Solvency II Framework in Insurance Equity Valuation: Some Critical Issues

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A new regulatory framework – Solvency 2 – has been in place for over two years in the European insurance industry. Given that an increased number of market participants are availing of Solvency 2 data in assessing insurance equity valuations, this paper aims to highlight some critical issues and shortcomings associated with that practise.

1. Introduction

For all regulated European insurance entities a new solvency regime called Solvency 2 (S2 from now onwards) became effective since 1st January 2016. Under the new framework, insurance companies determine their level of available capital resources (EOF or Eligible Own Funds) and relate that to their stochastically calculated level of required capital (SCR or solvency capital required) thus deriving a certain Solvency Ratio (EOF over SCR). The aim of the regulator (EIOPA) was to move away from the old deterministic and not risk-based Solvency 1 regime towards a more market-consistent and risk-based approach to measure available capital.

During the course of the last two and a half years, an increasing number of equity market participants started to use S2 data in order to assess the equity fair value of listed insurance groups. Moving from the actual Solvency Ratio components (EOF/SCR), analysts and investors started to focus on price-to-equity capital ratios (namely unrestricted Tier 1) while the information on capital generation has been used to estimate free cash flows available to shareholders in order to calculate the equity fundamental value.

In this work, we would like to highlight some critical issues in using the S2 framework to build a coherent and informed valuation to compare to the current market price.

The study will proceed as follows: we start to briefly summarise the main drivers of the S2 framework, showing the elements constituting the SCR, the EOF and the Capital Generation. Then we remind the main valuation methods that in the last 20 years have been used in the European equity markets for the Insurance Industry (P/E, Dividend Yield, EV/MCEV, FCF). After that, we show what the actual approach using S2 is based-on and how it is currently used. Finally, we underlie some critical issues and incoherence of the approach to determine a proper economic equity value.

We conclude that S2 data are valuable and provide insights but shouldn't be used, in our view, as a unique approach for equity valuation. We think investors should go through a much more comprehensive set of data to build a more stable and coherent framework in order to determine a fundamental economic value of equity capital.

2. Solvency II Regime: aims and structure

The introduction of the new prudential supervisory regime had different objectives[1]:
– Adopting a risk-based economic capital to better calculate and undertake all the different risks involved (technical, market, operating etc.);
– Creating a level playing field within the European Union;
– Increasing Policyholders' protection;
– Improving capital allocation within firms and groups.

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offer to invest in, or to buy or sell, any interests or shares in any funds, or to participate in any investment or trading strategy."

*** Exane BNP Paribas, Paris. "The views expressed in the paper by Niccolò Dalla Palma do not represent Investment Research as defined by the MiFID regulation. This paper is not, and should not be considered as, an offer to invest in, or to buy or sell, any interests or shares in any funds, or to participate in any investment or trading strategy."

[1] Andenas M., Avesani R.G., Manes P., Vella F., Wood P.R., *Solvency II: A Dynamic Challenge for the Insurance Market*, Il Mulino, Bologna, 2017.

The new regime was built on three pillars: the quantitative aspects of risk exposure in Pillar I, the corporate governance issues in Pillar II and the risk transparency (reporting system) in Pillar III.

Figure 1: Solvency 2 three Pillar structure

Pillar 1	Pillar 2	Pillar 3
Quantitative requirements	Qualitative requirements and supervisory review	Reporting, disclosure and market discipline
• Own funds (based on market-consistent valuation of BS) • Risk-based requirements (MCR and SCR)	• Governance, risk management and required functions • Own risk and solvency assessment (ORSA)	• Supervisory process • Disclosure • Transparency • Support of risk-based supervision through market mechanisms

Source: Dalla Palma et al.

We focus here on Pillar 1, because it's the one producing the quantitative elements that are increasingly used for valuation purposes. We note that, starting from the second quarter of 2017, EU insurers disclosed also their Solvency and Financial Condition Reports (SFCR), in accordance with Pillar 3. This additional set of reporting is quite important in order to assess the strength and quality of the Solvency ratio, allowing market participants (and policyholders) to look at the capital situation of the main subsidiaries. Through this approach analysts and investors can dissect the positives and negatives of the single entities, trying to better discriminate the quantity and quality of capital at a group level (capital fungibility, cash remittances constraints etc.).

A mark-to-market approach

Importantly, S2 starts from an economic valuation of the entire balance sheet. It is based on a market-consistent (MC) approach, whereby assets and liabilities are valued at the amount for which they could be exchanged and transferred under regular market conditions. If the valuation methods of the international accounting standards (namely IFRS/IAS) differ from the market-consistent approach, the insurer should use other MC compliant methods.

Figure 2: Simplified S2 Balance Sheet

	Best estimate	Technical Provisions
Assets	Risk Margin	
	Own Funds	Surplus
		SCR
		MCR

Source: Andenas et al.

As far as the valuation of Liabilities is concerned, the value of technical provisions has to be equal to the sum of best estimate and risk margin, where the former is defined as the probability weighted average of future cash-flows, taking into account the time value of money using the relevant risk-free interest rate term structure, while the latter is equivalent to the cost of capital the insurer is required to hold to take over and meet the insurance obligations throughout their duration.

Figure 3: Simplified comparison between IAS/IFRS and S2 accounts

| Assets and Libilities	IFRS	S2
Property, plant and equipment	Amortized cost/FV allowed	Fair Value
Loans and receivables	Amortized cost	Fair Value
HTM Bonds	Amortize cost/FV	Fair Value
Other Bonds	Amortize cost/FV	Fair Value
Shares	Fair Value	Fair Value
Derivatives	Fair Value	Fair Value
Investments in subsidiaries, associates and JVs	Cost/FV allowed	Fair Value
Technical Provisions	Prudent local standards, with shadow accounting lo limit ALM mismatch and technical liabilities	FV (absence of prudence)
Financial Libilities	Amortized cost/FV allowed	Fair Value (no adjustments for own credit risk)
Scope of Consolidation	All controlled entities	All controlled entities, excluding banking and non insurance entities are not consolidated in an insurance Griup

Source: Andenas et al.

Defining capital requirements

The Solvency Capital Requirement (SCR) is calculated as the amount of capital that insurance companies should hold to be able, with a probability of 99.5%, to meet their obligations to policyholders over the next year, thereby ensuring that a 'ruin' event will not occur more than once in 200 years.

In practice the calculation that the insurance undertaking performs is structured in six main modules and further into sub-modules. In addition to the classification proposed by the legislation, other risks taken under consideration are liquidity and ALM risk, sovereign risk, strategic and emerging risks, reputational risk and risks connected with group membership.

Figure 4: Risk mapping
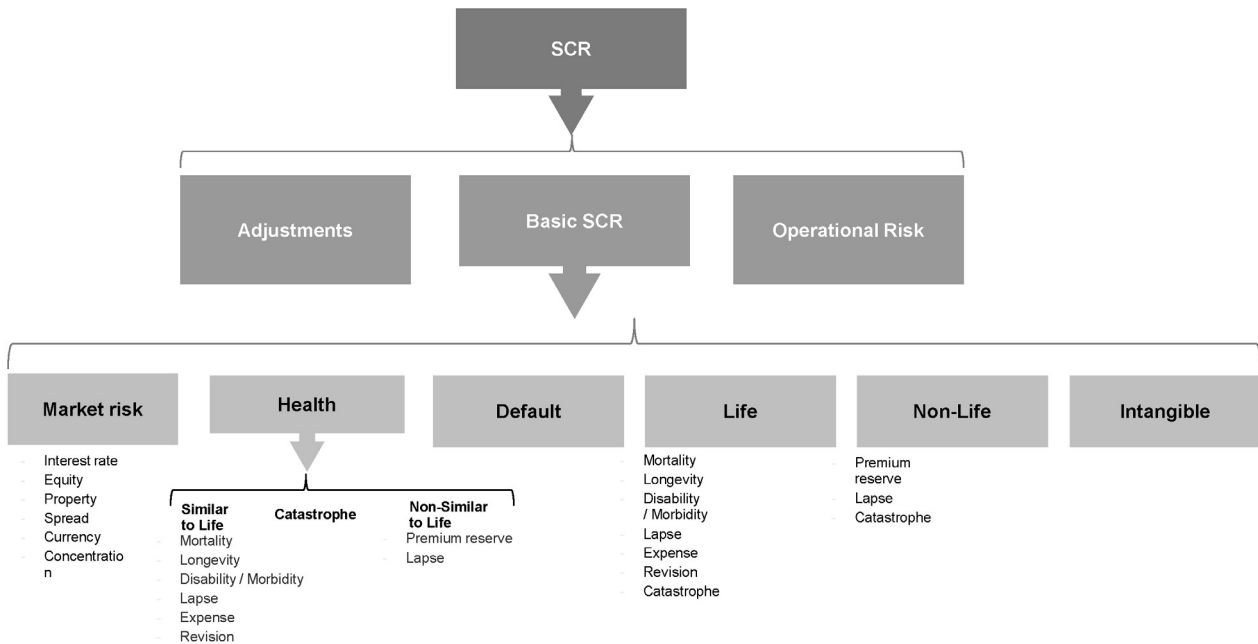
Source: Ageas

Defining available capital

Eligible Own Funds (EOF) represents the financial resources of the undertaking required to absorb losses related to the assumed risks. EOF consist of the excess of assets over liabilities, valued through a market consistent approach and reduced by the eventual amount of own shares held, plus the eligible subordinated liabilities (basic own funds) and the ancillary own funds (unpaid share capital, letters of credit and guarantees and any other legally binding commitments to undertakings). EOF should be classified into three tiers, depending on whether they are basic or ancillary and on the extent to which they possess some characteristics (permanent availability or subordination, considering the duration of the item and whether it is dated or not. In addition, the absence of incentives to redeem, mandatory servicing costs and encumbrances need to be considered).

