The aporetic financialisation of insurance liabilities: Reserving under Solvency II

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Abstract

The valuation of insurance liabilities has traditionally been dealt with by actuaries, who closely monitored underlying illiquid features, assumed a long-term perspective, and exercised their own subjective, expert judgment. However, the new EU regulatory regime of Solvency II (S2) has come to require market-consistent valuation supplemented by a risk-sensitive capital. This is considered an unwanted shift towards short-termism that is misaligned with the industry's long term and countercyclical character. The new principles place the 'technicalising' logic of financial economics over 'contextualising' actuarial know-how. Following existing analytics of valuation from the ethnography of reinsurance markets and the social studies of finance, such requirements appear either as an alarming attack against the actuarial component of traditional valuation practice, or else as a preserver of it, through a process of enfolding at the heart of the financialisation project. This article holds that the case of S2 challenges both these analytics of valuation. S2's financialisation project, precisely by attempting to construct itself, deconstructs itself into an actuarial project, in a recurring, aporetic process. In this respect, fair (or otherwise) valuation remains always undecidable, inconclusive, and thus responsible.

Keywords

Financialisation, insurance, Solvency II, fair value, actuarial valuation, aporia, autoimmunity

Introduction

The valuation of insurance liabilities is one of the most distinctive and core practices of the insurance industry. This reserve amount, which insurers need to set aside today to cover past and future claims, comprises the most significant liability item of an insurer's balance sheet.[1] Its calculation requires the close monitoring of the liabilities' particularities and the adoption

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of a long-term perspective which is consistent with the insurance industry's role as a stabiliser of the economic and financial cycle. Indeed, insurance smoothens the consumption of individuals facing either idiosyncratic or aggregated shocks, such as natural catastrophes. It also stabilises long-term incomes by protecting savings and pensions, and provides a key source of steady funding for global financial markets, as it fosters lending and investment with a long-term perspective (Kessler et al., 2017).

Solvency II (S2), the new EU insurance regulatory framework that came into effect in January 2016, requires insurance liabilities (along with assets) to be valued henceforth in a market-consistent way, in line with financial economics logic. This presents a challenge for reserving actuaries given that the valuation of insurance liabilities naturally resists conforming to a purely technical, market-consistent, fair value approach. Most importantly, though, it presents a challenge for the insurance industry, since such a regulatory requirement is considered an unwanted shift towards short-termism that is misaligned with the industry's historical long-term character.

The problem can be framed as follows: for the insurance business to operate as a long-term stabiliser of the risk cycle, it needs valuation tools that allow for countercyclical management. This is what actuarial valuation modelling practices traditionally offered. In valuing illiquid and market-uncorrelated insurance liabilities, actuaries had to closely monitor their underlying contextual features, make use of long-run historical data, and exercise their own subjective, expert judgment. Such practices allowed the insurer to ignore market pressures and adjust itself accordingly throughout the peaks and valleys of the risk cycle. However, by being explicitly required to value liabilities in a market-consistent way, the S2 insurer is now obliged to switch to financial economics modelling practices that closely track short-term market prices, with liabilities now being *hedged* instead of *reserved for* – that is, the insurer now seeks to reduce the risk of liabilities' adverse price movements, instead of preparing itself to adequately meet obligations for the benefit of its policyholders. In that respect, S2 valuation modelling practices tend to privilege pro- instead of counter- cyclical management.

This gives rise to several questions. First, how does the financialisation of insurance liabilities – i.e., the adoption of financial modelling practices in valuing insurance liabilities – transform conventional actuarial ones? In which ways, if at all, is it now possible for an insurer to manage the different phases of the risk cycle in a countercyclical way, in order to fulfil its role as a stabiliser? On a more theoretical level, how do these empirical transformations sit with existing analytics of valuation practices? To explore these issues, this article examines the effects of the switch to market-consistent valuation on the modelling practices used by actuaries within the S2 framework. A thematic approach is adopted by investigating the implementation of market consistency in terms of a comparison between different 'epistemic cultures' (Knorr Cetina, 1999) – financial economics versus actuarial economics – and between different practical understandings involved in valuation – technicalising versus contextualising (Jarzabkowski et al., 2015).

In recent years, a growing literature in accounting research has aimed to explain the rapid adoption of the fair value imperative (Morley, 2014; Power, 2010). This body of work focuses on the asset side and, importantly for our question, not on the transformation of valuation modelling practices themselves owing to the switch to fair value (Spears, 2018). This latter point has received attention in ethnographic research connected to the social studies of finance (SSF), which centres on the routine working practices of valuation modellers and the tensions that arise therefrom. Such studies tend to portray the different practical understandings of valuation involved in this as a set of interrelated practices which are not

mutually exclusive but instead, either complementary or interchangeable. In this context, the financialisation project, which in broad terms is considered to prioritise technical market valuation over contextual human judgment – and which in related insurance terms, can be understood as the placing of financial modelling logic over expert actuarial know-how – has been seen in one of two ways: as an alarming attack on the contextualising component of insurance which ultimately endangers the goal of a balanced complementarity (Jarzabkowski et al., 2015), or else, as creating the need for an alternate, 'technical' enfolding of the contextualising component through an underlying, selective process at the heart of financialisation (Beunza et al., 2010; Muniesa, 2007).

By considering the adoption of the S2 model, this article makes a contribution to the existing literature on fair value, and more generally, to the SSF in two ways. First, the article is one of the first to address how the requirement for market consistency shapes the insurance liabilities modelling valuation practices traditionally used by actuaries. Thus, it extends the existing literature on fair value, which is largely restricted to the asset side of banks and trading desks, for example, to the liability side of insurance firms.

Second, the article challenges the assumption that the different practical understandings involved in the valuation process are complementary or interchangeable. By drawing on Derrida's philosophy, this article suggests that these are instead aporetic. In that respect, it seeks to move the existing valuation literature towards the recognition that an unresolvable logical contradiction is at work within the modelling valuation practices of insurance liabilities.

The article is structured in three sections. The first discusses the theoretical underpinnings of existing valuation approaches and presents S2 as an empirical challenge to their core conceptualisations – accordingly, an alternative Derridean perspective is introduced to rethink the analytics of valuation. The second section then describes the practices of insurance liabilities valuation and the different logics behind the actuarial and the market-consistent paradigms. The third section explains the aporetic process at work within these valuation practices, and finally, the conclusion offers some brief reflections on why this matters.

