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Anticipating uncertainty, reviving risk? On the stress testing of finance in crisis

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Anticipating uncertainty, reviving risk? On the stress testing of finance in crisis

Abstract

Widely regarded as a watershed moment in the governance of the present global financial crisis, the U.S. Treasury's Supervisory Capital Assessment Program (SCAP) of Spring 2009 undertook to 'stress test' the solvency of the largest American banks by projecting their capital adequacy going forward. The SCAP is shown to have been an important intervention that restored market confidence in U.S. banks because it rigorously embraced and acted through a subtle but significant change in the repertoires of risk management, a very public turn to anticipatory techniques designed to ensure preparedness for low-probability, high-impact events. And, as the subsequent failures of stress testing exercises to inspire confidence in European banking are also shown to demonstrate, the performative power of these anticipatory techniques itself turns on their seemingly precise methodological application and animation by a positive affective charge.

Key words: global finance; risk management; stress testing; anticipatory turn; performativity.

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Introduction: ‘risk’ and ‘stress’

... a vast risk management and pricing system has evolved, combining the best insights of mathematicians and finance experts supported by major advances in computer and communications technology. ... This modern risk management paradigm held sway for decades. The whole intellectual edifice, however, collapsed in the summer of last year because the data inputted into the risk management models generally covered the last two decades, a period of euphoria. Had instead the models been fitted more appropriately to historic periods of stress, capital requirements would have been much higher and the financial world would be in far better shape today.

Testimony of Alan Greenspan, Committee of Government Oversight and Reform, October 23, 2008.

Last year’s stress assessment was a watershed event – unprecedented in scale and scope, as well as in the range of information we made public on the projected losses and capital resources of the tested firms. We are gratified that market participants and private analysts viewed the exercise as credible. It helped to restore confidence in the banking system and broader financial system, thereby contributing to the economic recovery. Now we are working with banks to ensure they improve their risk-measurement and risk-management as well as strengthen their liquidity and capital levels while also providing the credit that households and businesses need.

Ben Bernanke, ‘The Supervisory Capital Assessment Program – One Year Later’, Speech at the Federal Reserve Bank of Chicago 46th Annual Conference on Bank Structure and Competition, May 6, 2010.

'Risk' has been a highly prominent metaphor in the crisis that, emerging from sub-prime mortgage markets in the United States of America (U.S.) in August 2007, continues to engulf global finance. At the time of writing, in early 2012, the crisis has apparently morphed, moved and consolidated as a sovereign debt dilemma in the Eurozone. But, at the outset of the crisis, and in the United Kingdom (U.K.) and its U.S. heartland in particular, it was commonplace for it to be cast as a 'mispricing' or 'underpricing of risk'. With their prices in free-fall, it seemed that the assessment and valuation of 'risky assets' related to and derived from sub-prime mortgages had been optimistic at best. That the crisis could be rendered in these terms was a consequence of 'the vast risk management and pricing system' that Alan Greenspan described in his Testimony to the Committee of Government Oversight and Reform in October 2008. At the heart of this system was the belief that 'mathematicians and finance experts supported by major advances in computer and communications technology' could correctly calculate the uncertainties of this or that asset as risks which could be valued, managed, priced and traded accordingly.

As the crisis ripped from sub-prime asset markets into money, capital and derivatives markets globally, a second, related and more pervasive metaphor of risk also came into common currency in the figuring of the tumult: 'excessive risk'. Miscalculations and failures in the pricing of risk, combined with the massive salaries and bonuses earned by those trading in those risks, had, it seemed, fed a dangerous euphoria of highly-leveraged speculation. As with many previous instances of financial crisis which have similarly been represented in terms of excess, it again appeared to be the case that markets had recklessly gone beyond what was rational and reasonable (Cameron, Nesvetailova & Palan, 2011; de Goede, 2009). But, in this specific instance, it was an excess of risk, alongside an evaporation of liquidity (Brunnermeier, 2008; Langley, 2010; Nesvetailova, 2010), that appeared to threaten not only individual banks and institutions but the circulations of global financial markets as a whole. Markets which were supposed to efficiently price and distribute risks between investors, and thereby minimize so-called 'systemic risk', had in

effect produced dangerous concentrations of excessive risk in institutions that were now deemed ‘too big to fail’.

