Coping with Uncertainty: Aporia and Play in Actuarial and Financial Practices

Charalampos Fytros

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To the memory of my mother

(1945-2015)

Abstract

This thesis aims to bring into sharp focus a contradiction that seems to persist in actuarial and financial practice. Specifically, how efforts to manage the uncertain and potentially catastrophic future, via actuarial and financial calculative modeling, fail precisely where they succeed. The purpose is to disclose that the problem with such efforts is not that they are not yet scientifically sophisticated enough, nor that they frequently lack the intuitive judgement which experienced practitioners can bring. Rather, it is that our certainties, which may have either a technical or judgmental origin, are always and already permeated by uncertainties, and vice versa. Thus, what this thesis aims to show is the radical and inescapable entanglement of certainty with uncertainty, or of the technical with the social, which is not simply complementary or oppositional, but in a more fundamental way, aporetic. This aporetic entanglement is conceptualized within the thesis as an ongoing play of difference. Specifically, a play that is ontological and central to what sustains actuarial practice exactly as that.

The thesis consists of three papers. The first one focuses on the financial markets and aims to disclose, following a Heideggerian analysis, how investing is ontologically dependent on a prior understanding that dictates what counts as significant, or not. In this respect, financial markets are conditioned not just by the social/technical entanglement, but also by a further entanglement among different styles of understanding.

The second paper focuses on the liability side of insurance companies and argues that the so-called financialization of insurance liabilities (i.e., the requirement for a market-consistent valuation of them) does not uncritically expand financial economics (i.e., practices oriented towards the market with a dominant technicalizing aspect) at the

expense of actuarial logics (i.e., practices oriented towards the underlying liabilities with an effective contextualizing aspect). Rather, a Derridean autoimmunity process is revealed – one that "auto-deconstructs" the financial sovereign of the market-consistent valuation into its actuarial "other".

The third paper focuses on Solvency II, the new regulatory framework for EU insurers since 2016. By taking a close look at the quantitative and qualitative requirements of the new framework, the paper claims that the regulatory text and its accompanying algorithm can never be made unambiguous, or free from fundamental paradoxes. However, instead of adding confusion, this paradoxical quasi-structure ultimately increases the possibilities for understanding the subtleties of the insurance business and its solvency issues. In this context, the paper reconsiders performativity as a play of differences – a rethinking that focuses more decisively on *not* knowing, rather than on what can be rendered knowable.

Declaration of Authorship and Publication Status of Papers

This thesis is presented in the alternative format. As such I make the following declaration about authorship and publication status of the three papers which make up the body of the thesis.

Paper 1 (chapter 2 in thesis) – Heidegger and Modern Finance.

This paper was authored by me alone and was published in *Critical Perspectives on Accounting*.

Fytros, C. (2018). Heidegger and Modern Finance. *Critical Perspectives on Accounting*, 52 (2018): 17-34, https://doi.org/10.1016/j.cpa.2016.08.001

Paper 2 (chapter 3 in thesis) – Folding the Actuarial: The Aporetic Financialization of Risk Liabilities.

This paper was authored by me alone and is now 'revise and resubmit' with *Finance and Society*. This is a minor revision and the editors indicated that they will not send it out for review again.

Paper 3 (chapter 4 in thesis) – Pricing (In)Solvency: Performativity as a Play of Differences.

This paper was authored by me alone and is submitted to *Critical Perspectives on Accounting.*

Charalampos Fytros, CFA, FHAS

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Lancaster University

Acknowledgments

What is usually asserted in philosophy is how conditions of possibility tend to withdraw from view. The conditions of possibility for this thesis are, on the contrary, very clear to me: they rest with Professor Lucas Introna.

I have been extraordinarily fortunate to have worked with Lucas; his influence goes well beyond mere theoretical ideas expressed in this thesis. His ability to distil subtle nuances that underlie the field of risk management and actuarial practices had a lasting impact on my sense of the effects of the politics of such practices. His generosity, which was reflected in so many ways, from commenting on my papers to hosting me in Lancaster, is deeply appreciated. I am profoundly grateful to Lucas for having believed in me, in the first place, and supported, in more ways than I could name, each of the three papers presented in this thesis.

I also owe debts to Kostas Amiridis, who not only introduced me to the performativity literature, but also to Lancaster and its university. Since the course of this research has been interdisciplinary, I would also like to thank Professor Laurence Hemming for his guidance and instructive comments on the first paper.

I am also immensely grateful to Ioannis Chatzivassiloglou, a friend and fellow actuary in the Bank of Greece, for our endless discussions about Solvency II which greatly informed and shaped my views. Ioannis did not only share information about the development process of Solvency II, but also readily oriented me within the maze of actuarial and financial literature. It is a blessing indeed to have received this support by such a friend.

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Table of Contents

1. Introduction

The purpose of this introductory chapter is to cover the background and context of the thesis and demonstrate the common research question and theoretical concerns that run through the three research papers: (1) Heidegger and Modern Finance; (2) Folding the Actuarial: The Aporetic Financialization of Risk Liabilities; (3) Pricing (In)Solvency: Performativity as a Play of Differences.

An important context that sheds light on the approach and focus of the research presented here is the experiential and professional background of the researcher. The concerns and issues discussed in these papers were not based on data that were gathered, selected, organized, analyzed and presented based on a third-person perspective, as would be typical for a doctoral student studying the practices of others by means of an ethnographic methodology, for example. Rather, the researcher has practiced professionally as an actuarial and financial consultant for the last 15 years. In his capacity as Chief Actuary and Chief Risk Officer, he was given the opportunity to consider – carefully and sometimes painfully – the theoretical and practical questions of risk and uncertainty, to assess (and be assessed on) claims of valuations and to construct, use, defend and go beyond models and modeling practices. In short, to experience firsthand the social and technical entanglements such issues produce and witnessed "from the inside" the so-called financialization trend that emerged and continues to dominate some of these practices.

In this respect, much of what is included within the three papers comes from the need to make sense of and theorize these experiences in order to grasp the practical, theoretical and philosophical significance of such and other changes for the financial profession and for the field of actuarial science more generally. This immersion in

professional practice, and attempts to make sense of it, revealed what Joyce famously termed, its "chaosmic" infrastructure[1]. In-situ actuarial and financial practices are far from an "anything goes" chaos, but they are equally far from consisting of a benevolent, unifying totality or an undisrupted cosmic set of rational choices which undeniably maximize utility. If they are neither this nor that, then it is tempting to claim that they are instead something in-between, or, assuming a more radical vocabulary, something beyond, "in excess". However, for reasons we hope we show within the three papers, we feel that both such claims either fall short or go too far. Instead, we want to assert that all that can be said, is that they are what they are and not anything else.

Such a tautological claim may seem too poor, informationally – especially in the current age of the revolution of information. And rightly so, if we equate understanding with practices that simply aim at the acquisition of more information, of more (big) data. However, Heidegger, the subject of our first paper, was fond of tautologies because, unlike explanations that reduce the phenomenon in question to something else, such as defining heat as motion, or market efficiency as an arbitrage-free state, tautologies force our attention onto the phenomenon, the whole phenomenon, and nothing but the phenomenon (Braver, 2012a: 195). By saying that, the intention in the three papers is not to somehow limit ourselves to a pure, Husserlian transcendental account. Rather, this thesis wishes instead to explore the possibility that if we are entirely of this world, if the laws of the financial reality are not but a set of empty tautologies without any solid reference that breaks through outside the cave, then we can still name the relationships among the pieces of our financial practices that actually do and say something. As this thesis will argue, a common approach that runs throughout all three

[1] The term "infrastructure" is used to precisely deflate any "hardness" implied by the plain term "structure". Infrastructure points to the Derridean "quasi-structure".

contributions is the view of the phenomenon of our financial practices (theoretical or empirical) as a "play" – a play might be self-referential, but it simultaneously defers such self-referentiality in that it comes along with real consequences. In the words of Joseph Campbell, a soap opera, yes, but a soap opera that hurts (Campbell & Moyers, 1988).

In that respect, the driving force – and, one might say, the overarching research question – behind this thesis is to bring into sharp focus a tension or contradiction that seems to adhere in actuarial and financial practice – something all good actuaries know, but do not often articulate. That is, on the one hand, there are the efforts of finance and actuarial practice to anticipate future, potentially catastrophic events in order to tame and govern uncertainty – in other words, to deliver the promise of managing uncertainty and making an indeterminate and unknowable future knowable and calculable. On the other, such efforts seem to contain in themselves a contradiction: where they succeed precisely, they also simultaneously seem to fail. The traditional response to this contradiction – as will be argued and shown below – is either to say, "our models are not yet sophisticated or scientific enough", or to argue that they are too scientific or technical and lack the intuitive and nuanced judgement that experienced practitioners can bring. That is, either argue that the *hard* and the *soft* should complement each other or that they are fundamentally oppositional to each other. This thesis will suggest, – through the three papers, – that this response is inadequate. It would suggest that it is not a matter of uncertainty that is mitigated by certainty, i.e., it is not "uncertainty-towards-certainty" thanks to our powerful financial and actuarial scientific tools nor, turning the terms around, is it that our certainties are temporarily disturbed by uncertainties that will eventually yield into settlement in due time. Rather, it is that our certainties are always and already permeated by uncertainties, and vice versa. Thus,

what this thesis aims to show is the radical and inescapable entanglement of certainty with uncertainty, or of the technical with the social, which is not simply complementary or oppositional, but in a more fundamental way, it is aporetic: that is, *simultaneously* oppositional *and* complementary. What is termed in other words, within the thesis, as an ongoing play – a play that is ontological and central to what sustains actuarial practice exactly as that.

As a practitioner, immersed in practice, the researcher is used to working in both the asset and liability sides of an institution. This reality was mirrored in the development of the three papers. The first one, Heidegger and Modern Finance, focuses on the asset side: the financial markets. What does it mean to invest? How are we to make sense of an asset market transaction? What makes an asset strategy legitimate, and thus developed and followed? The second paper, Folding the Actuarial: The Aporetic Financialization of Risk Liabilities, turns towards the liability side: what does it mean to value a liability? If the first paper explores how it is possible to assess the value of the ownership of a stream of claims, i.e., the value of an asset, the second paper explores the possibility of making sense of the value of the ownership of a stream of liabilities, especially in the light of the contemporary trends of financialization which demands a market-consistent assessment between asset and liabilities. The third paper, Pricing (In)Solvency: Performativity as a Play of Differences, makes a further step and focuses on the uncertainty which accommodates every asset and liability valuation: if the first and second paper emphasize the valuation processes to arrive at a valuation point (a value), the third paper focuses on the riskiness that surrounds such valuation points and how such risks are measured and managed by financial firms – in our particular case study, insurance companies. In that respect, the three papers of the thesis comprise a holistic approach to the sense-making practices (through, e.g., valuation modeling) that

run across contemporary financial institutions, such as insurance companies.[2] In this regard, the thesis can be read as an attempt to unearth the richness of relationships, theoretical aspirations, empirical limitations, understandings and misunderstandings, framings and enframings, formations and deformations that run through an institution's life to make sense of itself. Following Ingold (2011) and Introna (2018), the purpose of the three papers is an attempt to unearth the flow of the financial life along lines, indivisible lines with no definitive origin, as such – the way meanings interpenetrate along the line of flow, supporting and deconstructing each other. As Introna writes,

> "All of these lines of flow mesh together – what Ingold (2011, p. 63) calls the *meshwork* – to condition the ongoing flow and unfolding of the conversation [practice], exactly as a conversation [practice], rather than a sequence of interacting utterances [doings]." (Introna, 2018:8).

The three papers also draw upon and speak to existing bodies of literature[3]; therefore, they both owe a debt to and also make a contribution to such literature. The theoretical framework that covers the three papers were designed to follow a specific pattern. The first paper assumes a more general and wide approach, which serves to locate the research of the thesis within the existing literature in the mainstream of finance and the Social Studies of Finance (SSF). Thus, it focuses on the Efficient Market Hypothesis (EMH), which is one of the most renowned, and equally contested, part of the Modern Portfolio Theory. In focusing on the EMH, the paper introduces the main tenets of its rival theory: of Behavioral Finance (Dawes, 2001; Forbes, 2009; Howard, 2004; Kahneman, 2011; Klein, 2009; Krozner & Shiller, 2011). Beyond discussing the widely

[2] Our focus remains on insurance companies, although many of the same could be said for other institutions, as well (especially pension funds).

[3] In what follows, the discussion restricts itself to those references included within the three papers.

assumed rivalry between the mainstream orthodoxy and behavioral finance, the paper also makes a passing reference to the field of Economic Sociology (Akerlof, 1984; Granovetter, 1985, 1995; Smelser & Swedberg, 2005; Zelizer, 1988) in order to eventually focus on the literature of the Social Studies of Finance, – which complement, rather than displace such sociological tradition. The field of the SSF extends into a vast area of multiple and diverse directions. The thesis is located mainly in the literature on performativity. That is, it is oriented towards the epistemological question of the relation between "reality" and "theory" that goes beyond the traditional idea of economics describing, more or less adequately, some supposedly "real" processes (Boldyrev et al., 2016:2). The thesis is particularly interested in the performativity of models within the financial (first paper) and the actuarial (second and third papers) fields of practice. Whereas the first paper takes a more general or "ontological" stance towards performativity, – attempting to unearth its commitments (as exemplified mainly in the works of Callon, 1998, 2005; Callon & Law, 2005; Callon & Muniesa, 2002) and assess them relative to the Heideggerian ontology, – the second and third papers assume a more empirical stance relative to performativity, as they both focus on how the link between theory and reality works in specific empirical cases: the market-consistent valuation of insurance liabilities (second paper) and the solvency capital requirements of insurance firms (third paper). Thus, the second and third papers follow the more general shift of the performativity literature towards performative practices (Beunza & Stark, 2009; MacKenzie, 2006, 2009, 2011; MacKenzie & Millo, 2003; Millo & MacKenzie, 2009; Muniesa, 2014; Muniesa et al., 2007; Svetlova, 2012), oriented towards perspectives that are considerably under-studied: the valuation of insurance liabilities and the modeling of solvency for insurance companies.

The focus on the performative practices of the market-consistent valuation of insurance liabilities also allows the research in the second paper to be positioned relative to the vast literature on financialization (Çalışkan & Callon, 2009; Epstein, 2015; Jarzabkowski, 2017). The paper is interested in what is widely perceived as the intrusion of financial economics in the traditional actuarial practices through the requirement to value insurance liabilities in a market-consistent way (Turnbull, 2017). To that end, the paper offers a critical reading of the work of Jarzabkowski (2017). Her seminal ethnographic work, – located within the SSF literature, – attempts to show how financial markets actually work – specifically, how, in global reinsurance practices, such practices are impacted by the growing trends of "marketization". By analyzing the requirement of market-consistent valuation, this paper also positions itself relative to the vast accounting literature on Fair Value (Penman, 2007; Power, 2010; Towers Perrin, 2014; Zimmerman, 2007; Zyla, 2012). However, this is done from the point of view of the liability side, which is considerably less explored than from the asset side.

In focusing on the performative practices of modeling solvency for insurance companies, the research in the third paper is also linked to the recent growing literature on preemptive and forward-looking risk technologies (Amoore, 2013; Aradau & Van Munster, 2011; Anderson, 2010; De Goede, 2012; Grusin, 2010) since the solvency model can be seen as precisely a novel, preemptive risk technology. The paper is also linked to the accounting-in-practice literature; specifically, the thesis is interested in how such risk technologies alter the traditional accounting modality of the insurance institutions (Power, 2015; Young, 2011). Such connections, in their turn, lead the research to be associated with the growing recognition in the philosophy of science (Douglas, 2000, 2009; Svetlova, 2013, 2014; Laudan, 2004) that it is not possible to have a clear separation between theory (science), as exemplified in a model, and its

application, – that is, the translation of the model (theory) into the messy field of its application. In other words, to the growing recognition that the deeper we move into the "tails of the future", that is, into a world that is getting more complex, more interconnected, and thus more potentially destructive and disruptive, then, "the relationships between science, expertise, and decision are radically rearticulated so that distinctions between 'science' and 'non-science' become more malleable" (Amoore, 2013:9). The paper also does a critical reading of Lockwood (2015), a work positioned within the performativity literature, which attempts to uncover how technocratic calculative modeling such as Value-at-Risk, which shares the same ontological architecture with the solvency model, crowds-out alternative ways to imagine the "unimagined". The paper draws significantly on the performativity literature that studies the limits of performativity (Brisset, 2016; Henriksen, 2013; Svetlova, 2012) by rethinking performativity as a play of differences. As such, it also assumes a critical orientation towards the search for the constitutive conditions of performativity (Brisset, 2016).

One might then ask what the distinctive point of view of this thesis, which underlies all this theoretical work, is. Or perhaps, what are the intellectual tools that allow the thesis to draw upon, and speak to, this body of literature and theory? To do this intellectual work, the first paper draws on the work of Heidegger, and the second and third papers on that of Derrida. In other words, the intention of the thesis is to deploy philosophical ideas, Heideggerian and Derridean, to situate finance and actuarial practice within a broader context of the human endeavor, in order to see it in a new light. In that respect, all three papers are further connected with direct readings from works by Heidegger (1946, 1960, 1962, 1966, 1977, 1991, 1994, 2001) and Derrida (1973, 1986, 1988, 1990, 1992, 2000, 2001, 2005, 2008). Since Heidegger and Derrida did not write specifically

about finance, the research makes use of more recent theoretical works that re-read Heidegger and Derrida and extend their insights in many directions. We use their analyses and interpretations to build upon our specific cases (for example, referring to Heidegger: Braver, 2009, 2012a, 2012b; Caputo, 1993; Dreyfus, 1980, 1995; Dreyfus & Kelly, 2011; Dreyfus & Spinosa, 1997; Dreyfus & Wrathall, 2005; Harman, 2002, 2005; Malpas, 2008; Richardson, 1963; Spinosa, 2001, 2005; Spinosa et al., 1999; Thomson, 2005; Young, 2002, 2006. Referring to Derrida: Burke, 2002; Caputo, 1999, 2000; Cooper, 1989; Hill, 2010; Naas, 2008; Royle, 2008; Wortham, 2010).

Heidegger is used in the first paper as an initial starting point to probe and reconsider the current theoretical developments "from the inside" of the field of finance, as well as to reveal the commitments and tendencies of the much more differentiated and sophisticated literature in the SSF, to which the research subsequently turns[4]. Although the differences between Heidegger and the EMH, as well as Behavioral Finance, are easier to show, many of the Heideggerian insights are in fact already, to some degree, accounted for in the literature on performativity – for example, issues such as the blurring of the financial world, the *public* world, with the world of a model, a *private* world. As such, one of the intentions of the thesis is to uncover the more subtle differentiations between Heidegger and this contemporary body of theory. To that end, the focus of the thesis is more on the later Heidegger and his views on technology as an onto-historical phenomenon. In the words of Thomas Bay,

> "While [SSF] take a more Heideggerian position regarding finance, their prescriptions regarding markets reflect more immediate instrumentality than

[4] As exemplified mainly in Callon, 1998, 2005. See our earlier discussion.

> the philosopher would support. Rather, Heidegger would emphasize how finance is a part of a longer-term historical process." (Bay, 2018: 2).

By allowing the thesis to be informed by Heidegger, it is claimed that Heidegger is able to think not only in terms of the technologically stimulating play between contexts that reconfigure and refine, as Callon (1998, 2005) seems to do, but also, in a more radical way, in terms of *the play of the play*: that play we did not initiate, yet a "play in which [our] essence is at stake." (Heidegger, 1991:113). It is the contention of the thesis that such a play (a play already given) informs our financial practices in a "gentle" – in that it does not force but always and already allows for the possibility to be broken – yet decisive way.

As both the second and third papers shift their approach towards performative practices, we also divert our philosophical gaze and allow ourselves to be informed by Derridean concepts such as autoimmunity and aporia to account for the processes involved in the fair valuing of insurance liabilities and the assessments of solvency. The second and third papers have a common background, that of Solvency II (S2), – which is the new regulatory framework for EU insurers after 2016. In the context of S2, the valuation of insurance liabilities is dramatically altered relative to existing actuarial practices, and a new model to assess the solvency of each insurer is constructed and put into circulation. The focus here is on modeling and its promise to provide accurate prices on insurance liabilities and (in)solvency risks, to technically determine and manage the indeterminate uncertainty that threatens an insurance company. Such technocratic modeling ambitions are widely perceived as resulting in crowding out alternative practices such as expert judgements and the application of traditional actuarial prudence. Derrida's notions of autoimmunity, deconstruction, and aporia allow the thesis to differentiate itself from many of the claims that can be found in the extant literature (for example, in

Jarzabkowski, 2017; Lockwood, 2015; Power, 2004) and realize that it is not only impossible to defend such polarities – a point already shared by many in the performativity literature – but also that each of the opposing principles is constituted via the other – that is, how, in other words, conditions of possibilities transform, always and already, into conditions of impossibilities. In this respect, the thesis takes a critical stance towards efforts to use performativity as a resource to inform our practices in order to improve them or make them more intelligent. Instead, performativity is rethought as a play of differences that may both extend or limit the performativity of the model, in an undecidable way. The point, then, is not how to remain solvent – that is, control the play and regulate our financial destinies – but rather to be drawn into and lose oneself in this play, i.e., to become "with" this event (Bay & Schinckus, 2012: 4).

Given this general and high-level overview of the common context and background that informs the three papers and their theoretical position relative to the extant theorizing body, we will now proceed to a more detailed presentation of each of the three papers in order to elaborate some of these issues more specifically. The final chapter of the thesis will summarize the implications and contributions of the overall research project. It will also provide an account of the limitations of the research and the potential avenues for future work.

1.1. Heidegger and Modern Finance

As already indicated, the paper takes a close look at the financial markets and what it means to invest in them. It looks, for example, at the ways investors reach decisions about investments and how more generally, financial market is conceptualized. In that respect, it is necessary to explore initially the way finance itself, "from the inside", makes sense of itself – that is, how the theory of financial economics envisages investors to reach investment decisions.

For that reason, the paper begins by introducing the two main views within modern financial economics that largely reign the academic and the professional fields: the orthodox view under the label of Modern Portfolio Theory which includes, among others, the Efficient Market Hypothesis (EMH), and Behavioral Finance which contests the EMH and is considered its main rival.

In its broad outlines, EMH's central idea is that a stock's price incorporates all the available knowledge about the value of the company and the best predictions about the future of the stock (Kahneman, 2011:213-5). This essentially means that all assets in a market are correctly priced since, in such a picture, investors are considered to be rational, profit maximisers who compete with each other while trying to predict future market values of individual securities by processing important current information which is almost freely available to all of them.

The rival theory, Behavioral Finance, seeks instead to discover cognitive, emotional or behavioral reasons behind the economic decisions of the financial participants. In the face of well-documented empirical cases, its central hypothesis is that market participants are beings with inherent biases that corrupt their judgments and decisions, and thus have thinking processes that are flawed, inaccurate and unreliable. One of the most emblematic examples is the wide use of heuristics – that is, experience strategies, not rational nor evidence-based, – that people commonly use in thinking. In short, contrary to the EMH's beliefs, market participants are decision makers of questionable efficacy.

Such "from the inside" views are usually set in opposition to "outside" efforts, such as Economic Sociology, which attempt to apply a sociological perspective to economic phenomena. What mainly changes with Economic Sociology is the concept of the actor: where in both the EMH and Behavioral Finance, the analytic starting point is the

individual, for Economic Sociology, it is typically groups, institutions and society. Thus, the actor is seen as a socially constructed entity and the social structural levels as phenomena sui generis, without reference to the individual actor (Smelser & Swedberg, 2005:4). In that respect, whereas the EMH and Behavioral Finance simply consider an economic action to either succeed or fail to ascend to the status of economically rational action by, for example, identifying it with the efficient or inefficient allocation of risk and return, Economic Sociology gives room to traditional (habitual) economic action (Akerlof, 1984; Smelser & Swedberg, 2005:4) that goes beyond what are mere habits and rules of thumb for the orthodox, and obvious elements of irrationality for the behaviorist. In that way, Economic Sociology turns what constitutes the main resource of the orthodox view, rationality as an *assumption*, to a topic in need of investigation: rationality as a *phenomenon* to be explained, not assumed.

SSF extend such sociological tradition: investors are not only embedded in networks of personal connections but are also inextricably and simultaneously embedded in systems of technologies, cognitive frameworks, simplifying concepts and calculative mechanisms (MacKenzie, 2009:180). Therefore, such studies acknowledge that all markets "are combinations of human beings and physical objects" and that equipment or materiality matters since "it changes the nature of the economic agent, of economic action and of markets." (MacKenzie, 2009:13). In that context, SSF explore the hypothesis that financial economics' success is in part "performative" and not simply a descriptive or analytical success (MacKenzie, 2009:30). Whereas, in other words, the orthodox discerns a twostep process whereby a subject initially observes the bare financial reality out-there and then attempts to bridge what is perceived a knowledge gap by constructing an (in)accurate representation (model) of what stands out there, SSF leave open the possibility that reality itself can change by the widespread use of

the model itself. In other words, there are no two primary fixed poles of independent agents, a subject and an object, but an endpoint of agencements (MacKenzie, 2009:19-25), which are socio-technical arrangements that co-produce stability.

At this point, the research turns towards Heidegger in order to problematize and reconsider both the *inside* views of financial economics, and the *outside* views of the SSF. The point is not to use Heidegger as an external referee in order to decide which view best describes what is considered "investor's rationality" and how it is constructed in the midst of the financial markets, but to make an attempt and see through the Heideggerian lens the financial phenomenon of investing. With this attempt, it will be possible to problematize both the *inside* mainstream views and the *outside* more marginal perspective, and contribute to the relevant literature by uncovering a more neglected aspect of finance, one that does not rest on the a priori rational (EMH) or biased (Behavioral Finance) nature of investors, but neither on the a posteriori technical and social entanglements they construct.

Heidegger's philosophical attitude takes its departure from lived experience. For him, humans' most fundamental features cannot be discovered through a rational, evidence-based, scientific-type analysis, nor even a linguistic inquiry since all of them presuppose our unreflective involvement and pre-propositional way of comporting in the world. From such a starting point, he tries to walk a fine line between realism and constructivism about truths and the status of scientific entities (Dreyfus & Wrathall, 2005:9-10). He thus focuses on the notion of *being*, "that on the basis of which beings are already understood" (Heidegger, 1962:25-6). A culture's understanding of being, i.e., the style of life manifest in the way its everyday practices are coordinated, allows people and things to show up as something – that is, the shared practices into which we are socialized provide a background understanding of what counts as things, as human

beings and what it makes sense to do. Such a central insight allows Heidegger to assume, in his later works, a historicist perspective since he acknowledges that the history of the West consists of a series of "epochs" of different understandings of being, where the "unconcealment" (truth, or better yet, what grounds truth) of beings varies according to such background understandings. In that respect, each epoch (pre-Socratic, ancient, medieval, modern, and contemporary/technological) has its own understanding of being which determines its "beingness," or how all beings are in that age, including man. Heidegger calls these understandings "sendings" from being, in an obvious attempt to indicate that they are not the results of our conscious choice or transcendental faculties (Braver, 2012a:190-1). Such historical sendings of being give him a perspective on the basis of which it is possible to understand the emergence of modernity that culminates in the (postmodern) technological understanding of being.

In terms of the financial economics field, this historicist perspective implies that the emergence of the modern financial economics of the EMH and Behavioral Finance is a historical phenomenon that has simply transformed markets into epistemology-centered arenas where the fundamental problem is how to develop a system of justified true propositions that can support, and subsequently trigger, the appropriate economic actions. Just as a valid argument produces only true conclusions from true premises, the idea is that a properly built, e.g., risk management system insulates the circulation of financial truth throughout its entirety (Braver, 2012a:173). Both the EMH and Behavioral Finance, in their ontology, treat all financial propositions as epistemic and hence as subject to tests of truth and responsible belief; therefore, we need to conduct epistemological "stress tests", like Socratic elenchus or Cartesian doubt, maintaining only those which pass the tribunal of reason (Braver, 2012a:130).

In that respect, Behavioral Finance simply raises the stakes by imposing an extra set of required filtrations to render observations and inferences as impersonal and as much divested of any local, temperamental or psychological biases as possible, of the kind identified in the experimental work of Kahneman and Tversky (1979); other than that, it remains like the EMH, framed in an ontological picture of investors as subjects or knowers and the investment world as an object of knowledge.

Based on the Heideggerian concept of understanding of being that creates a clearing where things show up as what they are, the thesis attempts to reconsider financial markets in a way that goes beyond epistemology-centered arenas, as the EMH and Behavioral Finance suggest. Financial markets are thus rethought as a clearing that organizes and preserves dissonance, generated by dissimilar participating investment styles that clash and meet each other, where the place of meeting is the transaction price. Every market calculation that bestows a value, and thus every market transaction, - can only take place on the basis of local investment communities that disclose a way of *being in the world* that matters most to us. In such a way of *being in the world*, an insistence on the salience of certain possibilities takes place, through the use of a particular kind of *mots justes*, that excludes or presents other possibilities as irrelevant. Therefore, the act of a simple market transaction is not only or exclusively stimulated by epistemological motivations (of a modern imperative) that may degenerate into mere algorithmic signals (in a technological universe); rather, it is an agent's act of situating herself in such a way within the investment universe that attempts to bring out, at its best, the style of her investment community. The portfolio builder does not simply understand and construct her portfolio in objective or subjective terms; rather, she comes to see the entire world through her portfolio.

Such Heideggerian rethinking of financial markets allows the thesis to resolve a puzzle brought forth by the Nobel laureate and Behavioral Finance guru, Daniel Kahneman. For Kahneman, a simple market transaction looks like an almost insurmountable contradiction: what makes a person *buy* and the other *sell* given that they share the same information? Such a question is indeed puzzling if regarded from an epistemic point of view: obviously, one of the parties fails to rationally interpret the objective financial evidence. One of them is right, and the other is wrong – at best. At worst, both parties are wrong. Thus, Behavioral Finance's condition of the possibility for a simple market transaction rests on a mistake resulting from defective judgment, deficient knowledge, or carelessness in the face of the given, transparent financial information: in short, from some sort of biases. Of course, equally perplexing is the EMH's perspective according to which there should only be market transactions that solely gain exposure to the Market Portfolio – nothing more nor less.

However, from a Heideggerian point of view, Kahneman fails to entertain one more possibility: both parties could equally be right. From an analytic point of view, this possibility is a plain contradiction, but – it is not if reason itself is not universally but locally emergent on the basis of a prior inexplicit or unthematic understanding of the way the world opens up. Within her local investment community, the investor simply attempts to bring out the style of her investing understanding, at its best; in such an attempt, she may succeed or fail (so both parties of the transaction may be right or wrong) regardless of the actual payoff: money ("return" in the financial parlance) can only support or force the collapse of the particular's style investing practices, and further release new possibilities in such practices.

After this first critical assessment of the views "from the inside" of finance, the research turns to examine a more sophisticated perspective, which is certainly closer to

Heidegger, as articulated in the SSF body of literature. What is pointed out is that in Callon's (1998) analysis, an economic actor is not an individual human being, nor even a human being embedded in institutions, conventions etc., but is "made up of human bodies but also of prostheses, tools, equipment, technical devices, algorithms etc." (Callon, 2005:4).

In this respect, the field of SSF is excellent in capturing this anti-essentialist play on how, for example, the financial calculator can render an agent both *more* (as predicted by the neo-enlightenment project of the mainstream financial theories) and *less* sophisticated than initially acknowledged. This is accomplished by focusing on the particular technological devices, their materiality, algorithmic configurations and so on, which uncovers what a "computer solution" is in practice: nothing but a chain of further problems, a cascade of updates, an endless interplay of framing and overflowing. For Callon (1998:18), "overflowing" denotes the impossibility of total framing: technologies may allow the framing and stabilization of actions, yet they simultaneously provide an opening onto other complexes, thus constituting unexpected leakage points where overflowing occurs. Therefore, for Callon, an asymmetry is created as long as the probability of gain is on the side of the agency with the greatest powers of calculation, i.e., the one whose tools enable it to perform, make visible and take into account the greatest number or relations and entities (Callon, 1998:45).

According to Heidegger's perspective, there is no doubt that within styles of investing, calculative practices are mixed with humanizing attributes in a hybrid way that creates surprises which are transformative, thus enriching and refining understanding. There is no doubt that practices become "more refined, richer, delving into the complexity of relationships", and indeed, practices do tend to gather; gathering is Heidegger's name for how a new way of doing something brings all the disparate aspects of the matter or

activity together (Spinosa, 2005:492). However, such practices have a kind of telos for Heidegger; this telos depends upon the rest of the practices in the investment community, the kinds of identities the community supports, and the kinds of traditions and uses the community is familiar with and holds valuable (Spinosa, 2001:218). For Heidegger, the entirety of the agent's financial life is felt as directed towards that telos, which of course, may take on a new look and collect all the already built-in sophisticated skills to shine in a new way. All investing styles (e.g. value investing, momentum trading, asset/liability matching, risk-return optimization, quant-type arbitrage) are made possible on the basis of our Western historical destiny that matters most to us. The multiplicity of meanings is always something historical for Heidegger (1991:96), and this historical multiplicity of value or meaning attribution is well preserved and displayed within the public sphere of financial markets which open up and preserve fields of historical solicitations. Such solicitations create a market reality exactly at that point where irreconcilable understandings rash against all others, challenging and shattering all others' way of understanding and organizing experience. The density of this "othering" results in a market reality that is *transgressive*, not dialectic nor synthetic, as the EMH and Behavioral Finance would imply in that sooner or later, a rational or irrational equilibrium would prevail. It would also neither be simply asymmetric, as SSF would imply, in that the party with the more sophisticated agencements or prosthetic powers will always retain a higher probability of gain through the created asymmetries.

In that respect, if a market reality is transgressive rather than asymmetric, then the "other", i.e., what remains outside the understanding (style) that shelters and secures valuation, the excluded, is not waste; instead, it is what enables market reality. Every valuation creates a deficit that is filled by the other, and thus a transaction (the simple

product of disparate valuation practices) can be said to be a common project between two parties that effectively share nothing in common, making the market a potential community without commons.

Based on this Heideggerian re-framing of the financial market, the thesis is allowed to extend SSF's classical argument about the entanglement of the technical and the social: financial markets are conditioned by a further (unsuspected by SSF) entanglement, that among styles, which rise out of the concrete inheritance of understandings of being.

In its rest, the paper probes deeper into Heidegger's views about the technological understanding of being and brings into focus a neglected aspect of the financial practices, being the fact that we make sense of them in terms of "bulls and bears", in order to further support and sharpen the point of the analysis. This point can be stated as follows: if we nullify the distinction between styles, the same way SSF nullify the distinction between the technical and the social, then what remains is this ongoing play of the "sendings" of being which plays without "why": the mysterious withdrawing and sheltering of the different styles that are granted, linger for a while, only to go in the margins again. This simple, plain waxing and waning of the multiple sendings of being, that do not persist in their presence but moderate (i.e., economize) themselves – such may be the Heideggerian workings of financial markets. A play though, that is beyond SSF's technologically stimulating play between contexts that reconfigure and refine.

1.2. Folding the Actuarial: The Aporetic Financialization of Risk Liabilities

The second paper focuses on the actuarial practices of the valuation of insurance liabilities. Insurance liabilities have traditionally been considered complex and technical, "a countryside to explore on foot and not by fast cars." (Kennedy et al., 1976:46). This is why trading insurance contracts, which would provide a market value, is generally not seen as possible. Such natural distaste against standardized market

valuation has traditionally given ample space to actuarial practices that tended to estimate reserves in close relation to their underlying subtleties and over their full lifetime – what is usually called "run-off". However, such run-off approaches are orthogonal to modern financial economics' conceptualizations which are market-oriented, and simply ask for the replication of the liability cashflows through a current portfolio of assets as closely as possible (Hibbert & Turnbull, 2003:726).