On valuation: Complementarity, interchangeability, and autoimmunity

Fair value

In recent years, a vast literature in accounting research has emerged on fair value (Bromwich, 2007; Morley, 2014; Penman, 2007; Power, 2010; Zyla, 2012). This body of work aims to explain the rapid adoption of the fair value imperative and disclose the widespread concerns about its reliability relative to more traditional valuation practices. This is because fair values are never real market values but only estimates of market prices which could be obtained, i.e., fictional constructs which depend on critical assumptions about orderly markets (Bromwich, 2007; Power, 2010). Thus, fair value's appeal seems to rest more on the conceptual shift in what counts as 'reliable' in accounting and less on its technical superiority (Power, 2010: 201).

However, as Spears (2018) points out, the existing literature does little to examine how the switch to fair value has, in turn, altered the valuation practices used by financial market participants. As such, it implicitly assumes that market participants are consensually in favour of techniques drawn from financial economics, of which fair value is one, "rather than fair value itself influencing the adoption of such techniques" (Spears, 2018: 3). This deficit is particularly significant in the case of insurance liabilities, given their illiquid and long-term

nature. In fact, while at the beginning of the S2 project, all stakeholders enthusiastically accepted its requirement for fair value insurance liabilities, by the end of 2012, few people believed that the regulation would ever see the light of day.[2] This was because of fierce disagreement on how fair value, which emphasises market short-termism, should be implemented such that the national EU insurance industries could continue to provide long-term guarantee products (Hulle, 2017: 315). What is more, the adoption of fair value came hand-in-hand with S2's additional and novel requirement to hold risk-sensitive capital. This drastically changed what was traditionally considered an appropriate steering strategy for an insurer throughout the uncertainties of the market risk-cycle. In other words, in the case of insurance liabilities, the stakes of the switch to fair value had more to do with the way actuarial modelling practices had to be reconfigured to accommodate market consistency for insurance purposes, rather than the adoption of fair value itself. The article, thus, explores this transition by taking a closer look at the way routine valuation actuarial practices had to render themselves both *market-consistent* and *insurance relevant*.

Complementarity and interchangeability

In their ethnographic study of reinsurance, Jarzabkowski et al. (2015: 72, 79) distinguish between two practical understandings that are central to the calculative practice of valuation modelling: *technicalising* and *contextualising*. The former refers to the practice of quantifying and enumerating – handling, that is – the technical aspects of the valuation process. The latter refers to the practice of bringing expert knowledge about the contextual features of the valuation object into the evaluation process. With the view that these oppositional practices are complementary, Jarzabkowski et al. (2015: 84) posit that a meaningful value, which not only stems from raw data but also reflects the valuator's experience, can only be generated by blending technicalising and contextualising procedures.

This theoretical approach describes traditional actuarial valuation practices well. Consider, for example, how two prominent actuaries, James Berquist and Richard Sherman, begin their classic paper on 'loss reserving', i.e., the valuation of insurance liabilities:

> Loss reserving cannot be reduced to a purely mechanical process or to a 'cookbook' of rules and methods. The utilisation and interpretation of insurance statistics requires an intimate knowledge of the insurance business as well as the actuary's ability to quantify complex phenomena which are not readily measurable … while certain general methods are widely accepted, actuarial judgment is required at many critical junctures to assure that reserve projections are neither distorted nor biased. (quoted in Friedland, 2010: 81)

For Berquist and Sherman, the technicalising aspect of the generally accepted actuarial models and methods cannot by itself conclude the valuation project. As Jarzabkowski et al. (2015) would agree, contextualising expert judgment is necessary "at many critical junctures", from understanding the data to interpreting and even adjusting the output.

In addition, this conceptual scheme seems to remain much closer to the subtle idiosyncrasies of the insurance sector in relation to existing SSF work on the influence of calculative models on markets (MacKenzie, 2003, 2006; Millo and MacKenzie, 2009; Muniesa et al., 2007; Svetlova, 2012). This body of work tends to investigate how the application of financial models not only reflects but also shapes markets. In a strong form, this happens when many market participants obtain similar returns from the model – i.e., the model's technicalising force is so dominant that it operates as a structure to be followed

uniformly (Svetlova, 2012: 419). Such a 'performative' (MacKenzie, 2006) prospect, however, is generally missing from the insurance sector, for which no secondary liabilities market exists and different prices and valuations for largely equivalent coverages flourish. Following Jarzabkowski et al. (2015), this could be attributed to contextualising practices, which allow the actuary to adjust and even manipulate a model's technical output in order to arrive at a value that is considered appropriate and meaningful based on his or her expert judgment.

An effective contextualising hand in the valuation process is crucial to the insurance sector fulfilling its role as a stabiliser of the financial and economic cycle. This is because stabilisation requires countercyclical management on behalf of the insurer: the insurer's valuation models should have the capacity not to follow market prices blindly but, instead, calculate alternative values in which judgments are expressed. This should allow better transmission of insurance liabilities' intrinsic and contextual features, such as their illiquidity and long-term nature.

However, under the framework of Jarzabkowski et al., S2's requirement for market-consistent valuation of liabilities would seem like a tilt towards the technicalising aspect of the process. This is because S2's financialisation project forces actuaries to recalibrate their models, shifting away from the intrinsic particularities of the liabilities themselves and towards the market itself. Consequently, there is limited need for contextualisation: all relevant information is considered to be already incorporated into market prices, and hence, technicalising becomes more dominant. The demand for market-consistent valuation therefore appears to put strain on Jarzabkowski's vision of *complementarity*, and the possibility of countercyclical management accordingly dissipates, hindering the insurer's role as a stabiliser.

On the other hand, some researchers, including Muniesa (2007), argue that social aspects can be incorporated into technical operations. In that respect, "automation does not necessarily imply impersonality" (Beunza et al., 2010:25) – under Jarzabkowski's terms, technicalisation does not necessarily imply loss of contextualisation. From this perspective, there is no need to 'strike a balance' between the two since the former would already encompass the latter (Muniesa, 2007). Thus, traditional actuarial modalities cannot be threatened, and rather than defend them unnecessarily, we would need to explicitly decide in which ways to fold them into market-consistent valuation so as to retain a desirable insurance sector (Beunza et al., 2010). There are notable echoes of actor-network theory (ANT) in Muniesa's (2014) position. As Pickering (1993) notes, ANT conceives of human and material agency as being essentially entangled, exhibiting a kind of *interchangeability*. In this view, technical agency can be understood to 'substitute' human agency (and vice versa). This is the view that implicitly underlies SSF's traditional focus on how models and other market devices increasingly mediate social interaction within markets (Spears, 2017).