**Figure 5: Eligible own funds flow chart**
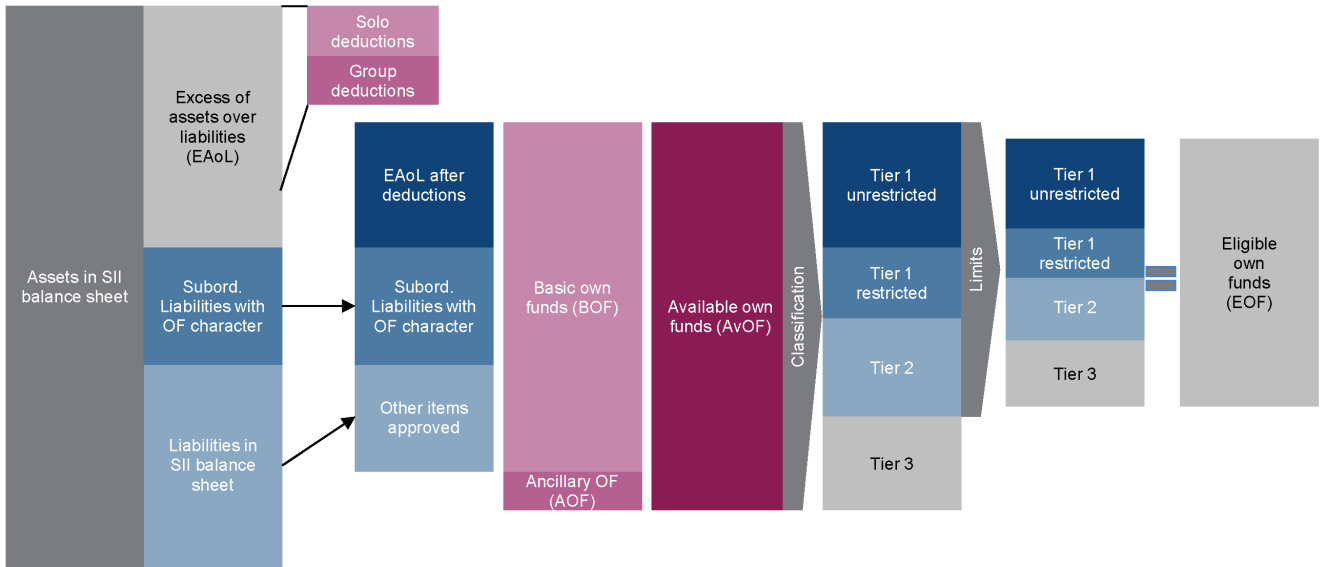
Source: Munich Re

In order to be compliant with the SCR, the EOF are subject to the following quantitative limits: Tier 1 must be at least 50% of SCR, Tier 3 must be less than 15% of SCR and the sum of Tier 2 and 3 must not exceed 50% of SCR. Additionally, the tier 1 must be at least 80% of MCR, tier 2 must not exceed 20% of MCR, while tier 3 and ancillary OF are not eligible to fulfil the Minimum Capital Requirement. The MCR is derived from the SCR and is calculated as a linear function of a set of variables like: technical provisions, written premiums, capital-at-risk, deferred taxes and administrative expenses, all net of reinsurance. It should not be less than 25% or more than 45% of the SCR

Figure 6: Tiering limits
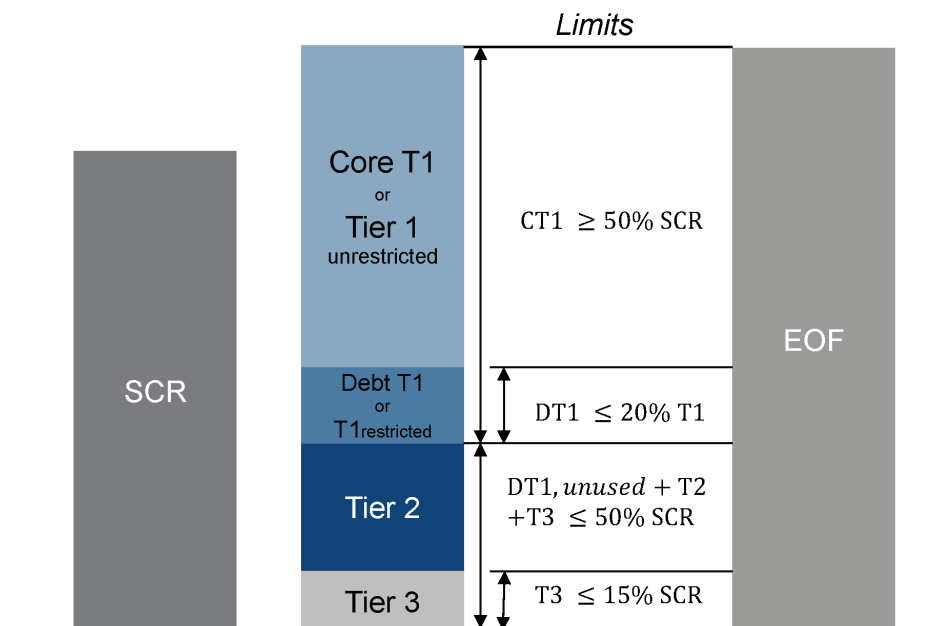
Source: Munich Re

Long-term Guarantee measures and UFR

Within the market consistent framework the regulator introduced a number of non-economic measures. The common objective, with the exception of transitional measures aimed at giving the industry time to adapt to the new framework, was to recognize the long-term nature of the insurance business, particularly in relation to life contracts.

In order to absorb the impact of artificial volatility on long term contracts valuation – that is, a variation in own funds not linked to a change in the cash flows generated by a financial instruments, for instance due to a credit spread change not due to an increased issuer default probability – the regulator introduced the so-called Long Term Guarantee measures (LTG), two of which are not transitional: the volatility adjustment (VA) and the matching adjustment (MA).

– *Volatility adjustment*: a reference portfolio set by EIOPA is used to calculate an average spread of the asset portfolio vs the swap curve. Such spread, with an application factor of 65%, is added to the risk-free swap rate to discount liabilities. It allows capturing the illiquidity premium. The risk of default is separately considered.

– *Matching adjustment*: similarly to the VA also the MA increases the discount rate to reflect the illiquidity of liabilities. The main difference is that it is not based on the EIOPA reference portfolio and it requires a strict cash-flow matching between assets and liabilities since it is using the 'locked' asset yield to discount liabilities.

The other non-economic element introduced by S2 regulation is the Ultimate Forward Rate (UFR): from the last liquidity point (LLP) – 20 years for the EUR area, 50 years for Pound Sterling – a theoretical curve is extrapolated to obtain an ultimate forward rate of 4.05% (it started at 4.2%, but it will fade in steps to around 3.65%, based on the new calculation methodology) – that is a one year forward rate in year 60.

Figure 7: Swap Curve vs S2
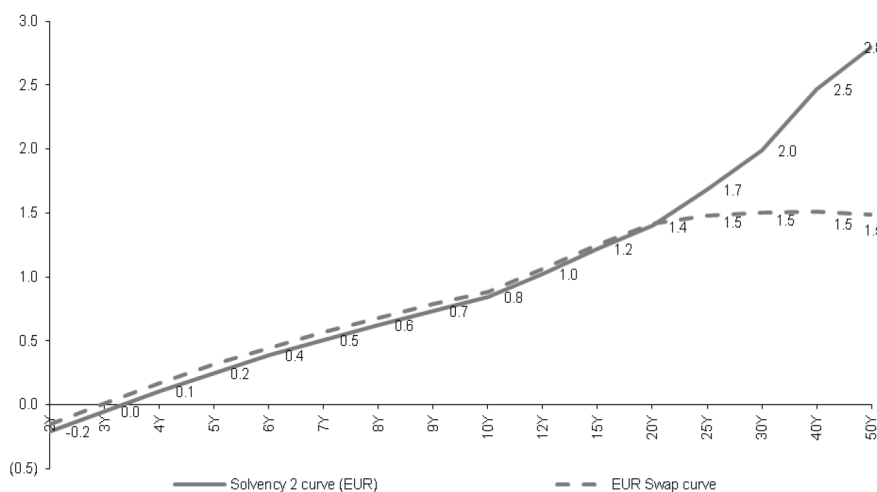
Source: Bloomberg, EIOPA, Exane BNP Paribas

Capital generation components

The dynamic movement of the EOF and SCR in any given period can finally show the change in available surplus capital or capital generation of the business. In essence it is the S2 flow of net wealth creation.

Focusing on the unrestricted Tier 1 component of EOF (which is essentially a market consistent equity value), the flow from one year to the other can be summarised in the following components:

– The Excess Spread (return earned above the risk free rate);

– Non present value income streams (any income not capitalized on the BS as part of the best estimate, typically underwriting profits and fee income);

– Risk margin unwind (for policies that contain significant non-hedgeable risks);

– Operational result (above best estimate assumptions);

– Value of new business net of required capital;

– Capital efficiencies;

– Market volatility;

– Model and assumption changes.

The net capital generation is then defined as the increase in unrestricted Tier 1 net of capital requirements to fund growth. Importantly, we note that listed

insurance companies have sometimes adopted slightly different definitions of "capital generation" closer to "free capital generation", i.e. the capital generation

over and above a certain level of target S2 – thereby implicitly using a multiplier also for SCR movements.