However, if we compare Alan Greenspan’s Testimony at the height of the crisis in the U.S. with remarks made eighteen months or so later by Ben Bernanke, his successor as Chairman of the Board of Governors of the Federal Reserve System, then the edifice of risk management and its place in the crisis would seem quite different. Bernanke reflects in his speech on a particular crisis management intervention, the Supervisory Capital Assessment Program (SCAP) of the first months of the Obama administration in Spring 2009. Part of the U.S. Treasury’s Capital Assistance Program (CAP), the SCAP projected whether the 19 largest American bank holding companies had adequate capital on their balance sheets going forward, and if they required further recapitalisation. From October 2008, these banks had already received \$216 billion between them in previous rounds of recapitalisation by the U.S. Treasury (Board of Governors, 2009b: 4). Commonly known as ‘the bank stress test’, the SCAP is widely regarded as the beginning of the end of the crisis in its heartland. Thus, for Greenspan in 2008, it was the problems of ‘modern risk management’ which had ‘held sway for decades’ that were crucial to the genesis of the crisis. But, for Bernanke in 2010, it was the stress test as an ‘exercise’ in ‘risk-measurement and risk-management’ which had ‘helped to restore confidence in the banking system and broader financial system’.

This article will address the problem of how, in Bernanke’s terms, the SCAP came to be viewed by ‘market participants and private analysts’ as ‘credible’, such that it was the ‘watershed event’ which restored confidence in U.S. banks. This is a problem which is made all the more pertinent by the failure of subsequent bank stress test exercises, undertaken in Europe during the summers of 2010 and 2011, to produce a similar turning point in the crisis. According to Bernanke, and typically for other Federal Reserve insiders, risk practitioners and financial media commentators, the success of the SCAP hinged on its ‘unprecedented ... scale and scope’, and ‘the range of information ... made public on the projected losses and capital resources of the tested firms’. The SCAP certainly involved the kind of direct cooperation between supervisory and

regulatory agencies that is not a usual feature of U.S. arrangements, and included the Board of Governors of the Federal Reserve System, the Federal Reserve Banks, the Federal Deposit Insurance Corporation, and the Office of the Comptroller of the Currency. From this perspective, it is also the case that ‘stress test transparency’ – a departure from standard practice which made supervisory methodology publicly available, and which opened-up the books of the market institutions that together accounted for two-thirds of banking assets in the U.S. at the end of 2008 - ‘played an important role in stabilizing the financial system’ (Tarullo, 2010). By extension, the failures of the European bank stress test exercises of 2010 and 2011 could perhaps be attributed, in comparative terms, to the institutional weaknesses of the European and national supervisory and regulatory agencies that undertook them, and to the relative opacity of the information that they made available for market consumption. The prevailing common sense would thus suggest that the success of the SCAP hinged on the comprehensive and more-or-less complete information about concentrations of risk in major U.S. banks that it made available, precisely the information that markets had been desperately craving since late 2007.

When analysing the apparent and relative success of the SCAP stress tests here, however, I want to relate this problem to broader questions about developments in financial risk management, on the one hand, and about the power of anticipatory techniques for governing the future in the present, on the other. Crucial to the capacity of the SCAP to allay market fears and anxieties about U.S. banks was not so much that it made risk information transparent, but that in producing that information it rigorously embraced and acted through a subtle but significant change in the techniques of financial risk management. Just when one might have expected financial risk management to have reached the kind of limit point suggested by Beck’s (1992) insurability thesis, the ostensible threshold was extended. Rooted in the creativity, experimentation and remarkable fungibility of calculations of risk (Ewald, 1991), that which seemed to be an unmanageable excess was folded back into financial risk management by a newly prominent set of techniques. In ‘making public’ the thing or ‘object of concern’ of the risks, capitalisation and solvency of U.S. banks

(Latour, 2006: 6), the SCAP was a partial rejection of the efficacy of probabilistic calculations based upon ‘historical periods of stress’ to be ‘fitted’ into existing risk management models. But, it was also a very high-profile adoption of the anticipatory techniques of stress testing which are designed to calculate preparedness for low-probability, high-impact events. And, as the subsequent failure of the European exercises brings into sharp relief, these scientific techniques held a performative power in the SCAP which itself turned on their seemingly precise methodological application and animation by a positive affective charge.