Both complementarity and interchangeability do well to disclose the distinctiveness of the different practical understandings involved in the act of valuation. Both are also effective in acknowledging the entanglement of contextualising and technicalising processes, as well as how tensions between these may eventually be reconciled. Jarzabkowksi suggests that they need to be balanced while Muniesa, assuming that they are always folded into one, underlines how explicit choices need to be made in the move towards technicalising to preserve the contextualising dimension. While they disagree on the relationship between its different aspects, both authors assume a positive view of the valuation process: the more the tensions are resolved, the more appropriate the valuation becomes.[3]

However, the experience of the S2 negotiations, beginning in 2009, raises problems for these theoretical perspectives on valuation. What the analysis of this process will show is that apparent acts of balancing or folding may in fact destabilise, rather than stabilise, valuation

practices. Indeed, with S2, every round of efforts to stabilise the directive's valuation rulebook proved counterproductive. The S2 directive was published in 2009 for application in 2012, but it was subsequently postponed several times, first to 2014, then to 2015, and finally to January 2016 (Hulle, 2017:313). This was due to the inherent paradoxes in implementing a market-consistent valuation within the insurance business model. In its final text, which remains in effect since January 2016, the S2 directive seems to perpetuate such paradoxes. Despite its undeniable commitment to market consistency, i.e., technicalising principles, S2 explicitly calls for prudence in the valuation of reserves, which is distinctive of the contextualising understanding and requires the exercise of good actuarial judgment.[4] In the following sections, I argue that the co-existence of market consistency and prudence in the valuation of insurance liabilities cannot be accounted for in terms of either complementarity or interchangeability. Instead, I suggest rethinking the relationship between technicalising and contextualising principles through a Derridean lens of aporia and autoimmunity.

Aporia and autoimmunity

In contrast to the notion of a self-identity of traditional metaphysics, Derrida introduces the term 'aporia' to denote an event that prevents the metaphysical concept from fulfilling its promised unity. As Burke (2002: 4-5) puts it, an aporia is

> not a contradiction which can be brought into the dialectic, smoothed over and resolved into the unity of the concept, but an untotalisable problem at the heart of the concept, disrupting its trajectory, emptying out its fullness, opening out its closure ... [an aporia is] an 'impasse', a path that cannot be travelled; an 'interminable experience' that, however, 'must remain if one wants to think, to make come or to let come any event of decision or responsibility'. (Burke, 2002: 4-5; quoting Derrida, 1993: 16)

Aporia is thus the condition of responsibility and decision. A useful way to develop this idea is through the related concept of 'autoimmunity', which describes a process inevitably at work in every sovereign identity (Naas, 2008: 124). Autoimmunity is the failure of an organism to recognise its own constituent parts as such, resulting in an immune response against its own 'self'. A classic example of a concept that suffers a sort of autoimmune disorder is democracy. It is perfectly possible to use democratic principles, such as free speech and elections, to bring democracy to an end, i.e., democracy can be voted out of existence. Yet this suicidal trait of democracy is what opens it to an alterity beyond the self-same and gives it the possibility of responsible democratic action. In that respect, no sovereignty can give total legitimacy to itself in a closed and self-sufficient way if it wants to have a future. Nothing is, or ever was, pure, integral, and undivided (Caputo, 1999: 130).

This a valuable theoretical insight because it underlines how a sovereign entity can only be sovereign by immunising itself not, as traditionally thought, against others (who are not of the self-same kind), but against its own self. In philosophical terms, it turns traditional conditions of possibilities into conditions of impossibilities. If this is so, then what enjoys autonomy is less sovereignty's self-sufficient power to defend (as per Jarzabkowski) or select (as per Muniesa) its future, but rather, that impersonal, historical, community-wide and unconscious drifting game "which seems to carry the selves along by its own momentum" (Caputo, 2000: 102).

Having clarified the theoretical underpinnings of this article, I now turn to the empirical context of the analysis. Specifically, I explore how S2's requirement for a market-consistent valuation of insurance liabilities revolutionises practices traditionally used by actuaries. In so

doing, I shed light on the novel tools now provided to insurance companies, such as the risk-sensitive capital requirement, for steering their way through different phases of the risk cycle.

Valuation of insurance liabilities

Actuarial versus fair values

The challenge with valuing insurance liabilities, as indicated above, is that there is no secondary market for them. This is because portfolios of insurance contracts have never been homogeneous, owing to the differences in company marketing practices, underwriting policies, policy forms, coverage terms, and claim handling strategies. In addition, potential purchasers of insurance liabilities do not have access to an insurer's private information and, thus, may have legitimate concerns regarding anti-selection, expecting that the insurer would only want to unload its most problematic claims (Conger et al., 2004: 19).

In the past, the problem of evaluating insurance liabilities in the face of their heterogeneity was dealt with in multiple ways. In non-life insurance, reserving was determined on a case-by-case basis by specialised underwriters using their expert judgment and individual experience (Turnbull, 2017: 276).5 Gradually, however, case-by-case reserving was viewed as inherently subjective, unstable, and inadequate, especially for the problematic category of claims that have already been incurred but not yet reported to the insurer (Turnbull, 2017: 296). Accordingly, it was deemed that valuation ought to involve some form of statistical method that would be able to generate an estimate that includes even the portion of claims that is absent from the claim cases currently reported. This knowledge gap was filled by actuaries who progressively standardised a set of calculative methods which became a universal basis for valuing unpaid claims. Actuarial standardisation helped identify and statistically analyse development patterns of unpaid claims in historical data; these findings could then be appropriately adjusted to yield future projections of currently unpaid claims.

This is not usually regarded as having been a step towards financialisation since, at that time in the late 1970s (Turnbull, 2017: 275-309), financial markets still played a minor role. However, it was an essential development in the propagation of financial calculation, since it managed to translate a plethora of case-by-case data points into aggregates that could be statistically analysed and on whose basis appropriate projections could be made. At least theoretically, this actuarial standardisation narrows down possible calculative outcomes, significantly diminishing variation or convincingly explaining it where it remains.[6] This enabled an actuarial epistemic culture for the valuation of non-life insurance liabilities.