Figure 8: Sources of capital generation under S2
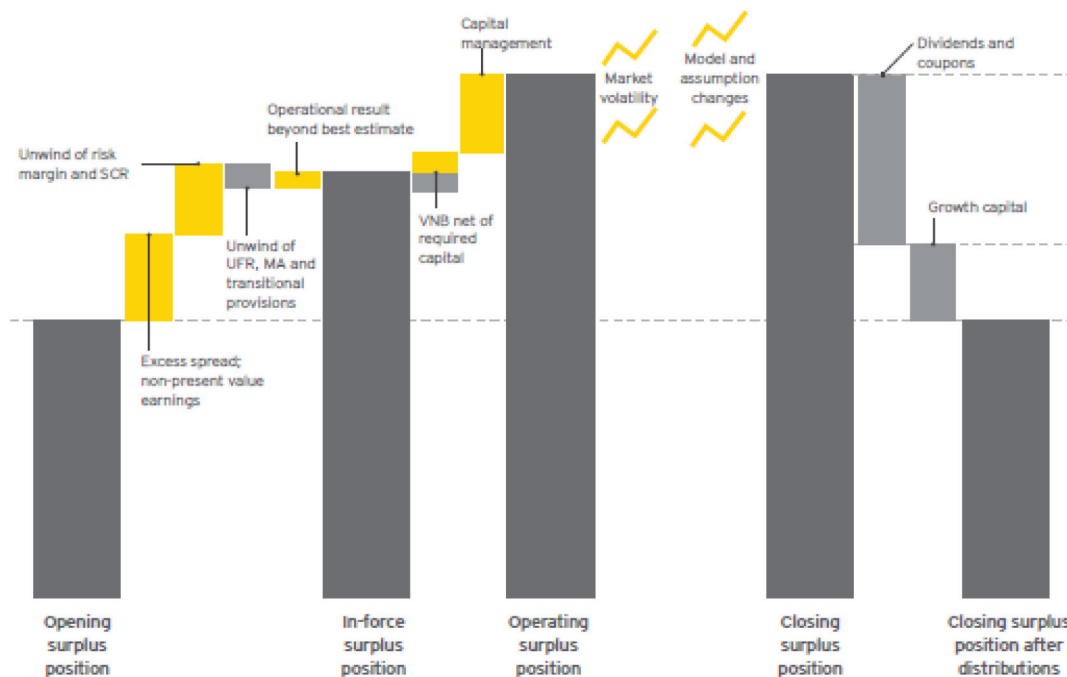
Source: EY.

3. Valuation approaches in the European Insurance Industry: a brief history

In the last 20 and more years, the topic of valuation in the insurance industry has been relatively complex, particularly in Europe and above all in the Life sub-sector, mainly due to the actuarial elements embedded in the process.

Starting from the basic principle that the equity value is the NPV of all the resources pertaining to shareholders in the future[2], the characteristics of the business and the specific issues affecting the accounting have driven a lot of different ways through which the market tried to assess the value of insurance companies.

The use of market multiples has always been present as a quick tool to compare the listed stocks, at least on a sub-group basis (life, non-life, reinsurance, asset management etc.) or applied under a sum-of-the-parts approach. Naturally, discrepancies in accounting principles among different countries and own company flexibility in reporting caused some inconsistencies. Having said that, the PE multiple (12m forward) has been relatively stable during the last 16 years, averaging 10x and, excluding the 2002 and 2008 levels (15x and 6x, respectively), ranging from 8x to 12x for the sector as a whole. Despite all the limitations and simplistic nature of the approach, we believe that relative valuations through multiples will continue to be used due to their easy back of the envelope nature. We at least recommend the application of some adjustments to the accounting figures employed to align for different policies and of course to put a strong effort in considering the comparability in terms of businesses/markets[3].

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[2] Koller T., Goedhart M., Wessels D., *Valuation*, 6th Edition, Wiley, NY, 2015.

[3] Guatri L., Bini M., *I moltiplicatori nella valutazione delle aziende*, UBE, Milano, 2002.

Figure 9: European Insurance Sector PE
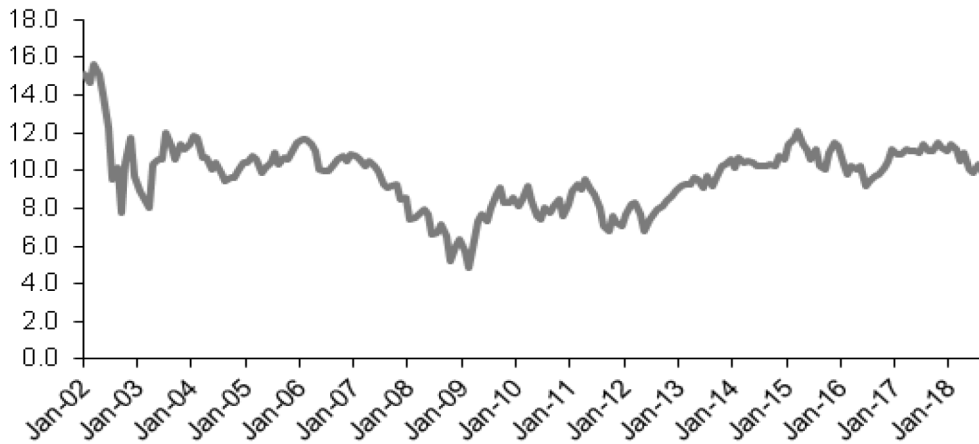
Given the positive cash generative nature of the business and the limited growth opportunities available in Europe, the Dividend Yield has increasingly become an important element in discriminating the attractiveness of listed insurance groups, in particular post 2008. In a prolonged low yield environment, the capacity of distributing sustainable cash to shareholders became a distinctive factor in all the asset allocation strategies in search for bond-type equities. The total yield of some stocks (Dividend + Share Buy Back) has been one of the major drivers of performance in recent years. The core dividend yield of the European insurance sector averaged 4.6% in the last 16 years, being between 4% and 6% in the last 10, in particular. While considering the cash generation capacity of a business a fundamental driver of its value, we think that a deep understanding of the nature of that cash is vital in building a sensible valuation of the equity capital. In particular, discriminating between stock and flow (that is, return on capital vs return of capital) is paramount.

**Figure 10: European Insurance Sector Dividend Yield**
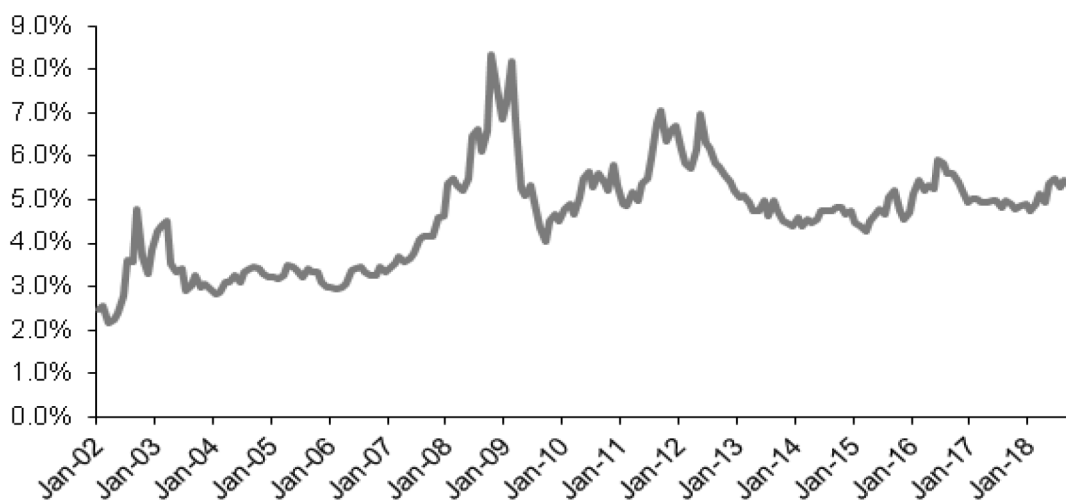
Starting in late 90's, the Embedded Value (EV) approach became then a more common valuation framework[4]. At the beginning the approach was based on a building block analysis starting from the Tangible NAV of the company and adding to the latter the value of In-Force, corresponding to the NPV of future profits expected from the policies alive at the time of the valuation. The calculation was based on a deterministic DCF, adding on an NPV basis the net cash earnings generated by the portfolio run-off, using normalized assumptions (on asset yields, maturities, redemptions, cost of capital etc.). The determined EV was actually the value of net assets in place, from which, adding an estimation of the NPV of the future new business, we got the equity value under an appraisal value method. In those days, a simplified approach consisted in applying a multiple on the value of new business of the most recent year, to determine the goodwill (the value of future growth opportunities). In so doing, the market was effectively capitalising a NPV flow, exploiting the risks of overestimating growth for a large number of life companies[5], something that became evident during the bear market period after the dot-com bubble. Starting from the EV framework was also common practice calculating the Free Cash Flow yields, where the FCF was based on the free surplus generation. The TNAV component of EV could in fact be broken down in two components: required capital and free surplus. The advantage was that it allowed excluding any future profits from the free cash definition. Among other inconsistencies, anyway, it's worth mentioning the fact that neither the definition of required capital was coherent across companies, nor were the EV methodologies and the level of disclosures.