After 2016, Solvency II (S2), the new regulatory framework for EU insurers, explicitly demands a market-consistent way of valuing both assets and liabilities. Such a shift towards market-consistent (economic) valuations is widely perceived as requiring the technically obscured actuarial valuation expertise to be reduced to the mere mechanical plugging in of the market's latest bond prices (Turnbull, 2017:268). However, this seems almost impossible given the technical minutiae of every liability portfolio. Nonetheless, it could be argued that financial markets are specialized in exactly this: how to derivate a price (Preda, 2007), often in the absence of any standardization, or even an underlying entity to price (Aspers, 2009). After all, the basic tenet of marketization is that risk *can* be managed and transferred via market mechanisms (Çalışkan and Callon, 2009), whatever the case at hand.

Traditional actuarial practices are closer to what Jarzabkowski (2017) describes as the blending of *technicalizing* and *contextualizing* understandings. Actuarial valuation is generated at the nexus of these two practical understandings (Jarzabkowski, 2017:84). Technicalizing refers to the initial use of actuarial probabilistic models, which, after being loaded with the relevant empirical data, have the ability to generate a set of technical values via appropriate actuarial reconstructions of past events. Such technical outputs, however, do not comprise the endpoint of the valuation process. On the contrary, they serve as anchors that provide structure for the valuation process and a

point of departure for “qualitative overlays” (Svetlova, 2012:430). The latter are based on actuarial and management expertise relative to the particular contextual features of the underlying liabilities and to the well-known limitations of the models. Such effective contextualizing practices compare and amend the generated set of technical values to arrive at a final valuation figure (usually called “selected”) that is considered relevant and appropriate. In that way, actuarial valuations remain meaningful (contextualizing), even as significant statistical, actuarial abstractions are achieved (technicalizing).

Such an approach differs from existing research into the role of models in calculation and the performativity of markets (MacKenzie, 2006, 2003; MacKenzie & Millo, 2003, Millo & MacKenzie, 2009; Muniesa et al., 2007). Performativity theory, in its strong form, implies that the model unambiguously shapes or conditions how, for example, option traders make decisions and behave – a hard structure from which everyone obtains similar results (Svetlova, 2012:419). In other words, the technicalizing force of the model is considered dominant in the (strong form of) performativity literature. Such a dominant technicalizing aspect is clearly mitigated in the insurance sector by the blending of contextualizing practices since such practices allow for ad hoc changes, deviations and selections from the purely technical outputs of the actuarial models. In that respect, contextualizing practices feed in counter-performativity in the process of valuation. However, the point is that the financialization pressures and demands for market-consistent valuation of liabilities tilts the balance towards the technicalizing aspects of the process; contextualizing practices, which feed in counter-performativity, are consequently marginalized.

This is because in market-consistent valuation, models are no longer oriented towards the liability itself; rather, they are calibrated to the market. Of course, the absence of market transactions (as with insurance liabilities) is a problem, in that prices cannot be

extracted directly from the market. In such a case where the direct use of quoted market prices is not available, a model which extracts an "implied" fair value by reconstructing a hypothetical transaction given current, generally available market data should be employed. Therefore, if meaningful valuations were traditionally generated at the nexus of technicalizing and contextualizing, then Jarzabkowski is right to ask worryingly what might happen if contextualizing becomes a skill of the past (Jarzabkowski, 2017:180). The demand for market-consistent valuation seems to strain traditional actuarial modalities which tended to temper models' technicalizing tendencies by requiring contextualizing expert knowledge, potentially increasing the performativity aspect of the valuation models.

However, by researching closer the way in which financialization of insurance liabilities is materialized, the paper's approach departs from Jarzabkowski's blended two-stream schema. By zooming in on what is considered an invasion of short-termism into long-termism, i.e., market prices into actuarial values, an aporia emerges that dictates how the further technicalizing is accentuated, the further it requires contextualizing; that is, the further we stretch to attain a purely market, short-term view, the further we find ourselves entangling with long-term actuarial views. The thesis of the paper is thus closer to that of Muniesa (2007) who, in his analysis of the automation of Paris Bourse's closing auction, uses a culinary metaphor to describe how automation can retain a social component: according to him, just as cocoa powder has to be carefully "folded" into fresh cream to preserve the qualities of the cream, the social aspects of a live trading floor need to be understood and then adapted into algorithms to preserve the social component of a market (Pardo-Guerra et al., 2010).

In that respect, the contribution of the paper is twofold. Firstly, it suggests, as per Jarzabkowski's two-stream schema, that the financialization of insurance liabilities

does not uncritically expand financial economics (practices oriented to the market with a dominant technicalizing aspect) at the expense of actuarial logics (practices oriented to the underlying liabilities with an effective contextualizing aspect). Instead, it becomes possible to preserve the actuarial component of the insurance business, as long as the actuarial aspects are recognized and then adapted into market-consistent valuations. Secondly, in close relation to the first contribution, that if this holds, then this suggestion is theoretically supported and anticipated from a Derridean perspective which detects within our practices, including the modeling valuation practices, an "autoimmunity" process. This process turns something, e.g., the financial sovereignty of the valuation, against its own defenses – it is a process inevitably at work at the heart of every sovereign identity. Such autoimmunity tension that inheres in the midst of the financialization project, simultaneously constituting and de-constituting the financial sovereign and thus the modeling valuation practices themselves, has been neglected from the current performativity literature. For example, Muniesa (2007)'s aforementioned folding position implies a mild preservation process for that component (in our case, the actuarial component) which is in danger of extinction – a mildness that is far from the "aporetic" strain and restlessness which accompany Derrida's autoimmunity concept. MacKenzie (2006), on the other hand, takes an empirical stance and simply sees models as subtle sovereignties that may empirically perform or counter-perform the markets, without any further theorizing ado about the constitutive elements of the phenomenon. Svetlova (2012) who, although rightly so, sees models as departure points from their technical sovereignty, her perspective seems to trail a practical instillation "from the outside" of a fresher and more invigorating "qualitative" layer into 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

the inside". In that respect, the second contribution of the paper is to extend this part of the performativity literature towards the recognition that an autoimmunity process is at work within the modeling valuation practices of insurance liabilities, which simultaneously constitutes and de-constitutes the financial and actuarial aspirations of the valuation process.

To that end, the research in the paper begins by identifying the key points involved in the process of modeling valuation practices before and after S2. Before S2, the point of the valuation process was to come up with adequate reserves[5] – that is, 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 (Tunbull, 2017:221). In that respect, actuaries did not hesitate to overcome technical specificities and inject significant margins of prudence within their actuarial valuation models. Such prudence margins were (and still are) a substantial steering (and competitive) tool in the hands of the management, as long as they can be accurately budgeted via actuarial techniques and thus piled or released throughout the peaks and valleys of the market risk-cycle[6], in effect operating as a stabilizing factor against the swings of the economic environment and the wider claims experience and competition.

In contrast, market-consistent valuation as dictated by S2 requires the reconstruction of a hypothetical fair market transaction via a valuation model that breaks up into two explicit pieces: a *best estimate* and a *risk margin*. Best estimate approaches may build

[5] Reserves or Technical Provisions, i.e., the value of what is usually referred to simply as "insurance liabilities", is perhaps the most distinctive feature of the insurance business. Granting insurance automatically involves creating technical provisions to meet promises of future compensations (under)written by the insurer. In simple terms, reserving is about identifying that amount of money which needs to be set aside today to account for liabilities as they fall due in the long-term or for claims that have not yet been settled.

[6] The market risk-cycle shifts between hard and soft markets on the basis of the cost of capital available in the market (Jarzabkowski, 2017:205).

on existing actuarial technicalizing and contextualizing practices, but they simultaneously include a shift from a more contextually tilted "adequate estimate" to a more technically tilted "expected or mean value". Risk margin, on the other hand, is intended to represent the amount to be transferred to a third party in order for that third party to cover the expected cost of future regulatory capital on the transferred business; what is relevant to the research, though, is that it is not a (prudent) margin on the reserves.

Before S2, reserves and the prudence margins that did (or did not) accompany them were the major lever that determined an insurer's success or failure along the market risk-cycle. Capital[7] was still there, but as it was calculated in a rigid rules-based way, and it stayed more in the background as a typical regulatory obligation. It was the reserves, and the wise use of their periodical accumulation and de-accumulation (release), that allowed the insurer to survive the perils of the market risk-cycle. In fact, a good actuary was recognized by her contribution to the injection and consumption of the prudence margins in the face of the risk-cycle's uncertainties.

In the current, post-S2 financialization era, such a schema is considered too opaque and inward-looking. That's why it is significantly changed to reflect a new set of sensitivities which is closer to the capital markets. Reserves lose much of their prominence and become a simple number, extracted either by the market or by a technical exercise, which makes maximum use of generally available market data and cannot be overlaid by qualitative judgments or contextual business needs. Reserves are there to cover anticipated risks, i.e., the mean of the distribution – nothing more, nothing less. The rising star now becomes *capital*. Its purpose is to cover for the unexpected

[7] The statutory minimum capital which an insurer must have available (beyond reserves) to ensure that it will remain solvent even if extreme risks materialize.

part of liabilities, or in other words, to provide a buffer to absorb extreme movements, usually referred to as the "tails" of the risk distribution. Capital under S2 is risk-based, meaning analogous to the risk assumed by the insurer. It is risk-sensitive, based on the simple idea that the riskier the assets and/or liabilities, the more capital needs to be committed. Such risk-sensitive capital now becomes the new lever for insurers to survive the market risk-cycle. In hard times, the insurer may pull it downward and de-risk herself. In good times, she may push it upwards to assume greater levels of risks. Everything thus boils down to the new *capital* lever. How is it going to fare relative to the old, *reserve* lever? Is Jarzabkowski right to claim that the new capital lever is privileging the technicalizing aspects of the business at the expense of the contextualizing ones, or, stated differently, that it is raising performativity and model risk to the highest?

The paper suggests that even in the financial economics paradigm, the actuarially driven practices are recognized, re-packaged and folded (Muniesa, 2007) into the newly engineered market-consistent envelope. For example, take the matter of reserving: although it has been transformed into a technical exercise to estimate the mean value and does not allow for any prudential (or aggressive) margin, S2 still requires the insurer to allow for *all* possible outcomes in setting its reserves and not just the reasonably foreseeable or some other subset. In other words, an additional amount needs to be included in the best estimate to ensure that the best estimate is a "true" best estimate (mean) of *all possible* outcomes, as opposed to something less, such as a best estimate of *all reasonably foreseeable outcomes* (IFA, 2013:45). Such an amount provides for the very low probability but very high severity events that tend to be ignored since they are not contained in the data and are often referred to as Events Not In Data (ENID). The allowance of ENID is a new and obviously very subjective element of calculations

(IFA, 2013:82). It disrupts the technical, market-consistent calculation of reserves and requires a form of calibration with something that is beyond data and markets themselves. Such a calibration ends up with a loading that is very difficult to validate, i.e., to assess in terms of its inadequacy or excessiveness. In that respect, the allowance for ENID provides actuaries with one more lever, beyond the capital one. It allows for a countercyclical management of prudence that may better match the insurer's business and market cycle's contextual reality. It legitimizes, in other words, pre-S2 actuarial sensibilities that encouraged contextualizing practices. In that respect, the financialization project recognized, and thus folded within its sovereignty, levers that are orthogonal to the logic of its own capital lever. This means that it allows for the possibility of the capital valuation model to counter-perform in normal times (since more capital is required due to the ENID loadings) and to perform in non-normal times, contrary to the initial technical tendencies of the capital lever.

The conclusion of the paper's research can be summarized as follows: the more exclusive a market-consistent and thus short-term and technical (i.e., reliable) view becomes, the more the insurance company will be forced to betray its long-term commitments and stop following an insurance business model. This is because an insurance business model can be as such so long as it can exploit an arbitrage opportunity of ignoring short-term market pressures by precisely appropriating its liabilities. On the other hand, the more exclusive an actuarial and thus long-term and contextual (i.e., relevant to its liabilities profile) a view becomes, the more the company may not get to the "long-term" because it will be declared insolvent before it gets there (Merz & Wüthrich, 2008:545).

From a Derridean point of view, the research analysis reveals an "autoimmune process" in which the financial sovereignty of short-termism produces, precisely in order to be

sustained, the very actuarial long-termism that threatens to undermine it (and vice versa). In precisely such an autoimmunization process, the financialization of insurance liabilities creates its own sovereign capital lever that can only have a future if it allows itself to be de-leveraged by its "other" – that is, an actuarial one that produces surprises in normal times so as to disrupt technical complacency and prompt accumulation of capital in the face of the imminent non-normal times.

To simply account for the blending of technicalizing and contextualizing, as well as the inherent tension which exists between them, as Jarzabkowski (2017) does, falls short of Derrida's autoimmunity concept. For Derrida, the relation between the technicalizing and the contextualizing is always already aporetic, meaning that it suggests an absolutely impassable situation which cannot be resolved through rational analysis or dialectical thought (Wortham, 2010:15) due to a "constitutive autoimmunity" that simultaneously threatens both of them and allows them to be perpetually rethought and re-inscribed (Naas, 2008:124). If this is the case, then a model, as the site of technicalizing and contextualizing practices, may perform or counter-perform the market, but such performativity issues arise in the first place because the model is always already disrupted by the inscription of an autoimmune impossible possibility: *impossible*, due to its autoimmune transgressions that keep it open and unsettled, and *possible* because it is perhaps the only one worth its name (Wortham, 2010:15) since a "possible" possibility would fail to open up a possibility beyond that already enveloped or prescribed within the various levers.

The paper concludes with a more general comment on the act of valuation that is in line with the research conducted. The uncovered-by-the-research impossible possibility of the act of valuation cannot be resolved by more sophisticated technical analyses nor through the availability of more big data and neither by becoming all the way native

(i.e., increasingly allowing itself to be immersed in the context). The aporia inscribed makes value self-deferring, always left unsaid and always to-come. Valuation calls for reevaluation, not because more data is at hand and/or a better calibration is possible, but precisely because valuation itself relinquishes its sovereignty and self-identity. It thus comes to denote not some past, present or future valuation regime but a field of possibilities in which all valuation regimes might arrive or appear, and as that field of possibilities, it would be irreducible to any of these regimes (Naas, 2008:41). Such a field is full of cracks, i.e., full of borderline areas, mixtures and marginal spaces, but it is also what gives sense to the whole actuarial and financial economic valuation infrastructure. In that respect, there is no answer in the question of valuation of insurance liabilities; the attempt at answering is the only actual answer.

1.3. Pricing (In)Solvency: Performativity as a Play of Differences

The third paper takes as its research object Solvency II (S2), the new regulatory framework for EU insurers that has come into effect after January 1st, 2016. S2 is a market-consistent, risk-based regulatory standard. This means it requires a market-consistent valuation of the insurer's assets and liabilities, and it determines, by adopting a risk-based approach, the appropriate amount of capital that each EU insurer must hold as a buffer to reduce its risk of insolvency. In the second paper, the focus was on S2's requirement for market-consistent valuation of the insurance liabilities. In that framework, there was an inevitable discussion regarding what was termed the "capital lever", i.e., the capital requirements as determined by the S2 risk-based model. The "capital lever" was introduced to precisely juxtapose it with the "reserve lever" that dominated the actuarial landscape in the pre-S2 era. In the third paper, the focus is exclusively on the S2 risk-based algorithm (the "capital lever" of the second paper) that allows the determination of the appropriate capital requirements for each insurer based

on the specific risks the insurer assumes[8]. In that respect, the third paper focuses on the efforts of the S2 risk-based model of pricing risks and investigates the S2 standards (more generally) and the S2 risk-based algorithm (more specifically) as a tool that is used by insurers for efficient risk management purposes.

What is more, while the second paper theorized its research findings in the modeling practices of insurance liabilities' market-consistent valuation with the help of the Derridean notion of autoimmunity, the third paper further extends this Derridean approach and proposes to go as far as to rethink the concept of performativity itself as a *play of differences*. This is because the research conducted in the third paper uncovers a peculiar combination of circumstances with regard to the existing body of performativity theory: on the one hand, performativity literature reveals that economic ideas and models change, shape and construct reality, rather than simply describe it. In that respect, the wide use of a risk management tool, like the S2 model, changes reality in ways that might reinforce or undermine the model's initial aspirations. The performativity commitment, therefore, is about the entanglement of knowledge (theory) and practice (Boldyrev et al., 2016:7); it cannot be about evaluating what is "better" or what "succeeds" from a privileged knowledge viewpoint that can safely guide practice. However, on the other hand, as long as the performative spillover effects are detected and disclosed in the literature, a tendency can be noticed that seems to underlie part of the performative analysis conducted, and that is the use of performativity as a resource to provide a more informed and more nuanced response to the *"what might be done?"* question. A telling example can be found in Michael Power (2004) who, after providing a convincing and thorough diagnosis of the first- (primary) and second-order (performative) risks of the risk management practices, finds himself in a privileged

[8] This is why the approach is termed "risk-based".

position to conclude with a few suggestions on how to secure an "intelligent" risk management approach. Such intelligent suggestions obviously address both primary risks and performative effects in ways that current organizational practices most probably fail to do[9].

Another example, but in a slightly differentiated way, is Lockwood (2015). Lockwood is keen to clarify that her goal "is not to advocate specific financial regulatory reforms", but she hopes instead "to create space for alternative or additional ways to acknowledge, act in, and respond to a world of risk, uncertainty, and reflexivity." (Lockwood, 2015:749). Such a space can be opened up as long as we follow her criticism about how the apolitical and technocratic technology of the Value-at-Risk modeling (a structure eventually adopted by the S2 algorithm itself) is not only inherently unable to predict the unpredictable, but also renders the unpredictable unimagined by crowding out alternative anticipating responses such as subjective judgment and systemic financial regulation (Lockwood, 2015:743).

In other words, whereas Power (2004) uses performativity to enhance our intelligence in designing risk management systems, Lockwood (2015) uses performativity to show how intelligent risk management systems are in need of something alternative to the technocratic nature of the Value-at-Risk models, i.e., something precisely crowded out by the extensive use of such models. In both of these cases, performativity is used as a resource to restore and set right something which is (rightly) felt as deficient. The research point of the third paper is obviously not to delegitimize the performativity perspective; however, it closely follows Introna (2018), when he suggests that

[9] Although the third paper does not mention it, another telling example (which also reveals the inner connections between the three papers) can be found at the end of the first paper, where Beunza (2009), one of the most prominent researchers in the SSF literature, is quoted to talk about initiating a "performativity hedge fund" – that is, using the performativity concept as a central resource to design more informed and intelligent investment strategies that can make money.

"…scholars want the world to always add up", and in our case, it is performativity scholars who want the world to always add up: we tend to suggest that if we had done this or that, then our risk management practices would have been "intelligent" and the failure (in our case, insolvency) would have been avoided (Introna, 2018:17). In that respect, understanding performativity and why, for example, one theory can affect the world while another cannot (Brisset, 2016) becomes a crucial resource in our efforts to decide "this" rather than "that", thereby designing and implement an intelligent risk management system that can stave off insolvency.

By taking as its case study the S2 standards and the S2 risk-based model, the research in the third paper proposes rethinking performativity as a play of differences. Such rethinking allows researchers to see that performativity is both extended and limited in an undecidable way; therefore, it does not render itself to be used consistently and unambiguously as a resource to restore or optimize. Performativity as a play of differences focuses on *not* knowing, which leaves the issue at hand, e.g., the prices on risk as produced by the S2 model and therefore the issue of solvency itself, as an open and unsettled issue – perhaps for another, different round of modeling efforts to initiate, in their turn, their own deconstruction. Under this view, models are not constituted within an oppositional field: their technicality (idealization) does not undermine subjective judgments (de-idealization); they are also not dialectical: they do not ascend the staircase of the dialectic by going through the lower opposites to attain the higher (Olthuis, 2002:84) since, in the differential play, what is lower can never be left behind, and there is no ascending staircase involved. Models as constituted effects of the differential play of traces are instead always and already "deconstructable" and aporetic.

Even if we were able to identify the conditions that need to be fulfilled for a theory to be performative, as Brisset (2016) seems to do, such conditions can only remain

necessary, but they can never be sufficient. That is, they can only explain, but they cannot determine. In that respect, the third paper extends the existing literature on performativity by recognizing that if performativity is simply an effect of the differential play of the model traces (i.e., the differences it introduces and instantiates) and thus, following Derrida, is undecidable and non-formalizable, then the point cannot be about our ability to keep our head in the midst of the play and rationally exploit the decoded performativity mechanisms as a resource to regulate solvency or, in the framework of a more general noble cause, the financial cycles of booms and busts[10]. The point is not to safeguard our entities (an insurance entity, in our case) from the dispersal, but to disperse such entities into the play.

To that end, the third paper begins its research project by disclosing the basic theoretical idea that drives risk-based capital: the riskier the assets and liabilities are, the more capital an insurer has to hold. In that respect, a risk-based capital approach conveys a very clear message: should insurers expose themselves to *more* risk, they are required to hold a larger amount of capital to operate as a buffer in the event of adverse developments. Should they expose themselves to *less* risk, then a lower amount of capital is required. In such a context, it makes perfect sense for insurers to decide, a priori, the level of risk they feel comfortable with, i.e., to define their risk profile or risk appetite, and then navigate (risk-manage) themselves accordingly so as not to breach the risk tolerance limits that effectively quantify their risk appetite, or, in case of a breach, have a proper plan in place for re-alignment. In that respect, such a simple idea turns itself into a powerful governance tool of risk management which redefines insurers' activities (relative to the pre-S2 era).

[10] As, for example, seems to be the concern for Beunza (2010), as noticed at the end of the first paper.

However, the core problem of risk-based capital is how to define and technically measure individual and enterprise-wide risk, i.e., how to put a price on risk. It is not that we can somehow stick some sort of "risk-o-meter" deep into the financial and insurance system to get an accurate measurement of the risk of complex financial instruments and insurance liabilities (Danielsson et al., 2015). This is because risk is an elusive entity with both technical and social aspects. In fact, it seems less of an entity with clear boundaries and more of a vague horizon on the basis of which specific entities, like equities, show up as threatening. Thus, the technical quantification of risk seems quite ambiguous right from the start; nevertheless, for risk-based capital, such measurement is of necessity since, in the absence of sound and accurate risk measurements, risk-based capital is, at best, meaningless and, at worst, dangerous (Danielsson et al., 2015). To that end, S2 follows finance theory and defines risk as a matter of volatility in expected outcomes (Power, 2004:14). Such a definition allows capital requirements to exhibit risk sensitivity by adopting a scenario-based approach. Key parameters surrounding the scenarios have been calibrated, thanks to the technical analysis carried out by the European Insurance and Occupational Pensions Authority (EIOPA), which is, by definition, an independent advisory technical body that assists the European Commission in the design of S2. Calibration and relevance are thought to be secured by the use of current and historical market and industry data in line with the inherent characteristics of each individual risk submodule. All of this ensures that the solvency assertions, which "imagine" and prepare for the unpredictable, of the S2 model enjoy a scientific and technical calibration with a confidence level of 99.5%.

Such a technical calculation by the S2 algorithm does not just make possible the assessment and management of the current solvency status, but opens up a further, more

radical possibility, in that it makes possible the separate examination of solvency capital requirements with respect to future risk emergence over a longer time horizon.

By requiring solvency to be assessed both in current and in forward-looking terms, S2 manages to integrate the traditional accounting modality with practices of organizational governance, like enterprise risk management (Young, 2011), in a radically new way. Indeed, the traditional, prevailing accounting modality has been that of the point-in-time balance sheet in which the static presentation of history has been regarded as more reliable than the uncertain projected future (Power, 2015:51). However, as our temporal frames of the future shift increasingly towards an "emergency imagina[tion]" of a potentially catastrophic future (Opitz & Tellmann, 2015), static presentation of history becomes less and less relevant. What matters now is how such a radically uncertain future can be rendered technically visible and acted upon in order not to be lived, but precisely to be survived (Elmer & Opel, 2006). The S2 current and future risk assessments dynamically link the balance sheet as a point-in-time statement of assets, liabilities and own funds with all current and emerging risks that are technically imagined to be faced by the organization and their management. Doing so effectively removes traditional balance sheets' foothold on history and resets it towards the unexpected, embodying the principle that, in the face of a radically uncertain future, history is a poor predictor of future outcomes (Power, 2015).

Next, the research shifts its attention to disclosing the counter-performative effects of S2's algorithmic technology. Two counter-performative effects are examined: procyclicality (in both the asset and liability sides) and gaming of the model. The first is generated due to the fact that all insurers are obliged to use a model with the same ontological architecture, i.e., a model that technically dictates a uniform response; for example, in falling markets, that response would be "de-risking" by selling. What is

more, the research reveals that the philosophy of risk-sensitive capital charges cannot so naturally extend in the field of insurance risk. This is because, in the insurance S2 framework, high reserves result in higher capital charges, but this is counterintuitive in that, traditionally, a high reserve ratio relative to premia was considered a healthy indicator for the insurer.

The complexity of the relations within the S2 model and its vast informational and input needs also make the model vulnerable to gaming. In that respect, S2 should not be seen as an algorithmic chain that transparently binds raw data with prices of risk which accurately represent the level of risk absorbed by the insurer from the world out there. Rather, it is more accurately described as a modeling "swarm" (Bennet, 2010:32) of flows that participate in a particular ontological choreography (Introna, 2016:25; Thompson, 2007), in which each member can potentially determine the output in a more or less significant way.

Having disclosed both the novel set of possibilities that are opened by the S2 model and its potential counter-performative effects which undermine the initial inspirations of ensuring solvency and policyholder protection, the paper is in a position to state the inherent aporia detected within the S2 project itself (an aspect of a more general aporia in the concept of solvency itself): the more technocratic risk is managed, i.e., the more insurers strive to implement and use the S2 model in an efficient self-disciplinary way, the more the insurer herself, due to efficient gaming, and/or her macro environment, due to procyclical effects, turn unstable, endangering solvency and policyholder protection. In the face of such an aporia, the research assumes a critical stance against Lockwood (2015) in that her appeal to a "soft" rationality, capable of policing, delimiting, substituting - "hard" modeling, cannot restore its deficiencies in the fight against uncertainty. The argument of the paper is in fact closer to Svetlova (2012)'s

view, that we simply *cannot* know whether a model may perform, even if widely adopted, since models are always and already open to soft adjustments to assume relevance in the "meshwork" (Ingold, 2011) and complexities of the market life happening (Introna, 2018:8). In a similar vein, counter-performance alternatives such as subjective judgments and macroprudential regulation (the ones Lockwood appeals to) may simply fail, even if widely adopted, since such soft imperatives are always and already open to hard adjustments in order to assume reliability and allow for responsible decision-making.

In fact, S2, despite its commonly recognized scientificly-based, technical and hard structure, is surprisingly keen to provide a wide range of "soft" alternatives to manage its own potential model performativity. For example, despite S2's commitment to market consistency (that is, to fairness and transparency), calls for prudence (which is subjective and opaque) are central within its standards; in fact, demands for market consistency *and* prudence (as if their co-existence is unproblematic or natural) go together in the valuation of insurance liabilities. Further demands for soft qualitative overlays such as proportionality, simplifications and the "four eyes principle" are scattered throughout the S2 directive. What is more, a surprisingly extended range of tools and measures is provided to manage the tendency of market consistency to beget procyclicality, and these measures have the perverse effect of deferring market consistency in many circumstances.

Beyond such "explicit" soft transgressions which blur the scientific application of the standards, the paper, by researching deeper within the calibration of the equity risk submodule, reveals that S2 incorporates in its application an inexplicit, and thus more radical, play between the technical and the prudential, i.e., the scientific and non-scientific. Its algorithmic code, by its own standards, is found to be "skewed" from a

"scientifically true" 99.5% calibration in order to precisely account for an inherent aporia that disrupts the solvency project. Specifically, an economically pure calibration at such a high level of 99.5% renders capital requirements so burdensome for the industry that it will necessarily end up reducing its diversity by allowing only larger, and thus fewer, insurers to achieve solvency by S2 standards, which by itself implies an increase of the insurance systemic risk – precisely what is to be avoided in the first place. On the other hand, a looser, non-economic calibration may preserve the industry's diversity by allowing more and smaller insurers to achieve solvency by S2 standards; however, it would open up the possibility for a higher rate of future insolvencies, eventually increasing the insurance systemic risk. Therefore, in the case of S2 calibration and application, it seems that it is impossible to draw the lines between the economic and non-economic, and the scientific and non-scientific. The only way to achieve a scientific/economic solvency calibration is by precisely *breaching* the economic and evidence-based conditions that make it possible and allow for non-economic, political and expert judgments (its "other") to be heard.

In other words, the research discloses that, for the S2 model to preserve its ideal technical character which legitimizes solvency capital calculations and its self-governance capabilities, it needs to be "de-idealized" (Svetlova, 2013) to account precisely for the aporetic structure of its *raison d'être* (i.e., solvency). In that respect, the deeper we move into the "tails of the future", that is, into a world which is getting more complex, more interconnected and thus more potentially destructive and disruptive, the more, "the relationships between science, expertise, and decision are radically rearticulated so that distinctions between 'science' and 'non-science' become more malleable." (Amoore, 2013:9).

Derrida's aporia is a useful insight that allows the research to go beyond notions of "controversies" that can presumably be ironed out in later, more sophisticated versions, as Power (2004) seems to imply, or notions of "alternatives", as in Lockwood's (2015) version. The point is not to simply "create space for alternative or additional ways" (Lockwood, 2015:749) in the fight against uncertainty (insolvency), but to denote how every space that gathers a meaning is always and already fragmented, constantly transgressed so that the thing itself (market consistency or prudence and solvency or insolvency) slips away (Derrida, 1973:104). This is why the research lets itself be informed by Derrida: for him, the text, i.e., any discourse, whether political, social, philosophical, and in the research case, *regulative* in the form of technical standards, is the field of operation of deconstruction which harbors within itself that which transgresses it (Cooper, 1989). In the research case of the S2 market-consistent and risk-based capital model, we come to appreciate how S2's own technical standards, the written text upon which solvency comes into being, harbors in itself a double bind: the possibility of performation *and* its negation. The text itself both extends and limits performativity of the model in an undecidable way.

For Derrida, any effect-producing system produces its effects by a kind of "spacing", producing marks or traces which make nominal unities called concepts or meaning in terms of the differential relationship – the space – between the signifiers (Caputo, 2000:96). In that respect, models are differential: they produce nominal and conceptual unities as effects of the differential play (spacing) opened up between their marks or traces. What is more with this Derridean approach is that difference reestablishes reference in a way beyond the traditional confrontation between constructivism (as implied by performativity) and "reality checks" (Felin & Foss, 2009; Ferraro et al. 2005, 2009). Following Derrida, the capacity of the text of a model to differentiate enables

signification: the more differential, the more fine-grained it can be. In this way, the power of reference increases exponentially with the complexity and richness of the differential economy of the model. In that respect, the research is enabled to make a provocative claim: what is being perceived within the solvency text as an inconsistent differentiation between, e.g., the principle of market values and the introduction of market-deference measures, or between the paradoxical demand for market consistency and prudence, *increases*, rather than obfuscates, the understanding of the subtleties of the insurance business and its solvency issues. However, if reference thickens through differentiation, performativity becomes precisely more undecidable because, on the one hand, the increase in reference has the potential to enable the model's performativity while on the other, the increase in differentiation makes available more strategies and reasons to resist or adjust the model's recommendations.

This is precisely what the research project of the third paper proposes rethinking: performativity as an effect of the play of differences. A differential play that, as Derrida crucially adds, cannot be enclosed or regulated – the circle of the play cannot be closed.

In the next three chapters, each of the three papers is presented. The thesis concludes with the final chapter, where the contributions and limitations of the whole of the research, along with potential avenues for future research, are summarized.

2. Heidegger And Modern Finance

Financial Economics is typically considered to constitute a branch of economics that focuses on what Nobelist Robert Merton calls "the allocation and deployment of economic resources, both spatially and across time, in an uncertain environment" (Nobel Lecture, Dec 9, 1997). It deals with the valuation of assets and the assessment of their riskiness (individually or collectively) and focuses on the places (i.e. financial markets) where such valuations and risks are traded and thus allocated between different actors (individual or institutional). A significant part of this process is driven by stipulating theories and building models that can derive testable results and implications.

We can readily distinguish two main views within modern financial economics that largely dominate both the academic and the professional field: an hegemonic orthodox one, that systematically shapes financial education, practice and regulation (that is, the three stages of theorizing, executing and monitoring) and an ascending challenger that calls into question critical components of the orthodox view, offering either mild alternatives that can be smoothly assimilated by the standard theory or radical ones that are considered simply incompatible. The orthodox view, based on neoclassical economics (Forbes, 2009:1), consists of several waves of theories packed under the label Modern Portfolio Theory (MPT): the emergence of Capital Asset Pricing Model in the 50s, the Random Walk hypothesis, the Efficient Market Hypothesis (EMH), the Arbitrage Pricing Theory and the development of Passive Investment since the early 70s, have progressively reinforced MPT, giving it an esteemed status within and way outside the field. Behavioral Finance on the other hand, already from the early 70s, began to make inroads mainly in the academic field (since many professional practitioners seem to equally disregard both the orthodox and the alternative views as

intellectual vehicles that simply keep academics busy in circulation) by not only thoroughly contesting EMH but by crucially providing researchers with a new promising agenda of empirical fieldwork.

The claims of the mainstream theory extend and cover a wide range of issues – in what follows, we will mainly focus on EMH, because it is the most renowned and equally the most contested part of the collective bundle of MPT. In its broad outlines, EMH's central idea is that a stock's price incorporates all the available knowledge about the value of the company and the best predictions about the future of the stock (Kahneman, 2011:213-5). This essentially means that all assets in a market are correctly priced, since in such a picture, investors are considered to be rational, profit maximizers who compete each other trying to predict future market values of individual securities, processing important current information which is almost freely available to all of them. What emerges is an efficient market and this suggests, it is impossible to outperform the overall market through expert stock selection or market timing, so long as assets are correctly priced i.e., equal to their "intrinsic" value. In other words, perfect rational prices leave no scope for skillfulness, but they also protect uninformed or simply fool investors form their own inadequacy. That is, there may be no room for expert investors, i.e., investors who systematically beat the markets, but there is also no room for "fool" investors, i.e., investors who systematically lose: what there is, is a prevailing net of collective rationality (the grand total of individual ratiocinations) which puts a maximum cap and a minimum floor in skilled investing.

The rival theory of Behavioral Finance is not content with the explanatory premise of rationality, but instead seeks to discover cognitive, emotional or behavioral reasons behind the economic decisions of the financial participants, since the explanandum itself changes. In the face of well documented empirical inquiries that trace, for

example, systematic mean reversion, long run trends, herding amongst security analysts etc., it cannot anymore be the postulated efficiency of the markets. Rather, what now needs to be explained is precisely such enduring departures from traditionally postulated efficiency. In terms of financial skillfulness, it too acknowledges that there is a maximum cap, i.e. there can be no expertise in for example stock selecting, but claims instead that there can be no minimum floor, that is, it does not think there are no unsophisticated or even fool investors and thus neither any minimum floor that can prevent a potential race to the bottom – which explains the existence of stock market crashes and their opposite, the emergence of financial bubbles[11]. It holds that many investors lose consistently, an achievement that a dart-throwing chimp could not match. The central hypothesis is that market participants are beings with inherent biases that corrupt their judgments and decisions and thus, with thinking processes that are flawed, inaccurate and unreliable. One of the most emblematic examples is heuristics, that is, experience – not rational-and-evidence-based – strategies that people commonly use in thinking. In short, market participants are of questionable efficacy decision-makers.