However, the power of actuarial aggregation comes at a significant loss of information – that of the original individual claim data – requiring compensation. Thus, actuarial valuation was never seen as a merely technical task. Actuaries blended technicalising professional knowledge with contextualising practices not only to overcome the limitations of their models, but also to better calibrate valuations with the insurer's specific business needs in mind. The main goal of such actuarial practices was to determine an *adequate* sum of reserves, i.e., to secure today, with a high level of confidence, that level of funding which would meet the uncertain liabilities of unpaid claims as they evolve in the future (Turnbull, 2017: 221).

This sum ought to be 'comfortable' enough to shield the insurer from surprises which could not have been foreseen by studying the historical data alone. The need for this protective buffer meant that actuaries did not hesitate to impose ad-hoc qualitative overlays on their technical results in order to inject significant margins of *prudence* into their valuations. By

their nature, these valuations were more a matter of judgement and less a sum that could be straightforwardly calculated.[7] Crucially, though, they operated as a substantial steering device and competitive tool in the hands of management. This would remain the case as long as the valuations could work countercyclically throughout the market risk-cycle, in effect operating as a stabilising buffer against the swings of the economic environment, the actual claims experience, and wider market competition.

To explain this stabilising role, it should be noted that the insurance business operates within a risk cycle that shifts between hard and soft phases on the basis of the cost of capital available in the market (Jarzabkowski et al., 2015: 205). An adverse claims experience, litigious legal environment, poor economy, or a combination thereof sets the stage for a 'hard' insurance market, where premiums increase and the capacity for most types of insurance decreases. The reverse is true when better circumstances prevail, yielding a 'soft' insurance market. Insurers entering a hard market with high prudence margins enjoy a competitive advantage, as they have the ability to operate relatively 'softly' by releasing such margins, thus attracting profitable new business without endangering their solvency position. In effect, they would be operating countercyclically and tempering the hard upswing of the risk cycle. In soft markets, when capital is widely available, insurers can reinforce their solvency position by adopting hard practices and strengthening their prudence margins. This would prepare them for the ensuing hard phase at a time when companies are tempted to operate in ways which weaken their finances.

However, the way this stabilising buffer was to be exploited, i.e., the timing and proportion of releasing or strengthening the prudence margin, remained a largely subjective decision with precarious implications. If, for example, an insurer unwisely released 100% of its margins too early at the beginning of a hard market, it would end up incapable of softly overriding the tough times, subsequently endangering its solvency position. Beyond business uncertainty, there was also significant uncertainty regarding the margin itself – whether it was real or imaginary, and, consequently, whether the reserves were adequate or not. In fact, non-life insurance insolvency over the past few decades has been heavily correlated with the underestimation of reserves (Courchene et al., 2008). Gradually, it became clear to the regulatory authorities that the way actuarial techniques determined the 'adequacy' of reserves was problematic, since the outcome was very sensitive to the actuary's subjective attitude (Morris Report, 2005). Indeed, the earlier pre-S2 'appointed actuary' approach placed regulatory obligations on a suitably qualified individual. This put the actuary in a stressful position, since it required her to balance regulatory obligations on top of management pressure to treat valuations according to business needs and the risk cycle, as well as policyholders' 'reasonable expectations' about current and future benefits. In such a context, determining the adequacy of reserves seemed like a 'heroic' act (Collins et al., 2009).

What is more, the actuarial profession failed to properly account for the financial market risk exposures that their life insurance businesses were underwriting on an ever-increasing scale (Turnbull, 2017: 194). This led to conventional actuarial practices receiving significant criticism from financial economics practitioners (Turnbull, 2017: 214). Over time, in the absence of market consistency, actuarial valuations started to look alarmingly subjective and inward-looking, as they seemed to inevitably recommend margins that were either inadequate or excessively prudent. The problem with inadequacy was obvious: it could lead to insolvency. The problem with excessive prudence was more complicated: it allowed management to subtly misrepresent their performance or solvency position. In other words, what was intended to preserve prudent countercyclical management began to look, from the perspective of financial economics, like creative accounting.

S2 was launched by the European Commission to remedy such shortcomings. Informed by the Basel regulatory schemes for banks and by the most recent developments in risk management, S2 claimed to provide a more accurate and transparent reserving approach by requiring the valuation of liabilities to be market-consistent. This requirement, directly imported from financial economics, is widely considered to disallow subjective overlays and divert attention to current values, encouraging an everyday, short-term risk management approach. Market-consistent valuation means that "liabilities shall be valued at the amount for which they could be transferred, or settled, between knowledgeable willing parties in an arm's length transaction" (S2 Directive 2009/138/EC, Article 75). To achieve this in the absence of a secondary insurance liabilities market, S2 requires the reconstruction of a hypothetical fair market transaction via a valuation model formed of two parts: a best estimate and a risk margin.

The best estimate, as suggested by its name, is a 'central' value that should be sufficient on average; hence, it should be an expected value or mean (CEA, 2007). This implies that any implicit margins of prudence, traditionally applied on the basis of good judgement, should now be removed from a best estimate valuation. In that respect, although best estimate approaches generally build on existing actuarial techniques, they include a crucial shift in the valuation target from a more contextual 'adequate estimate' to a more technical mean value.

The risk margin, in simple terms, is the amount an insurer would need to pay to entice a third party to purchase its liabilities. The risk margin is not a prudency margin: it is not there to compensate for the probable inadequacy of the best estimate, especially as the latter no longer targets adequacy but only expected values. Rather, it reflects the price charged by a willing purchaser for accepting the deviation risk of the actual outcome compared with the best estimate (CEA, 2017). For S2, this price is estimated based on the current cost of capital and thus, carries within it, the promise of future profits to be gradually released to the purchaser of liabilities should the claims experience develop as expected (or better thereof) (Chatzivassiloglou, 2017).