Figure 11: FCF definition in the EV world
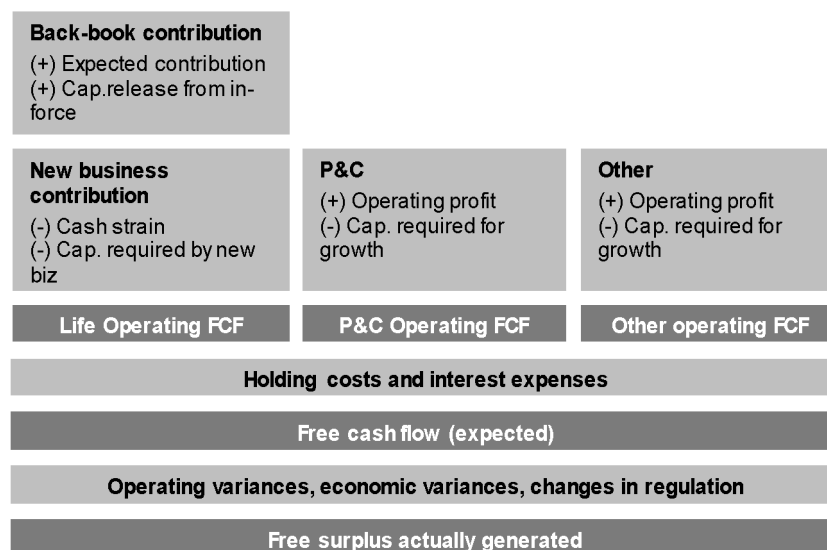
Source: Exane BNP Paribas

In the context of ever decreasing interest rates coupled with reduced equity and real estate values, another issue started to emerge. Given the common practice of guaranteeing returns on life policies, the compressed asset yields moved closer to the minimum guaranteed levels, thus affecting the reliability of a deterministic approach with normalised asset yield assumptions in assessing the real value of portfolios. The actuarial profession came to rescue then[6], proposing a stochastic approach in valuing the run-off, using more sophisticated models to take into account the likelihood of obtaining yields lower than the guaranteed return and proposing a tool to consider that scenario, pricing it through proper option models. In a much more volatile market environment, both listed insurers and the analyst community moved to a more market consistent configuration of value, arguing that a simple deterministic approach of a standard DCF was not representative of the contingent actual pricing conditions at any point in time. The European Embedded

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[4] Massari M., Zanetti L., Gianfrate G., *The Valuation of Financial Companies*, Wiley, NY, 2014.

[5] Giuliani S., *Crescita e Valore*, Aracne, Roma, 2005.

[6] De Felice M., Moriconi F., *A Course on Finance of Insurance*, GCAF, Università Cattolica, Milano, 2002.

Value first, and the Market Consistent Embedded Value later, came into force as the new valuation paradigm. With this further step, all the assets and the liabilities were valued on a market consistent basis, thereby exploiting the use of complex modelling and involving directly the companies in the valuation process. That element induced of course a clear reliance of the equity market on the numbers produced directly by the finance and actuarial divisions of the firms, changing at the margin their incentives in feeding the analysts and investors with the "right" set of numbers coming from their internal models[7]. Of course, that created a hiatus between the production of primary information and the capacity of the market to properly elaborate and challenge it. After a period of relative acceptance, the 2008 crises put a lot of pressure also on the new approach. Adding to the issues just mentioned on the reliability of numbers, all the actors had to suddenly recognize that a pure MC approach was probably too volatile for a relatively stable long term business, whose liabilities are practically not callable (so with low liquidity risk) and whose leverage was not that high (at least versus the banking industry. Typical net asset leverage used to be 20-25x for banks vs 5-6x

for Insurance companies). When the reported figures after the crisis started to emerge, we had cases of MCEVs halving in just 1 year, pricing the extreme market conditions at that time as they were "fair" and therefore applied for the overall duration of the business in force (in most cases longer than 10 years). Of course this kind of volatility and pro-cyclicality fostered doubts on the solidity and adequacy of the approach for this kind of businesses; as a consequence, it started to become less and less used as a primary valuation tool. After a period of mixing different approaches (the EV was again coupled with PE and dividend yield), since 2016 we are witnessing the emergence of a new era, that is to value the equity of the Insurance companies following the new S2 framework.

4. Solvency 2 as an Equity Valuation Tool

With the advent of the S2 framework we have witnessed an increased usage of S2 data for valuation purposes. Three kind of metrics have been in focus. They resemble but are conceptually different to the free surplus based FCF definition in the 'EV world'.

Figure 12: From the EV to the S2 world
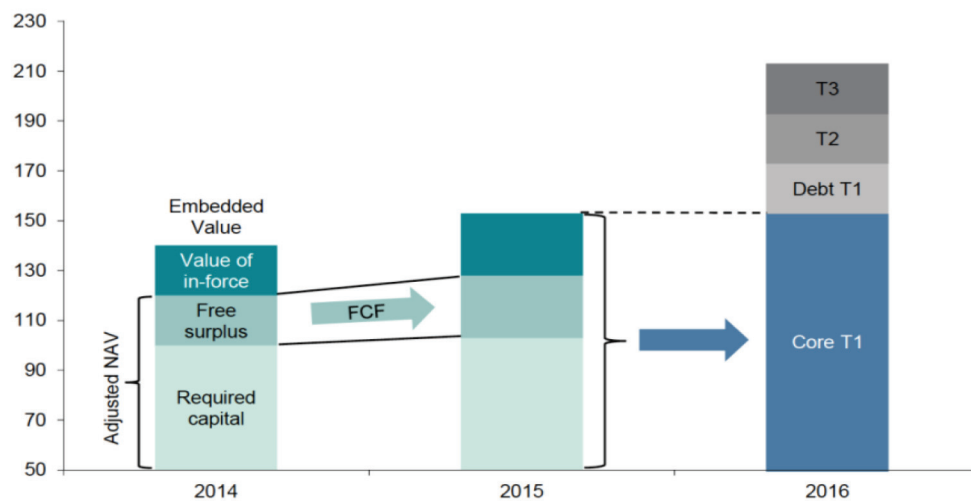
Note: the proportions are purely indicative. CT1 will not be exactly equal to the old EV definition

Source: Exane BNP Paribas

1) *Capital generation yield*: sometimes misleadingly called cash flow yield, the S2 derived capital generation as percentage of market cap can be compared across companies. For 2017 we find the sector average

stood broadly around 10% (with a 5-15% range). The underlying assumption is that S2 capital generated can be paid out in dividends or reinvested in growth. Importantly we note that companies do not disclose ca-

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[7] Giuliani S., Lualdi M., *L'Introduzione dello EEV nel Settore Assicurativo: Aspetti Critici*, la Valutazione delle Aziende, n. 35, 2004.

pital generation based on the underlying components (excess spread, new business value, etc.) but rather on an aggregate basis. The definition and presentation of "underlying" or "normalized" capital generation is moreover not always the same.

Figure 13: Capital generation yield 2017
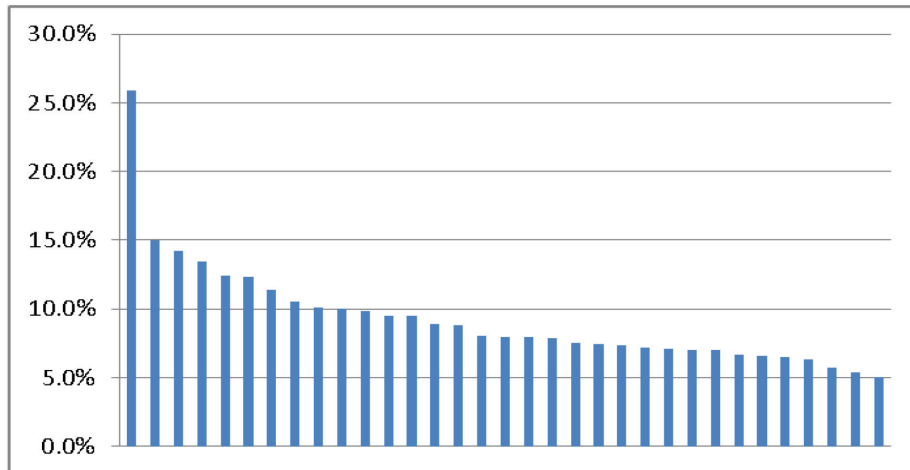
Source: Company data, Bloomberg

**Figure 14: Sources of capital generation under S2 – disclosure view**
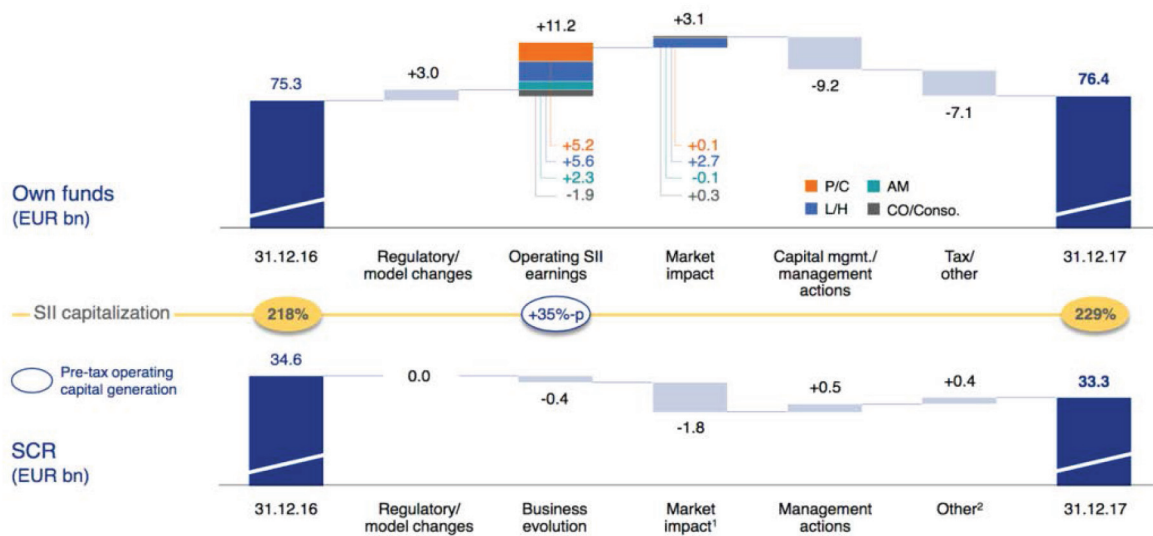
Source: Allianz

2) *Free capital generation yield*: a variation of capital generation yield it reminds of the FCF methodology stemming from the EV disclosure earlier described (effectively, a free surplus generation). The main difference to the simple capital generation yield is that it only captures the 'free' capital generated over and above a certain target capital level – the market practitioner shall set his own target capital level, or use the company basis. Importantly, the difference to the EV based FCF is that all capital generated above a certain level is captured, not just the tangible capital.