It is worth noticing how such heuristics-and-biases paradigm offered a new body of possibilities for empirical work in the field and thus caught on quickly. The psychologist Gary Klein notices (Klein, 2009:54-5) that researchers have added more and more kinds of biases and so, as many as 60 biases have been identified in the research literature (as of 2009). The concept of decision biases is now firmly embedded in the fields of psychology, economics, and business and it has been described in a number of books for a general audience with provocative titles and juicy references to "pseudo-scientists, lunatics and the rest of us", who "systematically fail to think rationally" due to the

[11] Where the orthodox views a "permanently high plateau" having been reached by stock prices, behavioral finance recognizes the emergence of a mere financial bubble.

"irresistible pull of irrational behavior"[12]. It is worth noting what Yale University professor and Nobel Laureate Robert Shiller mentions, that the bestselling book about the financial crisis currently is "House of Cards" by investigative newspaper reporter William D.Cohan, with the subtitle "A Tale of Hubris and Wretched Excess on Wall Street" (Kroszner & Shiller, 2011:15).

Behavioral Finance's core tenets have managed to secure a wide and extended agenda: from the existence of the current economic and financial crisis (it's the result of people's biased nature and over-reliance on rational/mathematical models), the inexistence of expertise (there is only an illusion of financial skill), to the way historical practices unfold (our narrative fallacy to see a "march of history" against what "really" goes on: pure drifting).

Although the general sentiment is that Behavioral Finance has not yet achieved to fully supplant orthodoxy, let alone provide effective guidance on how to deal with the growing number of documented biases other than the empty imperative of "effectively manage your (inevitable) biases"[13], leaving radical views aside – for example, Taleb's notorious dismissal of the whole industry of producing financial predictions (Taleb, 2007) – many argue that a process of assimilation of the behavioral perspective into the traditional corpus of theory has for long been underway (Forbes, 2009:1). A most recent example "to bridge the divide between modern portfolio theory and Behavioral

[12] See for example, "Sway: The Irresistible Pull of Irrational Behavior" by Brafman and Brafman (2008), "Blind Spots: Why Smart People Do Dumb Things" by Van Hecke (2007), "Predictably Irrational: The Hidden Forces That Shape Our Decisions" by Ariely (2008), Russo and Schoemaker's (1989) "Decision Traps: The Ten Barriers to Brilliant Decision Making", and Dawes's (2001) "Everyday Irrationality: How Pseudo-Scientists, Lunatics, and the Rest of Us Systematically Fail to Think Rationally".

[13] Here we hit what we may call 'the infinite regress of biases': assuming that someone does provide such effective guidance (in fact, the typical literature is flashed with suggestions), what indubitable (meta)reasons do we have to believe these are biased-free?

Finance" is Howard's popular Behavioral Portfolio Management[14]. In his methodology for portfolio management, Professor Howard acknowledges that,

> "in spite of the fact that behavioral is in the name [i.e. instead of "modern"], behavioral portfolio management's recommendations are based on thorough statistical analyses. If it cannot be objectively measured and confirmed by large, long time period studies, then it is not used. At my core, I am an empiricist, and so if I do not see it in the data, then I do not believe in it for investing purposes." (Howard, 2014)

In such efforts, the core vocabulary of the MPT is preserved (such as "expected" and "alpha" returns, "volatility" etc.) but is simultaneously extended to include either pure behavioral insights (such as "emotions", "price distortions" etc.) or hybrid (that is, part traditional, part alternative) concepts (as for instance, "the emotional impact of volatility"). Under such a view and despite Professor Howard's claims about how "[o]nce you reject MPT and accept behavioral portfolio management, everything changes", the assimilation of the behavioral perspective can be seen as succeeding in injecting a more empirical flavor into the traditional, rationally assumed posit of the efficiency of the markets. In such a way, it is possible to avoid the two dubious extremes of the orthodox and the alternative outlook of modern financial economics: the ultimate rationality and irrationality of the market participants. However, such gay assimilation does not seem possible with each of the two disciplines that, alongside EMH and Behavioral Finance, have also attempted to examine the economic and financial phenomena: Economic Sociology and the Social Studies of Finance.

[14] Howard's paper on behavioral portfolio management was one of the most downloaded papers on the Social Science Research Network (Voss, 2012).

Economic Sociology, usually opposed against the mainstream classical and neoclassical economics, attempts to apply the sociological perspective to economic phenomena (Smelser & Swedberg, 2005:3). Given recent developments, such sociological perspective does not only include personal interaction, groups, social structures (institutions) and social controls (e.g. sanctions, norms and values) but also social networks, gender and cultural context (e.g. Granovetter 1985, 1995; Zelizer 1988). What mainly changes with Economic Sociology is the concept of the actor: where in both EMH and Behavioral Finance the analytic starting point is the individual, for Economic Sociology it is typically groups, institutions and society. Thus, the actor is seen as a socially constructed entity and the social structural levels as phenomena sui generis, without reference to the individual actor (Smelser & Swedberg, 2005:4). Such a starting point leads to a different and broader view of what constitutes economically skillful action: whereas EMH and Behavioral Finance simply considers an economic action to either succeed or fail to ascend to the status of economically rational action (by, for example, identifying it with the efficient or inefficient allocation of risk and return), Economic Sociology gives room to a form of action that goes beyond what for the orthodox constitutes mere habits and rules of thumbs, and for the behaviorist obvious elements of irrationality: to traditional (habitual) economic action which, arguably, constitutes its most common form (Akerlof 1984; Smelser & Swedberg, 2005:4). In that way, Economic Sociology turns what constitutes the main resource of the orthodox view, rationality as an assumption, to a topic in need of investigation: that is, rationality as a phenomenon to be explained, not assumed. In that line, the central tradition of recent Economic Sociology attempts to explore the consequences for economic action of the embedding of actors in networks of interpersonal connections (Granovetter 1973, 1985, 1992; MacKenzie, 2009:180).

According to MacKenzie, the Social Studies of Finance (SSF) complement rather than displace such sociological tradition: apart from the networks of personal connections, human beings are inextricably and simultaneously embedded in systems of technologies, cognitive frameworks, simplifying concepts and calculative mechanisms (MacKenzie, 2009:180). The essence of SSF is precisely to study and disclose such a complement that results from "the application to financial markets of social science disciplines beyond economics (and also wider than those approaches to 'Behavioral Finance'…), such as anthropology, gender studies, human geography, political science, and sociology." This new and alternative approach displays a unique concern with the materiality of markets: their physicality, corporeality, technicality (MacKenzie, 2009:2). As MacKenzie points out, such emphasis on materiality goes beyond simply indicating the importance of objects and technologies (i.e. *things*): it signifies that "human actors who make up markets are not disembodied agents or abstract information processors" as both EMH and Behavioral Finance assume, but "embodied human beings, and bodies are material entities. The capacities and limitations of these material entities (including those of human brains) are hugely important to how markets are constructed." (MacKenzie, 2009:3). Therefore, it should be acknowledged that all markets "are combinations of human beings and physical objects" and that equipment matters, since "it changes the nature of the economic agent, of economic action and of markets." (MacKenzie, 2009:13). Therefore, SSF explore the hypothesis that financial economics' success is in part 'performative', that is, not simply a descriptive or analytical success (MacKenzie, 2009:30). Where the orthodox discerns a twostep process that consists initially of a subject that observes the bare perceptual matter of the market (i.e. the financial reality out-there), and secondarily, of her attempt to bridge the knowledge gap (between the observer and the observed) by constructing a

(un)successful model, that is, an (in)accurate representation of what stands out there, SSF leave open the possibility that reality itself can change by the widespread use of the model itself. In other words, there are no two primary fixed poles of independent agents (a subject and an object) but an endpoint of agencements (MacKenzie, 2009:19-25), that is, socio-technical arrangements that co-produce stability.

Until now, we have only attempted to provide an admittedly very brief and sketchy review of the deeply variant narratives on the financial economics' phenomenon. EMH and Behavioral Finance, products of a modern imperative, have indeed worked under a modernist ontology that turns financial things (assets, prices, technologies) into objects that need to be rationally and efficiently handled by informed agents/subjects such as investors, analysts, regulators. Economic Sociology's literature has not been reluctant to start fuzzing such a clear dichotomy by subsuming the latter variety in social networks (to which most of the time you are simply found thrown into), whereas SSF seem to complete such an endeavor by dissolving both of them, in the face of techno-sciences, into sociotechnical hybrids. It is exactly at this point that we want to take what seems at first glance, and indeed rightly so, a peculiar turn, and introduce the German philosopher Martin Heidegger. We are forced to since after all, as the title of the essay suggests, this is a piece that tries to link Heidegger with finance. Now, trying to link Heidegger with finance is like trying to connect two of the most opposite poles: you hardly need to be an expert on Heidegger to be familiar with his notorious repulsion towards the devastating financialization of our era and his affection for such marginal practices like poeticizing and thinking. Heidegger himself is explicit about it:

> "The humanity of humans and the thingness of things is dissolved, within the self-assertion of producing, to the calculation of the market value of a market that is not only a global market spanning the earth but that also,…, markets in

> the essence of being and so brings all beings into the business of calculation, which dominates most fiercely precisely where numbers are not needed." (Heidegger, 1946:219)

But does that mean that a Heideggerian can only philosophize and poeticize? What if, by preserving the possibility of the impossible, we allow for a moment a Heideggerian to breath, live and dwell within such a financial world? What if we imagine of a Heideggerian dwelling amidst financial things? Now, when you attempt to connect two of the opposite poles of an electric circuit, you end up with what is called a short-circuit that can potentially result in an explosion. When attempting to connect Heidegger with finance, I am not so interested in finding out how such a short-circuit explosion may hurt Heidegger (in fact, in the face of so many scholars defending Heideggerian purity, I don't think I can even suggest causing any damage to Heidegger's "correct" reading) – rather, I am interested in examining how such an explosive Gestalt switch transforms finance *as* finance from the inside, by allowing a Heideggerian to contribute to the phenomenon, after having being transported *inside* the phenomenon. And it seems that the more someone allows for that, the more the connections which were previously unthought, keep multiplying. Thus, it is impossible to adequately defend a priori and from the outside a Heideggerian approach to finance: although I could invoke other similar efforts that endeavour to explore economics via philosophy and hermeneutics[15], I will simply ask the tolerant reader to patiently bear with me on this and defer her judgment until the end. In that spirit, in what follows, we are not going to provide a philosophical commentary that deals with the outside form of finance, but a substantive attempt to explore a Heideggerian approach relative, first, to the two mainstream views (EMH and Behavioral Finance) of modern financial economics, and second, to the

[15] See for example Lavoie (1990).

currently more marginal SSF standpoint, which, following MacKenzie, seems to constitute a more sophisticated and deeply enriched position from that of the Economic Sociology.

2.1. EMH, Behavioral Finance and Heidegger

Heidegger's philosophical attitude takes its departure from lived experience. For him, human's most fundamental features cannot be discovered through a rational-and-evidence-based scientific-type analysis nor even a linguistic inquiry, since all of them presuppose our unreflective involvement and pre-propositional way of comporting in the world. From such a starting point he tries to walk a fine line between realism and constructivism about truths and the status of scientific entities (Dreyfus & Wrathall 2005:9-10). He thus focuses on the notion of being, which he realizes cannot be a substance (modernity) or a process (postmodernity), but instead, "that on the basis of which beings are already understood" (Heidegger, 1962:25-6). A culture's understanding of being (the style of life manifest in the way its everyday practices are coordinated) allows people and things to show up as something – that is, the shared practices into which we are socialized provide a background understanding of what counts as things, as human beings and what it makes sense to do on the basis of which we can direct our actions towards particular things and people. Such a central insight allows Heidegger to take his famous turning (Kehre) and assume, in his later works, an historicist perspective since he acknowledges that the history of the West consists of a series of "epochs" of different total understanding of being, where the unconcealment (i.e. truth or better, what grounds truth) of beings varies according to such background understanding. Instead of Being and Time's single set of modes of being (readiness-to-hand, presence-at-hand, existence) that were evidently anchored in the ahistorical and fundamental nature of Dasein (roughly, the human being), each epoch (pre-Socratic,

ancient, medieval, modern, and contemporary/technological) has its own understanding of being which determines its "beingness," or how all beings are in that age, including man. Which essentially means, we should not look for Francis of Assisi-type saints in the ancient Greece, nor Achilles-type warriors in the medieval Assisi. Heidegger occasionally compares these understandings to the a priori because they are prior to and enable experience (Braver, 2012:192). In what ends up being a virtuous spiral (instead of a vicious circle), we cannot (as a subject proper) first gather neutral observations of the world (as we might from an object proper) from which to derive categories, since a particular way of understanding must always already orient the experiences our investigations start from[16]. Heidegger calls these understandings "sendings" from being, in an obvious attempt to indicate that they are not the results of our conscious choice or transcendental faculties (Braver, 2012:190-1) – the same way someone cannot consciously invite what she is going to dream tonight. Such historical sendings of being (at the heart of later Heidegger's thought) gives him a perspective on the basis of which it is possible to understand the emergence of modernity that culminates in the (postmodern) technological understanding of being.

In terms of the financial economics field, this essentially means that the emergence of modern financial economics of EMH and Behavioral Finance is a historical phenomenon that has simply transformed markets into epistemology-centred arenas where the fundamental problem is how to develop a system of justified true propositions that can support and subsequently trigger the appropriate economic actions. Just as a valid argument produces only true conclusions from true premises, the idea is that a properly built e.g. risk management system, insulates the circulation of financial truth

[16] The virtuous spiral becomes vicious circle if we try to enter it from the outside; that is, if we start from an epistemological veil of ignorance which we then try to lift by seeking the appropriate reasons. But fortunately, we are always "thrown" into this circle from the beginning.

throughout its entirety (Braver, 2012:173). Both EMH and Behavioral Finance in their ontology, treat all financial propositions as epistemic and hence as subject to tests of truth and responsible belief; therefore, we need to conduct epistemological "stress tests", like Socratic elenchus or Cartesian doubt; and only those that pass the tribunal of reason deserve our trust (Braver, 2012:130). In finance, stress testing has now become ubiquitous: not only as an integral part when assessing the performativity of a portfolio, but as a stringent requirement when assessing the solvency capital requirements for both Banks and Insurance Companies under Basel III and Solvency II supervisory regimes.

In that respect, Behavioral Finance simply raises the stakes by imposing extra required filtrations in order to render observations and inferences as impersonal and as much divested of any local, temperamental or psychological biases is possible, of the kind identified in the experimental work of Kahneman and Tversky (Kahneman & Tversky 1979); other than that, it remains like EMH, framed in an ontological picture of us as subjects/knowers and the world as an object of knowledge.

This Heideggerian, historical (and thus, not necessary) emergence of the modern epistemic imperative imposed by EMH and Behavioral Finance where subjects objectively control and dominate financial objects, goes contrary to the dominating positivistic narrative which states that previous versions of financial markets used to remain caught in a limbo state of unsophisticated (and perhaps solely speculative) practices that were duly overcome by the rise of ("objective") science and technology in the last two centuries, that eventually helped participants clear their distortions and prejudices, and thus achieve control over their financial fate; rather, according to Heidegger, previous versions of financial understandings simply *didn't have to* develop such modern epistemic practices (the same way Aristotle's understanding of falling

bodies – through teleology – didn't have to develop practices around the postulated vocabulary of a gravity field). MacKenzie provides an exceptional illustration of such a point when he claims that "[t]he empirical success of the Black-Scholes-Merton model was a historically contingent process [i.e. not an ahistorical necessity] in which the model itself played a constitutive role." (MacKenzie 2006:259). In other words, Black-Scholes-Merton model and the practices gathering around it don't *just* make sense but make sense (and thus perform) *for* modern financial economics.

The same is true with what currently seems to be the technological transcendence of modern financial economics and their epistemology-centred, subject/object ontology, which in Heidegger's idiom constitutes the passage from Cartesian modernity to Nietzsche's characterization of late modernity, i.e. to the technological epoch. The entrance point was prepared by Behavioral Finance itself, since it did not just help EMH to transform markets into epistemology-centred arenas (by injecting scepticism and demanding harder and more sophisticated controls in the course of the financial decision-making practices), but also did something radically new: it called into question the human subject itself. With modern financial economics, human subject was the one solid point in reference of which the mysteries of the various financial entities (equities, bonds, derivatives etc.) were uncovered. Nothing seemed able to resist against the novel set of weapons unleashed by finance's modern subject: applied mathematics, computer science, statistics, fundamental analysis, economic and financial theory, they were all used to crack every (hidden) code of the financial entities and open up the way for financial engineering (which included unpacking and repackaging the decoded DNA of financial entities). But with Behavioral Finance, exactly this subject who unleashed such an arsenal was called into question. And thus it became, next to every other financial entity, a subject for inquiry – an object. This, according to Heidegger, is the

entrance point of the technological transformation of modern finance, of technofinance. Having cracked every hidden code of all the financial entities so as to objectify and control financial decision-making, we late-moderns have turned exactly those practices back onto ourselves (Thomson, 2005:60), producing a calculative thinking that quantifies everything, reducing (financial) entities (including humans) to bivalent, programmable information, to digitized data that can be algorithmically manipulated. Thus, post EMH and Behavioral Finance (supported by an eager neurofinance), humans have been classified as another source of risk that simply needs to be recognized, proceduralized and properly (following "best practices") managed: we belong in the category of "operational risk" which is defined as "the risk…incurred for inadequate or failed internal processes, *people* and systems…" (Operational risk, 2016, italics added). But once subjects begin treating themselves as objects, the subject/object distinction itself is undermined and the subject is thereby put on the path toward becoming just another resource to be optimized, that is, secured and ordered for the sake of flexible use (Heidegger, 1977: 173; Thomson, 2005:60). Thus EMH and Behavioral Finance's human subject that continually strives to come up with epistemically sound representations against a given but uncertain financial universe, simply becomes another resource awaiting optimization, for the self-continual packaging and repackaging of the decoded financial DNA in an automated and efficient way, for the sake of its constant self-overcoming of money with money[17]. In short, from financial

[17] High Frequency Trading can be thought of as an exemplar of such technological proceduralization, so long as all data and expectations (quantitative and qualitative) have been taken into account and algorithmically settled in advance. In addition, Beunza and Stark talk about reflexive modeling (Beunza & Stark, 2011), which takes place when "traders use models to translate stock prices into estimates of what their rivals think" – that is, rivals strategic thinking/actions becomes itself a resource, an entry to be updated so as to feed your own model. What is more, the collapse of the subject/object distinction that for Heidegger occurs with the passage to the postmodern, technological style of finance (what we here briefly call "technofinance") is also implied by the shift of the field's vocabulary: we no longer "buy" or "sell" "assets" such as cash, equities or bonds (which strongly imply the presence of a subject as an "owner" of a financial "real" object) – instead we are "long" or "short" in equity, interest rate, credit, spread or whatever "risk factors" and in synthetic (cash or otherwise) positions; here, both the

engineering (modern finance) to the continual re-engineering, proceduralization and automation of the financial universe (postmodern technofinance).

Since for Heidegger an understanding of being creates a clearing where things show up as what they are (i.e. in their essence), it is possible under his terms to understand financial markets not only as epistemology-centered arenas (as EMH and Behavioral Finance suggest), social constructions (as Economic Sociology suggests) or sociotechnical prosthetic machines or devices for collective calculation that go beyond individual's cognitive limitations and create asymmetries (as SSF seem to suggest and as we explore in the next section) (Callon & Muniesa, 2003; MacKenzie, 2006:268; Mirowski, 2002), but also as a clearing that organizes and preserves dissonance, generated by dissimilar participating investment styles that clash and meet each other (the place of meeting being the transaction price). Every market calculation that bestows a value and thus every market transaction (triggered by) can only take place on the basis of local investment communities that disclose a way of being-in-the-world that matters most for us. In such a way of being-in-the-word, an insistence on the salience of certain possibilities, aspects, entities, connections, manipulations etc. takes place, through the use of a particular kind of *mots justes*, that excludes or presents other possibilities as irrelevant. Therefore, the act of a simple market transaction is not only or exclusively stimulated by epistemological motivations (of a modern imperative) that may degenerate into mere algorithmic signals (in a technological universe); rather, it is an agent's act of situating himself in such a way within the investment universe that attempts to bring out at its best the style of his investment community. Transacting in

"owner" and the "object" are dissipated: much more disengaged and dispassionate the former (since you are simply long or short), less "real" and weighty the latter, since there are "really" no assets, just factors that really/fundamentally drive asset behavior – the same way there are "really" no tables, just molecules that really/fundamentally bump each other around.

the markets is the result of having already being attuned with a specific investment community. An investment portfolio cannot be considered successful because it succeeded to include an objective element (as for example EMH would suggest) or because it simply happened to make the right subjective bet (as Behavioral Finance would imply). In fact, the portfolio builder does not simply understand and construct his portfolio in objective or subjective terms, rather he comes to see the entire world through his portfolio. That's why Warren Buffet may talk and show records of his investing style to an EMH practitioner for years, without making any difference – because Buffet does not dwell in EMH's world. As he ingeniously puts it:

> "It is extraordinary to me that the idea of buying dollar bills for forty cents takes immediately with people or it doesn't take at all. It's like an inoculation. If it doesn't grab a person right away, I find you can talk to him for years and show him records, and it doesn't make any difference." (Graham & Dodd, 2009: xvi)

What doesn't make any difference for the other is the "records", that is, the supposedly most important, simple, neutral and transparent fact of the performance of a portfolio – which casts doubt on whether such or other similar transparent metrics or evidence, towards which all minds supposedly converge, make any sense. Understanding a style – a way of life – is not about transparently understanding given facts or formulae: it is about "soaking it up as we respond to the endless bits of feedback we're continuously receiving as to how well we're performing Dasein-ish activities" (Braver, 2012:171). In that respect facts do come, but they come too late:

> "the understanding we get from our world picture is not a set of theses. It is a kind of orientation, a way of knowing one's way around, what Heidegger calls being competent at living a certain kind of life." (Braver, 2012:199)

In that respect, an investment portfolio aims to uncover a particular state of affairs in the world: it is a demand to see the "tempo" of the events that actually determines what is at issue for us, that is, the cultural commitments we cannot help sharing because they make us what we are (Dreyfus, 1980:3). On that basis, the investor quiet his thoughts and wills (as a poet or a thinker) so as to let himself be carried away by the historical unfolding of intelligibility, that is, of how what rests today marginal (e.g. a bubble) will become central tomorrow (and thus change our practices with time)[18]. In that way, every investment act makes an embodied and concrete statement that its particular background investment community is worth caring about and is thus capable of inspiring and eliciting further and further meaningful involvement with it (Dreyfus & Kelly 2011:219). Should such acts fail, the community faces the possibility of revealing itself as too trivial, too shallow and thus too weak to sustain its practices and elicit further involvement. For Heidegger, when local community and reality enmesh in such ways, then financial things are "thinging" and resist themselves from turning into mere

[18] When David Swensen, Yale's University Chief Investment Officer and an expert investor, took a large, short position in subprime mortgage-backed securities which during the credit crunch paid off enormously, his position had already *uncovered* the subprime mortgage industry in its *essence*: it uncovered it as a bubble, as a speculative deviation of prices which is largely unsustainable. What at first is only tacit and amorphous in the financial community's background understanding (e.g. a bubble stemming from a profitable business in the midst of a low interest rate environment) is given form and lit up by the skilful portfolio-builder. In that respect, for Heidegger, it is the skilful investor immersed in his investment practice who primordially understands *in situ* what a financial bubble is – not the academic scholar who steps back in order to scientifically catalogue the ahistorical and universal features that constitute a bubble, bringing supportive, objective evidence. What is more, around such an uncovering skilful practice, a set of novel possibilities is opened up which may gather further meaningful comportments that count for the investment (and not only) community – for example, regulate or deregulate the mortgage industry, create a systemic-risk watchdog etc.

resources (which comprises the greatest danger of technofinance – more on that, in the next sections).

We claim that following Heidegger, the condition of the possibility for a simple market transaction rests on the organized dissonance generated and sustained by the clashing among disparate participating investment styles, dynamically emerging and preserved within the public space of the markets. It is worth noticing how for Nobel laureate and Behavioral Finance guru Daniel Kahneman, a simple market transaction is an almost insurmountable perplexing issue. He keeps asking: what makes a person buy and the other sell given that they share the same information? What makes them both to think the current price is wrong (Kahneman, 2011:212-3)? It is an insurmountable perplexing issue because it looks like a contradiction: how is it possible one party to sell and another buy on the grounds of the same information? Such questioning makes sense within an epistemic framework: obviously, one of the parties fails to accurately interpret or represent the objective evidence that is offered from the world out-there. One of them is right, the other is wrong – at best. At worst, both parties are wrong. Thus, Behavioral Finance's condition of the possibility for a simple market transaction rests on a *mistake*, an error resulting from defective judgment, deficient knowledge, or carelessness in the face of the given, transparent financial information: in short, from some sort of biases. Yet, equally perplexing is EMH's perspective according to which there should only be market transactions that solely gain exposures into the Market Portfolio – nothing more nor less. But it's worth taking a look of Warren Buffet's portfolio when it was first opened to his limited partners in order to decide if they would cash out or not:

> "After years of glittering returns, the scruffy-looking little portfolio was a bit of an anticlimax. They had a big position in a textile company that Buffet didn't think was worth much on its own, but which had bank and insurance holdings;

> there was Blue Chip; inside Blue Chip, there was a retail operation that was mostly a shell, holding ash from recent divestments; and finally a scattering of publications of little financial importance. Some of the shareholdings, moreover, were unregistered, so they couldn't be sold on stock exchanges." (Morris, 2009:74)

A "scruffy-looking" portfolio relative to the market's 'efficient' one.

Kahneman fails to entertain one more possibility: both parties could equally be right. From an analytic point of view (which endows reason with a penetrating mighty power in the face of which no language-game, no form of understanding can resist), this possibility is a simple contradiction. Yet it's not, if reason itself is not universal but locally emergent on the basis of a prior inexplicit/unthematic understanding of a way the world opens up (and Heidegger advisedly says "a" way, "for we can never say that it is the absolute one." (Heidegger, 1994:139). Within her local investment community, the investor simply attempts to bring out at its best the style of her investing understanding; in such an attempt, she may succeed or fail (so both parties of the transaction may be right or wrong) regardless of the actual payoff: money ("return" in the financial parlance) can only support, or force to collapse the particular's style investing practices and even release new possibilities in such practices:

> "Saying that the point of business is to produce profit is like saying that the whole point of playing basketball is to make as many baskets as possible. One could make many more baskets by having no opponent. The game and styles of playing the game are what matter because they produce identities people care about… customary businesses and business people exist in market

> economies to form identities that are recognized by others as respectable due to their usefulness or excellence." (Spinosa, Flores & Dreyfus, 1999: 55-7)

Current financial theories see placing an investment (i.e. reaching a decision under uncertainty) as essentially equivalent to a prediction – of how the investment is going to fare within the investment horizon. A prediction needs to be supported by reason and/or adequate evidence. Rational arguments and the use of adequate empirical evidence can only be secured by the unbiased mind of a subject, which stands properly purified against an objective and transparent world. Only within such a subject/object model of knowledge can such an emphasis to predictions be given. But it shouldn't. Rock bottom is not our skill at predicting: rock bottom is our skill at *existing*; my existing within a world makes me to know how to go about and do what is appropriate in each situation.

2.2. Social Studies of Finance and Heidegger

Implicitly or explicitly, the central mainstream divide in modern financial economics between the orthodox view of actors as rational and Behavioral Finance's view as subject to systematic psychological biases, presupposes a view of the actor as an individual human being or akin to such a human (MacKenzie, 2009:23). That is, the source of intelligibility in both views is sought on the individual. Fix or secure the latter (the individual) and gain the former (intelligible decision-making). This is not the case for Heidegger, who uses the term "being-in-the-world" to distinguish himself as clearly as possible from the traditional idea of individual consciousness. For him, intelligibility resides in the shared social practices prevalent in a particular culture at a particular historical moment. Such an understanding, far from being a function of a hidden reason, rests upon nothing more than the way things are done. For EMH and Behavioral Finance this entails an unacceptable relativism; not for Heidegger, for whom non-cognitive

modes of being-in-the-world, like care, have priority over reason (and consequently, over relativism itself when seen as a simple product of reason's critique). Thus, far from being a pure noetic subject (a fair abstraction of reflective philosophy), active, practical, engaged being-in-the-world finds itself thrust in the midst of contexts that cannot extricate itself from.

This change of scope, from the hidden depths of a subject to the surface of how things are done, is developed and extended by Social Studies of Finance (SSF), which treat economic agents as made up of what Michel Callon calls *agencements*, of combinations of human beings, material objects, technical systems, texts, algorithms and so on. In such combinations it is indeed impossible to demarcate individuality – in fact, what is needed is precisely a story of how anything like pure individuality can render itself intelligible in the first place. That's why the vocabulary of SSF shifts into terms like hybrids, sociotechnical, actors, networks, collectives, i.e. terms that mix, combine, connect, assemble, terms that emphasize more the vibration of the verb, that is the act-ing-with, the doing, and less the doer, the segregated/independent substance, the congealed (in fact, what is in need of explanation is more the phenomenon of stabilization and less that of instability) – exactly like Heidegger's *being*-in-the-world that cannot be *a-being*-in-the-world. Of course, Callon's Actor-Network theory goes much further in that the nature of agents or actors remains undecided, potentially including non-human entities as well as human beings. Thus, in Callon's analysis, an economic actor is not an individual human being, nor even a human being embedded in institutions, conventions, personal relationships or groups, as Economic Sociology

posits, but is "made up of human bodies but also of *prostheses*, tools, equipment, technical devices, algorithms etc." (Callon, 2005:4 italics added)[19].

This *prostheses* talk is quite interesting: for MacKenzie, "a human being equipped with a financial calculator is a different actor from one without one." (MacKenzie, 2009:23). "Indeed", he writes elsewhere, "markets themselves can be seen as *prostheses* in the sense that they enable human beings to achieve outcomes that go beyond their individual cognitive grasp." In that respect,

> "the field [SSF] can be seen as sharing behavioral finance's view that the cognitive capacities of unaided individual human beings are limited. However, the social studies of finance also emphasize the ways in which sophisticated economic calculations are nevertheless made possible by material devices (the computerized equivalents of Black's sheets, for example), by organizational routines, by concepts (such as "implied volatility") that simplify complex realities, and so on." (MacKenzie, 2006:267-8).

Thus, under this view, the preconditions of "rational" economic action are located in the technical systems, procedures, ways of communicating, networking and so on, that make such action possible.

Yet, in a subtle way, such a point marks a divergence relative to Heidegger's claims up to here. Indeed, a human being equipped with a financial calculator is a different actor from one without one, but that does not mean that the cognitive capabilities of the former get extended (or sophisticated) and thus surpass the limitations of the latter. This might sound odd, because in a way it is true that a financial calculator does indeed make you capable of calculating within a second the square root of 157.37, yet such obvious

[19] As far as finance is concerned, MacKenzie provides an excellent de-dramatization of the attribution of agency to non-human entities (an attribution which in general has provoked fierce debates around Actor-Network theory), with the case of the law of contract (MacKenzie, 2009:21). In what follows, we focus on agencements that include humans.

cognitive extension is not essential enough to demarcate you from someone who is not equipped with such a calculating power at hand. A human with a financial calculator is faced with a different way of being disposed to things, a different way of being attuned in to things in the world, a different set of possibilities and practices that gather around. Such practices do require calculations, algorithms, systems, massive data sets, connectivity etc., that is, stuff which cannot obviously be related with a man without a financial calculator, yet it does not render humans more "sophisticated" or put them in a situation to produce "truer" judgments about a phenomenon at hand, say, the solvency estimation of a credit institution. In fact, Michael Power's talk is quite telling here, when he writes about risk management (perhaps the pinnacle of the most sophisticated of practices of humans with financial calculators) and "risk management fictions" that need to prove "links to risk adversity and motivation". For Power, participants are not dupes and realize they may be simply part of a costly construction of an illusion or fantasy of control: "it's silly, but we have to do it." (Power, 2007:199). This suggests that man is more of a "ceremonial" creature[20], a point that undermines any attempt to evaluate or integrate different aspects (a man with and a man without a financial calculator) under terms like prostheses that imply pushing, extending and elevating further what is, perhaps by nature, limited. In fact, the technical systems, procedures and so on that consist the preconditions of "rational" economic actions may as well *hinder* sophistication, as is the case of infinitively "passing the buck" in proceduralized Enterprise Risk Management systems that work under the imperative of setting in place clear "procedures and lines of responsibility and accountability" (EIOPA, 2013:20). Agencements with the most sophisticated of humans, material objects, technical

[20] In fact, Ingram, Underwood and Thompson, pioneers on cultural theory of plural rationality in Enterprise Risk Management, entitle one of their papers as "Finding the right risk *rituals* to appease regulators and rating agencies." (Ingram et al, 2012, italics added) For an exposition and also critique from a Social Studies of Finance perspective of their theory, see Fytros (2014).

systems, texts, algorithms and so on, cannot insulate the circulation of financial truth; why not? Because for Heidegger, deep down such agencements do not constitute but a historical complex which is not prosthetic, not epistemic, not grounded, but only, *bestowed*.

Of course, it would be wrong to attribute to the SSF much, or perhaps better, *any* of the ontological presuppositions that define EMH and Behavioral Finance. In fact, the field is excellent in capturing this anti-essentialist play on how, for example, the financial calculator can render an agent both more (as predicted by the neo-enlightenment project of the mainstream financial theories) *and* less sophisticated than initially acknowledged[21]. This is accomplished by focusing on the particular technological devices, on their materiality, algorithmic configurations and so on, which uncovers what a 'computer solution' is in practice: nothing but a chain of further problems, a cascade of updates, an endless interplay of *framing* and *overflowing*. "The same goes for markets", notes Muniesa, who also observes how some "notable epistemologists of economics have even toyed with the idea of considering markets in terms of an evolutionary proliferation of algorithmic forms, an ecology of 'evolving computational entities' as Philip Mirowski put it" (Muniesa, 2014:67). For Callon, 'overflowing' denotes the impossibility of total framing, which is the work of cleansing, of disconnection in order to conclude a calculation – made possible by the technosciences – and settle reality (Callon, 1998:17). In short, technologies allow the framing and stabilization of actions while simultaneously providing an opening on to other complexes, thus constituting unexpected leakage points where overflowing occurs (Callon, 1998:18). In such a (phenomenally infinite) process,

[21] See for example Beunza & Stark's play between dissonance and resonance (Beunza & Stark, 2011), or MacKenzie's analysis of the valuation practices of ABS CDOs (MacKenzie, 2011).

> "the tools are constantly reconfigured to take into account in more and more detail a set of entities and relationships which were hitherto excluded from the framework of calculation. The framing becomes more refined, richer, delving into the complexity of relationships, and in so doing it authorizes decisions which are more and more calculated or (to use the commonly-accepted word) more and more rational." (Callon, 1998:24).

Therefore,

> "The more an agency is able to complicate and broaden the network of entities and relations to be taken into account, the greater is its capacity to create asymmetries between itself and other agencies… The probability of gain is on the side of the agency with the greatest powers of calculation, that is to say, whose tools enable it to perform, to make visible and to take into account the greatest number or relations and entities." (Callon, 1998:45)

Now, let us try to give a picture of all this: imagine that a decision under uncertainty (the typical type of decision called for in the markets) is represented by a circle. For Behavioral Finance, a technological device such as a financial calculator that endows with the capacity to overcome several of the inherent cognitive human restrictions, manages to restrict ungrounded human discretion and opinion in just, say, one quarter of the circle. The other three quarters of the circle have been filled by the relevant "objective" calculations as performed by the technological device (i.e. the financial calculator), which is fed by empirical data, mathematically and algorithmically manipulated. For Behavioral Finance, that remaining part of the circle's one quarter, the unsettled part, should be minimized and is in fact minimized as long as you perform a systematic biases-cleansing and remain simultaneously in line with the latest scientific, financial innovations that have the capacity to progress and unearth, little by little, those

hidden factors that drive financial phenomena – for EMH, there is obviously no left over right from the beginning that can be attributed to ungrounded discretion and unexamined opinions.