It should be noted that there are many possible theoretical approaches in circulation regarding the calculation of the risk margin, with diverse quantitative and qualitative results for different insurance products.[8] All approaches aim to structure a hypothetical fair transaction and are anchored in concepts of market efficiency and rationality. This variety implies that with respect to insurance liabilities, there can be different rational responses in a transfer market (IAA, 2009: 66). Although this does not imply that 'anything goes', it effectively means that economic rationality is both more fragile and more diverse than usually acknowledged. As such, no aspect of reconstructing a hypothetical fair market transaction for insurance liabilities is clear-cut. In that respect, S2 has had to make its way through a diversity of approaches in order to opt for a set of assumptions and calculations that makes possible, in a peculiar performative circularity, S2's market-consistent valuation.[9]

The logic behind reserve and capital levers

In the traditional framework, an actuary is oriented towards predicting ultimate future benefits, i.e., taking a long-term view. In order to understand how well an actuary has done her job, one has to wait and see how close to reality her predictions of future benefits turn out to be. This entails patiently comparing the emergent actual pattern with the actuary's expected one – a task referred to as 'comparison against experience' or simply 'actual-to-expected'. However, asking an actuary to place a fair value on an insurance liability requires her to predict not the cost of future benefits but rather the price at which a present hypothetical fair transaction

would happen. Once that prediction is made, there is no way to check the actuary's work. This is because, once the hypothetical transaction moment passes, any subsequent transaction would need to reflect, sometimes radically, a vast number of updated valuation parameters – for example, different in-force business, different interest rate conditions, and so on. This means that, in a fair value world, an insurance actuary becomes more like an investment banker, trying to predict the *unknowable present* instead of the *unknown-at-present future* which eventually becomes knowable in due time (Zimmerman, 2007). This would render comparison against experience obsolete.

In the traditional pre-S2 style, validation techniques such as actual-to-expected were required to monitor and reveal deviations of the expectations from the actual unfolding experience. Comparison against experience was a technical exercise that enabled close calibration with the liabilities' actual development, allowing for an ongoing process of adaptive learning.

In S2 however, actual-to-expected techniques carry much less weight since, strictly speaking, there is no 'actual' involved. To better understand this, consider a parallel with equity markets: stock prices are determined not only by company fundamentals, like sales and EBITDA, but also by 'endogenous' market factors (Danielsson et al., 2002), such as a change in the trust climate. Likewise, the actual drivers of the insurance liability's market price are now blurred between the underlying features of the liability and wider 'endogenous' market expectations, including those about how that particular insurer is faring relative to its peers. Market expectations may thus over- or under- state an insurer's liability portfolio relative to the actuarial, underlying-related values, since the point is no longer what the internal actuarial function expects but what the market as a whole expects – a process constantly reproduced by the behaviour of price-oriented operators (Esposito, 2013: 111).[10] Thus, in terms of S2, the actual-to-expected becomes *expected*-to-expected.

Such a shift is likely to be intensified by the recent, post-S2 trend towards the issuance of insurance-linked securities, an early step towards a market for insurance liabilities. Insurance-linked securities are complex financial securitisations of insurance risks that provide directly observable market prices for insurance liabilities, eventually delinking insurance liabilities from their underlying run-off development. For Bougen (2003: 272, 263), the risk transfers involved in securitisation "might be more imaginary than real" and "might inch society a little closer towards ... an increasing lack of insurance protection". However, for the time being, the practice of using market-consistent models rather than directly observable market prices remains prevalent.[11]

Market-consistent models, while not pure mark-to-market, change the very terms under which actuaries and other professionals tend to understand the insurance business. The new modelling style seems to privilege the technicalising aspects of the business in a way that conventional actuarial practices, with their effective contextualising aspect, did not. A way to highlight this is by noting that a best estimate represents a mean value. For a symmetric liability distribution, therefore, a best estimate ought to prove itself adequate 50% of the time and be inadequate the remaining 50%. In other words, in a market-consistent framework (and assuming a symmetric liability distribution), an insurer targets those levels of reserves that will prove sufficient only half the time. The question, then, is how the other half is going to be covered for. The answer is through regulatory capital which serves as a buffer, allowing the insurer to pay claims even when losses exceed expectations. Regulatory capital is funded by shareholders who commit their capital for profit booked within the risk margin which, as discussed above, does not represent anything other than a reserved amount of the future profits according to the current cost of capital.

Before S2, the main 'lever' that determined an insurer's success or failure along the market risk-cycle was their reserves and their prudence margins (or lack thereof). Regulatory capital was still required, but as it was calculated in a rigid rules-based way, it remained in the background as a typical regulatory obligation. It was the reserves, and the subjective use of their periodical accumulation and de-accumulation, that allowed the insurer to survive the perils of the market risk-cycle and contribute to its stabilisation. In fact, a good actuary was recognised by her contribution to the injection and consumption of the prudence margins in the face of the risk cycle's uncertainties.

However, under S2's financial economics perspective, such an approach was considered too opaque and inward-looking. It was thus changed to reflect a new set of sensitivities, closer to the capital markets. Reserves lost much of their prominence and became a simple number, extracted either by the market or by a technical modelling exercise that makes maximum use of generally available market data, no longer overlaid by qualitative judgments about contextual business needs. With S2, reserves are there to cover only anticipated risks, i.e., the mean of the distribution – nothing more, nothing less. The emphasis is now on *capital*, whose purpose is to cover the unexpected part of the liabilities, providing a buffer to absorb extreme movements, usually referred to as the 'tail risk'. In contrast to the anticipated losses, the unanticipated ones do not determine the cost but the *risk* of the insurance entrepreneurship (Chatzivassiloglou, 2017: 101). This is a risk assumed by the shareholders, who agree to commit their capital in exchange for future profits which are calculated according to the current cost of capital, booked within the risk margin, and gradually released as the claims experience develops.

Contrary to the pre-S2 era, S2 capital is risk-sensitive, i.e., the riskier the assets and/or liabilities are to the insurer, the more capital needs to be committed. It is calculated by using a technical set of prespecified risk charges which are supposed to quantitatively mirror the inherent risk of each asset or liability, without the need for any contextualising overlay. Such risk-sensitive capital makes sense for market instruments such as equities, bonds, or real estate because their prices exhibit volatility; however, it has a peculiar sense when extended to insurance risk. This is because, in insurance, risk is traditionally defined as the *possibility*, and not the *volatility*, of actual damage, injury, liability, or loss of existing value or status as a consequence of an external event. Under the S2 framework, insurance risk is redefined as in capital markets, i.e., as probabilistic change in value over time (Thimann, 2017: 7-8). Under such a financial theory definition, insurance risk becomes the risk that the actual experiencing of the liability claims may emerge differently than expected, i.e., may display volatility.