3) *Price-to-T1 ratio*: more specifically price-to-unrestricted Tier 1 as a proxy for price-to-EV. This approach has mainly been used for transactions on life companies – particularly in the case of life back books.

Figure 15: P/EOF for some recent transactions
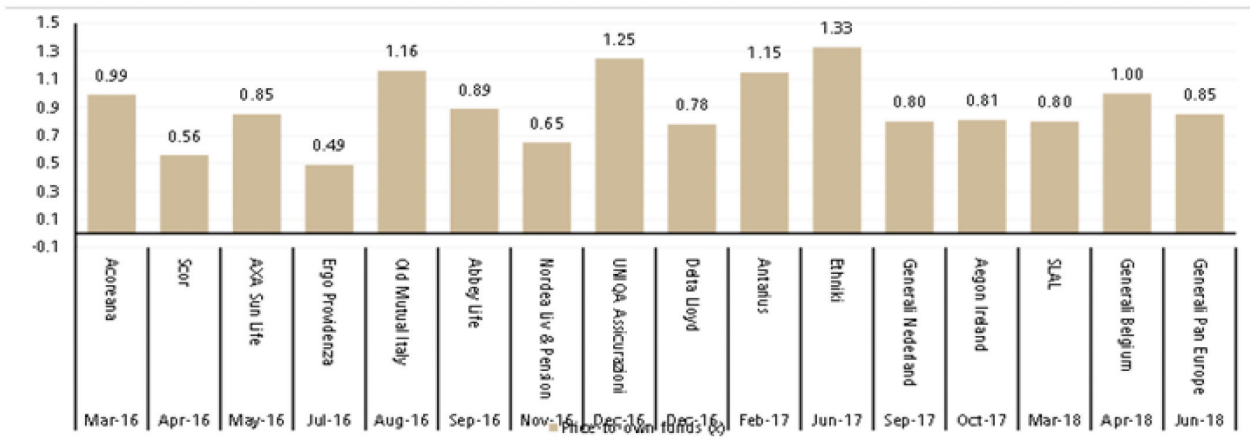
Source: PwC and SFCR Reports

The average multiple at which the deals showed have been closed in the last 30 months is 0.9x EOF. In the same period the European Insurance Sector traded between 0.8x and 1.0x EOF on average, if we exclude some P&C names with low capital needs and high returns like the UK and Scandinavians. With all the caveats related to the comparability between the group of deals and the listed companies, we can nonetheless notice a similar level of valuation for M&A transactions and minority financial holdings. The ideal gap between the two (namely the synergies and premium for control, typically at the 25-30% level) seems not to be present. We think that's something to deepen in future research, understanding if the hiatus can be related to the fact that the market is underestimating some risks in pricing current businesses or if most of the delta is due to sample differences and the structure of EOF.

5. Critical issues

In this section we highlight some of the critical matters we see in the use of S2 inputs for valuation purposes. The over-arching issues are the cash-conversion of capital generation and the degree of market consistency in the S2 balance sheet. We note that these topics are more significant for the life industry, due to the structurally long-term nature of the business.

Stock and Flow

The fundamental value of equity capital is the NPV of all the resources pertaining to shareholders – free cash flows to equity – in the future. S2 flow (capital generation) is one of the drivers of cash, but it is not cash. S2 equity stock (unrestricted Tier 1) is a proxy for mark-to-market net asset value, but the P/NAV based valuation is only relevant if there is a strong link between RoNAV (return on net asset value) and dividend capacity: the relationship of P/BV = (RoE – g)/(CoE – g) is ultimately driven by the Gordon Growth Model.

The following critical issues shall be considered, in our view:

1. 'Going concern' regime and risk-margin calibration: Contrary to S1, S2 introduces a 'going-concern approach': insurers determine their financial requirements under the assumption that they will continue to operate and write new business for the foreseeable future. The going-concern regime seeks to ensure that if a firm does go out of business, policyholder protection and continuity of insurance cover are sustained. To achieve this, S2 introduces the 'risk margin' – a provision that increases the best estimate of a firm's insurance liabilities to produce a market-consistent value [8]. The risk margin is calculated using a cost of capital of 6%. The European insurance association argued a more appropriate calibration would be 3% [9]. "Although the cost of capital approach was selected on grounds of relative simplicity, it requires an annual projection of SCR for the full run-off period of the liabilities, which is anything but straightforward for many insurers. To calculate SCR accurately at each future duration requires complex projections and this is impractical for many insurers' models. This difficulty is recognised within EIOPA guidance, which has set

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[8] Swain R., Swallow D., *The Prudential Regulation of Insurers Under Solvency II*, BOE Quarterly Bulletin, Q2 2015.

[9] Insurance Europe, *Insurance Europe comments on the review of the Solvency II risk margin*, 2017.

out a number of simplified methods. Unfortunately, these methods do not appear to be sufficiently accurate in many cases. One robust approach to this problem is to define, for each block of business and for each component of SCR, an appropriate 'risk driver' which is output by the model, so that it is assumed that this component of SCR moves proportionately to the driver. For example, for the mass lapse component, the risk driver might be the excess of total surrender values over total BEL in each future year. The projected SCR is then determined in each future year by combining the individual elements in the normal way. This approach requires both analysis and understanding of causes of risks and significant testing"[10]. Investors may of course have different views on either the methodology for the risk-margin calculation or its calibration.

2. S2 flow includes future profits: Future profits that Embedded Value captured in VIF (stock) and NBV (flow), are also implicitly recognized in the S2 own funds and capital generation. The first issue is that S2 own funds generated are equal to the net present value of distributable profits only under strict conditions[11]. The second (related) issue is that own funds generated in a given year are not a proxy for free cash or dividend capacity of an insurer in that given year. Capital generation shall rather be seen as the constraint to dividends than the only driver of dividend capacity. Understanding the cash conversion profile of the capital generated is therefore crucial and only very few insurers have given guidance on how the new business value translates into distributable earnings or how the capital generation itself breaks down. These differences in how the capital generation is built have to be properly assessed during the valuation process. As can be seen, the reliance of Capital Generation on up-fronted future profit can be very different.

Figure 16: Future profits in Capital Generation
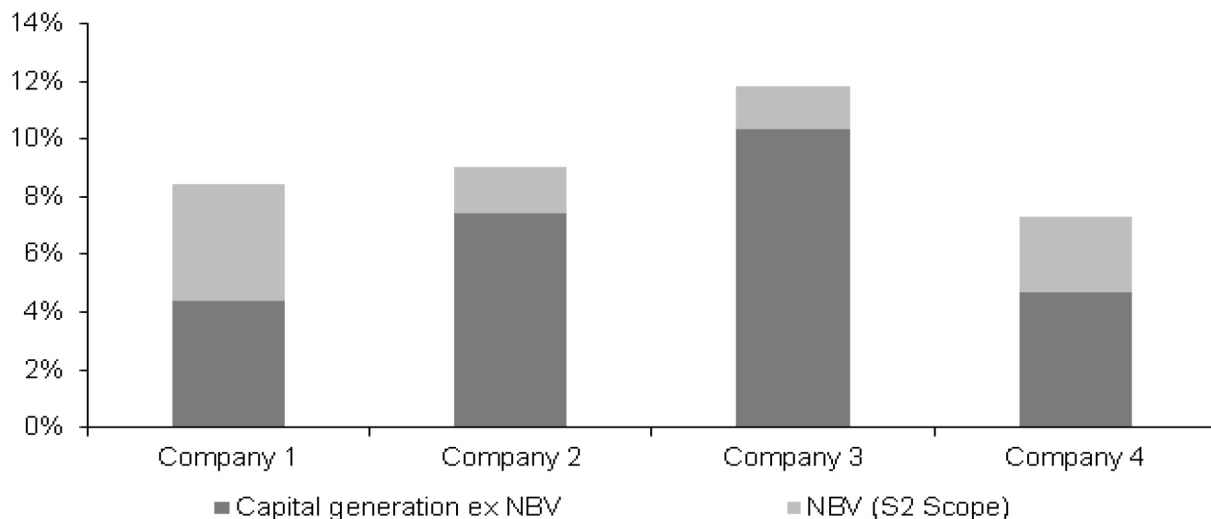
Source: Company data

3. Re-risking is neutral (the spread issue): Increasing asset risk will increase the capital generation as the insurer will earn a higher spread over risk-free rate. While this will be visible in the higher capital consumption the year of re-risking (although highly tempered by diversification effect), thereafter it will lead to a higher annual capital generation. This in turn requires a higher cost of equity. We believe it may be difficult for market participants to correctly adjust for small differences for different players, while a look at the market risk requirements should provide investors with a steer towards the net market risk exposure.

4. Mark-to-market impact on stock vs flow (commingle): The impact of mark-to-market is often a significant driver of S2 ratio swings, which the market tends to anticipate. Many listed insurers provide simplified sensitivities to movements in interest rates, spreads, FX, equity and other key market factors. These can be applied to the S2 stock. However, we would argue that given the dominant hold-to-maturity

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[10] Rae D., Barrett A., Brooks D., Chotai M., Pelkiewicz A., Wang C., *A Review of Solvency II – Has It Met Its Objectives?*, Institute and Faculty of Actuaries, May 2017.

