPMS
Too complex Based on models that despite their increasing complexity do not fully replicate the reality of management and policyholders behaviors	A good balance between simplicity and representation of the reality (especially policyholders and management actions) shall be achieved. Performance measurement should be aligned with pricing and expense decisions, measured in a real world or risk-neutral environment (depending on the indicator) and should include future business (with a distinction between in force business, renewals, and new business). Back-testing should demonstrate that behaviors are well replicated by the model.
Too sensitive to short term market volatility	The question of market consistency goes behind this paper. We believe that RAPMs should be based on market consistent models (with financial assets measured at their market value) and take into account the time value of option and guarantees embedded in life insurance contracts. Regarding the surrender option, there is no reason to suffer a volatile and significant cost if it can be demonstrated that policyholders' surrender behavior does not depend only on market data. At last, changes of RAPMs over time are interesting information for senior executives that also need average historical values to take decisions.
Very sensitive to the parameters and assumptions used to derive the income (e.g. discount rate, future premiums, risk-margin measurement methods) and the capital.	We do not see how to avoid the sensitivity of RAPMs to the model parameters. Some people believe that methodologies should be aligned among the industry and not change over the years. Both principles are not very realistic in the short term: - performance indicators are based on standards that are still in progress; - methods and models improve over the years. To increase confidence in these indicators, all aspects of expert judgment should be identified and sensitivity testing to assess materiality should be provided.
Partially used to run the business	RAPMs should be sufficiently transparent to be easily understood by executives and staff. If not absolutely necessary, it should be avoided to produce different sorts of RAPMs for the different standards (sometimes corresponding to different departments in a company), or for different lines of business.
Not always considered as relevant by investors and analysts which are not able to reconcile them with indicators produced in other industries	Basic information used to produce RAPMs shall be published e.g. deterministic projection, timing of the cash flows, methodology to derive stochastic scenarios, impact of policyholders' behavior and management actions on the model. A reconciliation between similar indicators produced for prudential, accounting, or performance purposes, shall be performed.

THE NEED FOR AN ECONOMIC STANDARD CLOSELY LINKED TO THE BOARD MANAGEMENT VIEW

Management uses a variety of key performance indicators in both running and assessing the performance of the company. Regarding the performance of the entity as a whole, in addition to MCEV measure, the move to Solvency 2 and the new IFRS for insurance contracts will have critical implications on the way insurers measure capital and financial performance and finally on the financial markets and regulators' judgment. These standards that provide information regarding profit over time through the value of in force will need to be reconciled and explained. An example of such reconciliation based on our case study is proposed in the appendix.

While Solvency 2 capital requirement and the IFRS profit measure cannot be ignored by executives, those standards require risk-neutral measures and may not reflect the full behavior of the management and the policyholders. We thus wonder if RAPMs should be measured based on real world cash flows (i.e. assets return including risk premium), taking into account future premiums and renewals of contracts (especially for one year life and non-life risk products) with a capital requirement based on ORSA measure. This RAPM is only an indicator – mainly based on judgmental hypothesis - in the decision making process that should be supplemented by other qualitative indicators (for instance legal risk not properly measured in the required capital for operational risk). At last, the cash flows used to measure RAPMs should also be published to know the length of time it takes to recover the cost of the investment.

¹⁰ J. Crispin, S. McGuire (2011) present different interesting principles to ensure RAPMs create the right incentives.

5. Conclusion

To explain the basis of senior executive decisions, investors and analysts appreciate the publication of RAPMs. RAPMs can lead to criticism, especially when those indicators are produced in a volatile economic environment and when they are used to determine compensation. RAPMs are partially based on expert judgment and it should be mentioned that the quantification of risks and rewards over the long term is tricky.

Different values for similar RAPMs will be published in a multi-standards environment. The challenge for insurers is to be able to run the profitability of their portfolios under economic, prudential and accounting rules while providing a consistent publication to markets. Insurers need thus to understand how the standards' differences will affect the numbers and how they can be reconciled and properly explained (i.e. showing that we should not compare apples and oranges).