For SSF, there is in fact, no problem accepting such a picture: indeed, the bringing in of prosthetic technological calculative devices does 'squeeze' unsophisticated practices to just one quarter of the circle. But the intriguing part begins when, the more we try to minimize that unsettled part of the circle by "complicating and broadening the network of entities and relations to be taken into account", the more we attempt to 'refine', 'enrich' and delve into the complexity of relationships to make the decision (i.e. the circle) 'more calculated, more rational', then the more such an endeavor becomes unstable and leakage points (critically saturated by entwining masses of human bodies, discretion, calculable entities, material restrictions and whatsoever) occur that provoke overflowing and create new circle(s) which ask in turn to be enriched, (re)filled anew by new computations, which, following their predecessors, cannot sustain themselves at the moment they begin covering the full circle. Thus, MacKenzie's metaphor is a fair one: like an engine, which is constantly refined, fine-tuned, updated but for exactly that reason spits surprises, thus effects and actively performs without simply describing or passively recording like a camera. An engine that keeps us busy, not a camera that reassures us by accurately representing what is out there (MacKenzie, 2006).

Now, such a view tends to undermine Heidegger's relatively distinct and durable investment styles that are mapped onto different understandings of being as historically have been handed down. For SSF, the emphasis is on a much greater flux that disseminates surprises exactly where you think you have, after continuous trials and hard work, demarcated enough: exactly when, after a significant period of circulation a model like Black-Scholes-Merton comes to be considered as the "right" way to price

options, a phenomenon at variance with that "correct" way, the volatility skew or smile, emerges (MacKenzie, 2006:258) – which keeps the engine going[22]. Technology or in our context, quantitative finance, which is distinctively networked, mathematical, computational and knowledge intensive (Stark, 2009:122), in short, 'technological', cannot thus constitute a 'supreme danger' in so far the engine, by enriching and updating itself, keeps going by dispersing surprises and disruptions. For Callon, since overflowing is omnipresent (in so far every framing creates overflowing and all disentanglement provides the opportunity for new entanglement), we don't need to preserve the idea "that there exist orders of reality, social spaces organized according to incommensurable and antagonistic logics" that can serve as a limit or resistance to the expansion of technologies and calculations: "[t]here is no Great Divide between societies populated by calculative agencies and societies in which the agents do not calculate"[23] and "[d]ifferentiation is spawned by a single recurring process." (Callon, 1998:38-9).

We shouldn't look outside finance to find those social spaces that (bravely still manage to) resist to technology and calculation. In fact, different calculative practices as organized and oriented by disparate investment styles is a phenomenon that inconspicuously permeates financial markets all the way down. Just to give an example of the incommensurability that characterizes such different calculative practices within finance which nevertheless passes unnoticed, think the quant-type investing style according to which: "It's not like building a bridge. If you're right more than half the time you're winning the game." (Overbye, 2009). That is, if on the average the quant beats the markets, then he is deemed to be successful. But interestingly enough, the

[22] In the same spirit, Muniesa describes vividly how the quest for an explicit, 'single point' of sound price discovery proliferated into a wide variety of algorithmic configurations, each solving a few problems but generating new, unforeseen ones (Muniesa, 2014:67).

[23] In short, "we have never been modern".

notion of the 'average' is a quant-type metric – which effectively means, the quant is benchmarking himself against a quant metric. The use of such a quant metric implies circularity: indeed, the quant measures himself in relation to a metric that makes sense on the basis of his quant-type understanding. But such a metric is not valued, for example, in Stephen Schwarzman's investing world: in his investment style, failure is not an option:

> "I really hate failure… When we fail it's a major, major, major event… We actually changed the way we made decisions at the whole firm after a very early failure that we had had and changed our whole investment process; that one failure created most of our successes."[24]

That's why he acknowledged he lost money on two situations in a history of 160 investments. For Schwartzman then, if you benchmark yourself with the average, you most probably are an average. But not for the quants' understanding.

There is no doubt that within both of these styles, calculative practices are mixed with humanizing attributes in a hybrid way that creates surprises which are transformative, thus enriching and refining understanding. There is no doubt that practices become "more refined, richer, delving into the complexity of relationships" – indeed, practices do tend to gather; *gathering* is Heidegger's name for how a new way of doing something brings all the disparate aspects of the matter or activity together (Spinosa, 2005:492). But such practices have a kind of telos; this telos depends upon the rest of the practices in the investment community, the kinds of identities the community supports, the kinds of traditions and uses the community is familiar with and holds valuable (Spinosa, 2001:218). So, it's not an idea or concept that suddenly befalls on the agent out of the

[24] Yale University (2008, April 11): Guest Lecture by Stephen Schwarzman in Robert Shiller's ECON-252-08: Financial Markets, 2008. Transcript retrieved 25 January 2016 from http://oyc.yale.edu /transcript/989/econ-252-08.

necessity of overflowing that his trial of framing has effected – rather, for Heidegger, the entire of the agent's financial life is *felt* as directed towards that telos; which of course, may take on a new look and collect all the already built-in sophisticated skills to shine in a new way. Thus, the quant type investor is solicited to control and secure a risk-return trade off in order to optimize it (what for Heidegger is made possible by a modern constellation of intelligibility that culminates in a technological one), whereas a value investor is solicited to bring forth and nurture the intrinsic potentialities of an underlying entity (in a poetic-like way). Respectively, momentum investing which tries to capitalize trends that come and go, is made possible on the basis of an understanding of being as the transient arising of something from out of itself (physis-like), whereas institutional investing can only make sense as created and dictated by an omnipresent (God-like) liability index. David Stark describes postmodern arbitrage, the epitome of high-tech's imperative capitalist finance, as soliciting an art of association, made possible by an operation that makes something the measure of something else (Stark, 2009:120). All such investing styles thus are made possible on the basis of our Western historical destiny – that's why they can perform and effectuate, grabbing and mixing people, practices and equipment together (agencements in SSF parlance): because such historical ways of being-in-the-world matter most for us[25]. The multiplicity of meanings is always something historical for Heidegger (Heidegger 1991:96), and this historical multiplicity of value/meaning-attribution is well preserved and displayed within the public sphere of financial markets which open up and preserve fields of historical solicitations.

[25] In that respect, every assertion that defines finance as solely a modern calculative business (i.e. as belonging to the modern or late-modern, technological imperative) is simply not thoughtful enough.

Such solicitations create a market reality exactly at that point where irreconcilable understandings rash against all others, challenging and shattering all other's way of understanding and organizing experience. The density of this "othering"[26] results in an accessed market reality that is *transgressive*[27], not dialectic or synthetic – as EMH and Behavioral Finance would imply, in that sooner or later a rational or irrational equilibrium would prevail – but neither simply *asymmetric*, as SSF would imply, in that the party with the more sophisticated agencements/prosthetic powers will always retain a higher probability of gain through the created asymmetries. In fact, Charles Morris describes an instance of portfolio insurance that disproves SSF's case of such asymmetric market reality. He writes about how the specifics of portfolio insurance were devised by two University of California - Berkeley finance professors, Hayne Leland and Mark Rubinstein, who soon started a company to execute such hedging strategy for big investors. Within months, some 100bn$ of stock portfolios were insured by services provided by Leland and Rubinstein's company and most of the Wall Street firms that followed swiftly. Obviously, all those companies had created an infrastructure that refined and made the practice of portfolio insurance more and more calculated and thus more and more rational, creating an asymmetry between such megaportfolios and the rest of the market. However,

> "Richard Bookstaber, who ran the portfolio insurance program at Morgan Stanley, recalls a conversation with a young salesman [who apparently lacked

[26] Which of course, is not limited only among styles but also among sub-styles. For SSF though, this remark is enough to render the whole notion of styles/sub-styles suspicious: that's why the focus on the overflowing, that is the destabilizing, disseminating, dispersive aspect of the elaboration of our financial practices (i.e. there are no styles, let alone sub-styles, there are simply hybrid differentiations "spawned by a single recurring process" (Callon, 1998:38-9)). However, this is not the case for Heidegger, who thus needs to give an account of the stabilization of our practices (i.e. styles) without metaphysical, foundational/fixed points that unite. We elaborate on this point at the concluding section.

[27] Lee Braver, a contemporary recognized Heideggerian scholar, has developed the notion of Transgressive Realism. See Braver (2012a).

> the sophisticated agencements of Wall Street's portfolio insurance] who wanted to confirm that Bookstaber was indeed managing some 3bn$ in portfolio insurance; that if stocks started to fall, he would sell futures at steadily accelerating rates; and that at least twenty other big firms would do the same thing. Bookstaber confirmed that was all true. The young man invested his modest savings in market puts, which are options that pay handsomely in big downturns, and a few weeks later [after Monday, October 19th, 1987], retired to a life of skiing." (Morris, 2008:43-48)

No doubt asymmetries are created and have importance *within* styles – however, such importance is rarefied *among* styles. Thus, for a market reality that is transgressive rather than asymmetric, the "other", i.e. what remains outside the understanding (style) that shelters and secures valuation, the excluded, is not waste: instead, it is what enables market reality. Every valuation creates a deficit that is filled by the other, and thus a transaction (the simple product of disparate valuation practices) can be said to be a common project between two parties that effectively share nothing in common – making the market a potential community without commons. After all, even High Frequency Trading needs other *non-algorithmic* traders in order for it to flourish and produce profits – a market flashed with high frequency traders is a systemically unstable market. It's also worth noticing Stark's remarks (Stark, 2009:147-151) with regard to hedge fund statistical arbitrage traders (one distinctive form of what we take to be a postmodern, technological style of investing): in order for them to intelligibly pilot their robots, they need exposure to 'other' trading desks with different evaluative principles (such as the merger arbitrage desk and the systems desk).

We can even think of it the other way around: when do we have a systemically unstable financial reality (for example, a total market crash of everything)? When a particular

investment style dominates so forcefully that all otherness, transgression or dissonance is lost into a series of uniform decisions and orders. From this point on, it's interesting to note furthermore: which investment style carries along such a supreme danger? Obviously enough, the technological, quantitative one (which is distinctively mathematical, networked, and computational intensive). What makes possible such a style? Heidegger's answer: the essence of technology.

Heidegger does not focus on technologies but on the phenomenon of technology itself – one of his most famous claim is that the essence of technology is nothing technological (Heidegger, 1977:4). By this, Heidegger wants to raise his concerns not with regard to the particularities of individual technological devices, but rather with the broader trend toward increasing technologization – i.e. the increasingly global phenomenon by which entities are transformed into simple resources standing by for optimization[28]. It is very instructive that Heidegger uses the odd word "en*framing*" (das Gestell) to pin down the essence of our current technological constellation of historical intelligibility. He employs the polysemic term "Gestell" precisely because it etymologically connotes a gathering together ("Ge-") of the myriad forms of "stellen", i.e. to set, stand, regulate, secure, ready, establish and so on (Thomson, 2005: 53) – in short, to *frame*. The greatest danger with such a constellation of intelligibility is how it succeeds to secure (frame) its monopoly on the real (the same way it succeeds in framing everything - including humans - as resources to be optimized) and thus crowd out all alternative understandings of being, effecting a kind of "double forgetting" in which we lose sight of our distinctive

[28] We have already commented on such financial trends, like risk management and its operational risk module, reflexive modeling and high frequency trading. Another worth mentioning is the transformation of stock prices from vehicles for the commerce of capital stock to some sort of merchandise in and of itself that ends up bringing derivative finance on top of plain finance (rather than, as traditionally thought, the other way around) (Muniesa, 2014:77).

capacity for world disclosure (which is exactly what building a portfolio is about[29]) and forget that anything has thus been forgotten (Thomson, 2005:57). For SSF, this looks quite fatalistic, in that Heidegger misses here the overflowing phenomenon brought about by the particular technological device - e.g., the financial calculator. But Heidegger cannot be accused of having missed such a phenomenon; indeed, he does account for how the internal strife between 'earth' (i.e., "that which resists and eludes all attempts to comprehend it...thus shatters every attempt to penetrate it" (Heidegger, 1960: 172)) and 'sky' (the disclosed or manifest stable possibilities for action (Dreyfus & Spinosa, 1997:183)), represents that dimension of intelligibility we experience both as it calls for and informs ("sky"), and as it overflows and escapes our attempts to pin it down ("earth"). Far from attempting to disregard SSF's anti-essentialist idea of framing/overflowing, Heidegger's narrative simply takes one step further – for overflowing by itself may constantly lead to new local *complexes*, but not to new local *worlds* (after all, it's not but an engine); yet, only through local worlds can things and people be brought out most worthily and shining. That's why Heidegger introduces two more elements apart from earth and sky: mortals and divinities – i.e. the temporality and vulnerability of our identities and constructions (mortals), and the gratefulness and reverential mood that descends to us for receiving all that is brought out by the particular situation we are thrown into (divinities) (Dreyfus & Spinosa, 1997:183-4)[30].

For Heidegger, if the current technological understanding does not gain its transparent obviousness neither by human doing nor by a transcendent hidden reason but is instead

[29] In two ways: one, by disclosing a new way to organize experience and construct a portfolio (in other words, by the emergence of a new investment style, such as High Frequency Trading) and two, by disclosing what is at issue for us (e.g. the technologization of everything, what it means to live in a technological world).

[30] For other interpretations of the Heideggerian fourfold (earth, sky, mortals and divinities) see Richardson (1963), Pöggeler (1990), Malpas (2008), Young (2002, 2006) and Harman (2002,2005). Here, we follow for the most part the interpretation and analysis of Dreyfus (1995) and Dreyfus & Spinosa (1997).

bestowed, then eventually, either a new understanding of being will emerge and take hold or everything will be brought permanently into line with this spreading technological understanding[31]. As possible sources of such a new paradigm, Heideggerian interpreters stress those "marginal practices" that have not yet been completely "mobilized as resources", "such as friendship, back-packing in the wilderness and drinking the local wine with friends" (Dreyfus, 1995:171). Ian Thomson adds the crucial role that will be played by "being as such", a phenomenon we can learn to experience as a preconceptual "presencing" and extraconceptual excess that existing practices never exhaust (Thomson, 2005:71). My final question will be based upon exactly this: does finance *within* itself has somehow preserved such a marginal understanding that can get us to notice through our financial world, what in Heidegger's idiom is called our mortality, entangled with the presence of the divinities that linger in the background of even our most advanced technofinance constructions? In short, to bring back our initial impossible-like conjecture: can a Heideggerian dwell within the financial community and disclose our vulnerability in a way that preserves in the midst of it, divinities and gratefulness for what has been (financially) bestowed to us, without in the meantime having to go as far as back-packing in the wilderness?

2.3. Bulls and Bears

It seems that people in financial markets find themselves resonating a unique sensibility or mood when being-in-the-markets, that just can*not* be the net product of mere private projections of all participants' inner dispositions. What is that? We name our markets *bull* or *bear* markets. This is a funny thing. We call them neither 'upward' nor 'downward trending' markets. We neither call them 'net appreciating' nor 'net

[31] A third solution of entering ourselves into an enlightening program of reducing technology's (bad) influences, is simply another technology-guided blueprint.

depreciating' markets. We call them bull and bear. One may claim, this is because we mean our market is *like* a bull or a bear market. But this is not accurate. Our markets *are* bull or bear. They are "really" bull or bear markets. And we can really be bullish or bearish. The bull or bear market is not a simile – it's a metaphor. And metaphors are not just a matter of idiomatic expressions – that is, a metaphor is not merely in the words we use; it is in our way of being-in-the-world. Metaphors are primarily a matter of understanding and acting and only derivatively a matter of expressions or thought[32]. Thus, a metaphor, like a mood, structures our comportment by deciding what is salient or not[33], highlighting and hiding aspects of a situation[34].

So, by talking metaphorically for the markets instead for instance, literally or by way of a simile, we want to denote something more fundamental than the simple fact that markets on the average just go up or down. We want to denote our way of being-in-the-markets, our *facticity* in the markets. And such facticity does not just correspond to the factuality of prices going up or down. Our in-the-markets-facticity is bullish/bearish. This is how we understand our way of being-in-the-markets – or, to put it in Heideggerian terms, such understanding has been given to us; such understanding is what has been given and what has been preserved – up to now.

This is a subtle point. Bulls and bears is not just a matter of expression. It's how we encounter markets *prior to* our expressions about them. It's a kind of concern or mattering which accordingly structures our being intelligently in the markets – that is,

[32] Therefore, since an argument *is* a building, my action is accordingly structured so as to bring on more evidence to *support* my reasoning. Thus, I comport myself purposively in order to construct a *strong* argument – that is I check its connections, try to support it with more evidence, ask for other's people opinion, etc.

[33] Therefore, since I can't *take* my eyes *off* her, I am trying to be with her all the time – it's more important to be with her than go home and watch that football game in TV.

[34] Therefore, since love is war, you can have many *conquests*; but then you hide the fact that love is a patient and your marriage can be *healthy* or *sick* – which has nothing to do with a conquest. For a related analysis see Lakoff & Johnson (1980).

our portfolios, our trading, our regulation, our education, our language, our strategies; everything. Within that disclosive space already opened up by bulls and bears, our practices make sense and become dominant while others become subordinate or ignored altogether. In such a space, we do not just encounter a bare investment product – say, a bare equity. We are *entranced* by an equity that can surge and drive our portfolio high, can offer a spectacular growth, is in a good position to outperform, has a positive outlook, has fundamental value, can match our risk profile, has raised its dividends, can be the target of a buying spree, can rebound or bounce back; we are *chilled* by a rally to the bottom, by negative surprises in the midst of a mending market, by a long term trend that has been breached, by a depressing tsunami, by overvaluation and underperforming; markets do not matter to us but as bull or bear. And such a mattering and understanding is not new – it's quite old.

But why the bull? Why the bear? What does such a metaphor tries to highlight? Why not, for instance, an airplane? Airplanes go up and down, can fly high or low, can land softly or hardly – they can even crash, just like markets. Why talk about bull markets and not about markets-airplanes – especially, we, the late-modern ones? Why living in the markets in terms of bulls and bears and not as passengers or better, pilots in an airplane? Well, this is quite a peculiar question, never raised before in the framework of the EMH and behavioral debate, never in the SSF space as well – but indeed, quite a Heideggerian one.

Seeking for a clue, we can begin by looking at the online etymology dictionary: we see that the relevant entry there relates the word bull to "inflate, swell", and dates its stock market connotation to 1714[35]. Another hypothetical etymology points to London

[35] bull.(n.1). Online Etymology Dictionary. Retrieved 15 February 2015 from http://www.etymonline.com/index.php?allowed_in_frame=0&search=bull.

bearskin ‘jobbers’ (market makers), who would sell bearskins before the bears had actually been caught – an admonition against over-optimism. Others point to the natural characteristics of the bull or bear. For instance, a bear hibernates, a bull does not. Bulls usually charge at very high speed whereas bears normally are thought of as lazy and cautious movers – a misconception, as is swiftly noted, because a bear, under the right conditions, can outrun a horse. Bulls are herding animals, which is analogous to how markets react in upward or downward trending – but bears are not, which poses a problem. Others point to how the world ‘bull’ plays off the market's returns being ‘full’ whereas ‘bear’ alludes to the market's returns being “bare”[36]. Et cetera et cetera.

Such attempts may be interesting, educating, amusing, or even intriguing, but fall short of providing any serious ground of how fundamentally bulls and bears structure our being-in-the-markets. If the case was that bull reminds us of “full” or that bears are lazy and do not run fast enough, nobody would care less – bulls and bears would have long been forgotten, or at best, they would have attested a temporal or partial meaning-granting status in our expressions when talking about markets (a simile or an analogy perhaps, but not a fundamental metaphor). They would not have reached the emblematic position to which we are referring to.

We may admit that the grounds for understanding our markets as bull and bear can never become explicit enough. That’s a valid point and in fact, quite a Heideggerian one. But as we have already attested, we are not looking for an explicit understanding – after all, we can never explicitly understand our masculinity or femininity; we cannot even teach it to little boys or little girls. We can only *be* masculine or feminine, and this is how little boys and girls get to be also. So, if what we are looking for is not explicit grounds,

[36] See for example, Market trend (2016, February 11). In *Wikipedia, The Free Encyclopedia*. Retrieved 18 February 2016 from https://en.wikipedia.org/w/index.php?title=Market_trend&oldid=704504025. See also, World Wide Words, http://www.worldwidewords.org/index.htm (accessed 18.02.16).

then what are we? Well, we are just looking for a hint, a hint that carries with it an appropriate weightiness that can echo something for us; for our living not only in-the-markets but also in-the-world. Such hints can be found in mythological symbols – for a symbol, in contrast to an allegory, manifests something which cannot be translated, which cannot be made available any other way – thus it constitutes a condensed point that serves to attune us with the plain presence of life itself; with an understanding that goes beyond simple describing or pointing outside of itself for its meaning.

Bulls and bears constitute such rich mythological symbols:

> "[The bull] is a very important figure in the mythologies of the whole world. The horns of the bull and the horns of the Moon are equated. The Moon is that celestial sphere that dies and is resurrected. *It carries its own death within it*; the principle represented in the Moon is *that power of life that conquers death*. The bull symbolizes that *lunar* character, and thus, since the Moon is the sacrificial planet, the bull becomes the sacrificial animal… [So, the bull] becomes a symbol linked with the Moon – *a symbol of death and rebirth*. Symbolically contrary to the Moon is the Sun, the blazing *light* that never dies. Wherever the Sun goes, there the light has gone... So the interaction of these two powers – the solar power of sheer light and the lunar power of reflected light, modified to life – is one of the great mythic themes... These are basic mythic pairs that express two kinds of immortality. There is the [lunar or bullish] immortality of the one who dies and comes back to life... The other immortality is that of the one who has gone through the golden Sun door and will never return... The idea of the reincarnating principle is thus of two orders: first, the reincarnating principle that puts on bodies and puts them off as the Moon puts on and puts off its light body; and the other is that principle of sheer

light that never dies, the light that is incarnate and immanent in all." (Campbell, 2003:13-14, italics added)

And what about bears?

> "Our first tangible evidences of mythological thinking are from the period of Neanderthal Man...and these comprise...a number of chapels in high-mountain caves, where cave-bear skulls, ceremonially disposed in symbolic settings, have been preserved. The burials suggest the idea, if not exactly of immortality, then at least of *some kind of life to come*; and the...high-mountain bear-skull sanctuaries surely represent a cult in honor of...the *bear*...
>
> Particularly instructive and well reported is the instance of the bear cult of the Ainu of Japan, a Caucasoid race...These curious people have the sensible idea that *this* world is more attractive than the next, and that godly beings residing in that other, consequently, are inclined to come pay us visits. They arrive in the shapes of animals, but, once they have donned their animal uniforms, are unable to remove them. They therefore cannot return home without human help. And so the Ainu do help – by killing them, removing and eating the uniforms, and ceremonially bidding the released visitors *bon voyage*... The bears are taken when still cubs and are raised as pets of the captor's family, affectionately nursed...when the little guest is about four years old, the time arrives for him to be sent home. The head of the household in which he has been living will prepare him for the occasion by advising him that although he may find the festivities a bit harsh, they are unavoidably so and kindly intended... The little fellow is quickly and skillfully dispatched... A banquet is then prepared... after which, with a number of farewell presents to take along, he is supposed to go happily home.

> Now, a leading theme... is that of the invitation to the bear to return to earth. This implies that in the Ainu view *there is no such thing as death*. And we find the same thought expressed in the final instructions delivered to the departed in the Ainu rites of burial. The dead are not to come back as haunts or possessing spirits, but only by the *proper natural course, as babies*.
>
> A second essential idea is that of the bear as a divine visitor whose animal body has to be 'broken' (as they say) to release him for return to his other-world home. Many edible plants, as well as hunted beasts, are believed to be visitors of this kind; so that the Ainu, killing and eating them, are doing them no harm, but actually a favor... The murdered beasts and consumed plants are thought of as *willing victims*; so that *gratitude*, not *malice*, must be the response of their liberated spirits to the 'breaking and eating' of their merely provisional material bodies." (Campbell, 1972: 33-4, italics added)

Bulls are associated with the lunar aspect of our existence. We are temporal beings and that means whatever comes forth, reaches its peak and maturity, eventually dies. It nurtures within the seed of its own destruction[37]. Like Human Minsky's financial instability hypothesis, stability breeds instability. What begins as empty, feeds itself to become full, only to return back – and start again. "Full circle, from the tomb of the womb to the womb of the tomb, we come" (Campbell, 2008:8). In such a structure, a kind of immortality is implied: birth, death and rebirth. Things do not end, they just keep on going, the same way the moon keeps on waxing and waning. The same is true with financial markets: bull markets *attune* us with such a cosmic play, with our temporal living, with being-in-the-world. The story of our lunar existence is the story

[37] "We are the seed that dies" (Seferis, 1955:246, author's translation from Greek language).

of our finite being-in-the-markets. We are bulls in-the-world, bulls in-the-markets. And the same way one can reach a meaningful life within such a bullish, lunar or temporal structure, the same way such a shining life can be given by markets; because the market's structure is attuned to the cosmic one – it could never be differently. Markets are not an isolated, independent, self-sufficient incident experienced privately by a bunch of equally isolated, independent, self-sufficient profit-seekers within society. Markets are attuned, from top to bottom by what it is to be and live in a finite human world. Being-in-the-markets is possible only because we are already being-in-the-world. An airplane metaphor (i.e. an *engine* metaphor for that matter) could never have given such a lunar aspect. An airplane is piloted, takes off from a specific point and lands to another one. It can fly low, high, can crash, can be fixed or endlessly updated; it's a fitting image for control-seeking modernity or post-modern engineering agencements – but it falls short to provide an attunement to the mysteries of our temporal structure. To the moon that simply waxes and waves – no destination to reach, no piloting to make, no highs or lows, no prosthetic updates; just waxing and waning[38]. A birth-to-death-to-rebirth circle that goes on and on and within it our skillful coping, our moods, our feats and tragedies, each taking and giving its turn in a *natural* course. An airplane crash is not a natural process. But what is more, the bullish aspect tells us that a financial crash is neither an anomaly; if it were, all it required would be more or less regulation to be fixed. But with every fixation, there will always remain something decisive that resists. And this is resonated by the bull; a direct attunement with that resisting mystery of being-in-the-world and being-in-the-markets; and our openness to it. Economist Paul Mc Culley writes that ultimately, when the bubbles created by

[38] In his "The Principle of Reason", Heidegger favorably quotes Angelus Silesius' verses: "The rose is without why: it blooms because it blooms/It pays no attention to itself, asks not whether it is seen." (Heidegger, 1991:35).

financial bullish alchemy hit the fundamental wall of financial affordability, the day of reckoning arrives: "ultimately, fundamentals do matter." (McCulley, 2009:265). Indeed, fundamentals do matter – but not the arithmetic fundamentals of financial affordability, but the fundamentals of our lunar, bullish attunement. It's more than just financial fundamentals. It's more than our financial factuality. It's about our bullish facticity; our way of being-in-the-world, in-the-markets.

The bull is focused to life that ends in death – and begins again. To growth that breeds its own distraction. From waxing to waning. To our mortality. The bear focuses to the opposite; to death that ends in rebirth. To what Mc Culley calls, the reverse Minsky journey. From waning to waxing. And what is to be found? The same hand that has bred the bubble, the same hand "quickly and skillfully" dispatches it. And what is now dying, what is collapsing, is not an end: "there is no such thing as death". So, it should not haunt us – it's only a "proper natural course", a course which lets babies, not possessing spirits, come forth. And we should accept such a thing without *malice* but with *gratitude*; what has reached its peak, what has dominated, willingly gives itself to that "proper natural course"; to its destruction. It's a deliberating self-willingly breaking. The bear tells us that markets are *given* to crashes in an act of self-willingness – crashes are *not* and cannot be the net effect of a deficient human nature, or of a leakage that failed to be framed adequately.

Our finite living, creation-destruction, in forward or reverse. What does it mean to live in temporal terms? It means to live in a vulnerable, crude and most risky reality where even the most stable or safe option is defined by the instability and unsafeness that ultimately breeds. In such a world you may legitimately claim that 'the best always lose and the worst always win'. A world full of greed and hubris on the way up and full of suffering and despair on the way down. How can one accept such vulnerability and

suffering? How can one participate in such sorrow? With malice or with gratitude? Bulls and bears make possible a graceful attunedness to such luminosity of being-in-the-markets, that is, of being-in-the-world.

2.4. Concluding Remarks

To construct a meaningful talk between Heidegger and modern finance, we have sought to contrast our philosopher with the views that emerge from the two mainstream theories of financial economics, EMH and Behavioral Finance, and the more marginal, yet richer and further sophisticated account of Social Studies of Finance[39]. Against EMH and Behavioral Finance, we noted how Heidegger deflates the scientistic pretentions of their rational and evidence-based reasoning. If EMH's financial actor can be construed as living and breathing *outside* the markets in a sphere permeated by an ahistorical, transcendental rationality, then Behavioral Finance's actor seems in contrast so tightly entangled and helplessly thrown *within* the markets that consequently falls victim of its noises and contingent drifts.

Heidegger restores the world-like aspect of the financial actor. She hasn't fallen from the sky, neither does she wallow in the earthly mud. Instead, she stands between earth and sky, feet firmly on the earth, eyes up until the sky – in short, she finds herself within an historical, horizonal ring of contextual meanings. According to this view, the widespread notion of calculation as the dominant practice of a financial actor recedes or even dissipates in the face of such more primordial being-in-the-world. Calculation (and especially the modern kind of calculation that purportedly seeks to maximize gain and minimize loss) may take place, undoubtedly, but it's not what *only* or *par excellence* takes place in finance. Financial practices of valuation need to be understood not in

[39] As exemplified mainly by the works of Michel Callon, Donald MacKenzie, David Stark, Daniel Beunza and others (see the relevant literature at the references).

terms of series of calculations but against the background of a more fundamental account of the way we are open to the world, the way in which the world opens itself and makes itself available for thought – ways that solicit for different kinds and degrees of calculation; portfolio building is a responding to such a primary event of availability – a craftmanship (of calculation *too*, but not of calculation *per se*).

SSF is very close to such a Heideggerian view. By adopting a symmetric position between quantitative or numeric calculations and qualitative judgments, SSF realizes that calculation can either meet the requirements of algorithmic formulation or be closer to intuition or judgment. The dividing line cannot be therefore where it is drawn by EMH and Behavioral Finance, that is, between calculation and judgment, since they are both about arraying and manipulating entities in a space in order to achieve a ranking, a decision, a value-attribution – a judgment, a calculation. To account for that, SSF coins the hybrid term "qualculation" (Cochoy, 2008). Under these terms, the dividing line is redrawn between arrangements that allow calculation (either quantitative or qualitative) and those that make it impossible. Thus calculation, whether arithmetical in form or not, is about the manipulation of objects within a single spatiotemporal frame – which can be done in indefinitely many ways (Callon & Law, 2005:719, Callon & Muniesa, 2002:1231-2).

However close to unearthing the phenomenon of qualculation against EMH and Behavioral Finance, Heidegger and the SSF assume a different stand in the face of its elaboration. Whereas SSF focuses on the overflowing, that is disseminating and disrupting ways of its deployment, Heidegger tends to see its elaboration in terms of producing better and better articulations of its core (but not fixed or intrinsic) style's imperative (Spinosa, 2001). Qualculation practices within investment communities/ styles display a kind of telos – not a hard teleological law, but a gentle law, a feeling as

it *feels-like*, a tendency that connects them to the rest of the (investment) community's life in such a way that the practices and the personal identities involved are taken as worthy (Spinosa, 2001:218). The same can be said to hold for styles per se: we have already noticed how the density of the other investment communities/styles result in a dense market reality – of how, that is, the "other" is not a waste, but instead what enables market reality. This effectively implies that each investment style is not segregated, contingent or simply drifting by its own in dispersion. That is, investment styles that carry along the historical understandings of the different epochs, are not derived out of necessity (as for example EMH would suggest), nor are simply contingent (as Behavioral Finance would suggest), but neither are endlessly overflowing and uncontrollably dispersive (as SSF would imply). Instead, they form a *legacy*:

> "The epochs can never be derived from one another much less be placed on the track of an ongoing process. Nevertheless, there is a legacy from epoch to epoch. But it does not run between the epochs like a band linking them; rather, the legacy always comes from what is concealed in the Geschick [destiny, sending], just as if from one source various streamlets arise that feed a stream that is everywhere and nowhere."(Heidegger 1991:91).

This might delimit SSF's antimetaphysical penchant for the overflowing, uncontrollable dispersion of new possibilities into multiple contexts, however, what is obvious is Heidegger's effort to provide a story of how gathering, uniting, in short "worldling" and thus "nearing"[40] is possible – without assuming any metaphysical unity rules that rule over polysemy. For Heidegger, the dancer shines at its best not at those moments where the human body releases itself energetically in the multiple rhythmic contexts of a

[40] In a world we are always not simply near in particular beings, but near to their presence to us (Braver, 2009: 60).

disseminative choreographic play, but at exactly those consummating moments where the dancer simply "whiles" (and around which, such energetic overflowings are eventually gathered):

> "The fiddle stops and the dancer whiles" (Heidegger 1991:127)

Heidegger notes how "'[w]hiling', 'tarrying', 'perpetuating' is indeed the old sense of the word 'being'. The while that every founding and every 'why' guards against, names the *simple, plain presence that is without why* - the presence upon which everything depends, upon which everything rests." And also: "To 'while' means: to 'tarry', to 'remain still', to 'pause and keep to oneself', namely in rest." (Heidegger, 1991:127, italics added). It is instructive to contrast such a Heideggerian "tarrying", such "remaining still" and "keeping to oneself in rest" with what belongs to the highly appreciated by both Economic Sociology and SSF notion of network, which is constantly in move between multiple contexts, either extending and proliferating or shrinking and disintegrating.

At those whiling, tarrying moments, another kind of dance seems to take over:

> "The fouring, the unity of the four, presences … as the worlding of world. The mirror-play of world is the round dance of appropriating." (Heidegger, 2001:178)

Heidegger talks about his fourfold (earth, sky, mortals and divinities) in the context of the thing. He chooses to speak about things, because in a technological epoch we are flashed by things (that's why SSF's talk about agencements is so timely). Given his bleak view about technology in that it turns everything (subjects and objects) into flexible resources, the difficult question he tasks himself with is, if it is possible for a technological device (i.e. the thing of the technological era) to gather the fourfold, that

is, if it is possible in technological agencements one's activity to receive a temporary, shining, even celebrating focus where everything gathers or fits together – in short, if the local technological gadgets (that turn everything into resources) can become *things*, that is, local gatherings that set up local worlds, allowing for a multiplicity of different (i.e. not mere technological) ways of being to emerge (Heidegger, 2001:141-184, Dreyfus (1995), Dreyfus & Spinosa (1997)). A thing obviously does not create a world, just as a world does not create a thing – there is, instead,

> "a relation of reciprocity [or mirror-play] between thing and world, such that the thing allows the world to reveal itself in the interconnections [i.e. overflowings] of things, just as the world also enables the thing itself to be revealed through the way it stands [i.e. "whiles"] within that set of interconnections." (Malpas 2008:246).