[11] Kent J., Morgan E., *S2AV: A Valuation Methodology for Insurance Companies under Solvency II*, Milliman, 2016.

model, for well-matched portfolios the movements should be minimal, except for the part impacting the free portfolio. And when there is asymmetry due to regulatory adjustments, the capital movement should not be valued 1-for-1 in the fair value assessment. Strictly related to this issue is the focus on capital generation guidance from companies, which is very

basic at this stage (often a range S2 points expected to be generated per year) and lacks any sort of either auditing and comparability or sensitivities to market factors. We believe market participants shall therefore pay close attention to how swings to S2 capital (stock) translate into higher or lower S2 capital generation (flow).

Figure 17: Solvency Sensitivities
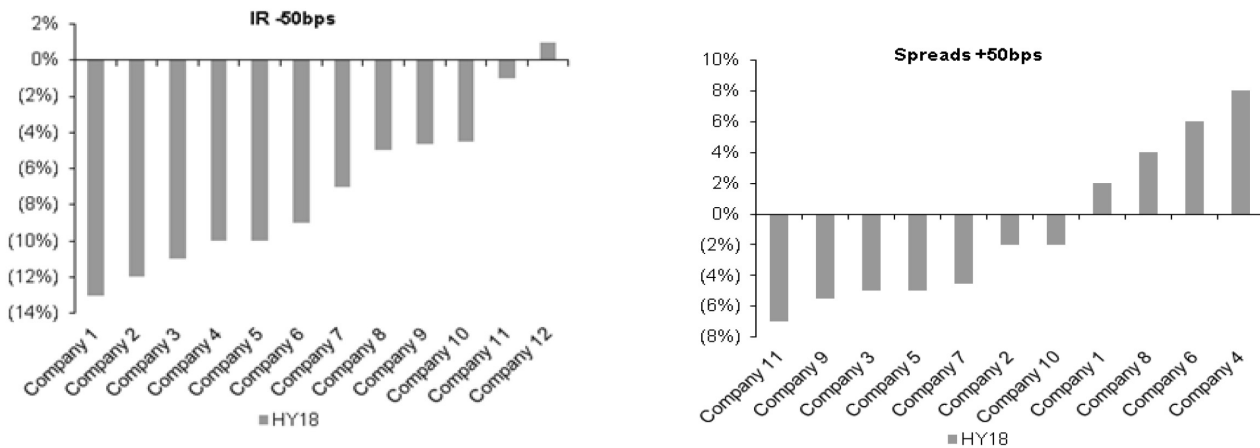
Source: Company data

The intrinsic commingle between stock and flow of the S2 framework can lead to significant distortion in the equity valuation, especially when participants treat the delta between reported S2 ratio and pre-set target as excess equity (valued separately at face value) and then add to that a multiple of annual capital generation. For example movements in spreads arguably have very limited impact on the real free cash flow generation of an insurance group as bonds are typically held to maturity to match liabilities duration; ultimately a positive delta on EOF stemming from spread narrowing will be compensated by a lower capital generation in the future as the positive mark to market in the stock is largely an up-front. To the extent that market participants are not provided with the relevant information on the intrinsic commingle between stock and flow in relation to spread movements, it is very easy to get a 'distorted' equity valuation as the flow used is backward looking and hence not reflecting what has been recognized and up-fronted already in the stock.

5. Run-off valuation (the fixed costs issue): transactions on back books in run-off have so far largely taken place at a price below unrestricted Tier 1. This rightly reflects the fact that the framework is based on a going-concern view. This implies that cost-assumptions are not reflecting a run-off / closed business and the only way to offset this would be to have a fully-variable cost base or to integrate in the best esti-

mate of liabilities the explicit 'exit costs' besides the cost of capital to run-off the liabilities already captured in the risk margin. This raises a note of caution for the adoption of multiples of annual capital generation in the equity valuation as clearly distinction should be made between the elements of capital generation that are durable and sustainable and those that are more one-off in nature like the release of solvency capital from business running off.

6. Acquisition valuation (synergies capitalisation): in case of M&A transactions the acquirers typically consolidate the target with a look-through view on the future estimated cost base of the combined entity. This means *de facto* a capitalization of estimated future synergies to be extracted; hence, market participants need to be careful in avoiding double-counting by adding to the initial 'flow' of the combined entity capital generation the targeted synergies of the merger plan as at least part of the latter could already be recognized in the opening stock of S2 capital of the merged group.

Non-economic distortions

S2 is a regulatory framework. Its main objective is therefore not the valuation of insurance equity but the protection of policyholders. In order to avoid excessive pro-cyclicality of regulation, leading insurers to be asset sellers at times of asset stress and buyers of assets at times of bubbles, the regulator introduced a number of

non-economic counter-cyclical adjustments (mostly known as LTG measures) to reflect the illiquid nature of a large part of insurers' liabilities and therefore the ability to have a hold-to-maturity model on the asset side. The regulator also allowed for transitional measures from S1 to S2. Lastly: some policyholder assets can contractually and legally be used to absorb policyholder losses – these are included in insurers' own funds (uT1), but do not pertain to the shareholders.

The following critical issues shall be considered, in our view:

1. VA/MA adjustment: The volatility adjuster uses a credit-adjusted spread over an EIOPA determined reference portfolio with an application factor of 65%: however companies do not own the reference portfolio (which is calculated as the average portfolio for the European industry) and the application factor is arbitrary. Some companies moreover use dynamic volatility adjusters, with methodologies leading to different outcomes with significant impact on the level of the SCR. The matching adjustment uses a fundamental spread to capture the risk of default and rating downgrades. In order to apply the MA, the insurer needs to have a cash-flow matched portfolio and in some cases this is achieved through the use of SPVs which circumvent regulatory requirements. Ultimately the aim of the VA and MA adjustments is to provide insurers with a countercyclical buffer to reflect the illiquidity of liabilities and the hold-to-maturity model for assets. Once again these factors impact the capital constraint on free cash to equity holders rather than making capital generation a better guidance of distributable cash. Basing the value of a fixed cash flow liability on the assets backing it and recognizing on day one the unearned illiquidity premium is clearly not market consistent. Importantly, a movement in the VA over a given period is ultimately driven by what is held in the industry reference portfolio; as such, we observe changes in the value of the BEL and hence the residual equity value of a specific undertaking that are not linked to the actual company's future dividend paying capacity.

2. The Ultimate Forward Rate (UFR): The UFR has a strong impact particularly for the currencies with an early Last Liquid Point (LLP), namely the EUR at 20 years. At current interest rate levels it lifts upwards the S2 curve from the LLP. The objective of the UFR is to reflect the long-term nature of life insurance liabilities and to offset deviations of interest rates from the long-term average (based on the average nominal interest rate since 1961, rather than a moving average). The equity investors may however have different views on the direction of interest rates based on their market view and investment horizon. In that respect the UFR can significantly distort the valuation of long-term liabilities, particularly in the EUR-area and for retirement products and hence alter the economic view of the real equity value for shareholders. Ultimately it can be seen as a 'zero cost' form of capital borrowing which needs to be unwound over time as we move closer to the LLP. A valuation technique that treats excess S2 equity vs a set target at face value without discriminating for the weight of the UFR benefit in the stock and then adds a multiplier to the annual capital generation would typically overstate fair value of long duration life and pension books, as the multiple applied to the flow which includes the negative annual UFR unwind (typically 10x) is way smaller than the actual implied 'capitalization factor' of the UFR contribution to the stock of EOF (often over 20x the annual unwind).

3. Transitional measures (on interest rates and reserves): transitional measures were implemented to allow a smooth transition from S1 to S2. They reduce the constraints on capital available to the shareholder, but do not impact the actual cash profile of the business. Recent research based on market data shows that there is a positive market appreciation for Solvency 2 ratios that are not relying on transitional measures and a negative correlation for movement in capital requirements[12]. In some jurisdictions, regulators feel pretty comfortable in considering "transitional capital" as fully distributable (eg. PRA in UK).

4. Equity charge adjustment: the equity dampener objective is to lower the equity charge at market troughs and increase it at market peaks, to incentivize countercyclical behavior when it comes to equity investments. Given the weight of equity investment, this should be relatively marginal in terms of net capital generation – but it is one of the many dynamic factors in the SCR calculation.

5. Policyholder buffers (e.g. the German RfB case): unrestricted Tier 1 funds can include loss-absorbing policyholder reserves. This is the case of the free German RfB, considered surplus fund within the S2 basic own funds. The loss absorbing capacity drives the classification as unrestricted Tier 1, but ultimately the free RfB represents funds reserved for policyholders' future surplus participation but not yet allocated to individual contracts[13]. This is S2 capital that does not belong to the equity investors.

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[12] Gatzer N., Heidinger D., *An Empirical Analysis of Market Reactions to the First Solvency and Financial Condition Reports in the European Insurance Sector*, Working Paper, School of Business and Economics, FAU, February 2018.

[13] Burkhart T., Reuß A., Zwiesler H. J., *Allowance for Surplus Funds under Solvency II: Adequate reflection of risk sharing between policyholders and shareholders in a risk-based solvency framework?*, European Actuarial Journal, Issue 1, 2017.