Therefore, within the S2 framework adopting risk-sensitive capital, reserves become yet another instrument which receives its own capital charges according to its riskiness, as measured, for example, by the historical volatilities of the different lines of insurance business. Under this method, reserves carry risk since they might fall above or below their fair value whereas, in the traditional pre-S2 setting, only under-reserving was considered risky while over-reserving was not. In view of this, a counterintuitive paradox emerges: an insurer exercising good risk management by reserving more prudently is 'punished' with higher capital requirements, while an insurer taking higher risks by under-reserving is 'rewarded' with lower capital requirements (Doff, 2016: 593).

In the S2 era, risk-sensitive capital becomes the new navigational 'lever' for insurers throughout the market risk-cycle. In hard times, insurers may pull it downward to de-risk themselves; in soft times, they may push it upwards to assume greater levels of risk. Although simple and straightforward, we can discern two complications that arise with the use of the new capital lever as the main navigational instrument.

The first is its tendency to treat insurers like short-term traders instead of long-term investors. This is a problem because investment decisions in insurance are driven by the liability structure (Focarelli, 2017: 346). The long-term nature of liabilities creates the need to match them with usually illiquid assets in a buy-and-hold strategy. This does not fit well with a mark-to-market requirement that implies intention to sell (Mennicken and Power, 2015). What is technically interpreted by the capital lever as a short-term risk – the illiquidity of the asset – is in practice immunised by a buy-and-hold strategy that takes into account the goal of the business, which is to deliver a long-term promise.

The second complication is that this new capital lever is prone to procyclicality. In fact, it has been recognised in the wider financial literature that risk-sensitive capital and mark-to-market requirements can jointly prompt fire sales of distressed securities by capital-constrained financial institutions (Ellul et al., 2011; Koijen and Yogo, 2015). Using the capital lever is binary: it can either increase or decrease risk. Therefore, it tends to propose a similar industry-wide response by insurers in stressed times: decrease risk by fire-selling risky assets or by significantly shrinking the liability portfolio, i.e., disrupting the flow of insurance coverage at the very moment when the economy needs it the most. In that respect, navigation by the risk-sensitive capital lever tends to exacerbate a 'race to the bottom', reinforcing endogenous deteriorations in the trust climate.

To summarise, the dominance of the technicalising aspects of the capital lever in the context of the S2 financialisation project gravitates towards a short-term window of decision making and procyclical behaviour from the insurers. This undermines the insurance industry's ability to overcome the risk cycle via countercyclical management, thus hindering it from acting as a stabiliser.

Disrupting the tendencies of the capital lever

The S2 directive was published on November 25, 2009. At the time, policymakers knew that the S2 text would have to be reopened and amended to reflect some uncontroversial impending changes regarding the new EU institutional supervisory structure (Coelho, 2015). However, once S2 was reopened, policymakers and industry lobbyists would not allow it to be closed until a solution was found to address the tensions between the technical tendencies of the capital lever (short-termism and procyclicality) and the unique aptitude of the insurance business for long-term strategy beyond the typical accounting concept of 'going concern'. This was seen as a matter of urgency given that, in the second half of 2010, an industry study conducted to inform the design of S2's technical measures showed that the original directive produced inaccurate risk profiles that failed to capture insurer's buy-and-hold investment strategies.

The paradox of using a market-consistent valuation for insurance liabilities is highlighted in the issue of illiquidity. When it comes to assets, the market already prices illiquidity: the more illiquid the asset, the lower its market price. Meanwhile, a market-consistent valuation of liabilities cannot (and does not) incorporate the liabilities' illiquid character since, in the absence of a secondary market for insurance liabilities, there is no reliable and objective way of doing so. Given that insurers typically hedge their illiquid insurance liabilities with illiquid assets, the imperative of fair value thus creates an artificial shortfall in the insurer's balance sheet because the assets are valued at an 'illiquidity discount' while the liabilities are not. Therefore, according to the logic of financial economics itself, an adjustment should be incorporated to address this unfair, higher cost of what is in practice a 'perfect' hedge between illiquid assets and liabilities. This was a crucial matter for insurers, with a high quantitative

impact on the valuations of long-term business. Furthermore, as this paradox coincided with the low interest rate environment following the 2008 financial crisis, it put additional strain on insurers, which had provided long-term guarantees at much higher interest rates (Hulle, 2017: 314).

After a marathon of discussions over alternative solutions, a so-called Long-Term Guarantees (LTG) package was adopted at the end of 2014.[12] This included technical measures that better reflect the long-term nature of the insurance business and a hold-to-maturity strategy. In essence, the LTG package allows for a series of technical adjustments that circumvent market consistency in the valuation of long-term insurance liabilities backed by long-term investments. This is highly controversial since the financial economics purists allege that the LTG package is non-economic (Danielsson et al., 2011; Swarup, 2012) and "requires a large and unavoidable leap of extra-statistical faith" (Cundy, 2019). The LTG package is thus closely monitored by regulators and is subject to review until 2021 (EIOPA, 2018a). Contrary to the tendencies of the capital lever, the LTG lever is designed to reduce artificial balance sheet volatility in the short term and allow for countercyclical management.

A different and more subtle instance of disrupting the tendencies of the capital lever involves the case of reserves. As explained earlier, reserving has been transformed into a technical exercise to estimate the mean value without allowing for any prudential margins. However, consistent with the very concept of fair value, S2 requires the insurer to allow for *all* possible outcomes and not just the reasonably foreseeable ones (or some other subset) in setting its reserves. This implies that an *additional* amount needs to be included in the best estimate to ensure that it is a 'true' best estimate (IFA, 2013: 45; EIOPA, 2018b: 4). Such an amount would cover the 'low probability, high impact' events that tend to be ignored since they are not contained in the data, often referred to as 'Events Not In Data', or ENID. There is a large range of events that could fall into this category – from claims arising from nanotechnology to a meteor strike and many more (IFA, 2013: 45, 47-8). The allowance of ENID is an inherently subjective element of calculation (IFA, 2013: 82). It disrupts market consistency since it requires a form of calibration to something that is beyond data and markets. Its inadequacy or excessiveness is also difficult to assess, but, already, terms like 'adequacy' and 'excessiveness' belong to the traditional actuarial paradigm.