To enable this analysis, the article develops across three sections. The opening section focuses on the scenario-based stress testing techniques that distinguished the SCAP as a crisis management intervention. It places these techniques against the backdrop of the pre-crisis ‘paradigm’ described by Greenspan in his 2008 Testimony. The second section then explores the resonance of the SCAP stress tests with the proliferation of ‘enactment-based knowledge’ which, as Stephen Collier (2008) suggests, characterises the rise of anticipatory techniques such as catastrophe planning in contemporary security apparatuses operating across domains such as terrorism, pandemics and ecological disaster. By acting on the crisis ‘as if’ – that is, through a pair of quantitatively imagined scenarios of U.S. macroeconomic performance which had not and may never have happened – the SCAP was thus a ‘re-problematization’ (Collier, 2008: 238) of how the financial future should be managed in the present, part of a wider set of tendencies in contemporary liberal society to govern by uncertainty and not by probabilistic risk (Foucault, 2008; cf. Anderson, 2010; Amore & de Goede, 2008; Dillon, 2007; O’Malley 2009). Nonetheless, in acting to anticipate uncertainties in order to mitigate future dangers, the SCAP stress test remained a complex calculative interweaving of the imaginative and probabilistic, the novel and historical.

The SCAP apparatus operated very effectively. Indeed, the action on recapitalisation which it called-forth was undertaken by the public of banks and markets which it gathered together, without direct recourse to the CAP funds of the U.S. Treasury. The third section below asks how this was the possible, especially in comparison with the failure thereafter of similar stress tests to

restore confidence in the banking system in the European Union (EU). In the historical emergence and consolidation of financial risk management, it is not the ‘facticity’ (Latour, 1988) of techniques for dealing with the financial future that necessarily matters to understanding their prevalence over recent decades, even when those techniques claim to render the future knowable as probabilistic risks. Rather, as Millo and Mackenzie (2009) put it, the ‘remarkable success’ of probabilistic financial risk management techniques can be traced to their ‘practical usefulness’, ‘reputation among the different organizational market participants’ and ‘constitutive (or performative)’ qualities. Building on this argument via Lorraine Daston’s (1995) account of the affectively changed pursuit of ‘precision’ (as opposed to ‘accuracy’) in scientific techniques of quantification, it is shown that, in contrast to the success of the SCAP, markets and media analysts had misgivings about the EU stress tests because of their apparent methodological imprecision. Market expectations of serious sovereign debt problems and their consequences for Eurozone banks in particular did not provide the starting point for EU stress scenarios, such that the application of techniques for anticipating uncertainty and reviving risk were mistrusted and viewed as undermined by politically expediency.

Bank stress tests

The Supervisory Capital Assessment Program (SCAP) or ‘the bank stress tests’ formed part of the much anticipated Financial Stability Plan of February 10th 2009, the Obama administration’s first major governmental intervention in the crisis. While new Treasury Secretary Timothy Geithner was widely seen as the architect of the Plan, the SCAP was announced as a joint-statement of the leaders of the main government, regulatory and supervisory agencies (U.S. Treasury, 2009). The stress tests were to be a contributory mechanism in the Capital Assistance Program (CAP), itself an up-date on the Capital Purchase Program within the U.S. Treasury’s Troubled Assets Relief Program (TARP) of October 2008. The Capital Purchase Program had emerged when, only two

weeks after its introduction, the focus for the TARP became not the intended temporary purchase of illiquid and toxic sub-prime assets in order to indirectly recapitalise banks, but the purchase of preference shares to directly recapitalise banks. The focus of the CAP and its SCAP was the capital adequacy of the 19 largest bank holding companies in the U.S., especially the degree to which the ‘Tier 1’ common equity capital that appeared on the liabilities side of their balance sheets was sufficient to cover growing volumes of defaults and losses on the asset side.