Figure 18: Weight of Transitionals and LTGs in S2 ratios of main listed European Insurance companies
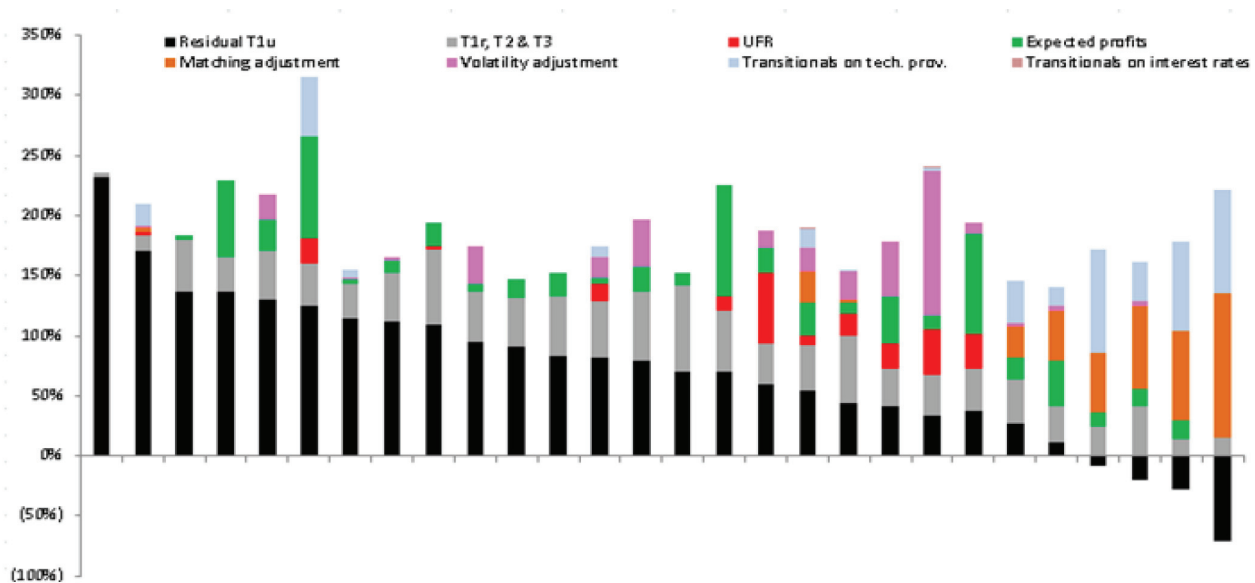
Source: Company data; Autonomous Research

As can be appreciated, the composition of the S2 capital can vary to a great degree, depending on the different country, lines of business and regulatory approaches. Therefore, the capacity to pay free capital to shareholders has to be linked to the nature of the capital available (hard vs soft, current vs future) as well as to the nature of the capital generated (cash/non cash).

Modelling and target capital

Using S2 for valuation purposes requires focusing on free capital over and above the SCR. This means that the calculation of the SCR is a key driver of free capital and any modelling difference between companies can have an impact on valuation. On one hand what the regulator sees as the SCR is what matters, on the other hand investors shall be aware that one of the objectives of EIOPA (the European regulator) is to drive convergence. So some differences could be softened over time and may impact the view of free capital.

The following critical issues shall be considered, in our view:

1. Standard vs Internal model: the SCR output from an internal model (or partial internal model) will in most cases be better than the standard model. Insurers are not obliged to use the internal model and will therefore only do so when it is to their benefit, given the costs involved in developing one and demonstrating to the regulator that it provides a better reflection of the actual risk profile of the company. The same business can therefore end up having a dif-

ferent capital consumption and net capital generation depending on which model is used. Once again the capital framework is the constraint on dividend capacity rather than the driver of dividends. The equity investor shall therefore take a view on the reliability of the internal model – in other words: will the regulator drive a convergence back towards a standard model approach over time or is there a true reason for the regulator to allow for the internal model approach for the foreseeable future? One topic that can have a relevant impact on a fundamental valuation is the nature of the so called "management actions" on the SCR. Basically the process can be split in two distinct groups: economic actions and modelling actions. The first one is linked to the decisions made by the management to change the overall risk profile of the business, being on the asset side (eg. reducing more risky asset vs less risky ones) or on the liability side (eg. changing product features in either the inforce book or the new business). The second one is based on "optimizing the model" (eg. changing risk modules or correlations, changing input estimates, moving to corporate structures linked to internal capital arbitrage etc.) with the only aim of reducing SCR, even if the true economic impact of these actions is nil. Looking at the period since the S2 framework has been introduced, we can note an yearly average growth of SCR of 3%, or 0% if we exclude 3-4 specific cases, versus an EOF CAGR of 5% (or 2-3%, like for like). The separation between the "economic management actions" and the "modelling manage-

ment actions" has to be considered a fundamental qualitative tool in the valuation process, we think.

2. Internal model vs Internal model (the diversification benefits issue): Internal models can be different between companies, leading to different outputs. While sometimes this is driven by different underlying volatility of the actual insurance risk, in other cases it can be driven by a different calibration of the correlation factors driving different diversification benefits. A key question for the equity investor is weather this sort of difference is 'sustainable', therefore supporting different constraints on free cash flows. As we can see from the following picture, we have different level of diversification effect, linked to business, country and asset mix. Given that from the outside is extremely difficult to properly assess the solidity of the model (particularly in terms of correlation matrix), we can try to increase the quality of the valuation process looking at two things: firstly, trying to compare different benefits for similar companies, or similar benefits for different companies (at least that shows some potential relative inconsistencies) and secondly studying some company break-up cases to try to dissect the real impact of the "loss of diversification" out of modelling. Some of the common pitfalls of internal models recently observed are: burdensome documentation requirements, herding, supervisory overlay calibrations, more complex governance framework, non-level playing field vs standard formula and over-complexity [14].

Figure 19: Diversification Benefits in S2 Models
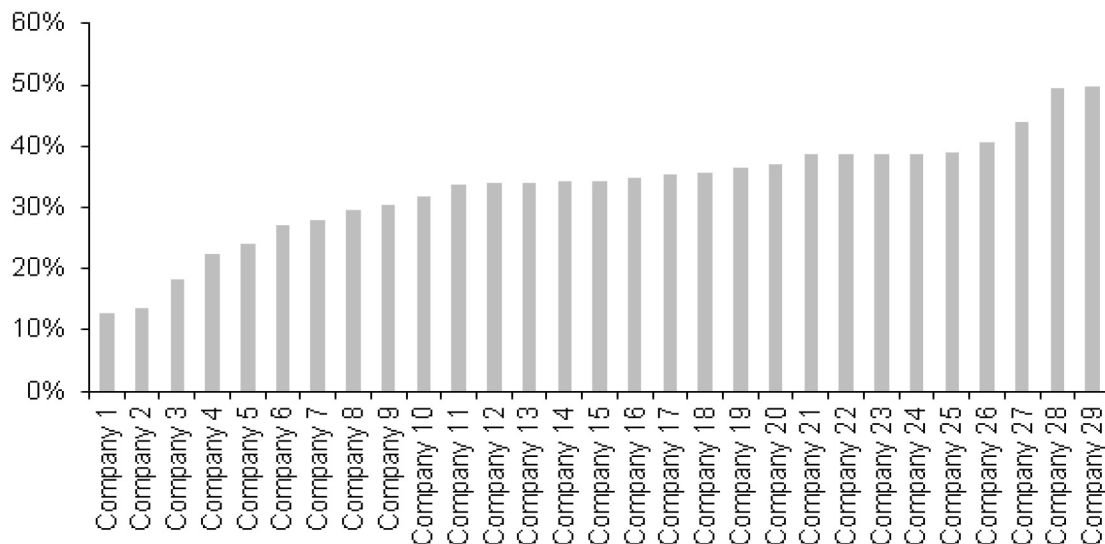
Source: Company data

3. What is the optimal Solvency target? Net capital generation is defined as the increase in unrestricted Tier 1 net of capital requirements to fund growth. A key question however is what the actual target capital level is: the regulator demands 100% coverage of the SCR. In practice companies will be under strict surveillance before they reach such level, both by regulators and equity / debt investors and to some extent also policyholders and counterparties. Different business models and different geographies can however lead to different choices in terms of target capital levels: a retail P&C business can in most cases run with a lower ratio than a commercial P&C business. A life business with high market risk and investment guarantees may require a higher ratio than a simple term life operation with no investment guarantees. Corporate structure, capital and cash pooling and geographical presence may be other factors influencing target capital levels. Ultimately the target capital ratio is something both management and the equity investors shall take a view on, in order to generate a better assessment of the net capital generation. Looking at the current solvency ratios of the European companies and comparing them to their target range, we notice an excess in the region of 15-20%. A superficial approach could be to consider this excess free to be distributed to shareholders (at the

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[14] Rae D., Barrett A., Brooks D., Chotai M., Pelkiewicz A., Wang C., *A Review of Solvency II – Has It Met Its Objectives?*, Institute and Faculty of Actuaries, May 2017.

end of the day, that's the level above the company's target, and it should take into account all the systemic and idiosyncratic risks involved). In reality part of the S2 movements can be predicated on non-economic factors and not always an economic change in sol-

vency is related to actual cash. In order to discriminate between a distributable free excess capital situation and a weaker one, we need to go through all the analysis we are trying to underlie.