Now, the financial universe is exactly that space where excessive technological gadgetry constantly multiplies, and where Heidegger's fourfold can be stress-tested. Such financial universe, caught up in an endless loop of innovative technical overflowings, full of tales of hubris and wretched excesses (which do not comprise but further kinds of overflowings), might be accurately described and decoded by both SSF's overflowings and Economic Sociology's networks, yet not intensely enough from a Heideggerian point of view, which asks: can this financial universe be a world[41]? Can

[41] Why such an obstinate emphasis by Heidegger in the "world"? In the Spiegel interview, he proclaims: "…according to our human experience and history, everything essential and of great magnitude has arisen only out of the fact that man had a home and was rooted in a tradition." (Heidegger, 1966:57). Such acknowledgement is offered by Heidegger against the interviewer's comment that "[i]t is thinkable that man has absolutely no determination at all. After all, one might see it to be one of man's possibilities that he reaches out from this earth to other planets…where is it written that he has his place here?" This is exactly the problem posed by technology: for the first time in history, it creates the conditions for men to live in a fully artificial environment, without having to walk on the earth (thus, flattening localities) or dwell below the sky (thus, flattening time), as if, in other words, without the previous background of a world that includes a home and tradition. To account for that, we don't need to go as far as live in a space station in Moon or Mars: the financial

this frantic, dispersive, mobile and fluid computational business gather the fourfold, and thus meet its limit (i.e. delimit itself and thus open the possibility of gathering itself) not by the ways of other non-computational social spaces, but precisely by *itself*?

Our claim, even against Heidegger himself[42], is that such impossibility is indeed possible and in fact engraved in the most conspicuous (and thus, equally inconspicuous) of our financial practices: in the way we name our markets. The bullish and bearish aspect of our being-in-the-markets gathers the constant provided set of opportunities to qualculate, that is, detach, manipulate, rank and display so as to conclude a well-grounded position that will eventually interconnect and overflow, in a thankful, non-qualculative attunedness of the simple waxing and waning of our temporal being-there. Such gathering leads to a ritualized transubstantiation of the brute factuality of the incessantly qualculated market prices into meaningful wholes, made possible by a more sensitive and fragile attentiveness to the plain temporal presence that is without why, to the (nonqualculative) awareness of its (qualculative) awareness.

When SSF's pioneer Daniel Beunza recognized that bubbles are the central challenge of our financial times, he embarked in a legitimate quest to devise strategies that would allow actors to deal with them (Beunza, 2010). He acknowledged that since the field of

environment is already such a technologically constructed space. Thus, the question Heidegger poses is, if and how such teletechnological (Clough 2000:3) gadgetry of the contemporary electronic markets, if and how the constant electronic trading that flattens out places (London, New York, Tokyo) and time (day and night) can, nevertheless, gather up a world, a home and tradition. That's why he offers us the possibility of the fourfold which, in the face of the technological devastation of our inherited, large-scale worlds, may turn gadgetry into "things" that gather up instead local worlds (fields of other than technological ways of being), and thus may make possible a free (not a compulsory) relation to technology, that is, a way of living in such teletechnological spaces that can be equally "essential and of great magnitude" as has always already arisen out of human experience and history.

[42] Against that Heidegger who sees a devolution of the Greek's aletheia as unconcealment, to the Romanized and christened veritas, to the modernized certitudo and ultimately to the technological enframing. This Heidegger considers finance as a calculative business which is not but the end result of a series of gradual erasures that have led to the extremity of the oblivion of Being – for a succinct description of such a Heidegger versus a reconstructed/"demythologized" one, see Caputo (1993).

Economic Sociology and SSF has been studying markets for a few years now, "maybe we already know a thing or two that could be 'translated' in investment strategies." Thus, "a conversation about the move from Economic Sociology to dollars is going to be *inevitable*." (Beunza, 2009, italics added) Such "inevitable" move (of the sociologists of finance into finance by e.g. initiating a performativity hedge fund) seems like an overflowing dispersion in a new and different concatenation where the possibilities of market recontextualization are themselves indefinite. This is a celebrative moment for SSF, in that it keeps the flux in play and constructs an even denser socio-economic reality by mixing and assembling together what was previously considered purebred and segregated: the academic theory is dragged downstairs into the agora, the agora upstairs into the theory's abstractions.

For Heidegger's taste, however insightful and intriguing such developments might look, SSF's hard won expertise simply becomes in this way part of the contemporary imperative for the contribution of sociological, anthropological and organizational reasoned proposals, that is, part of the late-modern imperative to broaden and further refine the framework of calculations that could authorize "decisions which are more and more calculated or … more and more rational" (Callon, 1998:24) in order to streamline economic activity and stave off bubbles – in short, SSF becomes part of a global fixing-the-economy imperative[43] which simply *feels like* the right thing to do. Thus, Heidegger would not object to the "inevitability" of such developments. He would however, tarry in the face of it. Indeed, it is inevitable within a technological understanding that mingles, links, accelerates and surprises. But he would object, inevitability can only occur on the basis of something that is not inevitable; of

[43] For such a fixing-the-financial-regulation critical management theory project, see Marti & Scherer (2016).

something that is simply bestowed. Thus, Heidegger is able to think not just for the (technologically stimulating) play between contexts that reconfigure and refine, but for *the play of the play*: that play we did not initiate, yet a "play in which [our] essence is at stake." (Heidegger, 1991:113). A play that plays without why, the mysterious withdrawing and sheltering of the different styles that are granted, linger for a while, to go in the margins again. The simple, plain waxing and waning – which, as the very existence of the financial markets show us, is *economical*. The "economic" is not simply the non-wasteful, non-excessive, effective rule/law (nomos: law/rule) governed management of our house (oikos: house), that is, of our markets. More profoundly, it's the other way around: markets *are*, so long as they remain *economical*; that is, so long as they remain tolerant, charitable and excessive[44] in letting-be populated by the manifold unfoldings of the meanings of Being, of the multiple sendings of Being which simply wax and wane without persisting in their presence, without refusing to give their way, without absolutizing but charitably moderating (i.e. *economizing*) themselves, without unwillingly but generously accepting their transient authority as a partial sending of that which gives itself ("es gibt"). In such economic mindfulness, the technological way of being delimits itself and lessens its grip in favor of a possibility that we can become attuned to financial things, and them to us, in an other than a technological way. In such a simultaneous attunement, meaningful wholes come about in which humans and things do not merely overflow each other in financial agencements, but also become intimate, that is singular, spoken of in tenderness and

[44] This is the "Divine Economy" of the Eastern Orthodox Church: the unlimited/excessive distribution of alms or charity or dispensation, which thus calls for tolerance and (for)givenness (Runciman, 1997:5,32). That's why the supreme paradigm of the "excessiveness" of the Divine Economy is the incarnation, that is, the birth, life, crucifixion and resurrection of God itself (Prokurat, Golitzin & Peterson, 1996:113-4).

maintained with care (Introna, 2009:41), thus allowing for destinies no mere technological, no mere market-like.

Our reconstructed Heideggerian claim in the face of SSF assertions has been that such gracious openness in such a profound play (beyond the play of agencements) has been readily given and preserved in the financial markets – up to now.

3. Folding the Actuarial: The Aporetic Financialization of Risk Liabilities

3.1. Introduction

Financialization entails, in a broad sense, the increasing role of financial motives, financial markets, financial actors and financial institutions in the operation of the economy (Epstein, 2005:3). In that respect, it has come to blur the lines between insurance companies and banking and investment firms (Chiapello & Walter, 2016:171). This has not always been the case. Insurance until some decades ago, was not classified within the financial sector but within industry, and it is only in the System of National Accounts of 1993 that insurance companies were put in the new major sector of financial corporations (Thimann, 2017:12). A peculiar sense that the insurance sector deserves an exceptional position relative to banking and investment activities is reserved even today, 25 years after the reclassification. Indeed, Turnbull suggests – in recapitulating the global financial crisis of 2007-2008 – that insurance institutions that relied on actuarial advice (and not on financial economics advice) were not in the front line of the crisis and they generally weathered its immediate impact successfully – with the notable exception of AIG "with its notorious financial products division that was far removed from conventional insurance business." (Turnbull, 2017:319). If we generally agree that the global financial crisis, despite the financial system's increased interconnectedness, primarily affected other than insurance institutions (such as banks[45]), then we implicitly accept that there is something in the "conventional" insurance business and the actuarial logic that serves it, which intrinsically distinguishes it from the rest of the financial sector and the financial economics logic that accommodates it. After all, AIG's "conventional insurance business" should not be confused with the financial havoc released by its financial products division.

[45] See for example the Turner Review (2009).

If it were indeed the case that actuarial advice naturally displays an orthogonal relation with the unpredictable swings of the financial markets, then it would be reasonable to expect to see actuarial practices to migrate and inform financial economic practices. However, what we see is exactly the opposite: financial economic practices explicitly invading actuaries and insurers' territories. Indeed, under Solvency II (S2), the new EU insurance regulatory framework that came into effect on January 1st, 2016, it is explicitly demanded to mark-to-market both insurer's assets and liabilities. As noted by Thimann, "[i]t is ironic that banks only have to mark-to-market their limited trading book, whereas insurers have to mark-to-market their full balance sheet even though insurance contracts are generally not tradable." (Thimann, 2017:12).

The valuation of insurance liabilities, that is, the amount (reserve) insurers need to set aside today so as to cover past and future claims, has been traditionally dealt by actuaries in a delicate way. Insurance liabilities have always been considered complex and technical since differences in marketing and underwriting practices result in a sea of subtle particularities that prevent wide homogenizations. This is why they have been characterized as "a countryside to explore on foot and not by fast cars." (Kennedy et al., 1976:46). This is also why trading of insurance contracts – that would provide a market value – is generally not seen as possible. Such natural distaste against standardized market valuation has given ample space to actuarial practices that tended to estimate reserves in close relation to their underlying subtleties and over their full lifetime – what is usually called "run-off". However, such run-off approaches are orthogonal to modern financial economics' conceptualizations that simply ask for the replication of the liability cashflows through a current portfolio of assets as closely as possible (Hibbert & Turnbull, 2003:726).

The first is an attempt to establish an actuarial value, the latter, an economic value[46]. Both are practices of worth attribution (Boltanski & Thévenot, 2006). The first derives worth by looking more closely to the subtleties of the underlying liability, forming probabilistic cashflow projections of their future, ultimate development, in a kind of a fundamental (Chiapello & Walter, 2016) and on-going concern for the long-term view (Day, 2014). The second has a taste for short-term, snapshot-type cashflow models that are silent (and thus symmetrical) about long-term developments, by requiring future values to be anchored in current values (implying no arbitrage opportunities) and disallowing subjective manipulations that may further particular stakeholders' interests at the expense of others[47] (Day, 2014). Actuarial valuation is thus a technically complex and opaque, subjective endeavor that puts human discretion and expertise at the center in order to account for the future – i.e., for how liabilities will ultimately develop; whereas economic valuation is an objective, transparent process that puts financial markets at the center in order to account for the present – i.e., for the liabilities' current worth.

The shift towards market-consistent (economic) valuations is widely perceived as requiring the technically obscured actuarial valuation expertise to be reduced to the mere mechanical plugging in of the market's latest bond prices (Turnbull, 2017:268). However, how can this become possible given the technical minutiae of every liability portfolio that resists being valued in a financial derivative form that is indifferent to its own underlying contingent biography (Amoore, 2013:61)? When insurance liabilities

[46] Economic value tries to answer the question: what is the asset or liability worth? In contrast, traditional accounting historical cost tries to answer the question: what is asset or liability cost? (Penman, 2007).

[47] Think for example, of agency costs: a weak valuation of the liabilities may be desired by management in order to disguise operating results and thus maximize their bonuses at the expense of shareholders (Day, 2014:96-7).

seek to own their singular trajectories in time, when they display their own timing, which seems asynchronous with short term market-timing? Nonetheless, it could be argued that financial markets are specialized in exactly this: how to derivate a price (Preda, 2007), often in the absence of any standardizable, or even any underlying entity to price (Aspers, 2009). After all, the basic tenet of marketization is that risk *can* be managed and transferred via market mechanisms (Çalışkan and Callon, 2009) – whatever the case at hand.

Traditional actuarial practices are closer to what Jarzabkowski (2017) describes as the blending of technicalizing and contextualizing understandings. Actuarial valuation – which allows risks to be priced and managed in order to enter circulation via tradable premiums between insurers and consumers and reinsurers – are generated at the nexus of these two practical understandings (Jarzabkowski, 2017:84). Technicalizing refers to the use of actuarial probabilistic models, which after being loaded with the relevant empirical data, have the ability, via appropriate actuarial reconstructions of past events, to generate technical rates – essentially expressing a large quantity of empirical data into multiple, technically abstracted sets of single modeled outputs. Such technical outputs, however, do not comprise the endpoint of the valuation process. On the contrary, they serve as anchors that provide structure for the valuation process and a point of departure for "qualitative overlays" (Svetlova, 2012:430). The latter are based on actuarial and management expertise relative to the particular contextual features of the underlying liabilities and to the well-known limitations of the models. Such effective contextualizing practices compare and amend the generated set of technical values to arrive at a final valuation figure (usually called "selected") that is considered relevant and appropriate. In that way, actuarial valuations remain meaningful (contextualizing), even as significant statistical, actuarial abstractions are achieved (technicalizing).

Such an approach differs from existing research into the role of models in calculation and the performativity of markets (MacKenzie & Millo, 2003, MacKenzie, 2003, 2006; Millo & MacKenzie, 2009; Muniesa et al., 2007). Performativity theory, in its strong form, implies that the model unambiguously shapes or conditions how, for example, option traders make decisions and behave – a hard structure from which everyone obtains similar results (Svetlova, 2012:419). Thus, the model functions as a more or less significant structurational modality, iteratively – that is, its technicalizing force is most dominant. Such a dominant technicalizing aspect is clearly mitigated in the insurance sector as long as contextualizing practices are allowed for, which introduce variation in the actuarial valuation process and thus feed in counter-performativity. Such variation should, however, not be seen as a defect. Indeed, the point of technicalizing practices cannot be to become free of presuppositions, but rather to find the right ones (Caputo, 1999:38) – ones that support an appropriate actuarial value. For Jarzabkowski, this is the job of contextualizing.

However, this is a job increasingly at risk due to the financialization/marketization of risks. The financialization pressures for market-consistent valuation of liabilities tilts the balance towards the technicalizing aspects of the process. That is, what becomes relevant is not anymore, the underlying elements of the liability and how they are going to play out in the future within the concrete insurantial, technological and societal contexts, but rather the obtainable and transparent market assessments that presumably incorporate all current available information – as if markets have always already done all the necessary contextualizing work. In market-consistent valuation, models are no longer oriented towards the liability itself – rather, they are calibrated to the market. The absence of market transactions (as with insurance liabilities) does not pose a problem because in such a case – where the direct use of quoted market prices is not

available – a model should be employed that extracts an "implied" fair value by reconstructing a hypothetical transaction, given current market generally available data[48]. If meaningful valuations are generated at the nexus of technicalizing and contextualizing, then Jarzabkowski is right to ask worryingly what might happen if contextualizing becomes a skill of the past (Jarzabkowski, 2017:180). The demand for market-consistent valuation seems to strain traditional actuarial modalities which tended to temper models' technicalizing tendencies by requiring contextualizing expert knowledge, potentially increasing the performativity aspect of the valuation models.

However, by taking a closer look in the way the financialization of insurance liabilities is materialized, our approach departs from Jarzabkowski's blended two-stream schema. We need to acknowledge that the point cannot be to contrast between the fertilizing plow of a valuation that is drawn by technicalizing and contextualizing yoked together, versus an evaluative junkyard yoked beneath the iron collar of abstract technicalizations (Brassier, 2007:201). Instead, by zooming-in in what is considered an invasion of short-termism into long-termism, market prices into actuarial values, an aporia emerges that dictates how the further technicalizing is accentuated, the further it requires contextualizing – that is, the further we stretch to attain a purely market short-term view, the further we find ourselves entangling with long-term actuarial views. Our thesis is thus closer to that of Muniesa (2007) who, in his analysis of the automation of the closing auction of Paris Bourse, uses a culinary metaphor to describe how automation can retain a social component: according to him, just as cocoa powder has to be carefully "folded" into fresh cream to preserve the qualities of the cream, the social aspects of a

[48] See Directive 2009/138/EC, article 76.

live trading floor need to be understood and then adapted into algorithms to preserve the social component of a market (Pardo-Guerra et al., 2010).

We would suggest that the financialization of insurance liabilities does not uncritically expand financial economics conceptions at the expense of actuarial logics. Instead, it becomes possible so long as the actuarial aspects are recognized and then adapted into market-consistent valuations to preserve the actuarial component of the insurance business. However, our claim goes beyond the mere presentation of a mild version of Muniesa's folding thesis. We wish to defend a more radicalized version, one that does not contentedly see the preservation of the (nearly extinct) actuarial within the financial for the sake of a more comprehensive, balanced and maybe higher dialectic position – one which resolves oppositions and restores equilibrium. Rather, we would propose a view that recognizes the necessary and fundamental disruption of the financial by the actuarial, the short-term by the long-term, the technicalizing by the contextualizing and vice versa. We wish to demonstrate how the financialization project of insurance liabilities, by precisely attempting to construct itself, deconstructs itself (Derrida, 2001) into an actuarial project, which in its turn is itself disrupted in a recurring play *that can never be arrested precisely because of the constant efforts to arrest it.* Our suggestion is theoretically supported and anticipated from a Derridean perspective which detects within our practices, including the modeling valuation practices, an "autoimmunity" process. This process turns something, e.g., the financial sovereignty of the valuation, against its own defenses – it is a process inevitably at work at the heart of every sovereign identity. Such autoimmunity tension that inheres in the midst of the financialization project, simultaneously constituting and de-constituting the financial sovereign and thus the modeling valuation practices themselves, has been under-studied in the current performativity literature. For example, whereas Jarzabkowski (2017)

worries about the potentially destructive power of the technicalizing sovereignty of the models in the financialization process, Muniesa (2007)'s aforementioned folding position implies a mild preservation process for that component (in our case, the actuarial component) which is in danger of extinction – a mildness that is far from the "aporetic" strain and restlessness which accompany Derrida's autoimmunity concept. MacKenzie (2006), on the other hand, takes an empirical stance and simply sees models as subtle sovereignties that may empirically perform or counter-perform the markets, without any further theorizing ado about the constitutive elements of the phenomenon. And Svetlova (2012) who, although rightly so, sees models as departure points from their technical sovereignty, her perspective seems to trail a practical instillation "from the outside" of a fresher and more invigorating qualitative layer into 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 the inside". In that respect, the paper aims to extend this part of the performativity literature towards the recognition that an autoimmunity process is at work within the modeling valuation practices of insurance liabilities, which simultaneously constitutes and de-constitutes the financial and actuarial aspirations of the valuation process.

The rest of the paper is structured as follows: in the next section, we take a close look of the reserve valuation practices before and after the requirements of market-consistent valuation under the S2 regime. In section three, we discuss how the market-consistent requirement alters the playing field for insurers and actuaries. We attempt to show the different logics involved between the actuarial and financial economics valuations, and the steering levers each one uses. In section four, we present how the financialization project of the market-consistent valuation in order to sustain itself, disrupts itself by folding in orthogonal to mark-to-market actuarial practices. In the final section, we

conclude by defending a Derridean approach of an autoimmunity process that is inscribed within models, before issues of technicalizing vs contextualizing, or performativity vs counter-performativity arise.

3.2. Actuarial and Fair Values

There is a broad consensus about the advantages of market-consistent valuation – for example, transparency, a general alignment with internal risk management, the ability to capture the impact both of embedded options and guarantees and of asset/liability mismatches (Focarelli, 2017:351). This is because efficiency of the capital markets acknowledges that prices are the result of the market's correct assessment of all available information (Zyla, 2012:5). To fair value then is to bring financial reporting of financial instruments closer to market values, resulting in risk valuations that are transparent and closer to the underlying economic reality (Towers Perrin, 2004:7).

How does one establish fair value when there is no market available? This is the case with insurance risk liabilities, since historically no secondary market for insurance liabilities has ever emerged. This is because portfolios of insurance contracts have never been homogeneous – even within a given product line they differ because of differences in company marketing practices, underwriting policies, policy forms, coverage terms, and claim handling strategies. On top of that, 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 attempt to lay off its most problematic claims (Towers Perrin, 2004:19). Such real-world asymmetries have been proved sufficient, historically, to prevent the formation of a market for insurance risk liabilities.

In the past, the problem of evaluating insurance liabilities in the face of their heterogeneity was dealt in multiple ways. In non-life insurance[49] for example, reserving and pricing was determined on a case-by-case basis by specialized underwriters using their expert judgment and individual experience (Turnbull, 2017:276). Gradually however, reserving by case-by-case estimation was viewed as inherently subjective, unstable and inadequate, especially for that problematic category of claims that had already been incurred but not yet reported to the insurer (Turnbull, 2017:296). Accordingly, valuation should involve some form of statistical method, some kind of calculative manipulation that could result in an estimate even for that part of claims that were absent from the currently reported claim cases. Such knowledge gap was naturally filled by the actuarial profession, which, after a series of technical explorations, adopted a standardized set of calculative methods that provided an ubiquitous technical basis to adequately valuate unpaid claims. Such standardization was based on the organization of the insurer's empirical past claims data in a particular technical way so as to build what is called a "run-off" or "development" triangle, which helps to identify and analyze statistically, patterns of development of unpaid claims that are present in historical experience. Such patterns, in their turn, are used for future projections of current unpaid claims.

This step is not usually seen as a step towards financialization, since at that time[50] financial markets still played a minor role. However, it was an essential development in the spread of financial calculation since it managed to translate a plethora of case-by-

[49] We mainly focus on the non-life business of the insurance sector (which includes for example, automobile and homeowners policies), because in general, it is considered the more orthogonal to the financial markets (i.e. there is usually no relation between a low or high interest rate financial environment and a car accident). The point is to examine how such orthogonality eventually becomes aligned with a market-consistent requirement.

[50] End of '70s, beginning of '80s (Turnbull, 2017:275-309).

case data into "sides" of an aggregate triangle out of which patterns of historical claims development could be identified, statistically analyzed and appropriately projected, beyond the original individual claim data details. In other words, it managed to standardize and (at least in theory) narrow down possible calculative outcomes, significantly diminishing variation or convincingly explaining variation of results[51], stabilizing and thus enabling an actuarial epistemic culture (Knorr Cetina, 1999) of the valuation of non-life insurance liabilities.

However, the power of triangle aggregation comes along with a significant loss of information of the original individual claim data details. Actuaries are not blind to the shortcomings of the triangle models and the uncertainty about the ability of these models to properly capture the pattern of claim development (Boumezoued et al., 2017:1). Thus, the actuarial valuation of insurance liabilities was never a mere technical issue. Indeed, the actuary blended its technicalizing professional expertise with contextualizing activities (Jarzabkowski, 2017) in order not only to overcome the models' limitations but also to better calibrate valuations with the particular business practices of the insurer, the current and expected phases of the market risk-cycle etc. The main goal of such actuarial practices was to come up with *adequate* reserves – that is, to secure today, with a high level of confidence, that level of funding that would meet the uncertain liabilities of unpaid claims as they evolve in the future (Tunbull, 2017:221). Against such background understanding, actuaries did not hesitate to overcome technical specificities and inject significant margins of prudence within their valuations by imposing ad-hoc qualitative amendments on the technical results. Such

[51] Variation of results is usually attributed to different methods of organizing and projecting data in the development triangle. Different methods represent different preferences – such differences allow "the technology" of the development triangle and its associated methods to be flexible and adaptable in a plethora of different business contexts.

prudence margins were (and still are) a substantial steering (and competitive) tool in the hands of the management, as long as they can be accurately budgeted via actuarial techniques and thus piled or released throughout the peaks and valleys of the market risk-cycle[52], in effect operating as a stabilizing factor against the swings of the economic environment, the actual claims experience and the wider market competition.

Given that a large percentage of non-life insurance insolvencies over the past few decades have been heavily correlated with the understatement of technical provisions (Courchene et. al., 2008), it became clear that the way "adequacy" of reserves is obtained via the technology of the triangle was not subjective-free and thus opaque, since it depended on the actuary's overall attitude. Indeed, the earlier "appointed actuary" approach (which put regulatory obligations on a suitably qualified individual) placed the actuary in a stressful position since it required her to balance management pressures regarding manipulation of reserves according to the business needs and market cycle, policyholders' "reasonable expectations" about current and future benefits, and regulatory authorities' obligations. In such a context, adequacy of reserves indeed looked like a "heroic" act (Collins et al., 2009). Regulatory authorities were not blind to such inherent tensions (Morris Report, 2005). If we couple this with the failure of the actuarial profession to recognize and account for the financial market risk exposures that their life businesses were underwriting in an ever-increasing scale (Tunbull, 2017:194), then the significant criticism long-established actuarial practices received from financial economics practitioners does not seem overstated. In the

[52] The market risk-cycle shifts between hard and soft market on the basis of the cost of capital available in the market (Jarzabkowski, 2017:205). Adverse claims experience (including catastrophic events), a litigious legal environment and/or a poor economy can set the stage for a hard insurance market (i.e. with increased premiums required from consumers). The reverse is true for soft periods. An insurer who enters a hard market with high prudence margins in his reserves, has the ability to remain relatively soft by releasing such margins, mitigating thus the impact in his lapse ratio and even attracting new business.

absence of market consistency, actuarial valuations end up being inward-looking and thus, either inadequate (that may lead to insolvency) or overly prudent (that may allow for management manipulations to override the market risk-cycle).

As of January 1st, 2016, a new supervisory framework for insurance companies called Solvency II (S2), has become applicable. It claims to provide a more accurate reserving approach by requiring liabilities to be calculated on a market-consistent basis. As already mentioned, such requirement, directly imported from financial economics, has the advantage to disallow subjective prudent or aggressive manipulations, and to direct instead attention towards current values, which in their turn encourage an everyday – i.e., with a short-term view – risk management approach. Market-consistent valuation requires 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."[53] To achieve that in the absence of a developed secondary insurance liabilities' market, S2 requires the reconstruction of a hypothetical fair market transaction via a valuation model that breaks up in two explicit pieces: a *best estimate* and a *risk margin*.

Continuing our non-life example: the best estimate in its most general sense is calculated from practices already established and widely followed by actuaries (such as the use of triangle-based techniques), which as already described, after being adjusted by the application of judgment based on sound reasoning and business logic, can provide a reasonable estimate (Courchene et. al., 2008) – however, with a critical departure. It is now a "best estimate", that is, an expected or mean value (probability weighted average) of the present value of future cashflows.[54] Thus, any implicit margins

[53] Directive 2009/138/EC, article 75.
[54] See CEA-Groupe Consultatif, Solvency II Glossary, March 2007.

of prudence that previously targeted adequate reasonableness, should now be removed. In that respect, although 'best estimate' approaches may build on existing actuarial technicalizing and contextualizing practices, they simultaneously include a shift from a more contextual-tilted "adequate estimate" to a more technical-tilted "expected or mean value".

What about risk margin? In simple terms, it is the amount you would need to pay another insurer to "allure" him to purchase your liabilities. It is easy for the risk margin to be misinterpreted, especially given its name. Nevertheless, it should be stressed that it is not a prudent margin on the reserves. That is, it is not there to compensate for the probable inadequacy of the best estimate amount, especially as the latter no longer targets adequacy but only expected or mean values. Risk margin is simply intended to represent the amount to be transferred to a third party, so that it covers the expected cost of future regulatory capital on the business transferred (IFA, 2013:72). There are many possible approaches in circulation for risk margin calculation, with diverse quantitative and qualitative results for different insurance products. This does not imply that anything goes. All approaches are in fact anchored in concepts of market efficiency and rationality – which in turn denotes that, with respect to insurance liabilities, there can be different responses to what a rational market participant, in a transfer market, would require at the time that the measurement is to be made (IAA, 2009:66). This effectively means that economic rationality is both more fragile and more diverse than usually acknowledged. It is not like Newton's laws that are supposed to be at work everywhere in the universe but is instead a more fragile property that must be carefully preserved by creating a hospitable environment (Guala, 2007:147).

The shift from what is conceived as subjective sphere to a calibration with what is supposedly implied transparently in the Great Outside of the markets, does not come

naturally or unambiguously, as guided by a steady, yet invisible hand of the markets. There is nothing "obvious" in putting a fair value to insurance liabilities. Although the details for the calculation methods of the risk margin are beyond the scope of this paper, it is sufficient for our purposes to note how the construction of S2's provisions on risk margin calculation has not at all been obvious, easy or straightforward. Indeed, not even fully aligned with suggestions provided by the insurance industry (for example, by Insurance Europe which represents insurers that account for around 95% of total European premium income, and by the CRO Forum, consisted of Chief Risk Officers from large multinational insurance companies[55]). In effect, imaginaries had to be produced,[56] assumptions and simplifications had to be engineered and re-engineered, which carried over their own allure and impact[57], in order to form those entanglements and alliances that could properly envelope long established and current best practices. To make possible the conclusion of the risk margin calculation (and thus the fair valuing of insurance liabilities), S2 had to simultaneously construct a hospitable environment and make its way through a diversity of approaches in order to conclude the calculations that make possible, in a peculiar performative circularity, its own rhetoric about market-consistent valuation[58].

[55] See CEIOPS-DOC-36/09 (p.21) for a table that summarizes some of their differences in view.
[56] See for example CEIOPS-DOC-36/09 and especially all this talk about the reference undertaking: should it be a mirror of the original undertaking? An empty, non-empty or another undertaking? Each one of them (or a combination thereof) rests on a different imaginary of what consists the best way to determine "the cost of providing an amount of eligible own funds equal to the Solvency Capital requirement necessary to support the insurance […] obligations (Directive 2009/138/EC, article 77(5))".
[57] For example, in order to avoid a circular definition of the Solvency Capital Requirement (SCR) "it is assumed that the risk connected to the assets that cover the SCR is zero. This simplifying assumption leads to an understatement of the risk margin, but it is useful for practicability reasons." (CEIOPS-DOC-36/09, 2009:17).
[58] For a list of twelve assumptions that makes possible the calculation of risk margin, see article 38 of EU Regulation 2015/35.

Indeed, we should not be surprised. Existing literature in the field of asset fair valuing has already pointed out how such values were never in fact "real" market values, but only estimates of market prices that would, or could be obtained by a reference entity, a fictional, ideal marketplace participant. They thus constitute "as if" or fictional constructs which depend on critical assumptions (Power, 2010:201). By aligning itself with the imperative of fair value that was supposedly envisaged to anchor value judgments into the objective and transparent bits of market reality, S2 had to construct a hospitable frictionless and fictitious space within which uncertainties could be rarefied, and therefore risks and references could be set and defined. Paradoxically thus, the (in principle) objective, market-based, outward-looking and transparent project of market-consistent valuation of insurance liabilities – that supposedly demarcates it from conventional actuarial valuations – could never get off the ground, unless precisely enabled by its "other": a fictional, constructed, inward-looking and full of ambiguous assumptions, ideality.

Having broadly sketched the actuarial and the market-consistent valuation paradigms, we now move on in the next section to examine the accompanying shift in the logic and the sensitivities that each one implies.

3.3. Reserve and Capital Levers

In the traditional framework, an actuary is oriented towards predicting ultimate future benefits (i.e. take a long-term view). In order to understand how well an actuary does her job, all someone had to do is wait and see how close her predictions of future/ultimate benefits "really" were. That is, patiently monitor how experience 'releases' itself with the passage of time and compare its emergent 'actual' pattern with the actuary's predicted or 'expected' one. However, in asking to place a fair value on an insurance liability, the actuary is now asked to do something fundamentally different.

She is asked to predict not the cost of future benefits but a price at which a hypothetical (fair) transaction would “now” (presently) take place. Once that prediction is made, there is no way to check upon the actuary – as with traditional actuarial work where all that was needed was patience for experience to unfold itself. Once the hypothetical transaction moment is past, any subsequent transaction would have a different inforce, different interest rate conditions, and more information for experience studies. That is, in a fair value world, an insurance actuary becomes 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, 2007:19). In a fair value world, comparison against experience as it unfolds itself, what is usually called actual-to-expected, has no currency.

In a pre-S2 world, validation techniques, such as actual-to-expected, were required to monitor and reveal deviations of the expectations from the actual unfolding experience, as long as the actuary's expectations were based on attempts to predict the future by uncovering past regularities via probability-based techniques. Comparison against experience was a technical exercise that enabled close calibration with the risks' underlying characteristics and actual development – one might say an ongoing process of adaptive learning. This can be seen as a ‘getaway’ from the shortcomings of the technicalizing and contextualizing actuarial practices, since it revealed, on the one hand, the models' technical limitations for predictions, and on the other, held the leash on unbridled actuarial judgment and discretion.

In S2 however, actual-to-expected techniques do not carry any weight since, strictly speaking, there is no “actual” involved. To understand this, we need to think, for example, of the analogy with equities. When an insurer marks-to-market his equity holdings day by day, he simply records their market prices – he is not additionally asked

to perform an analysis on their underlying fundamentals (e.g. sales, EBITDA, patent applications etc.) that may explain their price changes. In fact, even if such analysis is robustly performed, price changes may be driven by other "endogenous"[59] (Danielsson et al., 2002) market factors – such as a change in the trust climate. The same goes with a purely market-consistent insurance liability. The actual drivers of their market price are now blurred between the underlying features of the liability and wider "endogenous" market expectations, including expectations about how that particular insurer is faring relative to other peers and the market. Market expectations may thus over or understate an insurer's liability portfolio relative to the actuarial (underlying-related) values, since the point is not anymore what the internal actuarial function expects about the underlying liabilities within its ivory actuarial department, but what other market observers observe. Traditional actuarial valuations considered underlying liabilities features as the most relevant information: such features and the way they develop in the long term were considered as the "actual", as that underlying "real" against which validation of the actuarial virtualities (projections and expectations) would be compared and assessed. In purely mark-to-market liabilities, though, such "real" is blurred, since the underlying features are conflated with the orientation and expectations of others. Such conflation cannot be delineated in the way the run-off underlying liability features can, via for example, "triangle" actuarial techniques. Instead, it is always already overflowing in that the information concerning the orientation and expectation of others is not contained in prices, but is constantly reproduced by the behaviour of operators

[59] For Danielsson (2012, Danielsson et al., 2016), endogenous risk refers to the risk from shocks that are generated and amplified within the system. It stands in contrast to exogenous risk, which refers to shocks that arrive from outside the system. Financial markets are subject to both types of risk. However, the greatest damage is done from risk of the endogenous kind, since it is the risk created by the interaction between market participants and by their desire to bypass risk control systems.

who are oriented to prices (Esposito, 2013:111)[60]. Thus, if we are to speak in terms of S2, the actual-to-expected becomes *expected*-to-expected, which denotes a process of expecting (observing) your expectations (observances). Such a process raises performativity to its highest level – in the double sense that both the technicalizing aspects of the models are strengthened, and their operators/observers observe each other.

Such a shift is expected to be intensified by the recent trend towards the issuance of insurance-linked securities, which can be seen as early steps towards the establishment of a market for insurance liabilities. Insurance-linked securities are complex financial securitizations of insurance risks that provide directly observable market prices of insurance liabilities – which eventually delink insurance liabilities from their underling run-off patterns. However, for the time being, their circulation falls short from determining a deep and liquid market. The practice of using market-consistent models rather than directly observable market prices, still remains prevalent[61].

However, this practice, even if it's not pure mark-to-market, seems to change the very terms under which actuaries and other professionals used to understand the business. The new sensibilities seem to privilege the technicalizing aspects of the business in a way that conventional actuarial practices, with their effective contextualizing aspect, did not.