The broad parameters of the SCAP stress test exercise were announced in late February, with details about its methodology made public in the last week of April (Board of Governors, 2009a). The results of the tests for individual institutions were made available two weeks later, on May 7th (Board of Governors, 2009b). Under the methodology, banks were required by supervisors to undertake tests on the adequacy of the capital that they currently held against two different macroeconomic stress scenarios. These ‘plausible “what if” scenarios’ featured quantified assumptions about real GDP growth, unemployment and house prices for 2009 and 2010 (Board of Governors, 2009a: 10). The ‘baseline’ or ‘consensus scenario ... reflected expectation among professional forecasters on the depth and duration of the recession’, while the ‘more adverse scenario was designed to be severe but plausible’ (Tarullo, 2010). While the baseline scenario posited house price falls of -14% and -4% in 2009 and 2010, for example, for the more adverse scenario these projections were -22% and -7%. As for the other projections within the baseline scenario, figures for house price falls were arrived at by averaging the projections found in three well-established, respected and regular private economic forecasts – the Blue Chip Economic Indicators and Financial Forecasts surveys, Consensus Forecasts, and the Survey of Professional Forecasters.¹ Meanwhile, projected figures in the more adverse scenario were arrived at by supervisors themselves through an analysis of ‘the historical track record of private forecasters as well as their current assessments of uncertainty’, the latter including ‘subjective probability

¹ See, respectively: <http://www.aspenpublishers.com/blue-chip-publications.htm>;
<http://www.consensuseconomics.com/>; and <http://www.philadelphiafed.org/research-and-data/real-time-center/survey-of-professional-forecasters/>.

assessments' present in private forecasts from early 2009 (Board of Governors, 2009a: 5). For the main variables in the adverse scenario – real GDP growth, unemployment, and house prices – there was a probability of roughly 10-15% that each could be worse than projected.

Under each scenario, and using their year-end 2008 financial statement as a starting point, banks first produced projections of losses and shrinking revenues, where losses for 2009 and 2010 covered at least twelve separate categories of loans and other asset classes. Supervisors assisted in a process that was 'interactive and iterative' (Tarullo, 2010), providing indicative loss-rate ranges for asset markets as a whole based on historical experiences and quantitative modelling of relations between loan performance and macroeconomic variables. Next, supervisors evaluated banks' own projections in order to identify any methodological weaknesses, missing information and/or overly optimistic assumptions. This appears to have led to 'numerous modifications of the banks' submissions', often arising from a combination of 'comparative analysis across the firms' and 'supervisors' own judgements' (Tarullo, 2010). As a third step in the process, supervisors ran standardised information from banks, on such matters as detailed loan and portfolio characteristics, through their own probabilistic model. Finally, and based on these three steps, supervisors produced loss, revenue and reserve estimates for each institution that, combined with information on existing reserves and capital, were used to project the capital that banks would need to remain solvent under the scenarios.

Viewed against the backdrop of developments in financial risk management and regulatory practices across recent decades, the stress testing of banks that the SCAP exercise undertook was certainly not fundamentally new (Sorge, 2004). What was distinctive, however, was the pre-eminence that the SCAP, as a crucial intervention in the crisis, gave to its pair of 'forward-looking' scenarios (Board of Governors, 2009a: 1). The SCAP cut quite sharply against the grain of the pre-crisis economy, wherein multiple calculations of probabilistic risk were pivotal to the ways in which the financial future was both embraced and managed (Haldane, 2009; Rebonato, 2010). It was probabilistic risk which had enabled and legitimated a vast array of opportunities for

speculative profits and the financialisation of Anglo-American economies before the crisis (e.g. Blackburn, 2006; Partnoy, 2004), and risk management was simultaneously crucial to how the dangers of financial expansion were apparently diminished by banks and other market institutions. By the mid-1990s, risk management models and devices – most notably, value-at-risk (VAR), which emerged from the wake of the 1987 stock market crash and puts a probabilistic number on the amount a bank could expect to lose on its portfolio of assets on a relatively bad day - had become integrated into organizational procedures and subsequently into the 1997 Basel II global standard for capital adequacy (de Goede, 2004; Power, 2005). Default risks arising from mortgages and all manner of loans were also increasingly moved off bank's balance sheets, and were sliced, diced, priced, distributed and traded by investors as a consequence of techniques of asset-backed securitisation and structured finance (Leyshon & Thrift, 2007; Partnoy, 2004). And, while rapidly growing 'over-the-counter' markets for credit derivatives promised that the default risks of specific assets (e.g. a corporate bond) could be hedged through bespoke contracts, they also served to enable trading in volatility and variance which was marked by its indifference to the performance of underlying assets (Wigan, 2009).