The allowance for ENID, therefore, provides post-S2 actuaries with one more lever, beyond the capital one. During soft times, the ENID lever allows for an injection of prudence; during hard times, part of the prudence may be withdrawn. In other words, it allows for countercyclical management that may better match the context of the insurer's business and risk-cycle reality. What is more, higher amounts of ENID trigger higher capital requirements and vice versa. In effect, this renders the capital lever receptive to indirect countercyclical management, in contrast with its initial exclusively technical tendencies.

Value and the aporia of autoimmunity

To recap, before S2, conventional actuarial reserving practices routinely targeted long-term adequacy through a delicate blending of technicalising and contextualising. By using a reserve lever in countercyclical management, the insurance industry operated as a stabiliser of the economic and financial cycle. Financial economics has criticised such practices for being inward-looking and, in some cases, overly prudent and manipulative. Taking a short-term view, S2 yields reserves that no longer strive for long-term adequacy. A mean-value best estimate is now required, which is supplemented by a novel regulatory demand for risk-sensitive capital. In this way, both the best estimate and risk-based capital provide the necessary buffers for

anticipated and unanticipated losses. The risk margin constitutes the promise of profits to be gradually released to the shareholders who commit the required capital. The previous reserve lever is substituted by a novel capital one, which tends to steer the insurer in a procyclical way and under a short-term window.

If the story ended here, we would be justified in deploring the loss of contextualising skills. The theoretical scheme in Jarzabkowski et al. (2015) would be a good fit, as it would readily unearth the procyclical and potentially destructive effects of the technicalising-driven capital lever. However, in order to address an inconsistency deemed to be *unfair* that emerges by precisely requiring the consistent implementation of *fair* value in both assets and liabilities, S2 was forced to introduce exceptional hold-to-maturity measures via the LTG package, detaching from short-term asset volatilities. In other words, fair value implementation had to be circumvented in order for its true spirit – of fairly accounting for the illiquidity of both assets and liabilities – to be upheld.

In reserving, a mean-value best estimate that is stripped of any prudence margins squares with the S2 requirement of market consistency, making maximum use of available market data. However, in order for the valuation to be 'truly' market-consistent, an allowance needs to be made for an additional ENID amount that cannot be calibrated by any reasonably foreseeable set of market-consistent data, so as to precisely achieve a true best estimate of all possible outcomes.

Such disruptive incidents do not come without practical implications. Both the LTG and ENID levers reintroduce in S2 the pre-S2 actuarial possibility of countercyclical management, contrary to the embedded tendencies of the novel capital lever. From a Derridean point of view, this analysis unveils an aporia, where the concept of 'fair value', precisely in order to be sustained, has to remain structurally open to its other – to include, that is, what it tries to exclude, e.g., a 'non-economic' package of LTG measures and a subjective ENID amount, uncalibrated by any reliable set of market-consistent data. In other words, there is an 'autoimmune' process at work, in which the technicalising concepts of financial economics produce the very contextualising actuarial concepts that threaten to undermine them.

In such an autoimmunisation, the financialisation of insurance liabilities creates its own sovereign capital lever that can only work if it allows itself to be deleveraged by its 'others' – the LTG and ENID levers. The use of the ENID lever has countercyclical implications in that it (1) produces surprises by injecting prudence in reserves via the additional ENID amount, (2) disrupts the capital lever's technical complacency, which would otherwise dictate low capital requirements without the ENID amount, and (3) prompts extra accumulation of capital (i.e., triggers higher capital requirements by including the ENID amount, which preserves the possibility for subsequent capital releases in the face of imminent hard times). Similar countercyclical responses that allow the ignoring of short-term asset volatilities arise when the LTG lever is employed.

Autoimmunity also inheres at a more general level. The more exclusive a short-term view becomes, the more the insurer will be forced to betray its long-term commitments and stop following an insurance business model. This is because an insurance business model cannot be as such unless it can exploit an arbitrage opportunity by ignoring short-term market pressures. On the other hand, the more exclusive a long-term view becomes, the more the insurer may not get to the 'long term' because it risks insolvency in the meantime (Merz and Wüthrich, 2008: 545). After all, a short-term view is imperative for management decisions; most actions in an insurance company are taken on a recurring yearly basis, i.e., a recurring short-term window, even if informed by a long-term concern.

Contrary to Jarzabkowski's view, I would suggest that the financialisation of insurance liabilities does not uncritically expand financial economics conceptions at the expense of actuarial logic. Instead, financialisation is possible if actuarial aspects are recognised and adapted into market-consistent valuations to preserve the actuarial component of the insurance business. However, such a claim goes beyond Muniesa's (2007) folding thesis, in that it recognises the fundamental disruption of the financial by the actuarial, the short term by the long term, the technicalising by the contextualising (and vice versa). The financialisation project of insurance liabilities, precisely by attempting to construct itself, deconstructs itself into an actuarial project which, in its turn, is itself disrupted in a recurring aporetic process that can never be arrested precisely because of the constant efforts to arrest it.

This aporetic and autoimmune tension in the midst of the financialisation project has remained understudied, even if it is acknowledged, as in Muniesa (2014), that no single and pure solution can ever spring from any technicalising frenzy. In Muniesa's (2014) view, attempts to frame the valuation of insurance liabilities in financial economics terms generate new and unforeseen problems that result in "an endless interplay of framing and overflowing" (2014: 67). Ultimately, this is why S2 valuation measures, such as the LTG package, require constant updates. It is also why the implementation of the directive was persistently delayed with future reviews regularly scheduled. However, this analysis reveals that it is not a matter of endless new surprises, but of a single, prior, and deeply rooted, surprise: *insurance liabilities can only be fair (or otherwise) valued as long as they remain without a fair (or otherwise) value*. Events like the additional ENID amount and the LTG package are not just solutions that generate, in their turn, new and unforeseen problems – rather, they prevent the metaphysical closure of the valuation in terms of what is 'fair', with the irony being that such measures are needed precisely to substantiate a reliable and consistent application of 'fairness'. In this way, they do not *constantly deflect* the chain of fair value configurations in search of ever new and more appropriate solutions; rather, they enfold the material inscription of an aporia that *always already defers* fair value. Thus, fair valuation remains always already inconclusive and undecidable, and therefore, responsible.