A way to highlight this, is to understand what a best estimate represents: it's a mean value. For a symmetric liability distribution therefore, a best estimate implies that 50%

[60] This process is further accentuated by the natural information asymmetry of the insurance business, which does not allow other insurers to have full access into the liability portfolio of another insurer, in order to come up with a more informed valuation. Such information asymmetry is at odds with the financial economics assumptions of transparent and frictionless markets.

[61] That does not mean the reinsurance industry has not already been impacted by the issuance of such securities. See for example Jarzabkowski (2017), pp.158-184.

of the times the estimate will prove itself adequate and 50% inadequate. 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 times. But then, how is the other half going to be covered? The answer is, through capital. That is, S2 requires a market-consistent valuation that targets a best estimate that has been stripped away of any prudential margin. Such a "lame" valuation is then supplemented by capital that seeks to provide a buffer in order to absorb any unexpected liabilities *beyond* the best estimate. Who funds best-estimates? The insured, by the premiums paid. Who funds risk-based capital? Shareholders, or the purchasers of the liabilities. Why should they commit their capital? For profit, of course. But where is the profit? It is booked within the risk margin which, as already discussed, does not represent but a reserved amount of the shareholders' future profits according to the current cost of capital (and which, as time passes, and the claims experience gets developed, gradually releases itself) (Chatzivassiloglou, 2017).

What has happened here? Before S2, the major lever that determined an insurer's success or failure along the market risk-cycle was reserves and the prudence margins that accompanied them (or not). Capital was still there, but as it was calculated in a rigid rules-based way, it stayed more on the background as a typical regulatory obligation. It was the reserves, and the wise use of their periodical accumulation and de-accumulation (release), that allowed the insurer to survive the perils of the market risk-cycle. In fact, a good actuary was recognized by his contribution to the injection and consumption of the prudence margins in the face of the risk-cycle's uncertainties – in the business of taming uncertainty.

In the current financialization era, such a schema is considered too opaque and inward-looking. That's why it is significantly changed to reflect a new, closer to the capital

markets set of sensitivities. Reserves lose much of their prominence and become a simple number, extracted either by the market or by a technical actuarial exercise that makes maximum use of generally available market data – it cannot anymore be overlaid by qualitative judgments or contextual business needs. Reserves are there to cover anticipated risks, i.e. the mean of the distribution – nothing more, nothing less. The rising star now becomes *capital*. Its purpose is to cover for the unexpected part of the liabilities. In other words, to provide a buffer to absorb extreme movements, what is usually referred to as the "tail" of the risk distribution. 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 (i.e. detract it from other investment opportunities in the capital markets) in exchange for future profits which have been calculated according to the current cost of capital. Such profits are booked within the risk margin and are gradually released as claims experience develops itself.

Capital in S2 is risk-based, that is, analogous to the risk assumed by the insurer. It is risk-sensitive, based on the simple idea that the riskier the assets and/or liabilities, the more capital needs to be committed. It is calculated by using a set of pre-specified, risk-charges which is supposed to mirror in technical terms the inherent risk of the particular insurance liability – it is calculated, in other words, in a technical way, without the need for any contextualizing overlay.

Such risk-sensitive capital becomes now the new lever for insurers to survive the market risk-cycle: in hard times, the insurer may pull it downward and derisk himself. In good times, he may push it upwards to assume greater levels of risks. Everything thus boils down in the new "capital" lever. How is it going to fare relative to the old, "reserve" level? Is Jarzabkowski right to claim that the new capital level is privileging the

technicalizing aspects of the business at the expense of the contextualizing ones? Or, differently stated, that it raises performativity and model risk to the highest? In addition, what does that mean for the future of insurance and the broader financial system? These are challenging questions. Our aim is to show, in the next section, why Jarzabkowski is right and simultaneously wrong. Moreover, to claim, in the concluding section, that the point is to go beyond the technicalizing and contextualizing dilemma – to think about it as a whole, "desperately hard though that kind of thinking may be." (MacKenzie, 2011).

3.4. (De)leveraging the Capital Lever

We have already argued in the previous section how a 'pure' mark-to-market valuation of liabilities, based on directly quoted market prices – that could in principle be generated from a deep and liquid markets of insurance-linked securities – increases performativity, in the double sense of both strengthening the technicalizing aspects of the models, and through the operators/observers observing each other. Such a process tends to delink insurance liabilities from their underling "run-off" patterns – a linkage that is generally thought to be preserved by the conventional actuarial valuation practices.

We will begin this section by claiming that performativity increases, even in the absence of directly quoted market prices – that is, even if a market calibrated valuation model is used that needs to calculate a best estimate and a risk margin. Indeed, as long as the best estimate is conceived as a mean value, the use of stochastic (instead of more conventional deterministic) models is implicitly encouraged, since they display a better capacity to select a mean given their ability to come up with the distribution of a liability.

Stochastic models for unpaid claims reserving emerged in the mid-90s with the seminal paper by Thomas Mack (1993) who proposed a stochastic model that grounded the triangle-based conventional technique. Deterministic models (based on run-off triangles, as described in the second section) have the disadvantage that they ignore random fluctuations likely to occur, since they end up with a single point estimation. Sensitivity analyses does not completely remedy such deficiency, since it is generally limited to a fixed number of defined scenarios. On the other hand, significant advancements in computing power have made possible the smooth (and inexpensive) integration of such computational intensive techniques. Thus, although stochastic models have not yet gained widespread use (IFA, 2013:10), they nevertheless are gaining wider acceptance and replacing more conventional deterministic methods (IAA, 2010:xv).

Stochastic models by their nature are more technical constructions than the conventional deterministic ones. Although they also make use of the run-off triangle architecture, their utilization is more hands-off and automatic, in a kind of a black-box way. They tend to reorient the valuation practice towards more technical abstractions, such as, how to diagnose if residuals prior to heteroscedasticity adjustments are independent and identically distributed. Such diagnosis requires significant technical expertise to be appreciated – a point that seems far removed from more mundane but urgent matters, such as the close monitoring of the developments in the tort system in the context of which the assumed risk liabilities are eventually going to be released – and insurers' profits and losses are ultimately going to be adjudicated. What is more, the use of thousands of scenarios tends to create a sense of precision – especially to those who lack the technical skills to challenge the embedded technicalities. By providing a full

distribution of results, the user tends to think that he has succeeded to make available, in one technical sweep, all future possibilities on the screen in front of him.

For that reason, stochastic modeling is also considered a perfect candidate when analyzing extreme outcomes or "tail risks" (IAA, 2010:I-2). Extreme or tail risks is what we referred to above as the unanticipated part of the liabilities. That is, stochastic modeling does not just increasingly come to replace deterministic valuation of the anticipated part of the liabilities – i.e., the best estimate conceived as the mean of the distribution – but it also dominates the valuation of the unanticipated part – that is, the valuation of capital which as we showed, supplements best estimates in order to provide a more comprehensive coverage (of both anticipated and unanticipated losses). Stochastic production of the full probability distribution seems to open up a view into the tails of the distribution, that is, into a concrete calculation of the possible losses for future Black Mondays and Lehman Brothers.

The stochastic examination of the unpaid claims development tends thus to become a more complex, computational intensive and thus technical examination of their underlying records in a "collusion of anonymity" (quoted in Castel, 1991). Stochastic models demand significant technical expertise for their operation to be appreciated and challenged. This is coupled with their power to present a comprehensive range of results (that stretches from the anticipated mean to the unanticipated tails). As such, they are turned into sophisticated black boxes that tend to impose their assessments without further ado – straining contextualizing, qualitative overlays. They tend thus to increase performativity, in that their technicalizing effects perform the valuation of both the best estimates and the risk-sensitive capital.

As already discussed, the financialization project of insurance liabilities market-consistent valuation ends up substituting the traditional "reserve" lever by a "capital" one. The latter is heavily supported by stochastic technologies that privilege the technicalizing aspects at the expense of contextualizing. This can have destructive effects, since the capital lever may fall short not only to safely steer the insurer throughout the peaks and valleys of the market risk-cycle, but may also induce procyclical behavior that magnifies the fluctuations of the market cycle. It has been recognized in the wider financial literature, how risk-sensitive capital and mark-to-market requirements can jointly prompt fire sales of distressed securities by the capital-constrained financial institution (see for example, Ellul et al., 2011; Koijen and Yogo, 2015; Merrill et al., 2014). That is, due to the capital lever's simple and binary logic (release gear and increase risk/capital or pull gear and decrease risk/capital), it tends to propose in stressed times an industry-wide similar response: decrease risk by fire-selling risky assets or by significantly shrinking the liability portfolio – i.e., disrupting in this way the flow of insurance coverage, exactly at that time when society mostly needs it. The whole "race to the bottom" process is exacerbated by the fact that the deeper we move towards the tails of the distribution – i.e., the deeper we move into the crisis – the more the risk-sensitive capital valuation model spit surprises, invalidating its pre-crisis forecasting performances. Technically speaking, the capital valuation model fails because it experiences a structural break in stochastic processes governing prices that is reinforced by endogenous changes in the behavior of market observers – who keep feeding in the change in the trust climate (Danielsson, 2011). In other words, capital models counter-perform exactly at that time they were initially designed to perform.

This comes in stark opposition with the traditional view of insurers as stabilizers of the financial markets and the economy, which is often attributed to their business model.

For example, 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 that is orthogonal to a mark-to-market requirement that implies intention to sell (Mennicken & Power, 2015). The context of such a long-term strategy naturally mitigates pressures by the capital lever's uniform technical demands to fire-sell in order to derisk and reduce capital. What in the capital lever is read, technically, as a risk (an illiquid asset) is in practice immunized by a buy-and-hold strategy that takes into account the context of business – i.e., to deliver a long-term promise.

To summarize: the dominance of the technicalizing aspects (at the expense of contextualizing) of the capital lever in the context of the financialization project, makes it to perform the market in normal times and to counter-perform it in non-normal – stressed – times. This may end up having disastrous procyclical results not only for the insurance sector, but for society as a whole.

Is Jarzabkowski (2017) right then? Is it possible that the aggressive drive of the financialization enterprise for modeling, has ignored long established practices so uncritically – such as the accumulation of prudence margins in the reserves, and the asset-liability matching principle that insurance investments follow? We want to claim that this is not the case. We would suggest, in turn, that even in the financial economics paradigm, such actuarially driven practices are recognized, re-packaged and folded (Muniesa, 2007) into the newly engineered market-consistent envelope.

First of all, let us consider the matter of reserves. As we explained above, reserving has been transformed into a technical exercise to estimate the mean value and does not allow for any prudential – or aggressive – margin. However, S2 requires the insurer to allow

for *all* possible outcomes in setting its reserves and not just the reasonably foreseeable, or some other subset. In other words, an additional amount needs to be included in the best estimate to ensure that the best estimate is a "true" best estimate (mean) of *all* possible outcomes, as opposed to something less, such as a best estimate of *all reasonably foreseeable outcomes* (IFA, 2013:45). Such an amount provides for the very low probability but very high severity 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 very large range of possible set of events that could fall into this category – from claims arising from nanotechnology, to a meteor strike, to a Florida tsunami, and more (IFA, 2013:45, 47-8). The allowance of ENID is a new and obviously very subjective element of calculations (IFA, 2013:82). It disrupts the technical, market-consistent calculation of reserves, and requires a form of calibration with something that is beyond data and markets themselves. Such a calibration ends up with a loading that is very difficult to validate, to assess that is, in terms of its inadequacy or excessiveness. However, the use of the terms "adequacy" and "excessiveness" already belongs to the conventional actuarial paradigm. The allowance for ENID, thus, provides actuaries with one more lever, beyond the "capital" one. In normal times, the ENID lever allows for an injection of prudency; in non-normal, part of it might be withdrawn (since after all, the low probability and high severity event occurred). In other words, it allows for a counter-cyclical management of prudence that may better match the insurer's business and market cycle contextual reality. This of course means that it allows for the possibility of the capital valuation model to counter-perform in normal times (since more capital is required due to the ENID's loadings) and to perform in non-normal – contrary to the initial technical tendencies of the capital lever.

Secondly, let us consider the issue of investments. The S2 did not stay blind to the long-term nature of the insurance business that drives investment decisions. To ensure that a market-consistent valuation of assets would not result in an artificial volatility and procyclicality – with unintended adverse economic and social impacts – a so-called Long Term Guarantees Package (LTG) was incorporated, which included measures that better reflect the long-term nature of insurance business and a hold-to-maturity strategy. In its essence, the LTG measures allow a series of adjustments that defer market consistency in the valuation of either a particular set of liabilities that satisfy certain criteria (called "Matching Adjustment") or more generally, for the whole liability portfolio (called "Volatility Adjustment"). The LTG lever thus, counter-performs throughout normal and non-normal times.

3.5. Conclusion: Folding the Actuarial

The market-consistent valuation of insurance liabilities, a product of the financialization drive, dramatically alters the actuarial and insurantial landscape. Conventional actuarial reserving processes targeted long-term adequacy by a delicate blending between technicalizing and contextualizing practices. Such practices supplied management with a "reserve" lever that if wisely used, could safely steer the company throughout the peaks and troughs of the market cycle. This was in essence a counter-cyclical management of prudence: during good times, the reserve lever switched to accumulation; during harsh times, to de-accumulation. Financial economics have criticized such conventional actuarial valuation practices for being inward-looking and in some cases, overly prudent (Courchene et. al., 2008). However, the requirement for market consistency that was introduced by S2, cannot be conceived as a move from the previous private actuarial spheres to the Great Outside of the markets. Instead, the financialization project of S2 had to create another "more artificial, more fragile, more

engineered envelope" (Latour, 2011:158) that could attract long-established actuarial practices, albeit in a new light.

Assuming a short-term view, reserves no longer need to strive for ultimate adequacy: a best estimate conceived as a mean value of the distribution of unpaid claims, is enough. Such best estimate is supplemented by the necessary risk-sensitive capital, which now becomes the new star. Best estimate and risk-based capital provide the necessary buffers for anticipated and unanticipated losses. Risk margin envelops the promise of profits to be gradually released to the one who commits the required capital. The previous "reserve lever" is substituted by a novel "capital" one, which performs the required steering well in normal times, but counter-performs in non-normal. If the story ended here, we would be justified to deplore the loss of contextualizing skills. It would be as if the navigation of the insurance business had been relinquished over to an autopilot which, after thousands of stochastic scenarios recalibrated every new second, makes a claim that it has always and already unearthed the best course amidst the market risk-cycle. This is however, a false claim, in that it ignores the potential destructive and procyclical effects of the technical-driven, capital lever. However, the story does not end here. The financialization project recognized and thus folded within its requirements levers that are orthogonal to the logic of its own capital lever. Within best estimate, an allowance is asked to be made for a loading that cannot be calibrated by any "reasonable foreseeable" set of data. Such allowance reintroduces the old actuarial possibility of a counter-cyclical management. In addition, hold-to-maturity exceptional measures allow for long-term de-linkages with short term asset volatilities.

Our point is simple: the more exclusive a short-term view becomes, the more the insurance company will be forced to betray its long-term commitments and stop following an insurance business model. An insurance business model is as such, as long

as it can precisely exploit an arbitrage opportunity of ignoring short-term market pressures. On the other hand, the more exclusive a long-term view becomes, the more the company may not get to the "long-term" because it will be declared insolvent before it gets there (Merz & Wüthrich, 2008:545). A short-term view is an imperative for management decisions. After all, most actions in an insurance company are usually taken on a recurring yearly basis – that is, within a recurring short-term window, enframed by a long-term view.

From a Derridean point of view, our analysis reveals an "autoimmune process" in which the financial sovereignty of short-termism produces, precisely in order to be sustained, the very actuarial long-termism that threatens to undermine it – and vice versa. Autoimmunity for Derrida turns something against its own defenses. It is a process inevitably at work at the heart of every sovereign identity (Naas, 2008:124). It is a kind of "weak force" because it at once compromises the integrity and identity of the sovereign form, and simultaneously opens it up to a future (Derrida, 2005:xiv; Naas, 2008:125). In precisely such an autoimmunization process, the financialization of insurance liabilities creates its own sovereign capital lever that can only have a future if it lets itself be de-leveraged by its "other." That is, an actuarial one that produces surprises in normal times, so as to disrupt technical complacency and prompt accumulation of capital (in its own financial economics and technical sovereign terms) in the face of the imminent non-normal times.

In the bible, Genesis (41) tells the story about the seven years of plenty, when the Pharaoh is instructed to accumulate food, and the seven years of famine that follow, when the Pharaoh is instructed to de-accumulate. Although more than two thousand years have passed since the telling of this story, it seems that we still, at least in the insurance (and the financial) sector, have not found a better way to deal with the years

of crisis that follow the years of growth – *it is how you enter in the crisis that matters*, and less how you respond to the crisis, at that moment. That is, it is the previous accumulation – of reserves pre-S2 and of capital post-S2 – phase that allows an insurer to withstand the coming period of crisis. It is not, in other words, the financialization project per se, with its technicalizing sovereignty, that inherently impairs the insurer's capability of withstanding harsh times. Rather, it is the insurer's history that incubates the possibility of performing or counter-performing his future – not so much short-term responses at the time of the crisis prescribed by technical reflexes. After all, it is never you, a sovereign substance, that leaves traces. On the contrary, it is the traces that delineate you: sovereignty thus, is not the starting point, but the end result of a long series of traces (Harman, 2009:81). In that respect, it is the prior, accumulation-phase traces that form the insurer's sovereignty and hence capability to withstand the imminent harsh times. Possibilities for such tracing are not undermined by the S2 financialization requirements – or, more accurately, they are *no more* undermined relative to the pre-S2 era, albeit in a new way. The S2 financialization project preserves possibilities for accumulation-of-capital traces by requiring precisely the constitution of a market-consistent, and thus technicalizing valuation of insurance liabilities in normal times. The moment such technicalizing sovereignty is constituted, an internal resistance, an autoimmunitary resistance to itself (and thus, an inherent divisibility of itself) (Wortham, 2010:160) is ascertained in the search for a "true" best estimate – one, that simply can never be market-consistent. Such autoimmunitary resistance opens up the possibility for the insurer to infuse prudence in its market-consistent valuation and hold, consequently, more capital than envisaged by the technicalizing sovereignty – in other words, the possibility for the insurer to leave traces of a counter-performative

accumulation of capital during normal times, is opened-up, by efforts to precisely delimit it.

Such traces, in their turn, create options for genuine decisions – in that they always risk being wrong – during non-normal (crisis) periods: should I begin de-accumulation? If so, when exactly and how much of the margin should be spared? Such options are not pre-given possibilities but are novel opportunities created by the traces themselves (Esposito, 2013:110). They call thus for a genuine decision, i.e., a suitable way to be exploited, which is always at risk of being wrong. Without such traces, the insurer loses his own sovereignty, in that he is then – and only then – obliged to follow the pre-given, uniform, technical prescriptions of the capital lever: fire-sell assets or discontinue production.

Derrida (2005:101) suggests that:

> "to confer sense or meaning on sovereignty, to justify it, to find a reason for it, is already to compromise its deciding exceptionality, to subject it to rules, to a code of law, to some general law, to concepts. [It is] . . . to compromise its immunity. This happens as soon as one speaks of it in order to give it or find it some sense or meaning. But since this happens all the time, pure sovereignty does not exist; it is always in the process of positing itself by refuting itself, by denying or disavowing itself; it is always in the process of autoimmunizing itself, of betraying itself…"

Sovereignty, thus, must remain silent and yet must go on speaking endlessly in order to protect itself – but then it compromises by precisely protecting itself, expressing and justifying itself by introducing within itself counter-sovereignties that threaten to destroy it (Naas, 2008:128). The autoimmunity of the technicalizing sovereignty can be

translated into this sort of double bind: technicality is by its nature silent; it does not need any proof, it is self-proving. However, precisely to impose itself as a technical issue that deserves examination (i.e. turn itself into a necessary "technical criterion"), a reason must be given. For example, why does "heteroscedasticity" need to be checked? A reason must be given. However, such a reason inevitably points to how a technical notion such as heteroscedasticity links itself with the underlying liability patterns and how the latter, in their turn, violate or not other technical assumptions, such as the "independence and identical distribution of the standardized Pearson residuals" (Shapland, 2016); which, in its turn, must give another reason in order to defend itself, etc., etc. For Derrida, since this happens all the time, the technical is always in the process of positing itself by refuting itself, i.e. by linking itself in a context. The more it becomes technical, the more it refutes itself by giving reasons and linking itself to a context. In other words, the more technical it becomes, the more "political" it becomes.

To simply account for the blending of technicalizing and contextualizing, as well as the inherent tension which exist between them, as Jarzabkowski (2017) does, falls short of what Derrida describes above. For Derrida, the relation between the technicalizing and the contextualizing is always already aporetic. That is, it suggests an absolutely impassable situation, one which cannot be resolved through rational analysis or dialectical thought (Wortham, 2010:15), due to a "constitutive autoimmunity", which at once threatens both of them and allows them to be perpetually rethought and reinscribed (Naas, 2008:124). If this is the case, then a model, as the site of technicalizing and contextualizing practices, may perform or counter-perform the market – but such performativity issues arise in the first place because the model is always already disrupted by the inscription of an autoimmune impossible possibility: impossible, due to its autoimmune transgressions that keep it open and unsettled. And

possible, because it is perhaps the only one worth its name (Wortham, 2010:15), since a "possible" possibility would fail to open up a possibility beyond that already enveloped or prescribed within the various levers.

The impossible possibility of the act of valuation cannot be resolved by more sophisticated technical analyses, or through the availability of more big data. Neither by becoming all the way native (i.e. increasingly allowing itself to be immersed in the context). The aporia inscribed makes value self-deferring, always left unsaid, always to-come, even if it addresses us, especially at the moment it addresses us. Valuation calls for re-evaluation, not because more data is at hand and/or a better calibration is possible, but precisely because valuation itself relinquishes its sovereignty, its self-identity. It thus comes to denote not some past, present or future valuation regime but a field of possibilities in which all valuation regimes might arrive or appear – and as that field of possibilities, it would be irreducible to any of these regimes (Naas, 2008:41). Such field is full of cracks – i.e. full of borderline areas, mixtures and marginal spaces. But it is also what gives sense to the whole actuarial and financial economic valuation infrastructure. In that respect, there is no answer in the question of valuation of insurance liabilities – the attempt at answering is the only actual answer.

4. Pricing (In)Solvency: Performativity as a Play of Differences

> Maybe sometimes — the wrong way is the right way? You can take the wrong path and it still comes out where you want to be? Or, spin it another way, sometimes you can do everything wrong and it still turns out to be right?" (Tartt, 2016)

4.1. Introduction and Background

On November 5th, 2008, the reigning British monarch visited the London School of Economics where she was briefed by academics on the turmoil of the international markets. During the briefing, she infamously asked, "Why did nobody notice it?" (Pierce, 2008). Four years later, during a tour in the Bank of England, it was explained to the Queen that the City got "complacent" and people thought regulation was not necessary, but they assured her that the staff at the Bank were there to help prevent another crisis (The Guardian, 2012).

Since January 1st, 2016, regulatory staff has a new weapon to combat or notice turmoil early in the insurance sector: the new supervisory framework for EU (re)insurance undertakings, widely known as Solvency II (S2). S2 concerns itself with the appropriate amount of capital that EU insurers must hold as a buffer to reduce the risk of insolvency; that is, it defines the price that needs to be paid in the form of *capital* to be held aside to provide security to policyholders in the event of subsequent adverse developments that might impair the insurer's financial health. In other words, S2 is a kind of

"bankruptcy self-insurance" imposed by the regulators against shocks and adverse events.

There was much enthusiasm at the beginning of the S2 project. Indeed, early on, it was regarded as the "crown jewel of the European Union"[62]. Today, it is widely considered as one of the, if not *the,* most sophisticated regulatory regimes in the world (Rae et al., 2017:5), not least because it introduces a standardized risk-based solvency framework across the entire EU insurance industry which manages about €10 trillion of assets (Rae et al., 2017:35).

According to its narrative, S2 aims to reduce the risk that an insurer would be incapable of meeting claims, provide early warning to supervisors so that they intervene promptly if capital falls below the required level and promote confidence in the financial stability of the insurance sector (Hulle, 2017). In short, it aims to deliver what pre-crisis regulatory regimes apparently did not, allowing the regulatory staff to avoid future embarrassment from a seemingly naïve royal question.

S2 did not fall from the sky, of course. It had, on one hand, its own history: it took about 15 years, including multiple implementation delays, to develop (Hulle, 2017), which indicates the enormous size of and complexities inherent in the project. On the other hand, it was heavily influenced by the Basel regulatory schemes for banks, in line with the latest developments in risk management and recommendations from the International Accounting Standards Board, the International Association of Insurance Supervisors and others (Grima et al., 2017:187). In that respect, S2 belongs to that contemporary current of regulatory changes which, akin to the understanding of the "epistemization of economic transactions" (Knorr Cetina & Preda, 2001:27), claims to

[62] Quoted in "EU Solvency II - A non-life perspective", retrieved 05 January 2017 from https://www.casact.org/education/spring/2007/handouts/sandstrom.pdf.

make use of the most advanced tools of finance theory and risk analysis, such as Value-at-Risk modeling, to enact a set of scientific and technically sophisticated regulatory standards (Engelen et al., 2011). At the heart of such regulatory standards lie a risk-based capital requirement and a market-consistent valuation imperative for both assets and liabilities.

Thereby, it can be said that S2 looks much more closely to the current banking regulatory scheme than to its own predecessor, usually called Solvency I (S1), in its formation. S1 established capital requirements for insurers back in the 1970s, by requiring them to follow a specific, prescribed formula (i.e., formula-based, not risk-based, capital requirements). Assets were valued at so-called book values or historic entry values with little relation to their market value. Technical provisions for liabilities[63] were valued on a prudent actuarial basis (Power, 2015) – that is, on a basis that relied significantly on actuarial judgement and subsequently was far from being characterized as market-consistent. Due to such reasons, it was not rare for regulators and practitioners alike to adopt an informal prudential approach by encouraging the holding of significantly more capital than prescribed by the S1 requirements (Humphry, 2017:114).

With the gradual expansion of markets, the development of financial economics and a series of insurance collapses (most notably that of Equitable Life), it became evident that S1 was insufficiently sensitive to risk. Other types of risk beyond traditional insurance risk, such as credit, market, and operational risk which were not included in the S1 assessment (Humphry, 2017:114), should be accounted for. What is more, S1's

[63] Technical provisions (or reserves, usually referred simply as "insurance liabilities") comprise the most significant liability item of an insurer's balance sheet. The creation of technical provisions is perhaps the most distinctive feature of the insurance business. Granting insurance automatically involves creating technical provisions to meet promises of future compensations (under)written by the insurer. This is why the valuation of insurance liabilities is always a topic of insurance supervision (Doff, 2011:15).

market-inconsistent approach in both valuing assets and liabilities did not incentivize modern risk management practices such as, in the case of assets, hedging. In the case of insurance liabilities, it gave room for discretional practices such as over- or under-reserving[64]. Additionally, the backward-looking orientation of S1 (i.e., its reliance on past business and past probabilities) gradually became incompatible with the start-of-the-century's emerging "emergency imaginary" of a potentially catastrophic future (Opitz & Tellmann, 2015), which required a more anticipatory, preemptive and thus forward-looking technology to be reckoned with (Amoore, 2013; Anderson, 2010; Aradau & Van Munster, 2011; De Goede, 2012; Grusin, 2010). In short, S1 was risk-insensitive (i.e., requiring algebraic and not risk-based capital) and market-inconsistent, thus prone to management manipulations and unable to incentivize appropriate corporate governance practices such as risk management which is, by default, a forward-looking, market-calibrated activity that can preemptively account for a potentially threatening future.

Hence, there was a need for the changes brought about with S2, which demands market-consistent valuation of both assets and liabilities, and capital requirements that are sensitive to the risks assumed by the company. Such demands are widely thought to incentivize best corporate governance practices – in effect, risk management. In practice, risk management needs a clear way to explicitly measure both the individual types of risks (insurance, credit, market and operational) and the single, aggregate, enterprise-wide risk assumed by the company. Such measurements allow for the efficient management of the risk, i.e., for the technical regulation of increasing or decreasing risk via market techniques (like hedging) or practices specific to the industry

[64] Over-reserving is suspect of earnings manipulation. Under-reserving has a more direct relation to solvency since it undermines the insurer's ability to honor its liabilities.

(like reinsurance or asset-liability management)[65]. In this way, it is made possible to assure that both the individual and the aggregate risks are constantly kept in line with the firm's risk appetite and do not breach its prespecified risk tolerance limits – or if breached, to automatically trigger subsequent actions for realignment – even in the face of a catastrophic future.

Such a clear-cut, market-calibrated, algorithmic way of measuring risk (in order for risk management to operate) is precisely what is offered by S2's technical standards: risk is no longer buried within prudential and highly subjective assumptions as in S1 (Power, 2015:51), but is instead released, technically, in both its individual and enterprise-wide forms. This means risk is explicitly defined and measured in strict conformity with market reality, net of discretional and highly controversial non-market elements.

Risk-based capital and market valuation, therefore, do not simply inform the typical solvency indicator[66] of an insurer's S2 solvency status, but constitute what is widely thought of as a set of scientifically sound and technically oriented governance practices (risk management) to be followed by the S2 insurer. Thus, the aim of this paper is to zoom in and attempt to unearth the general working embedded in S2's risk-based pricing algorithm. Risk-based capital, despite its own rhetoric to provide a scientific

[65] Hedging is about protecting the insurer's investment portfolio, by engaging in market transactions which are designed to neutralize the market or credit risk of the portfolio, whereas reinsurance is about mitigating the risk of the insurer's liabilities, by effectively insuring them with other insurers (for that reason called "re-insurers"). Asset-liability management is about managing both assets and liabilities in ways to offset the interest rate risks involved.

[66] A typical indicator of an insurer's solvency status is the ratio of its own funds (equal to assets less liabilities) to the Solvency Capital Requirements. For example, assume an insurer which, under the S1 conventions, measures its assets and liabilities and finds them to be 340 and 220 units, respectively. This means that the insurer's own funds is 120 units (=340-220). Assume that the insurer then calculates its Solvency Capital Requirements (using the S1 prescribed formula) and comes up with a figure of 100 units. Then, the insurer's solvency indicator or Solvency Capital Requirement ratio under S1 is 120% (=120/100), which is interpreted as holding 20% capital in excess of the required (=100). Obviously, a ratio below 100% denotes insolvency status. Leaving aside a lot of subtle differentiations, the same approach generally holds for the S2 framework. However, what changes in S2 is the way assets and liabilities are measured (market-consistent, not book or historic values) and the way the single figure of the aggregate Solvency Capital Requirement is produced (algorithmic and risk-sensitive, not algebraic and risk-insensitive).

and neutral assessment of the risk assumed by the insurer, is technically designed in ways that open up particular possibilities of diagnosing and interpreting risk, empowering and disempowering specific behaviors that are not only in conformity with the initial designing intentions, but most crucially, beyond and in opposition to them. Such zooming-in will allow us to subsequently zoom out and disclose an aporia at the heart of S2. This aporia shows how the technical and scientific conditions of the algorithmic possibility to ensure solvency bring about their own destruction and conditions of impossibility, unless allowed to be deconstructed by their non-scientific "other", which are calls for prudence, discretion and good judgment beyond mere technical efficiency and scientific validity.

The S2 risk-based capital model is a classic case of a model considered to be scientific, and thus idealized, which is asked to function in a complex and mundane reality. It brings, however, a distinctive peculiarity relative to other such cases: it is not an instrument to be used by practitioners for achieving non-epistemic goals, for example, "making money" (Svetlova, 2013:321-22); in contrast, it is an instrument required to be used by practitioners to precisely safeguard an epistemically defined concept: the solvency of an insurer. In the first case, it is reasonable to expect that the model will need to endure a de-idealization process in its application in order for practitioners to bridge the gap between the model-as-science (a purely theoretical enterprise) and reality (a field of application). Such a de-idealization process seems to inevitably involve the blurring between epistemic and non-epistemic values for the eventual empirical success of the model (Douglas, 2000, 2009; Laudan, 2004; Svetlova, 2014).

In the case of the S2 model, however, the model-as-science has been both designed and calibrated precisely to serve its own pragmatic application, which in a peculiar circular way, is epistemically defined. For example, the quantitative requirements for solvency

are (epistemically) defined as that amount of capital that is sufficient for the insurer to withstand a variety of stresses over a one-year horizon with a confidence level of 99.5%. In that respect, the calibration of the S2 model (i.e., its transportation within the field of application) is supposed to precisely mirror that confidence level (and not something less or something different). Such "technocratic calibration" implied by models like S2 has been criticized within the performativity literature for its tendency to crowd out non-epistemic values under an epistemic and technically laden vocabulary. For example, Lockwood (2015), is keen to emphasize how the apolitical and technocratic technology of the Value-at-Risk modeling (a structure eventually adopted by the S2 algorithm itself) is not just inherently unable to predict the unpredictable, but also renders the unpredictable unimagined by crowding out alternative anticipating responses such as subjective judgement and systemic financial regulation (2015:743). From there, it is easy to argue against the increasing spillover performative effects of such technocratic tendencies.

From our point of view, it is not that solvency assertions (i.e., "imagining" and preparing for the unpredictable with a confidence level of 99.5%) could be better served by mitigating or supplementing scientific and technical aspirations with prudence, subjective judgments, simplifications and even a second layer of macro-prudential regulation with an exclusive focus on systemic risk (Baker, 2017). In fact, what needs to be acknowledged is that S2, besides its "hard", technical and scientific predilection, does not fall short in calling for "soft" modes such as prudence, the four-eyes principle (requiring at least two persons to review a significant decision prior to its implementation), proportionality and simplifications (i.e. making decisions according to the nature, scale and complexity of the risks inherent to the business), and even

supervisory authorities taking heed of potential pro-cyclical effects[67]. What is impressive with S2 is its paradoxical nature: where it calls for market-consistent valuation, it simultaneously calls for prudence[68]; however, you can either follow the market or deviate from it by assuming a "prudent" stance (the degree of which is, by itself, quite subjective). Where it requires significant decision making based on scientific and empirically valid criteria, S2 simultaneously asks at least two persons to review any such decision, as if the scientific and empirically valid is inadequate by itself to make (any) two minds converge in a neutral and "neat" way. Where it is overly prescriptive to the point of becoming rules-based, its aspirations are explicitly stated as principles-based.

Davies and McGoey (2012) claim that, in the wake of the financial crisis, there have been two different demands from elites and regulators. First, rational economic knowledge is to be further and more vigorously extended to prevent the "nobody noticed it" from being possible in the future. Second, a new, softer rationalism should be allowed for instead, which factors in the possibility of errors and systemic complexities. Although S2 is widely considered to belong to the first category, what is impressive is that it makes this distinction collapse by simultaneously enveloping both a "hard" (technical, scientific/economic) and a "soft" (judgmental, prudential) rationality to account for solvency. S2 makes available both "hard" and "soft" tools in an attempt to safely navigate towards solvency. If this is so, then Lockwood should be content: S2 is that *one* regulatory regime which does not fail to explicitly introduce "other possible ways to confront unknown unknowns" (Lockwood, 2015:745) and thus supplements,

[67] Calls for prudence, proportionality and the four-eyes principle are scattered throughout the S2 Directive (2009/138/EC). See for example Chapter 4 of Section 2 (specially Articles 41 and 76). For procyclicality, see Article 28 and Paragraph 61 of the Directive's introductory notes.
[68] Most notably in the valuation of technical provisions (Article 17 of the S2 Directive), the management of the business (Article 41) and investments (Paragraph 71 of the Directive's introductory notes).

or if you will, mitigates excessive technicalities with good judgement and alternative anticipating responses. If this is so, then, what is left for *us* to do? One answer might be to simply strive to overcome all implementational issues which perhaps hinder proper implementation. However, our point is that no matter how hard we struggle, solvency is as much about presence (implementation) as it is about absence (what is excluded and thus constantly defers proper implementation). That is, solvency is always to-come since solvency itself points to insolvency.