Within these developments in financial risk management, stress testing remained 'the poor relation in the family of analytical techniques to control risk', 'a second-class citizen' (Rebonato, 2010: 1). That said, stress testing did become more prevalent in banks' in-house risk management models after the collapse of Long-Term Capital Management in 1998, operating alongside and in addition to VAR (Aragones, Blanco & Dowd, 2001). It was also one of seven standards which had to be met under Basel II arrangements if an organization was to be permitted to substitute external oversight by regulators for such in-house risk management models. This was because, as Philippe Jorion (2007: 357) puts it in what is widely regarded as the principal textbook on VAR:

In practice, VAR measures based on recent historical data can fail to identify extreme unusual situations that could cause severe losses. This is why VAR methods should be supplemented

by a regular program of stress testing. Stress testing is a *nonstatistical* risk measure because it is not associated with a probability statement like VAR (*original emphasis*).

Stress testing also came to feature in national macroprudential regulatory and supervisory practices from the mid-to-late 1990s, and globally after 2001 in the guise of the International Monetary Fund's (IMF) Financial Sector Assessment Program (Sorge, 2004). So, and as the Board of Governors of the Federal Reserve System (2009a: 2) describe it, the SCAP was 'conceptually similar to stress tests that firms undertake as part of their ongoing risk management'. But, as they continue, previous in-house stress testing techniques tended to 'focus on individual business lines' rather than the totality of a bank holding company. Moreover, both macroprudential and in-house stress tests prior to the SCAP also varied considerably in their form. They could be piecewise and based upon analyses of the impact of anticipated movements in single key financial variables (e.g. interest rates, stock prices), or upon integrated scenarios which, providing 'a description of the joint movements in financial variables, could be 'drawn from historical events' (i.e. past crises) or 'from plausible economic and political developments' (Jorion, 2007: 357-8). In contrast, the SCAP stress tests were different because they were 'comprehensive', drawing on and bringing together quantitative forecasts for a wide range of macroeconomic variables, and because they deployed 'a common forward-looking conceptual framework' across the major banks (Board of Governors, 2009a: 2).

Enacting the SCAP apparatus

In bringing the scenario-based stress testing of banks to the front and centre of a key governmental intervention in the crisis, the SCAP would seem to share much in common with a broader anticipatory turn in the techniques which a growing body of scholarship identifies as at work in the contemporary liberal government of terrorism, pandemics and ecological disaster (see

Anderson, 2010). In particular, reading the stress testing of the SCAP through Stephen Collier's (2008) careful genealogy of what he describes as a 'new form of knowledge' devoted to 'estimating the likelihood and consequence of potentially catastrophic future events' (p. 224), it is clear that there is a resonance between these different techniques as they have emerged, travelled between and continued to develop across domains. So, while there are important differences between catastrophe planning and bank stress testing as anticipatory and scenario-based techniques – for example, as the SCAP methodology paper makes clear, even 'the more adverse alternative is not, and is not intended to be a "worst-case" scenario' (Board of Governors, 2009a: 5) – exploring these resonances can deepen and broaden our understanding of the distinctiveness of stress testing as a financial risk management practice that, prior to the SCAP, was somewhat nascent and underdeveloped.

When tracing a new form of calculative knowledge of catastrophe that works through estimates and likelihoods – from U.S. civil defence planning for possible nuclear attack during the late 1940s, to natural hazard modelling in the 1960s and 1970s, and, more recently, to terrorist risk assessments and their integration into federal budgetary rationalisation – Collier (2008) makes a distinction between 'apparatuses of collective security' that are produced through 'archival-statistical knowledge', on the one hand, and those produced through 'enactment-based knowledge', on the other (p. 225). On the basis of Collier's distinction, the SCAP stress test scenarios were akin to an enactment-based form of knowledge, including what he characterizes as a particular 'inventory', 'event model', and assessment of 'vulnerability'. Given the unravelling of all manner of risk calculations in 2007 and 2008, and the continuing sense in early 2009 that these were still uncharted financial waters, the starting point for the SCAP tests was that there was 'no archive of past events whose analysis might provide a guide to future events' (Collier, 2008: 228). As Rebonato (2010: 1) puts it, during the tumult of autumn 2008 in particular 'events of one-in-many-thousand-years rarity kept on occurring with disconcerting regularity'. Thus, instead of an archive, the SCAP included a dozen or so categories of loans and asset classes held by the banks and their

revenue in its various forms as the ‘inventory of elements’ which were deemed most relevant to the impact of future quantified ‘events’ (e.g. house price falls) included within the macroeconomics scenarios (Collier, 2008: 227). And, it was the ‘vulnerability data’ about these assets to future events which fed into loss and revenue estimates on bank’s balance sheets and, ultimately, to projections of capital adequacy (p. 235).