This perspective differs from prominent positions in the social studies of finance. Svetlova (2012), for example, seems to consider qualitative overlays as an external practical instillation of a fresher and more invigorating layer onto the technical surface of the model; she does not entertain the possibility that the sovereignty of the technical itself solicits its qualitative deconstruction precisely from within. And so, by foregrounding the technical details and the implementation paradoxes emergent from routine understandings of market consistency, the analysis presented here should lead this branch of the literature towards an awareness of a further process at work within insurance liabilities' modelling valuation practices, which simultaneously constitutes and de-constitutes the financial and actuarial aspirations of the valuation process.

Concluding remarks

I would like to conclude by addressing a final question: why does this matter? How, if at all, should an understanding of the autoimmune process change routine working practices among valuation practitioners and regulators? Why should we not, for example, simply regard the LTG package as a conscious and prudent choice that was folded into the financialisation project to frame and preserve what is most desired from the insurance sector, namely its countercyclical management? What benefit is there from recognising these remedial efforts as a deconstructive effect of the very attempt to give insurance liabilities a fair value?

For a valuation to be framed as 'fair' or otherwise, a relevant framework of general concepts and practices needs to be determined by regulators and related stakeholders. Such a framing is laboriously constructed by S2 and includes requirements and guidelines to calculate or make use of a best estimate, risk margin, risk sensitive capital, LTG package, and other tools. However, when we assume the autoimmune view and unveil the aporia of the additional ENID demand at the heart of the best estimate requirement, we automatically point to the inadequacy of our framings. We find that the valuation itself, 'fair' or otherwise, exceeds our framings and thus remains essentially a singular, idiosyncratic event – one that urgently calls for a responsible decision, if one wants to conclude with a value. Under this view, responsibility is reserved for the *act of valuation itself* and less so for the *act of constituting an appropriate framing* for the subsequent act of valuation. This repositioning of responsibility is crucial because it alleviates any illusion of conclusiveness as long as valuation, countercyclicality, and solvency are constantly challenged in the field, where the idiosyncrasies of the singulars resist all our attempts to frame them.

This does not imply that the act of constituting an appropriate valuation framework should not be met by regulators and relevant stakeholders with the utmost responsibility – after all, undecidability and inconclusiveness (and thus, responsibility) equally inheres at the level of framing formation. It simply highlights the fact that every new valuation framework widely adopted, carries within it a 'dangerous' promise: a claim that 'this time is different', that old shortcomings have been left behind, and that a long-sought after appropriateness in valuation has been henceforth firmly secured. In effect, the new valuation framework declares its universality, rendering every concrete valuation project a particular that should fall under it. In this way, fair valuation of a particular asset or liability is considered a member of the universal class of 'fair valuation'. Consequently, every valuation problem is seen as simply caused by the unavoidable passage of the general framework into the concrete case which, for some idiosyncratic reasons, fails to materialise the principles of the framework. Thus, responsibility is reserved for the task of designing responsible solutions that can eventually smoothen this passage and ultimately ensure that the concrete act of valuation, despite its random idiosyncrasies, will not fall short relative to the principles of the general framework. This is the role reserved for the LTG package, even if it is acknowledged, as in Muniesa (2014), that such packages should be responsibly redesigned *ad infinitum* because of the endless generation of unforeseen problems.

However, under the autoimmunity view, the act of valuation cannot be subsumed under a universal – the aporia inscribed makes value self-deferring, thus unclassifiable and singular. Framings and solutions are still sought, yet, as they remain internally open to aporetic undecidability, they are used in a way that points not to their promise but to their own inadequacy. In that respect, valuation, countercyclicality, and solvency can never be secured or concluded, but are constantly striven for in the field. A responsible decision is thus urgently called for not to address messy idiosyncrasies, but because of the simple fact that there are no manuals when facing something singular. This kind of responsibility cannot be ultimately substituted by any type of framing, solution, or package: its weight must simply be borne.

If this is so, then it is how an insurer enters a crisis that matters most, rather than how it responds to it in real-time by taking stock of the 'right' technical solutions that have 'responsibly' pre-enfolded countercyclicality. It is the insurer's responsible decision of having previously accumulated reserves (pre-S2) or capital (post-S2) that allows it to withstand and countercyclically manage a coming period of crisis. In other words, it is not the financialisation project per se, with its technicalising framing, that inherently impairs or secures this capability of the insurer. Rather, since both the pre-S2 framing (contextualising) and the post-S2 framing

(technicalising) remain always inconclusive and permanently deferred, it is ultimately the insurer's responsibility, as reflected in the mundane history of its everyday decisions and practices, to overcome the peaks and troughs of successive market risk-cycles.

Acknowledgements

Notes

1. Although 'reserves' technically refers to assets earmarked to cover insurance liabilities, such a distinction is not necessary here.
2. S2 uses the term 'market consistency' instead of 'fair value'. I use these terms interchangeably.
3. That is, not merely subjective but "objective" within its "active or practical situation" (Dewey, 1915: 516), and thus replicable and stable.
4. Directive 2009/138/EC, Articles 76 and 77.
5. I focus on the non-life business of the insurance sector, such as automobile and home insurance, because it is generally considered more orthogonal to financial markets (i.e., there is usually no relationship between interest rates and car accidents). The point is to examine how such orthogonality eventually becomes aligned with a market-consistent requirement.
6. Variation of results is usually attributed to different methods of organising and projecting data. Different methods represent different preferences. Such differences allow actuarial projection methods to be flexible and adaptable in a multitude of different business contexts.
7. Margins need to account for a wide range of possible sources of uncertainty, such as the range and quality of available data, the risk of selecting an inappropriate model or assumptions, the existence of random fluctuations, and worst-case scenarios of known and unknown risks. Accounting for all this becomes a very inexact science.
8. These include quantile approaches, discount-related methods, the use of explicit assumptions, and the cost of capital method (IAA, 2009: 63-110). S2 opted for the last of these.
9. Article 38 of EU Regulation 2015/35 lists twelve theoretical assumptions that make the calculation of the risk margin possible.
10. This process is further accentuated by the natural information asymmetry of the insurance business, in which insurers do not have full access to each other's liability portfolios. Having such access would help insurers reach more informed valuations. This information asymmetry is at odds with the assumptions of financial economics regarding transparent and frictionless markets.
11. This does not mean that the reinsurance industry has not already been impacted by the issuance of such securities. See, for example, Jarzabkowski et al. (2015: 158-84).
12. Negotiations were so fierce that not only was S2's implementation postponed for a number of years; the directive was widely perceived to have been abandoned (Hulle, 2017: 324).

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