What we mean by this is that the difference between the "hard" and the "soft" is aporetic in a Derridean sense: that is, where either of them manages to succeed, it precisely fails (Derrida, 1986:35). Why? Because "hard" is structurally informed by "soft", and vice versa. In that respect, solvency is already permeated by insolvency, in that a perfect "bankruptcy insurance" (if existed) would simply remove responsible decision making, exponentially increasing the chances of going bankrupt (Huerta de Soto, 2009:75).

The aporia involved in the solvency project and in the wider risk management modeling, usually passes undetected in the theorizing framework about performativity. On the one hand, performativity literature reveals that economic ideas and models change, shape and construct reality (rather than simply describe it). In that respect, the wide use of a risk management tool (like the S2 model) changes reality in ways that might reinforce or undermine the model's initial aspirations. The performativity commitment, therefore, is about the entanglement of knowledge (theory) and practice (Boldyrev et al., 2016:7); it cannot be about evaluating what is "better" or what "succeeds" from a privileged knowledge viewpoint that can safely guide practice. However, on the other hand, as long as the performative spillover effects are detected and disclosed, we cannot help noticing a tendency that seems to underlie part of the performative analysis conducted: the use of performativity as a resource to provide a more informed and more

comprehensive response to the "What might be done?" question. A telling example can be found in the work of Michael Power (2004) who, after providing a convincing and thorough diagnosis of the first- (primary) and second-order (performative) risks of the risk management practices[69], finds himself in a privileged position to conclude with a few suggestions on how to secure an "intelligent" risk management approach. Such intelligent suggestions obviously address both primary risks and performative effects in ways that current organizational practices most probably fail to do[70].

Our point is obviously not to delegitimize the performativity perspective, for it is very important in its own terms. Our point is more subtle and follows Introna (2018), when he suggests that "…scholars want the world to always add up"; in our case, it is performativity scholars who want the world to always add up: we tend to suggest that if we had done *this or that*, then our risk management practices would have been "intelligent", and the failure (in our case, insolvency) would have been avoided (2018:17). In that respect, understanding performativity and why, for example, one theory is capable of affecting the world while another cannot (Brisset, 2016), becomes a crucial resource in our efforts to decide "this" rather than "that", i.e., to design and implement an intelligent risk management system that can stave off insolvency.

Indeed, it is entirely plausible that an "intelligent" risk management practice can help avoid insolvency; however, our point is that "we simply do not know!" (Gray, 2009). Solvency is indeed possible as long as it is seen as a set of deliberative practices that organize uncertainty (first-order risks) and mitigate (counter) performative, second-

[69] First-order risks are the primary risks embodied in the formal mission of risk management (Power, 2004:15), e.g., credit, market, insurance risks, etc. Second-order risks are, e.g., personal, legal and reputational risks (2004:15) which emerge from the sheer workings of the risk management system. Second-order risks have the perverse effect to counter-perform, hence undermine, the formal mission of first order risk management.

[70] Although, as Power acknowledges, many organizations will rhetorically claim that such suggestions "are already part of their operating philosophy, that they are already intelligent." (Power, 2004:61)

orders effects. However, if it were only that, i.e., a matter that is of deliberative practices, then we would all know, for sure, how to remain solvent, and a definite (and intelligent, for sure) account and program of solvency could be given. However, it is precisely at such a point that solvency would lead to insolvency in that no responsible decision about risks and solvency would ever need to be taken, as such. This is because, for Derrida,

> "[w]hen the path is clear and given, when a certain knowledge opens up the way in advance, the decision is already made… [and then] irresponsibly, and in good conscience, one simply applies or implements a program… The condition of possibility of this thing called responsibility is a certain *experience and experiment of the possibility of the impossible: the testing of the aporia* from which one may invent the only *possible invention, the impossible invention*." (Derrida, 1990:41)

In order for solvency to be as such, that is, a responsible decision and assessment, it needs to remain open towards that "which continually escapes our perception, is continuously deferred, yet which can disrupt…at any moment, sometimes tragically" (Introna, 2018:17) our horizon of deliberate and intelligent possibilities. This is an impossible possibility.

In that respect, where performativity is analyzed in the wider literature simply to be used as a resource to deliberate for intelligent solvency practices, we are interested in withdrawing towards that pre-performative field, that *prior* impossible possibility always and already inscribed within our practices which keeps them open, deconstructable, undecidable, thus fragile, contingent and vulnerable – in other words, worthy to mesh with. Such withdrawal will allow us to reframe performativity as an

effect of the play of differences that constitute the written text of the S2 standards – an uncontrollable play that eventually renders performative effects undecidable. From our perspective, we want to denote how performativity is always and everywhere exposed to that play.

The rest of the paper is organized as follows: in the next section, we attempt to take a closer look at the way S2's risk-based capital model[71] works and how it is transformed into a technology of governance that builds upon and goes beyond previous practices. We examine how, by defining and technically putting a price onto each risk, possibilities for a new set of scientific governance practices are released which legitimate solvency claims relative to current and future risk emergence, even in the face of a radically uncertain future. In the third section, we get to examine the counter-performative effects that the S2 algorithmic model brings about and how such effects affect both the financial markets and what is perceived to be the core of the traditional insurance business model.

After examining both the initial aspirations (Section 2) and the counter-performative (Section 3) effects of the S2 model, we conclude in the last two sections by elaborating the Derridean aporia that we detect in the midst of solvency itself. We position our claims relative to the existing theorizing framework and show how such an aporia is inscribed within the S2 algorithmic code and precisely preserved within the S2 fragmented written text, rendering performativity an undecidable of the play of differences.

[71] S2 provides a generic risk-based capital model (called the standard formula) that can be followed by insurers who do not wish to develop their own internal model. We focus here on the standard formula since the percentage of insurers who eventually use an internal model has been very low. Although the standard formula is considered suitable for smaller and medium-sized insurers, it is believed that outside the UK, it is used by many larger insurers (Rae et al., 2017:21).

4.2. The Opening Up of New Possibilities

Risk-based capital is founded on a very simple, theoretical idea: the riskier the assets and liabilities are, the more capital an insurer has to hold. The riskiness of assets reflects the riskiness of the insurer's investment strategy; the riskiness of liabilities reflects the riskiness of his insurance activities (for example, different lines of insurance business have historically proved more volatile than others). At a first glance, this is a sensible idea: after all, why should we not want capital to reflect riskiness (Danielsson et al., 2015)? In that respect, a risk-based capital approach conveys a very clear message: should insurers up-risk themselves, they are required to hold a larger amount of capital to operate as a buffer in the event of adverse developments. Should they de-risk themselves, then a lower amount of capital is required. In such a context, it makes perfect sense for insurers to decide, a priori, the level of risk they feel comfortable with, i.e., to define their risk profile (or risk appetite), and to then navigate (risk-manage) themselves accordingly so as not to breach the risk tolerance limits that effectively quantify their risk appetite – or, in the case of a breach, to have a proper plan in place for re-alignment.

Such a simple idea manages to turn measurement of risk into a powerful governance tool: risk management. Risk management redefines insurers' activities, but also changes the concept of regulation itself. It redefines insurers' activities because insurers are now given the possibility to manage not only their individual risks[72] on a segregated basis (as they used to in an S1 environment), but also on an enterprise-wide level. The latter is considered an extra and more enhanced type of risk management, called *enterprise*

[72] The standard formula recognizes and quantifies the following main categories of risks faced by an insurer: insurance risk (which is specific to the industry), financial risk (market and credit) and operational risk. This is not an exhaustive list. A usual concern about the standard formula is how it fails to include risks that may have a significant impact in the insurer's balance sheet (for example, volatility risk. For more, see Doff (2016: 593-5)).

risk management, precisely to discern itself from older "silo-based" risk-management regimes where individual risks were managed in a segregated and thus uncorrelated way, creating a potential source of risk itself. Indeed, the "silo-syndrome" was criticized heavily after the 2008 financial crisis since it was considered to have contributed to a surprisingly fragmented organization in the midst of the Internet and global interconnection. It is suggested that under silo-based risk management, the unintended consequences of the interaction of different practices and worldviews were largely ignored. Enterprise risk management brought the possibility of breaking down the barriers within organizations (Tett, 2016) and gestured towards the epistemological and psychological comfort of a panoptic view (Power, 2015:51). Under its aegis, all silo risks are aggregated and managed, interactions are accounted for and capital is more efficiently used since it allows for diversification effects. In fact, the very practice of setting the risk appetite is considered "best practice" under enterprise risk management since it typically involves the determination of the enterprise level of risk the insurer is willing to accept to achieve his strategic objectives. This then trickles down into definitions of appetite for each of the silo risk categories (insurance, financial and operational)[73], thereby altering the way silo elements are seen and acted upon: they are still managed as in the previous S1 environment but now with the goal to be subsumed into an enterprise risk management framework.

Enterprise risk management also redefines the concept of regulation because it becomes a technology of governance-at-a-distance which claims to resolve the eternal dispute between proponents of tighter regulation and the industry lobby which stresses the ultimate cost of regulation to the policyholder and outside investors (MacNeil, 2012). The point is that regulation, in the face of risk-based capital – that is, in the face of

[73] Also for other individual key elements, such as earnings stability (Duverne & Hele, 2017:64).

explicit prices on individual and enterprise-wide risks – may depart from more classical steering tools, such as prohibitions and constraints, to leave space for more autonomous and self-responsible navigation by insurers. For example, regarding the investment strategy, the S1 regulatory environment was full of prohibitions and regulatory limits that concerned permissible asset classes and maximum limits; such regulatory constraints are absent from S2. This is because the embedded risk-based approach is thought to incentivize proper risk management behavior by itself. If an insurer is willing to assume higher levels of risk, she should simply pay for it in the form of higher capital requirements and extensive risk monitoring requirements. There is no need for regulators to enact any investment restrictions a priori. Enactment of S2 regulation takes place at the level of each and every business decision. Regulation takes the form of effective corporate governance practices which, in their turn, are informed by the technical measurement of the prices of risks.

This brings us to the core problem of risk-based capital, which is nothing other than how to define and technically measure individual and enterprise-wide risk – in other words, how to put a price on risk. Measuring risk is a project of its own. It is not that we can somehow stick some sort of "risk-o-meter" deep into the bowels of the financial and insurance system to get an accurate measurement of the risk of complex financial instruments and insurance liabilities (Danielsson et al., 2015). This is because risk is an elusive entity with both technical and social aspects. In fact, it seems like less of an entity with clear boundaries and more of a vague horizon on the basis of which specific entities (for example, equities) show up as threatening. The technical quantification of risk, thus, seems quite ambiguous right from the start. Nevertheless, for a risk-based capital approach, such measurement is necessary since, in the absence of sound and

accurate risk measurements, risk-based capital is at best meaningless and at worst dangerous (Danielsson et al., 2015).

In general, many (if not most) of the core technical elements used by S2 for the calculation of its risk-based capital are drawn from the realms of finance and investing[74] (Conwill, 2016:3). In that respect, S2 follows finance theory and defines risk as a matter of volatility in expected outcomes (Power, 2004:14). Such a definition allows capital requirements to exhibit risk sensitivity by adopting a scenario-based approach[75]. That is, the capital requirement for each of the individual risk submodules is determined as the impact of a specified scenario on the level of the insurer's own funds (i.e., the excess of assets over liabilities, already required to be measured in a market-consistent way). Key parameters surrounding the scenarios have been calibrated thanks to the technical analysis carried out by the European Insurance and Occupational Pensions Authority (EIOPA), which is, by definition, an independent advisory technical body that assists the European Commission in the design of S2. Calibration and relevance are thought to be secured by the use of current and historical market and industry data in line with the inherent characteristics of each individual risk submodule. These data span from, for example, the MSCI World Developed Price Equity Index for the equity-type risk submodule, to country or sub-country data about earthquakes, windstorms and other extreme events for the non-life, catastrophe-type risk submodule. The overall risk is based on a modular structure where separate solvency capital requirements are computed for each individual risk submodule. These are then aggregated with the help of prespecified correlation matrices to allow for diversification effects. In technical

[74] How these may or may not extend naturally to the specific insurance sector domain of insurance risk is investigated in the next section.

[75] Formula-based calculations are used for submodules where a scenario-based approach was not considered as the most appropriate (EIOPA, 2014:7).

terms, S2 ends up with Solvency Capital Requirements on a Value-at-Risk measure under a 99.5% confidence level over a one-year time horizon. This simply means that the aggregate, enterprise-wide capital required to be kept aside by the S2 insurer to remain solvent at the end of the coming year is algorithmically calculated in such a way as to be considered adequate to make her withstand 199 next possible years and fail in just one. This calibration objective equally applies to each of the individual risk submodules.

To give a simplified view of the matter, the S2 capital algorithm comes up with a standard capital charge for each of the insurer's key financial or insurantial instruments. For example, a particular equity within the investment portfolio of the insurer receives a specific equity-type capital charge that is higher than, for example, the spread-type capital charge of a high quality corporate bond. Such differences in the standard capital charges are supposed to reflect the different "riskiness" inherent within each of the financial instruments; for example, equity listed outside the OECD is riskier than equity listed within the OECD, which is riskier than a highly rated corporate bond, which is riskier than a government bond; similarly, receivable exposure is riskier from an unrated rather than a rated counterparty, and so on. Questions of how much riskier one instrument is relative to another are not answered by political narratives. They are decided by the empirical data themselves as they are technically gathered and analyzed by EIOPA. Such a "scientific" process is supposed to secure the soundness, neutrality and the apolitical status of the S2 risk-sensitive capital charges. In their turn, capital charges institute a technical field that provides a clear orientation between high (capital-intensive) and low (capital-efficient) risk instruments, on the basis of which technical governance-at-a-distance (as described in the beginning of the section) is made possible.

Such a technical calculation by the S2 Capital Requirements algorithm does not just make possible the assessment and management of the *current* solvency status, but opens up a further, more radical possibility.

A key technical element for the calculation is the time horizon to be used. As already noted, S2 opted for a one-year mark-to-market approach. S2 capital requirements, therefore, are bound to detect *current* risk emergence within a short period of one year. This effectively relinquishes the possibility to separately examine solvency capital requirements with respect to *future* risk emergence over a longer time horizon. Indeed, risk emergence due to longer-term risk issues is required by S2 to be addressed separately, beyond current solvency capital requirements, through adverse scenario analysis over a business cycle of three to five years, bringing in the whole range of management actions which might reasonably be taken in each scenario (Farr et al., 2008:15).

A longer time horizon includes risks that may look immaterial in the current solvency assessment (i.e., within a one-year horizon) but might become quite material in subsequent periods. Their solvency assessment should take place in the internal report of Own Risk Solvency Assessment (ORSA) which, in a more narrative-style manner, is intended to work as an all-encompassing statement of strategy and related risks (Power, 2015:50), anchored in the current point in time, and looking forward towards the unknown future.

ORSA is considered more of a process for decision making and strategic analysis than a regulatory document. The insurer is to actively take a close look at almost every possible future development of the environment in which its activity will evolve and produce, under such conditions, future possible solvency capital requirements along

with future possible economic balance sheets. Such projections differ from current ones in that the insurer identifies and integrates into its future scenario planning the impact of emerging developments, such as, for example, the emergence of new technologies like 3D printing or advances in biomedicine. The insurer is further required to consider other future developments, such as prolonged low interest rates or the possibility of catastrophic events (events with high severity but low frequency) that might affect its financial standing (Sandstrom, 2011:625); this is usually called stress testing. Stress testing is not simply scenario testing where projections of the trends of the company's financial conditions under various scenarios are plotted. Stress testing radicalizes scenario testing, in that it involves the worst-case and unlikely, in terms of probability, but nevertheless *possible* scenarios to be examined – an excess of the standard scenario testing.

Stress testing findings do not have any currency in an S1 world, where the uncertainties of the future are digested as risks by probability-based techniques that rest on the certainties of the actuarial science. Stress testing can only be meaningful in an S2 world, where the uncertainties of the future are not to be tamed by systematically studying the regularities of the past, and thus cannot be predicted and prevented. What remains, then, is to simply *embrace* them (Baker & Jonathan, 2002). Where in S1, uncertainties were transubstantiated into risks with the help of conventional probability-based technologies, in S2, a new set of technologies is used which preemptively looks for the possible; technologies, such as the solvency capital requirements algorithm and ORSA, which make possible a new form of risk perception – one that keeps the process of accumulating not certainty, but suspicion and doubt, going. In such an S2 world, the *event* cannot merely be what *actually* happens, as in the S1 world. The S2 event can only be *imagined* by anticipating its abstract form. ORSA and the solvency capital

algorithm are indifferent to whether a particular event occurs or not. What matters is anticipating it, visualizing it, and thus preemptively acting in uncertainty (Amoore, 2013:4). In this way, the future is brought into the present. No waiting for an unfolding future experience is required. That is, if you, as an insurer, cannot withstand a possible stress test disclosed in the forward-looking horizon of ORSA *presently*, you are automatically deemed insolvent, irrespectively of whether such a possibility ever occurs or not. If you are unable to absorb the algorithmic solvency risk charges *at present*, you are automatically deemed insolvent. Again, this is irrespective of whether the implied associated scenarios of the risk charges materialize or not within the one-year horizon.

Solvency risk charges and ORSA are not about predicting the future, but about *writing* the event from within, in advance, ahead of time. The possible future (both in the short- and in long- term) is placed into our hands to preemptively act and decide. It is produced in the present to deny a future that could possibly be. In a radically uncertain world, S2 requires insurers to ensure their solvency status by acting upon a technically rendered present future.

By requiring solvency to be assessed both in current (via the algorithmic risk charges) and in forward-looking (via ORSA) terms, S2 manages to integrate the traditional accounting modality with practices of organizational governance, like enterprise risk management (Young, 2011), in a radically new way. Indeed, the traditional, prevailing accounting modality has been that of the point-in-time balance sheet in which the static presentation of history has been regarded as more reliable than the uncertain projected future (Power, 2015:51). However, as our temporal frames of the future shift increasingly towards an "emergency imaginary" of a potentially catastrophic future (Opitz & Tellmann, 2015), static presentation of history becomes less and less relevant. What matters now is how such a radically uncertain future can be rendered technically

visible and acted upon in order not to be lived, but precisely to be survived (Elmer & Opel, 2006). Algorithmic risk charges and ORSA dynamically link the balance sheet as a point-in-time statement of assets, liabilities and own funds with all current and emerging risks which are technically imagined to be faced by the organization and their management, effectively removing traditional balance sheet foothold on history and resetting it towards the unexpected, embodying the principle that, in the face of a radically uncertain future, history is a poor predictor of future outcomes. In this way solvency becomes not a "spot" concept – a point estimate of a discrete valuation process informed by history – but rather a temporary, and thus fragile outcome of a broader organizational anticipatory infrastructure, involving continuous and relentless stress testing, governance practices, data collections and monitoring (Power, 2015:50).

4.3. Counter-Performativity

In the previous section we sketched out the broad underlying logic of S2's algorithmic pricing of solvency. Specifically, we demonstrated how S2 institutes itself as a legitimate technology for governance-at-a-distance by redefining practices inside the insurance organization (bringing down silo barriers) and by claiming to dissolve the long-lived disputes on the role of regulation itself; how it neutralizes and depoliticizes its algorithmic claims of risk-sensitive capital charges, making available, in this way, reliable and relevant prices for individual and enterprise-wide risks; and finally how, by separating calculations of current and future solvency status, S2 manages to interlink them, mirroring, in this way, the dynamics of a radically uncertain economic environment and giving due consideration to both short- and long- term issues of continuity and survival in the face of a potentially catastrophic future. In so doing, S2 succeeds in integrating accounting (with its emphasis on representations of history at

points of time) with forward-looking risk budgeting and enterprise risk management (Power, 2015; Young, 2011).

In this section, we will attempt to take one step further and disclose the counter-performative effects of S2's algorithmic technology. That is, we will try to identify mechanisms that reveal how the practical use of S2's model enacts economic processes to undermine its accuracy[76]. By attempting to analyse S2's technology and claims through the lens of performativity (Beunza and Stark, 2009; Callon, 1998, MacKenzie, 2003, 2006; Svetlova, 2012), we acknowledge that the financial and insurantial model advanced by S2 does not neutrally represent but actively participates in the construction of the financial and insurantial system at large. If the S2 model approximated an objective financial and insurantial reality with a 99.5% level of confidence as it claims, then we would only be left to celebrate S2's intellectual breakthrough so that regulators and policyholders would have nothing left to do but go home, reassured that insurers would deliver their promises since, after all, failure is inscribed in 1 out of 200 years. However, nobody seems to be celebrative, and nobody seems to be going home. In fact, the regulatory staff at the Bank of England reassured the Queen that their job was precisely to stay vigilant to combat complacency and stave off another crisis – an indirect hint to counter-performativity.

Our approach will restrict itself to the examination of two counter-performative effects: procyclicality (in both the asset and the liability side) and gaming of the model.

[76] MacKenzie (2008:19) distinguishes between Barnesian performativity and counter-performativity. In the former, economic processes are changed such that they better correspond to the model; in the latter, economic processes undermine the accuracy of the model.

(a) Procyclicality

The simplicity of the idea embedded within risk-based capital, i.e., more risk requires more capital, comes with an implicit ontological commitment regarding risk: risk is a single, "real" entity which is inherent in the characteristics of a financial instrument (WC, 2009:4). So, all we need to do is design the right "risk-o-meter", place it under the financial instrument and record the relevant level of risk. Such a process will show us that, for example, an equity is riskier than a bond and a derivative is riskier than cash. In the framework of such an implicit ontological commitment, capital requirements are calculated, and (enterprise) risk management is enacted.

The obligatory implementation of the S2 model by all EU (re)insurers commits them to following the same ontological principle which leads them to convergent investment strategies. For example, it has been noted that between 2001 and 2010, European insurers cut their allocation to equities (which are considered "risky") by 11 percentage points (equivalent to more than €1 trillion in current value) while their US counterparts did not. One of the key explanations put forth is S2 (Focarelli, 2017:349-50), i.e., the product of following a risk management logic that satisfies the same ontological commitment.

Such technically produced homogeneity may yield performative effects in normal times but has the potential to cause disastrous counter-performative, procyclical effects in non-normal times (i.e., exactly at that time when every solvency regime is asked to perform). For example, in an environment of falling markets, insurers may sell risky assets to comply with their risk tolerance limits (Rae et al., 2017:9). Such actions drive prices down further, such that, ultimately, if many insurers become forced sellers, a solvency crisis could be created for the insurance and the financial services industries

at large. In effect, S2's use of one-year Value-at-Risk, which carries within it the assumption that market volatility is a good measure of risk (Haldane et al., 2014), and its move towards market consistency increase the risk of herd behaviour and, thus, procyclicality.

The paradox here is that where market consistency succeeds in incentivizing the insurer to introduce and implement proper risk management practices, such practices, in turn, may ultimately undermine solvency. For example, a typical sophisticated risk management practice is delta hedging, which tries to manage equity risk in UK with-profits funds[77]. Delta hedging aims to provide protection in case of falling equity markets, as it involves selling equities and moving into cash. Thus, such a strategy is, in itself, procyclical (Rae et al., 2017:35). What is more, alternative asset practices may be crowded out: an asset manager may perceive an opportunity to buy assets that appear cheap in a falling market. However, in risk management technical terms, this is read as increasing risk positions which triggers requirements for additional capital to allow for the possibility that markets could continue to fall (Rae et al., 2017:35).

The point is that, since risk has been ontologically disambiguated and endowed with the status of being "real" and inherent in the nature of the financial and insurantial instruments, its management becomes more of a "processual" issue. Indeed, S2 embraces such a process-driven, technocratic attitude. What matters is not what an insurer *does* with an equity, but that the equity is "bad", per se, for an insurer. That is, an equity portfolio is read technically as increasing the insurer's risk profile, and the context of its use cannot be captured by the technical radar of the risk-sensitive capital. The same holds the other way around: until 2008, mortgages were considered a safe

[77] These are life insurance contracts which participate in the profits of the company; thus, they can also be seen as investment products.

asset; after 2008, we learnt that, apparently, we can do many risky things with safe assets (WC, 2009:4).

The point can be made more dramatically if we turn to the liability side and consider insurance risk, which is specific to the insurance industry, i.e., not shared with the banking or asset management industries. A risk-sensitive capital may make sense for financial instruments such as equities, bonds, derivatives, rated and unrated entities (with the qualification of the unintended procyclical effects), but has a peculiar sense when it is extended to insurance risk. Insurance risk is defined in the same way as market risk, i.e., following financial theory definition: it is the risk that the actual experiencing of the liability claims may emerge differently than expected (ending with, for example, more claims than anticipated from the premiums received).

The extension of the philosophy of risk-sensitive capital charges in the field of insurance risk does not seem so naturally obvious. This is because, in such a framework, high reserves result in higher capital charges (the same way higher amounts of equity result in higher capital charges), but this is counterintuitive in that, traditionally, a high reserve[78] ratio relative to premiums was considered a healthy indicator.

Our point has to do with the way reserves are seen under S2's risk-sensitive capital relative to the traditional sensibility. Formerly, reserves were perceived as one of the most important allies of the insurer's effort to honor future liabilities as they fell due. Reserves were (and still are) kept within the insurer's books for many years, for a variety of reasons. These include the particularly long-term nature of some of the liabilities

[78] As already discussed, reserves are kept by insurers to meet future benefits. They are one of the main tools to safeguard policyholders' expectations. So, high reserve levels are traditionally considered a "good" thing for policyholders. In pre-S2 regimes, prudential margins were usually injected within reserves in order to increase the total reserve amount and ensure that they will always prove adequate, even if future experience unfolds adversely.

(such as pensions), delays in the settlement of a claim which, in some cases, takes time to evaluate the entire size of, and disputes in the claim amount which have been relegated to the courts to decide. Indeed, an immense variety of reasons may inhibit a claim to be settled rapidly and force it to remain within reserves. Thus, the liabilities of the insurers (i.e., their reserves) exhibit a natural "latency": they are illiquid and non-runnable (in contrast with banks), and they display a kind of "maturity" process as time passes which is unique for each insurer. Part of the everyday insurance job has been to closely monitor this maturity process, be attentive to changes in the patterns of claims behavior, unearth and analyze their trends, measure the development of reserve expectations relative to the actual experience unfolding, and properly arrange all this within the insurer's collective memory for future navigation. In other words, an insurer would cultivate a "deep" mode of attention in order to unearth the social or technical fundamentals that drive changes in the maturity patterns.[79] Much of the core insurance business model has been how to respond to this distinctively "latent" activity that differentiated the insurance sector from the rest of the financial industry. It is on this basis that unique insurance strategies, such as hold-to-maturity liability-driven investments, reinsurance, actuarial provisions and others, have been developed. For example, the unique capacity of the insurance sector to embrace liquidity risk (in contrast with banks which have a limited capacity to hold assets that cannot be sold quickly) should be mostly attributed to this subtle differentiation.

Within the S2 framework of risk-sensitive capital, reserves are nothing more than one more instrument which receives its own capital charges according to its own "riskiness" as measured by, for example, the historical volatilities of the different lines of insurance

[79] In that respect, reserving and reserve-monitoring were always more than a technical exercise for insurers: they were an open window to the world.

business. Reserves, in this respect, are not capital-free. They carry risk since they might fall above or below their fair value[80] and thus are not considered "safe". In view of this, the more an insurer accumulates reserves and the longer it takes for them to "mature", the more she is penalized by being required to set aside higher capital requirements for longer periods.

The contrast is obvious. Under S2, insurers are technically disincentivized to accumulate high reserve levels for long maturity periods. They might thus seek ways to turn their liabilities liquid by, for example, speeding up their claims settlement rates. Alternatively, they may try to sell their liability portfolios to a third party, or package them within insurance-linked securities[81] and upload them to the markets. Furthermore, they may start offering new products with enhanced liquidity features, which transfer uncertainty to policyholders and decrease the maturity horizon. Such efforts effectively transform insurers' liability side from a more "latent" to a more "runnable" instrument. Insurers thus tend to converge their liability profile to the rest of the financial sector's (banking and asset management) – a shift that enhances procyclicality effects by gradually removing some of the fundamental distinctiveness of the insurance sector, hurting the diversity of the financial flora and fauna.

Accordingly, the paradox of risk management continues: a company taking measures for good risk management such as increased tariffs or more prudent reserving is "punished" by higher capital requirements, and vice versa: taking higher risks (i.e., under-reserving) results in lower capital requirements (Doff, 2016:593).

[80] In the traditional sensibility, over-reserving was not considered risky; only under-reserving was. However, this is not the case with S2, which sees dispersion around the fair value (due to over- or under-estimations) equally risky.

[81] In broad terms, insurance-linked securities are financial instruments whose values are driven by insurance events.

(b) Gaming the model

The technical structure of the S2 model inevitably requires technical skills to operate. Its operations demand highly skilled personnel[82] that can mobilize its vast technical infrastructure. The logic of the S2 risk-based capital model is not difficult to comprehend: it inevitably draws in users to translate key elements of their everyday business into technical terms that can work as inputs within the risk-based model. The user, in other words, learns to see the world through the technical lens inscribed within the model itself. For example, a bond is not a "real" entity that pays coupons at pre-specified dates and returns its face value at its maturity date; instead, it is a set of elements each displaying its own risk sensitivity, and thus, must each be "dividuated" (Deleuze, 1992) and assigned to the appropriate individual risk category (e.g., interest rate risk, spread risk). In this way, the user and, along with her, the insurance organization as a whole learn to see the financial and insurantial universe through technical "risk factors" which contribute positively or negatively to the overall risk charges. Such an algorithmic view inevitably privileges the technocratic processual aspect of the model (which serves the ontological commitment of risk as a "real" entity inherent within instruments themselves) and remains blind to other, less technical and processual, but more behavioural and contextual elements of the business. The end result is to see solvency as a "technical" exercise that requires optimization in the quest for capital efficiency.

In a mere optimization exercise, however, the problem is that the model itself can be gamed. That is, capital experts end up working to minimize capital requirements and maximize the solvency indicator, without necessarily turning the company more solvent

[82] Mainly drawn from the actuarial, risk management and finance departments, supported by IT specialists.

– in fact, usually making it less solvent due to the "technical complacency" created. Danielsson (2009) is quite telling when he writes:

> "One thing we have learned in the crisis is that banks that were thought to have adequate capital have been found lacking. A number of recent studies have looked at the various calculations of bank capital and found that some of the most highly capitalised banks under Basel 2 are the lowest capitalised under the leverage ratio…"

What is the source of this gaming? For the most part, the answer is *the inputs of the model themselves*. The implicit assumption is that, initially, raw data are entered within the model, and such raw data is then algorithmically manipulated in order for the model to "produce" the outputs, i.e., the prices per level of risk (individual and/or enterprise-wide). Such a neat visualization misses the fact that inputs are not simple, given nor transparent raw data on the value of which every mind converges. Instead, they are estimates, meaning they themselves are, for the most part, mediations derived from other interconnected models which, in their turn, enact new dependencies on further data and associated assumptions and interpretations. S2 should thus not be seen as an algorithmic chain that transparently binds raw data with prices of risk that accurately represent the level of risk absorbed from the world out there. Rather, it is more accurately described as a modelling "swarm" (Bennet, 2010:32) of flows that participate in a particular ontological choreography (Introna, 2016:25; Thompson, 2007) in which each member can potentially determine the output in a more or less significant way.

For example, during the pragmatic use of the model, one (quite powerful) way to check the quality of the inputs is through the output itself. Anomalies in the output/result may dictate reconfigurations of the inputs (at the level of data and/or assumptions); they are

not instantaneously swallowed without further ado[83]. That is, it is not the case that *first*, inputs are stabilized and *then*, results are naturally born in such a stabilized environment. Instead, both inputs and outputs are stabilized *simultaneously* in a recurring process. This suggests that inputs and outputs are not neatly separated a priori. Rather, their borders are situated in a porous space where they are being drawn and redrawn in a recurring negotiating process by both an anticipated "forward" (i.e., from input to output) *and* an unanticipated "backward" (from output to input) use of the model.

If the S2 model's output is mediated by layers of intersected interpretations instead of a direct connection to reality, then there is a broad way to not just consciously game the model, but more importantly, to *unconsciously* game it, too. The S2 model may counter-perform even under the best intentions of its users (and initial designers). If then that is the case, where does that leave solvency? Is solvency (and for that matter, S2 as a particular solvency regime) hopelessly caught in a vicious hermeneutical black hole from which nothing can escape? We will attempt to provide an answer in the following concluding sections.

4.4. The Aporia

We have claimed that the technical availability of prices for every level of risk (individual and enterprise-wide) assumed by an insurance company has opened a field with a new set of possibilities. Most crucially, new possibilities arose for a scientific and technical self-governance via legitimate risk management practices on an enterprise

[83] Typically, users keep a record of successive period results. Differences in successive periods results are always checked and analyzed since they carry much informational value about the appropriateness of data and assumptions used. For example, an unanticipated peak or fall of a result beyond a reasonably expected range relative to its historical development is thoroughly scrutinized. Such thorough investigations may dictate for a different perspective on the way a specific set of data or assumptions has been historically used or currently interpreted.

level, beyond silo barriers which typically obscured interconnections. The possibilities disclosed do not restrict themselves to current assessments but rather institute a decisive forward-looking and anticipating organizational infrastructure, suitable to come to terms with a potentially disruptive and catastrophic future. Such possibilities are thought to serve the main objectives of S2, which are policyholder protection and financial stability.

However, a performative analysis of the S2 model revealed a paradoxical aspect: the more risk is managed technocratically, i.e., the more insurers strive to implement and use the S2 model in an efficient self-disciplinary way, the more the insurer herself (due to efficient gaming) or her macro environment (due to procyclical effects) turn unstable, endangering solvency and policyholder protection. This, we claim, is an inherent aporia within the S2 project itself, serving as an aspect of a more general aporia in the concept of solvency more broadly.

An aporia for Derrida is an event that prevents a metaphysical discourse from fulfilling its promised unity – not a contradiction that can be eventually resolved into the unity of the concept, but an "untotalizable" problem at the heart of the concept, disrupting its trajectory and opening out its closure (Burke, 2002:4-5). It is not just a rhetorical term to denote doubt or "difficulty in choosing" (Royle, 2008:92); it is more radical, a sort of absolute blockage – not in the way a huge rock suddenly collapses and blocks the road indefinitely, but more of an event whereby "success fails" and "failure succeeds" (Derrida, 1986:35). Such an aporetic structure denotes that no notion, including that of solvency, is identical to itself, endowed that is, with an essential, autonomous being (Hill, 2010:40).

This point differentiates the approach taken here from other analyses in the Social Studies of Finance that equally account for performativity effects. As already mentioned in the introduction, Lockwood (2015) is keen on stressing the (counter) performative effects of Value-at-Risk financial models, which share the same ontological architecture as the S2 model. Although Lockwood (2015) acknowledges that she does "not advocate specific financial regulatory reform", her performative critique is offered to reveal current shortcomings of VaR and diagnose how its dominance makes it difficult "to create space for alternative or additional ways [such as subjective judgments and macroprudential regulation[84]] to acknowledge, act in, and respond to a world of risk, uncertainty, and reflexivity." (2015:749). After all, the first step towards a healthy organization is to have a clear diagnosis of the particular disease that endangers it: then, and only then, does it become possible to fight the disease and restore or preserve the organization's healthy status. Performativity is thus used as a resource in such a noble cause: to enhance solvency and stave off instability.