Understood in Collier’s (2008) terms, then, the enactment-based knowledge of the SCAP as a particular apparatus of collective security entails a ‘re-problematization’ of how the financial future should be managed in the present (p. 238). To speak of the SCAP as an ‘apparatus of security’ is to draw on a concept that, emerging from Michel Foucault’s initial and broad reflections on apparatuses (*dispositif*), slowly consolidates across his work. Composed of heterogeneous elements in relation, an apparatus as a distributed form of agency has many parallels with, and indeed informed the emergence of, Gilles Deleuze’s notion of ‘assemblage’ (Deleuze, 2006; Deleuze and Guattari, 2004). But, for Foucault (1980: 194-5), an apparatus is ‘a sort of – shall we say – formation which has as its major function at a given historical moment that of responding to an urgent need. The apparatus thus has a dominant strategic function’. And, by the time of his *Lectures at the Collège de France* in the mid-to-late 1970s, the strategic function of these ordering interventions is that of securing the life of the population in liberal society (Foucault, 2007, 2008).

Moreover, as Foucault (2007: 20) has it, an apparatus of security ‘works on the future’, such that ‘the management’ of ‘open series’ which ‘can only be controlled by an estimate of probabilities’ is ‘pretty much the essential characteristic of the mechanism of security’. This is because, as a range of literature inspired by and following in the wake of his work now underscores (e.g. Amoore & de Goede, 2008; Dillon, 2007; O’Malley 2009), contingency occupies an ambiguous position in the liberal government of populations. Securing liberal life in the face of the destructive threats and dangers of global circulations must not, at the same time, close-down the productive opportunities and profits that also arise from those uncertainties. The anticipatory techniques of stress testing deployed in the SCAP apparatus are, in short, part a wider set of

tendencies in contemporary liberal society that seek to govern by uncertainty and not by probabilistic risk. For example, the methodology paper for the SCAP features only a single summary box to describe the stress tests. Entitled ‘Assessing Capital Needs in an Uncertain World’, it begins by stating that ‘Projecting estimated losses and revenues for BHCs [bank holding companies] is an inherently uncertain exercise, and this difficulty has been amplified in the current period of increased macroeconomic uncertainty’. The SCAP works with, rather than against, the idea that the future is ‘unknown, with a wide range of plausible outcomes’ (Board of Governors, 2009a: 10).

Understood as a re-problematization of a financial future to be anticipated in the present through the enactment-based knowledge of stress scenarios, the SCAP apparatus nonetheless also featured the ‘recombination’ and ‘redeployment’ of existing risk management techniques rather than their simple and complete rejection (Collier, 2008: 238). Indeed, there is clearly a sense in which the tendency to regard stress testing as something of a remedy for the pitfalls of VAR and probabilistic risk management served, in effect, to buttress existing techniques. By way of illustration, consider the calculations of the required thresholds on the levels and composition of capital that banks were required to hold on the liabilities side of their balance sheets at the end of the two year horizon of the stress test: Tier 1 capital had to be greater than 6% of ‘risk-weighted assets’, with Tier 1 common equity capital similarly required to be in excess of 4% of ‘risk-weighted assets’ (Board of Governors, 2009a). Thus, through calculations of asset values that took probabilistic account of their risks, the SCAP held in place and did not sweep away one of the basic premises of VAR. Similarly, the assumptions that underpinned the modelling of the vulnerability of particular asset classes to the impact of future events were also largely probabilistic, based on the analysis of archives of historical data about each of those loans and instruments.

Despite these caveats, the SCAP apparatus did imply an important sea-change in what Collier (2008: 227) terms ‘mechanisms of mitigation’, that is, in the ways in which future dangers are to be addressed in the present through financial risk management and regulation. As part of the

CAP, and like all recapitalisation drives in contemporary crisis management and subsequent regulatory attempts to improve the so-called ‘resilience’ of banks, the SCAP apparatus sought to invigorate preparedness as a mechanism for dealing with the dangers of the uncertain financial future. As Ben Anderson (2010) has it with reference to a wide range of techniques that govern liberal life through risk and uncertainty, ‘preparedness’ can be distinguished from mechanisms of ‘precaution’ and ‘preemption’. As he describes these mechanisms or ‘logics’:

both precaution and preemption aim to stop the occurrence of a future, by either stopping a process before it reaches a point of irreversibility or initiating a new process. Preparedness is different. Its sphere of operation is a series of events after a precipitating event. Unlike precaution or preemption, preparedness does not aim to stop a future event happening. Rather, intervention aims to stop the effects of an event disrupting the circulations and interdependencies that make up a valued life (p. 791).