It is quite common to hear that MCEV will be replaced soon by Solvency 2 own funds (including explicitly the value of in force). We wonder if embedded value will not move to performance measures in a real world including future business, taking into account capital measures based on ORSA. The multiplication of publication of indicators equivalent to an internal rate of return illustrates that move. Adding to the existing long list of standards another standard reflecting the full view of the Board management is necessary but could lead to potential adverse consequences like increasing the so called black box of insurance.

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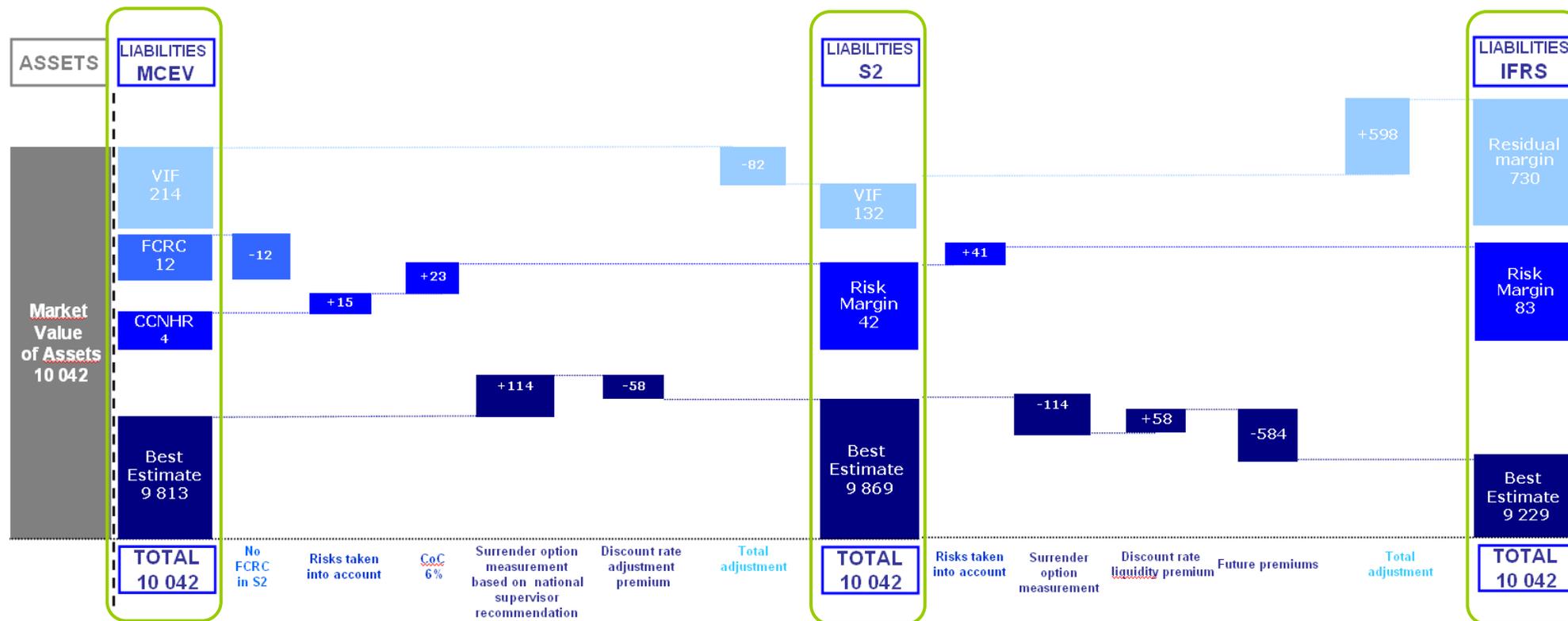
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APPENDIX – RECONCILIATION OF THE BALANCE SHEETS IN A MULTI-STANDARDS ENVIRONMENT



- Portfolio of participating contracts
- Amount of reserves as of 31.12.2011: €10 billion
- Each balance sheet is provided based on specific hypothesis to illustrate the potential effects of the standards requirements
- The IFRS balance sheet is measured with assets at fair value through net income