Our perspective is closer to the work of Svetlova (2012) who claims that "models are not performative per se. The performative power of models depends on the way they are used." (2012:421). Her point is that many models,

> "fail to be performative because they are part of 'calculative cultures' where market participants must adjust them to market complexity. … Model users account for unrealistic assumptions and neglected factors by applying their own judgements. Precisely because this judgement is necessary, the model is not an ultimate determinant of decision and action." (Svetlova, 2012:422)

[84] Macroprudential regulation is an extra layer of regulation focused on the macroeconomic curbing of the procyclical effects that are created by the microeconomic use of S2 and Value-at-Risk-type models.

Our argument against Lockwood's strategy is that her appeal to a "soft" rationality capable of policing, or delimiting, or substituting "hard" modeling cannot restore any healthy solvency status. This is not because something alternative, more (or perhaps less) is still needed. The point is to move beyond notions of deficiencies, not by attempting to compensate for them but by precisely letting them be, by realizing that we are always already "deficient" – and we call that "efficient". For Svetlova, we simply *cannot* know whether a model may perform, even if widely adopted, since models are always and already open to soft adjustments to assume relevance in the "meshwork" (Ingold, 2011) and complexities of the market life happening (Introna, 2018:8). In a similar vein, counter-performance alternatives, such as subjective judgments and macroprudential regulation (the ones Lockwood appeals to), may simply fail, even if widely adopted, since such soft imperatives are always and already open to hard adjustments in order to assume reliability and allow for responsible decision making.

In fact, S2, despite its commonly recognized science-based, technical and hard structure, is surprisingly keen on providing a wide range of soft alternatives to manage its own potential model performativity. For example, as we have already discussed in the introduction, despite the commitment of S2 to market consistency (that is, to fairness and transparency), calls for prudence (which is subjective and opaque) are central within its standards (as if the co-existence of market consistency and prudence is unproblematic or natural). Further demands for soft qualitative overlays, such as proportionality, simplifications and the four-eyes principle, are scattered throughout the S2 Directive.

What is more, a surprisingly extended range of tools is provided to manage market consistency's tendency to beget procyclicality. For example, the equity stress in the standard formula includes a countercyclical capital requirement (called "symmetric

adjustment"); its effect is to temporarily reduce the capital requirement and provide breathing space for insurers to manage the timing of any asset disposals (Rae et al., 2017:36). Additionally, a so-called Long-Term Guarantees (LTG) package includes a set of measures with the aim of eliminating "artificial" volatility from the balance sheet of insurers by removing S2 away from "full" market consistency. Such a package has received fierce criticism on the grounds that it is not "economic" (Danielson et al., 2011; Swarup, 2012; Wuthrich, 2011), i.e., not scientifically sound.

Another issue is the so-called Ultimate Forward Rate (UFR), which has a material impact on the discounting of deep long-term liabilities of the insurance industry for which no liquid financial instrument is available. In this case, the S2 yield curve is extrapolated from a stipulated Last Liquid Point (LLP) to the UFR in such a way that the extrapolated curve converges to the UFR over a period of many years (Rae et al., 2017:11). Obviously, both the determination of the UFR and the rate of convergence towards it can only be "imagined" and are heavily dependent on the selected method of calculation. This is why their nature is widely considered more as the locus of political compromises and less as science. In fact, Sven Giegold, a member of the European Parliament, came so far as to argue that "the setting of the UFR (the expected long-term level of future interest rates) requires *democratic* legitimation as it represents a collective bet on long-term economics. It [thus] should not be left to the discretion of a [technical] authority [such as EIOPA]" (Solvency II Wire, 2013, italics added).

Another soft issue is the use of regulatory flexibility: although under S2 it looks as though insurers would go technically insolvent before any forbearance is possible (Rae et al., 2017:40), a new article added to the S2 Directive after the financial crisis (Article 28) stipulates that "authorities shall duly consider the potential impact of their decisions on the stability of the financial system... In times of exceptional movements in financial

markets, supervisory authorities shall take into account the potential pro-cyclical effects of their actions." (Hulle, 2017:317). What is "exceptional" obviously rests on imaginary discretion; for example, one cannot but wonder, under the current low interest rate environment, how low and how long interest rates need to remain for an "exceptional" market condition to be declared (Rae et al., 2017:39).

That said, beyond such explicit soft transgressions which blur the scientific application of S2's standards, we would like to suggest that S2 incorporates in its application an inexplicit, and thus more radical, play between the technical and the prudential, the scientific and non-scientific, deep inside its algorithmic code.

Our case can be found in the calibration of the equity risk submodule (one of the market risk submodules). In a simplified view, the whole point of the equity risk submodule is to come up with a risk charge for the equity holdings of a company that will ensure a 99.5% market calibration. In simple terms, if an insurer holds an equity portfolio of, e.g., €1 million, the point is to find out the most the insurer could expect to lose over the next year with a 99.5% level of confidence. Would it be, for example, €300k, thus resulting in a risk charge of 30%? Or €400k, thus resulting in a risk charge of 40%? As already discussed, in the S2 scientific framework, only historical, empirical market data can answer this question, not political narratives about how markets work or should work. In the calibration study that was carried out by EIOPA[85], we read that, based on similar technical analyses, there exist two views; one is called the "majority view" (because it is supported by the majority of member states) and calls for a 45% risk charge while the other, called the "minority view", calls for a 39% risk charge (CEIOPS, 2010:41). What is interesting is how, within the study, it is demonstrated in an evidence-

[85] See "Solvency II Calibration Paper", CEIOPS-SEC-40-10, 15 April 2010; quoted hereafter as CEIOPS, 2010.

based, technical and scientific way that the 39% minority view "understates the equity stress" (CEIOPS, 2010:39), i.e., it does not constitute a "truly" 99.5% market-based calibration, and thus should not be opted for. However, within the final S2 requirements, the risk charge that was finally selected was indeed the 39%.[86] So, what happened between the calibration proposal of the 45% scientific view and the final legislative selection of the 39% risk charge? Obviously, a range of explanations can be provided, from those that advance a "conspiracy/power theory" (i.e., the insurance industry lobby overpowering the scientific, economic and evidence-based calibration of the EIOPA) to less suspicious ones, that simply point to expert judgments and concerns ultimately tipping the balance in favor of the minority view. [87]

Whatever the reasons for the adoption of the lower risk charge of the minority view, our point has to do with the "aporia" involved in the calibration/application project. Specifically, an economically pure calibration at such a high level of 99.5% renders capital requirements so burdensome for the industry that it will necessarily end up reducing its diversity by allowing only larger and thus fewer insurers to achieve solvency by S2 standards, which in itself implies an increase of the insurance industry's systemic risk – precisely what is to be avoided in the first place. On the other hand, a looser, non-economic calibration may preserve the industry's diversity by allowing more and smaller insurers to achieve solvency by S2 standards; however, it opens up the possibility for a higher rate of future insolvencies, eventually increasing the insurance industry's systemic risk. Therefore, in the case of S2 calibration/application, it seems that it is impossible to hold the lines between the economic and non-economic, the scientific and the non-scientific. The only way to achieve a scientific/economic

[86] Article 169 of the final Commission Delegated Regulation 2015/35.
[87] What is equally interesting to note is how the technical analysis of the calibration project is supported by a "majority" and "minority" view – as if the technical does not enjoy any "automatic" legitimacy.

solvency calibration is precisely by *breaching* the economic and evidence-based conditions that make it possible and allow for non-economic, political and expert judgments (its "other") to be heard.

In other words, for the S2 model to preserve its ideal technical character (which legitimates solvency capital calculations and its self-governance capabilities), it needs to be "de-idealized" (Svetlova, 2013) to account precisely for the aporetic structure of its *raison d'être* (i.e., solvency). In that respect, as we move deeper into the "tails of the future", that is, into a world that is getting more complex, more interconnected and thus potentially more destructive and disruptive, "the relationships between science, expertise, and decision are radically rearticulated so that distinctions between 'science' and 'non-science' become more malleable." (Amoore, 2013:9).

4.5. The Play

This brings us to our last point regarding the relation of our claims with respect to the existing theorizing of performativity. We begin by addressing the crucial question: how do we account for all this range of "soft" transgressions within the S2 standards? What are we to make of S2 when it is simultaneously criticized, on the one hand, for displaying a disproportionate bias towards scientific and economic technicality, and on the other, for not being scientific and economic *enough*, as it has allowed the existence of such soft measures, and even "hacking" its own algorithmic code in the first place? Are these mere controversies to be ironed out in the future? We want to suggest that they are not. In fact, in light of Svetlova's argument that "[i]nstitutional design might obstruct the potential model performativity" (2012:422), we claim, in a more provocative way, that S2's own "fragmented" standards obstruct its potential performativity. The sheer effort to frame solvency in hard and scientific terms is already enframed by a host of soft and non-scientific requirements.

Derrida's aporia is a useful insight that should help us go beyond notions of "controversies" that can presumably be ironed out in later, more sophisticated versions, or notions of "alternatives" that can better resolve or supplement existing deficiencies. The point is not simply to "create space for alternative or additional ways" (Lockwood, 2015:749) in the fight against uncertainty (insolvency), but to denote how every space that gathers a meaning is always and already fragmented, constantly transgressed so that the thing itself (market consistency or prudence, solvency or insolvency) slips away (Derrida, 1973:104). This is what makes Derrida so relevant: for him, the text, i.e., any discourse, whether political, social, philosophical, or as in our case, regulative in the form of technical standards, is the field of operation of deconstruction – a field which harbors within itself that which transgresses it (Cooper, 1989). In that respect, our paper has a distinctive contribution to make. According to the existing literature, it is acknowledged that the performativity of a scientific model is limited due to institutional reasons and bureaucratic constraints (Brisset, 2016; Henriksen, 2013; Svetlova, 2012). In our case of the S2 market-consistent and risk-based capital scientific model, we come to see how its own technical standards, the written text upon which solvency comes into being, harbors in itself a double bind: the possibility of performation *and* its negation. The text itself both extends and limits performativity of the model in an undecidable way. This is in line with Callon, for whom what really matters is this back-and-forth, uncertain and staggering movement of performation, for which nothing can be guaranteed (Boldyrev et al., 2016:17).

This textual "pre-performative force", prior to the distinction between actual performativity and counter-performativity, is evident even in the most exemplar case of the performativity corpus, the Black-Scholes-Merton (BSM) option pricing model (MacKenzie, 2003; MacKenzie and Millo, 2003). The BSM model has the typical

structure of a model: within its text, a specific set of inputs is defined, which when algorithmically manipulated on the basis of a particular set of assumptions, yields a price option. MacKenzie (2007) and Svetlova (2014) discuss how there were two phases in the BSM model's life: one before 1987, when the internal consistency of the text of the model was not contested, contributing to its performativity, and one after 1987, when it was contested and thus counter-performed. Before 1987, the model operated in an anticipated "forward" way: from its inputs and assumptions to the output. However, after 1987, the model operated in an unanticipated, "backward" form: investors began reading it backwards and started using a type of cheating called "volatility fudging" to obtain the price they considered "correct". In other words, "[i]nvestors (mis)used the model as a structure to tell *their* truth about the market." (Svetlova, 2014:90-1). The implied performativity twist of 1987, i.e., the shift from the forward to the backward use of the model, is consistent with a Derridean reading, according to which there is nothing outside the text, i.e., outside the context (Derrida, 1988) of the views and practices of investors. This means that, on the one hand, the option pricing model does not achieve any transcendental height outside the context of practices that could guarantee its forward-directed performance. And on the other, this context of practices does not impose itself as an enclosing frame that over-determines option pricing but is more of a surprise – an event – which even allows for the "backward-directed" usage of a model. In other words, it is an open-ended "process through which collective practices are constructed" (Callon et al., 2002:291) according to a network of differences and, hence, of referral to the "other" (Derrida, 1988:137).

For Derrida, any effect-producing system, such as S2 or the BSM model, produces its effects by a kind of "spacing", by producing marks or traces which make nominal unities called concepts, or meaning, not merely or primarily in virtue of the intrinsic

"substance" of the signifier but in terms of the differential relationship – the space – between the signifiers (Caputo, 2000:96). In that respect, models are differential: they produce nominal and conceptual unities as effects of the differential play (spacing) opened up between their marks or traces. Models, thus, are not oppositional: their technicality (idealization) does not undermine subjective judgments (de-idealization). But neither are they dialectical: they do not ascend the staircase of the dialectic by going through the lower opposites to attain the higher (Olthuis, 2002:84) since, in the differential play, what is lower can never be left behind, and there is also no ascending staircase involved.

What is more with this Derridean approach is that difference reestablishes reference in a way beyond the traditional confrontation between constructivism (as implied by performativity) and "reality checks" (Felin & Foss, 2009; Ferraro et al., 2005, 2009). Following Derrida, the capacity of the text of a model to differentiate enables signification. The more differential, the more fine-grained it can be. In this way, the power of reference increases exponentially with the complexity and richness of the differential economy of the model. A rich, differential vocabulary increases the power of description and understanding while an impoverished differentiation weakens it. In that respect, what is being perceived within the solvency text as an inconsistent differentiation between the principle of market values and the introduction of market-deference measures, or between the paradoxical demand for market consistency and prudence, *increases* rather than obfuscates the understanding of the subtleties of the insurance business and its solvency issues. However, if reference thickens through differentiation, performativity becomes precisely more *undecidable* because, on the one hand, the increase in reference has the potential to enable the model's performativity, but on the other, the increase in differentiation makes available more strategies and

reasons to resist or adjust the model's recommendations. This is performativity as an effect of the play of differences.

But what Derrida adds to all this is that such a differential play cannot be enclosed or regulated – the circle of the play cannot be closed:

> "For it belongs to the very idea of differential play that the play is self-differentiating, disseminating, and that any such formal rules as one could devise would be 'effects' of the play not the 'basis' of it, subsets of the play of signifiers, not rules which govern it." (Caputo, 2000:98).

If any assembly of signifiers is always and already set adrift by this differential play, then we need to recognize that the distinctions we make between market consistency and prudence or science and non-science spring a leak, and that what is carefully excluded is actually used. From this point of view, the familiar and persistent question of the existing theoretical literature on why some forms of knowledge become performative while others do not (Boldyrev et al., 2016:17; Brisset, 2016) loses its prominence since the point cannot be to identify those formal mechanisms to which performativity subjugates itself – because, even if properly identified, they can only *explain*, but they cannot *determine*.

Brisset (2016) identifies three conditions that need to be fulfilled for a theory to be performative. What is interesting to note though, is that the S2 model can be argued to fulfill all three of these conditions. For example, (1) it is empirical, in that it identifies and discriminates between at least two different ways of behaving (opting for/dismissing risk efficient/inefficient instruments), (2) it is self-fulfilling, in that all insurers are required by law to follow it so that "everybody thinks that everybody conforms to it" and (3) it fits with the existing conventions, as it precisely builds and

extends itself upon the widely accepted financial economics conventions. So, does that make it performative? No, as long as the differential play introduced by the S2 text itself, precisely to account for solvency, simultaneously introduces its own deconstructable conditions. In that respect, Brisset's (2016) conditions may be necessary, but they are not sufficient. It is not enough that everything be in line and fulfilled; and conversely, it might be enough, even if nothing is in line and fulfilled – which is the point in Tartt's (2016) quote at the beginning of this paper. S2 accesses solvency by opening up its own idealized and determinate field of possibilities, but it simultaneously de-accesses solvency by rendering it de-idealized and undecidable, always-to-come and deferred.

If performativity is simply an effect of the differential play of the model, then the point cannot be about our ability to keep our head in the midst of the play and rationally exploit the decoded performativity mechanisms as a resource to regulate solvency or, in the framework of a more general noble cause, the financial cycles of booms and busts. The point is not to safeguard our entities (insurance entities, in our case) from the dispersal, but to disperse such entities into the play.

5. Concluding comments

The first section of this final chapter summarises the implications and contributions of the thesis. This is followed by a discussion of its limitations and the potential avenues for future research.

5.1. Contributions and implications of the research

As discussed in the introductory chapter, the driving force behind this thesis is to bring into sharp focus a tension or contradiction that seems to persist in actuarial and financial practice. This is that, on the one hand, there are the efforts of finance and actuarial practice to deliver the promise of managing uncertainty and making an indeterminate and unknowable future knowable and calculable, and on the other, how such efforts seem to contain in themselves a contradiction in that where they succeed precisely, they also simultaneously seem to fail. In that respect, the thesis argues that it is not that our certainties are temporarily disturbed by uncertainties that will eventually yield, in due time, into settlement; rather, it is that our certainties are always and already permeated by uncertainties, and vice versa. Thus, what the three papers argue and show is the radical and inescapable entanglement of certainty with uncertainty, or of the technical with the social, which is not simply oppositional or complementary, but in a more fundamental way, aporetic. What this is termed in other words within the thesis as an "ongoing play".

The thesis explored this research focus on both the asset (first paper) and the liability (second paper) sides of an insurance company (second paper). It also explored the risks and the nature of the aforementioned contradiction inherent in such asset and liability valuations (third paper).

By engaging with the existing literature in financial economics, the thesis demonstrated that the theories of the Efficient Market Hypothesis and Behavioral Finance share a common ontological architecture – a point that runs contrary to the common and widespread assumption that these are two competing and largely opposing theories.

The thesis also makes a contribution by arguing that an investment strategy is not designed on the basis of "making money". Obviously, this does not mean that "return" is not a pressing issue for every financial or actuarial practitioner, as is widely acknowledged. It rather denotes that "return" is the outcome of a more primordial commitment to a background investment style that allows financial entities and strategies to show up as something. "Return" in this view simply supports, releases new possibilities, or even forces to collapse some of the specific practices of the particular investment style.

The Heideggerian analysis of the first paper also manages to extend the Social Studies of Finance's (SSF) classical argument about the entanglement of the technical and the social: financial markets are conditioned by a further entanglement, that of investment styles. In fact, if we nullify the distinction between investment styles, the same way SSF nullify the distinction between the technical and the social, then what remains is this ongoing play of the "sendings" of being, which plays without "why". If anything enjoys autonomy here, it is this play, that seems to carry along SSF's agencements by its own momentum (Caputo, 2000:102).

The thesis also makes a contribution in that, contrary to the claims of Jarzabkowski (2017), the so-called financialization of the insurance liabilities does not uncritically expand financial economics (practices oriented to the market with a dominant technicalizing aspect) at the expense of actuarial logics (practices oriented to the

underlying liabilities with an effective contextualizing aspect). Instead, the arguments and analysis presented show that it is possible, as long as the actuarial aspects are recognized and then adapted into market-consistent valuations, to preserve the actuarial component of the insurance business (Muniesa, 2007).

What is more, it is revealed that within our modeling valuation practices, an autoimmunity process is at work. Such autoimmune tension inheres in the midst of the financialization project, "auto-deconstructing" the financial sovereign, and thus the modeling valuation practices themselves.

This is most evident when considering the text of the Solvency II (S2) regulatory standards. One of the most central contributions of this thesis is that such a text (and its accompanying algorithm), precisely to serve the goal of solvency, can never be made unambiguous or free from material paradoxes. However, instead of obfuscating, this paradoxical quasi-structure ultimately increases the chances of understanding the subtleties of the insurance business and its solvency issues. A theoretical implication that follows this recognition is that all the S2 principles, which are designed and described within the regulatory text to safeguard solvency, can always be repeated differently, even in a way that produces insolvency. In that respect, the regulatory text does not remain authoritative because it has secured a solid reference to the financial world. On the contrary, it can make a difference, and thus contribute to solvency or to insolvency, as long as it remains cut off from any authoritative authorship – that is, consistently undoing itself, i.e., "auto-deconstructing".

In this respect, performativity is reconsidered as a play of differences. Such rethinking extends the current literature on performativity by not merely including in its notion the "possibility of failure" (Brisset, 2016:180), but by focusing more decisively on *not*

knowing – a point that leaves the issue of performativity open and unsettled. This does not imply that "anything goes", since the power of reference increases exponentially with the complexity and richness of the differential economy of the model. However, if reference thickens through differentiation, performativity becomes precisely more undecidable because, on the one hand, the increase in reference has the potential to enable the model's performativity, but on the other, the increase in differentiation makes available more strategies and reasons to resist or adjust the model's recommendations.

Now, what can be said about the practical implications of these contributions? Does awareness of the aporia change practice or not? In what follows, I will attempt to provide some more concrete suggestions on the practical implications of adopting an aporetic understanding of our valuing practices. As an opening remark, I would suggest that it minimally allows for the possibility of changing one's orientation to one's valuing practices. By saying this, I want to signal that there is a subtle, but very significant difference between changing the practice and changing the orientation towards the practice. The practice of the modeling of actuarial valuation has, for example, changed with the advent of S2 and more generally, with the ascendance of the financial economics paradigm. But such a change does not necessarily imply that the orientation towards the practice has changed as well. This is because the latter is conditioned by the wider ontological horizon on the basis of which the practice itself already makes sense. And it seems that the practice of actuarial and financial valuation—the act of pricing risk and thus of begetting certainty—remains under the spell of a horizon of ontological "neutrality". By this I mean that the typical reflective orientation of modelers is to take the relevant valuation practices as capable of freeing ('neutralizing') themselves from any material ontological bias in order to produce a value that stands transparently present – i.e. transparent and unambiguous all the way through. However,

for Heidegger, the very attempt to proceed without an already assumed ontological grounding is itself an ontological project which presupposes the separability of reflective consciousness from concrete first-order experience, which is embedded in language, historical tradition, and culture (Caputo, 1999:54). From this Heideggerian perspective, any practical implication can only have substance to the degree that it is accepted that the preconditions under which valuation practices labor, can never be fully exposed. As such, these preconditions (to the dismay of many) can never be rectified, debugged and thus 'neutralized'—especially since, for Derrida, such conditions of possibilities are always already conditions of impossibilities.

For regulators, this means that a regulative standard can never become unambiguous and free from material paradoxes—even to the point of invalidating the very original regulative aspirations. In this way, how the regulative standard is going to play out can never be regulated – its performance remains unregulated. This is because for every text—including a regulative and technical text—its signifiers neither signify what is given from the outside, nor express already internally constituted (i.e. given) standards. Rather, every text is always and already caught within a systematic play of signifiers and thus is subject to its own blind spots, which always and already preserve the possibility of a new reading.

For practitioners, on the other hand, it means that their models can never be used consistently and unambiguously to safely steer their way through uncertainty — *the success or failure of a model (or of a regulative standard for that matter) is ultimately a unique, unrepeatable and thus surprising event*.

As already discussed in the second and third papers, the LTG package of measures that is included within the S2 valuation rule-book, recognizes the long-term nature of the

insurance business and thus allows insurance liabilities' valuation to be de-linked from market values. Such relief from the requirements of market-consistency, preserves the old-established possibility of insurers to manage their business in a counter-cyclical way and thus operate as long-term stabilizers of the economic and financial cycle (by e.g. fostering lending and investment with long-term perspective).

If this is so, then, why shouldn't regulators and practitioners alike not simply take the LTG package as a conscious and prudent choice that carefully folded into the financialization project what is most desirable of the insurance sector, mainly, its long-term perspective and possibility for counter-cyclical management, and rather see it as a deconstructive effect of the very attempt of fair valuing insurance liabilities? After all, this was a choice thoroughly researched, debated, and eventually accepted by most of the participating stakeholders, in an open and democratic negotiation during the S2 development process.

A possible answer (if any) is that the autoimmunity view matters, as long as it remains disturbing and unwilling of providing any assurances — as long as it sides with the original difficulties in life, its breaks and irregularities. It matters, if it allows attention to be redirected from, for example, that exceptional day of the LTG agreement that supposedly secured the possibility of counter-cyclically managing the insurance business, to the everyday, routine working practices through which this package is de-constituted. In this respect, it makes clear that counter-cyclical management is not the result of a package, but the effect of an ongoing autoimmunity process that disturbs and destabilizes choices and packages. In this context, counter-cyclicality is an effect of the infinite drifting of our packages, agreements and aspirations. It is never possible to seize the origin (i.e. the day the LTG package was felicitously constituted) and hold it fast— as the typical orientation to the practice presupposes. For Heidegger, the origin always

recedes, withdraws—for Derrida, it always defers itself (Caputo, 1999:57). Thus, for the practitioner, the awareness of such an aporia changes radically the orientation towards the practice itself—the orientation becomes the awareness of awareness itself (Braver, 2013). Such an orientation transforms the practicing modeler into one that is more attentive to the *other*—or, to the otherness of the other (to what withdraws or defers itself). And, in so doing, opens up the possibility to experience the model as an uncertain gift that is always and already given; its performance cannot be guaranteed neither by its socially constructed nature, nor by its firm roots within the soils of financial reality—as a gift, it is simply unprogrammable, uncontrollable and surprising. Such orientation thus, opens up the possibility for an experience of thankfulness and gratitude towards certain uncertainty that lies beyond the hard complexities of financial reality or the soft indeterminacies of societal constructiveness. Such an aporetic practitioner might seem to do the same things but that same things would indeed be done very differently.

Hedge fund manager David Einhorn (2008:11-12) suggests that

> "[a] risk manager's job is to worry about whether the bank is putting itself at risk in the unusual times... This... makes value-at-risk relatively... potentially catastrophic when its use creates a false sense of security among senior managers and watchdogs."

How does one make sense of such a comment and practically account for it? One possible way is to insist, as Lockwood (2015) does, that such a recognition gestures towards alternative practices by focusing on the deficiencies, and specifically the counter-performativity effects ("creat[ing] a false sense of security") of a technical measure, such as Value-at-Risk. Thus, it can be accounted for practically by letting the

risk management practice be informed by alternative possibilities, such as expert, subjective judgements or different measures that have the capacity to mitigate model risk (i.e., performative effects).

However, for reasons already shown, such an interpretation uses performativity as a resource. If we ignore performativity as a resource and focus instead on this Derridean "pre-performative force" (Derrida & Caputo, 2008:194), i.e., on that *prior* impossible possibility always and already inscribed within our practices, then how can one describe and practically account for that prior impossible possibility?

Let us attempt to do just that. A model will always calculate a possible loss for a risk manager. A model is, thus, the manager's best possibility to say something and plan a strategy, i.e., to disambiguate. However, as Einhorn (2008) suggests, the manager's job does not stop there: her job is to worry how what is outside the model (i.e., its limitations, exclusions and shortcomings) may equally put her institution at risk. In other words, for the manager to reach a decision, he needs to embrace an impossibility: not to enhance the model's capabilities—i.e. further advance the model's possibilities, that is, further sophisticate what the model already includes or further expand it to include alternative measures—but read the model in a deconstructive way, that is, as an openness to its 'other', to what falls short of, to its impossibility. This would mean using her model as a representation not of something *present* (for example, a "real" inherent risk), but of something *absent;* it is not the presence of the "other" that fills the model, but its absence. Furthermore: not just of something absent, of that which is always left over, that which overflows (Callon, 1998), always slipping out of our conceptual claws, but of the interplay of presence and absence, the unsettled, unsettling fluctuation between presence and absence—in its mysterious for Heidegger, and undecidable for Derrida, form (Caputo, 1987:270;272).

Once the risk manager relates via his model to the other as the other, then something incalculable comes on the scene (Derrida & Caputo, 2008:17) −something which cannot be reduced to a past pattern, a forward-looking estimation, nor a regulatory standard. We call this, precisely, a practical, responsible decision. In the words of Derrida,

> "For a decision to be...responsible, it must, in its proper moment if there is one, be both regulated and without regulation: it must conserve the law and also destroy it or suspend it enough to have to reinvent it in each case, rejustify it, at least reinvent it in the reaffirmation and the new and free confirmation of its principle." (Derrida 1990:961).

5.2. Limitations of the research

As already discussed in the introduction, the researcher has an extensive professional background as an actuarial and financial consultant for a significant amount of time. Consequently, a limitation of this research project is that it seems to rely to a considerable degree on the experiences of the researcher, since it is this set of experiences that allow him to distil his subject matter and accompanying empirical data.

However, it should be stressed that the point of the research is not to make an empirical argument, but an ontological one, i.e., not to advocate for specific empirical changes, but to disclose conditions of possibilities that inform actuarial and financial practices of managing uncertainty.

If this is the case, then it is reasonable to wonder if other philosophical orientations could yield a more appropriate analysis. In fact, part of the shift from Heidegger (first paper) to Derrida (second and third papers) can be attributed to such reasons: Derrida's metaphors of play and undecidability seem more appropriate to describe the

performative practices of insurance liabilities' valuation (second paper) and pricing solvency (third paper), than Heidegger's metaphors of stillness and meditation that inform the point of view of the first paper.

That said, the point of the research is not to juxtapose Heidegger and Derrida, nor, in that respect, both of these thinkers with respect to other philosophical orientations. The point is rather to open up the possibility of experiencing a "prior" aporia that is inscribed within, and thus always and already, informs practices of managing uncertainty: an aporia that deflates the disclosed conditions of possibilities into quasi-conditions, as long as they are simultaneously conditions of impossibility. In this respect, there is simply no amount of philosophical reflection or analysis which could accommodate and resolve that.

5.3. Further research

It is possible to conceptualize two potential strategic avenues for future research in the framework opened up by this thesis. The first one relates to the theoretical approach adopted in this thesis; the second, is an empirical direction that is more relevant to the specificities of the S2 framework.

The theoretical approach adopted in this thesis occupies a specific place in terms of the performativity debates, and in the Social Studies of Finance literature more generally. From the perspective of this thesis, performativity cannot simply be a question of how economics or economists shape economy—instead, it cuts deeper and attempts to contribute to the question of how economic phenomena emerge and come into being (Svetlova, 2016:197). We have seen for example, how new economic phenomena, the market-consistent valuation of insurance liabilities and the pricing of solvency risk, emerged in and through the new institutional framework of the S2 insurance-related

regulatory standards. Conventional economics struggles to provide a compelling account of the enactment of such new formal practices and models, as long as it downplays the role of language and of the formation of beliefs and expectations of market participants (Svetlova, 2016:185). On the other hand, the constructivist position tends to overstate the workings of performativity, failing to see that the possibility of breakdown is central to the ongoing operation of performativity as such (Butler, 2010:153). In this respect, the kind of performativity that is proffered in this thesis aims to inflate the performative effects of market participants with respect to the conventional economist position, and to simultaneously deflate them relative to the constructivist position. This is achieved by precisely recognizing its aporetic dimension: performativity can only work (as the constructivist position holds) by precisely failing to work (as the economic-science position argues).

As such, a potential avenue for future research is to extend the development of the performativity literature towards the notion of an 'aporetic' performativity. Such an extension may entail the precarious undertaking to disclose how the constructivist and the economic-science positions are deeply aporetic—neither oppositional, nor complementary. The problem with the constructivist view of performativity is its reluctance to 'criticize' existing economic formations—constructivism implies that we can only take part in making activities that open up new possibilities and think from within that form of engagement (Butler, 2010:153). This is why Callon does not hesitate to call for the abandonment of 'the critical position'. After all, this is exactly what is considered wrong from this point of view with the conventional economist/scientistic position. By concentrating on forming judgments about e.g. capitalism, it fails to recognize that there is no one capitalism but multivalent operations of capitalisms (Butler, 2010:153). However, the aporetic view of performativity holds a position that

is neither uncritical and thus passive (constructivism), nor judgmental and thus active (scientism). Instead, it calls for a position that remains *critical*, yet, cannot turn *judgmental*. It remains critical as long as it accepts the ongoing making of economic realities, and only seek to intervene in them to oppose, further, or redirect a particular pattern of making (Butler, 2010:153). However, it does not turn judgmental inasmuch as its judgments are exercised in a way that do not depend on some sort of a pre-existing ground that offers legitimacy. Indeed, as Wittgenstein writes, such judgments disclose a telling ground of something that is anything but what we decided (Wittgenstein et al., 1969). That is, of something that is "other", which gives by means of taking (eluding) away.

Another avenue of potential future research is to attempt to connect this kind of 'aporetic' performativity with the concepts of illocution and perlocution, as modes of producing social facts, as expressed in the relevant performativity literature. While illocution refers to the production of reality by means of conventional speech acts, perlocution focuses on processes of formation, acceptance, and making believe of beliefs (Svetlova, 2016:185). Illocutionary performatives are about new realities produced; whereas perlocutionary performatives are about new kinds of effects that take hold. MacKenzie clearly notes the limits of the Austinian illocutionary paradigm in the economic and financial sphere, since the model only 'tends' to explain patterns of practices and thus it does not act with the same immediate efficacy that a sovereign does (Butler, 2010:151). This is why Butler notes that "most of what is interesting in economic and financial performativity belongs to the latter" (2010:153). Indeed, part of this thesis has been to support such a claim. For example, although Solvency II enjoys the efficacious authority of the sovereign supervisors, its reality and the change in practices it introduced did not rest on illocutionary acts, but on a set of perlocutionary

performatives—such as the gradual 'making-perceptible' (Kramer, 2014; Svetlova, 2016) that fair value should include extraordinary measures in order to become insurance-relevant. However, from the point of view of the 'aporetic' performativity, what seems even more interesting is the performative power in virtue of which deconstruction becomes possible—in other words, the Derridean undeconstructible or unconditional. The latter is not just a positive regulative ideal that admits gradual empirical approximations in the Kantian sense. It is more of an urgent promise or an urgent call to recall a memory that is unable to be placidly complacent with the present (Caputo, 2006:123). In that respect, the illocutionary (to a lesser degree) and perlocutionary performatives do not simply exhaust themselves in the investigation of that set of felicitous conditions that succeeded or failed to materialize—as current research seems to be interested in. Rather, their performative power is also deeply intertwined with this absolute urgency of 'here-and-now', which dictates that the more new realities are brought forth (illocution) or new kinds of effects take hold (perlocution), the more a gap is created between an infinite promise and what is measured and accumulated against this promise (Caputo, 2006:129). In the framework of the case studies of this thesis, this implies, for example, that the more insurance liabilities succeed to be valued based on a set of felicitous perlocutionary performatives, the more a valuation gap is created that defers valuation and urgently demands for a new valuation round. Such an aporetic tension can shed some light in the paradox of a process that achieves its effects in simultaneously regenerative and accumulative ways (Butler, 2010:149).

A second, more empirical potential promising avenue for future research in the framework opened up by this thesis lies in the detailed examination of the development of Solvency II. Part of this analysis is carried out in the second and third paper; however,

we would like to advocate for a more extensive one which would disclose, in a more detailed way, the several stages that were required for the development of the novel set of concepts and tools that was finally put into circulation by the implementation of Solvency II, and which is now already scheduled for review.

Such concepts and tools attempt to strike a fine balance between the principles of financial economics and the actuarial conceptual framework that accommodates, in a more natural way, the insurance business model. What is interesting to study is why older forms and versions of such tools were either rejected or further developed, in line—or more frequently, out of line—with suggestions from the European Insurance and Occupational Pensions Authority (EIOPA), which is the independent advisory technical body that assists the European Commission in the design of Solvency II. A closely related promising avenue would be to research the implementation issues of Solvency II, including the development of internal risk-pricing models that diverge from the standard formula that is described in the regulatory text (what is termed as the 'S2 model' within the second and third papers). The research should focus on practices of internal modeling that claim to "better" capture the particular risk profile of the specific insurer than the standard formula does—the research should attempt to disclose how it becomes possible to support such a claim, as well as discuss issues of calibration and monitoring of the model. What is also worth researching is how and if the solvency indicators produced by both the standard formula and internal models can be used to extract meaningful conclusions about the relevant solvency status of numerous insurers that operate under equally numerous dissimilar qualitative and quantitative risk profiles across the EU, which was one of the central and initial purposes of the whole S2 project.

Such a research project would provide the opportunity of further unpacking financialization processes and, more importantly, of disclosing both the empirical details and the ontological commitments of how "science in action" is carried out.

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