Figure 20: Solvency ratios: actual vs targets
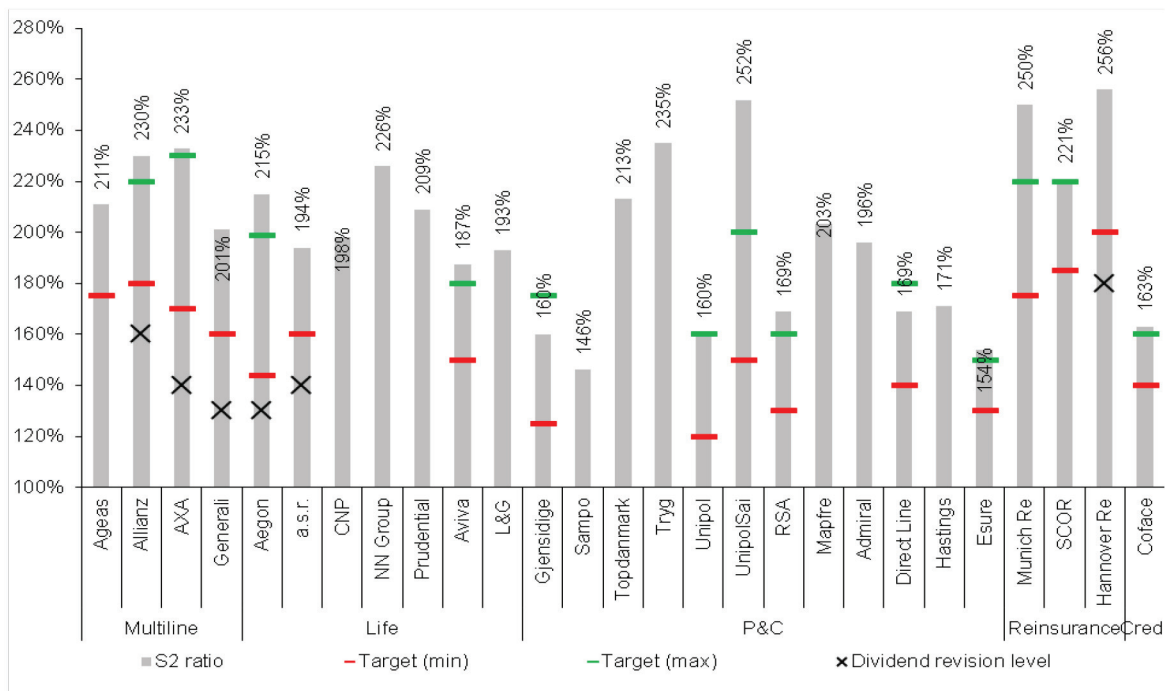
Source: Company data

Disclosure & comparability

S2 has significantly increased the level of disclosure. The Solvency Financial Condition Reports (SFCR) are mandatory and publicly available for all groups and for each subsidiary. Quantity of disclosure is however not a guarantee of full comparability across the sector: for example, so far many companies have given a view on "normalized" capital generation, albeit definition varies by company.

The following critical issues shall be considered in our view:

1. "Underlying" or "normalized" capital generation: in order to better understand the underlying drivers of capital generation, some companies have given a view on "underlying" or "normalized" capital generation. Such information is indeed useful, with some caveats: comparability between companies is limited by the different definitions – the "normalized" market return assumptions can differ, model changes are treated differently and so are management actions. On the SCR side the target capital ratio used as a multiplier for the SCR is also not always consistent (although

generally set at 100%). The issue is not dissimilar to the comparison of "operating" or "adjusted" earnings. To be more specific, we neither have the disclosure around the 'normalized' asset yield assumptions driving the excess spread nor around the operating and actuarial assumptions behind new business profits and operating return vs. current experience.

2. Group vs subsidiary view: group capital and capital generation are most scrutinized. While they represent the constraint on free cash flows for the group, they are not always informative of the subsidiary view and the potential bottlenecks that can be found at a local subsidiary level and that therefore constrain cash remittances back to group. One example is the diversification benefit on which the groups rely on – but such benefit is not always "payable" to shareholders if the risk is taken in different legal entities.

3. Aggregate view vs LoB: capital generation disclosure, where available, remains very high level and can hardly be broken down in detail by line of business (LoB) for multi-line companies.

4. Non-S2 operations: for operations included in

equivalence under Solvency 2, the capital generation can differ even more from the quasi-economic view of S2 and the price-to-capital ratio would be including a part of the business on a S2 basis and a part based on different regimes (e.g. US RBC) – leading to a further reduction in comparability across the sector.

5. *Assumptions (e.g. P&C reserves prudence, duration):* for the asset side the market-value concept is relatively simple, with the only exception of non-liquid or less liquid assets. The best estimate of liabilities does instead include a significant number of assumptions made by the company: while all of these have to be justified to the regulator and backed by actuarial reviews – the equity investor has little visibility and limited ability to compare methodologies and assumptions between companies. This problem is common to IFRS disclosure at this stage, albeit the forthcoming IFRS 17 accounting principle seeks to improve disclosure precisely on the key drivers of movements in liabilities.

Auditing

Last but not least, we note that one of the major obstacles for the use of S2 data is its auditing. The information is audited only once a year by the regulators, whose objective is to protect policyholders as much as possible rather than providing investors with comparable information. This is instead the objective of the IASB when setting IFRS principles, which in turn have other critical issues.

Conclusions

We think the market should use a much more comprehensive set of data rather than focusing mainly on S2 information to build a more stable and coherent framework in order to determine a fundamental economic value of equity capital of an insurance company. Ultimately – in line with the principle that the value of equity depends on the NPV of all the resources pertaining to shareholders in the future, we believe market participants need to form a view of dividend paying capacity of insurers based on all bottle necks that exist: regulatory capital (in and outside the EU), rating capital (where relevant to the business model), IFRS earnings (often driver of dividend policies), local GAAP (sometimes a bottle neck to intra-group dividend remittances), cash remittances from the group subsidiaries, holding liquidity, funding and leverage capacity where debt utilisation rates are sub-optimal (too high or too low). But, above all, we think it is paramount to "follow the business". Strategic and competitive analysis, margin analysis, genuine growth, capex needs, cost analysis (structure vs distribution) are just some examples of fundamental drivers of value that sometimes are not always sufficiently dissected in the external valuation by financial markets' participants – and that are difficult to analyse based on public S2 disclosure alone.

Figure 21: Bottle necks of dividend paying capacity of an insurance company
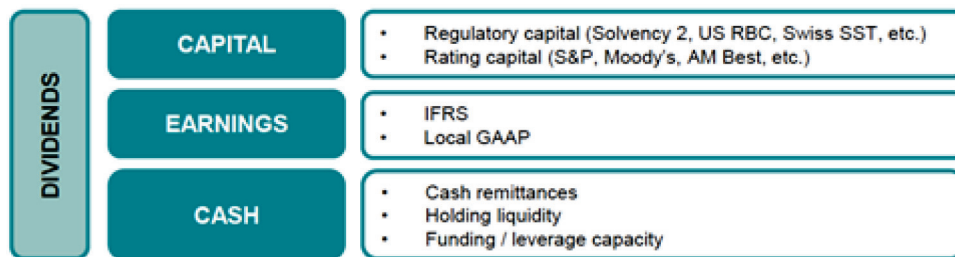
We believe that S2 data are valuable and provide insights, "it represents a huge improvement over Solvency I although it has not fully achieved the goals it aspired to. There are acknowledged shortfalls and imperfections where adjustments to Solvency II are likely. There remain other concerns around pro-cyclicality, and the appropriateness of market consistency is still open to criticism"[15], while SFCRs have provided useful disclosure to allow for more meaningful conversations with management around capital and capital allocation[16]. It is important, however, to be aware of the critical issues impacting the use of S2 data for valuation purposes and in our view a framework built with the basic aim to protect the policyholder shouldn't be used as a standalone tool for equity valuations.

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[15] Rae D., Barrett A., Brooks D., Chotai M., Pelkiewicz A., Wang C., *A Review of Solvency II – Has It Met Its Objectives?*, Institute and Faculty of Actuaries, May 2017.

[16] Rousseau L., *Technical Newsletter #43* (www.scor.com/sites/default/files/tnl-solvency_ii.pdf), SCOR, 2018.

References

Andenas M., Avesani R.G., Manes P., Vella F., Wood P.R., *Solvency II: A Dynamic Challenge for the Insurance Market*, Il Mulino, Bologna, 2017.

Burkhart T., Reuß A., Zwiesler H. J., *Allowance for Surplus Funds under Solvency II: Adequate reflection of risk sharing between policyholders and shareholders in a risk-based solvency framework?*, European Actuarial Journal, Issue 1, 2017.

Dalla Palma N., Horvath G., Jacquet T., Preston M., *It's not another Solvency 2 primer*, Exane BNP Paribas, 2016.

De Felice M., Moriconi F., *A Course on Finance of Insurance*, GCAF, Università Cattolica, Milano, 2002.

EY, *Cash, Capital and Dividends. How Solvency II is Challenging the Insurance Investor Story*, March 2016.

Gatzer N., Heidinger D., *An Empirical Analysis of Market Reactions to the First Solvency and Financial Condition Reports in the European Insurance Sector*, Working Paper, School of Business and Economics, FAU, February 2018.

Giuliani S. *Crescita e Valore*, Aracne, Roma, 2005.

Giuliani S., Lualdi M., *L'Introduzione dello EEV nel Settore Assicurativo: Aspetti Critici*, la Valutazione delle Aziende, n. 35, 2004.

Guatri L., Bini M., *I Moltiplicatori nella Valutazione delle Aziende*, UBE, Milano, 2002.

Insurance Europe, *Insurance Europe comments on the review of the Solvency II risk margin*, 2017.

Massari M., Zanetti L., Gianfrate G., *The Valuation of Financial Companies*, Wiley, NY, 2014.

Nissim D., *Analysis and Valuation of Insurance Companies*, CE/ASA, Columbia University, NY, 2010.

Kent J., Morgan E., *S2AV: A Valuation Methodology for Insurance Companies under Solvency II*, Milliman Research Report, 2016.

Koller T., Goedhart M., Wessels D., *Valuation*, 6th Edition, Wiley, NY, 2015.

Rae D., Barrett A., Brooks D., Chotai M., Pelkiewicz A., Wang C., *A Review of Solvency II – Has It Met Its Objectives?*, Institute and Faculty of Actuaries, May 2017.

Rousseau L., *Technical Newsletter #43* (www.scor.com/sites/default/files/tnl-solvency_ii.pdf), SCOR, 2018.

Swain R., Swallow D., *The Prudential Regulation of Insurers Under Solvency II*, BOE Quarterly Bulletin, Q2 2015.

Wilson T.C., *Value and Capital Management*, Wiley, NY, 2015.