The SCAP stress tests did not seek to make a future of bank insolvency actionable in the present by simply reverting to the kinds of precautionary mechanisms that prevailed before probabilistic financial risk management practices took hold. So, although the SCAP certainly emboldened the authority of supervisors and regulatory agencies whilst seeking to boost the volume of capital that banks held, this was not a return to the Basel I rules of the late 1980s wherein closely monitored holdings of capital set absolute limits upon a relatively static set of assets on bank balance sheets. It was also plainly not a replay of the precautionary interventions and regulatory programmes which came to prevail in the wake of the Wall Street crash and through to the early 1970s. Then, finance was enclosed in national economies through capital controls, and strict fire-walls separated investment from commercial banking which were also both tightly restricted. Finance was, in effect, positioned as ‘the servant’, subservient to the productive economy, policies of Keynesian demand management and the Bretton Woods system of fixed-exchange rates (Helleiner, 1993; cf. Best, 2005; Blyth, 2002; Helleiner, 1994). Now, and in contrast, finance remains relatively free-flowing

and very much open for business in spite of, and perhaps indeed because of, the turbulence of successive crises (Cooper, 2010). That said, the SCAP stress tests did signal a move away from the distribution of risk that was enabled prior to the present crisis by off-balance sheet accounting and the calculations and circulations of securitisation and structured finance, and from the logic of preemption which, as Louise Amoore (2011) argues, is promoted by the arraying of a range of possible futures in derivatives markets. The future dangers that the SCAP stress tests prepared U.S. banks for through recapitalisation were not those which were calculated and priced as probable and based on induction from past events, but those that, for the high-impact, low-probability events of the adverse scenario in particular, were quite unprecedented historically.

Practicality, performativity and precision

The SCAP can be understood, then, to have signalled and acted through a subtle but significant change in the scientific repertoires of financial risk management, a very public turn to anticipatory techniques which re-problematized how the financial future should be acted on in the present. Prior to the SCAP, previous governmental interventions in the crisis were largely unsuccessful at restoring market confidence in the solvency of U.S. banks. There was also initially little indication that the SCAP would later be regarded as such a success. The Obama administration's plans of early February were heavily criticised by the financial press and greeted by sharp falls on global stock markets (*The Economist*, 2009a, 2009b; Luce and Guha, 2009). So, how was it possible for this intervention to ultimately be viewed so approvingly in markets that it marked a watershed moment in the crisis in the U.S., especially in comparison with the failure of subsequent and similar bank stress test exercises during the summers of 2010 and 2011 to inspire confidence in European banks?

In addressing this question, what is immediately apparent is that the relatively successful operation of the SCAP in restoring confidence in U.S. banks was not a consequence of results

which produced rosy risk information. The 19 banks included in the SCAP were estimated to have collectively incurred losses of \$400 billion across the six economic quarters through to the end of 2008, including charge-offs, write-downs on securities in investment and trading portfolios, and discounts on assets acquired when taking-over failing or failed institutions (Board of Governors, 2009a: 3). The more adverse scenario of the SCAP projected that further losses at the 19 firms would amount to \$600 billion across 2009 and 2010, with more than two-thirds of these losses arising from residential mortgages and other consumer-related loans (Board of Governors, 2009b: 3). Moreover, under the adverse scenario, 10 of the 19 bank holding companies included in the Program were projected as needing to raise a cumulative total of \$75 billion in capital in order to meet the required adequacy thresholds at the end of its two year horizon. The 10 were given thirty days to produce plans that, over the next six months, would raise this capital from the markets and/or via the CAP which, through the purchase of preference shares, would fund public recapitalisation but not nationalisation.

It proved unnecessary, nonetheless, for any of the 10 bank holding companies to directly receive CAP funds in order to meet their projected shortfalls of capital. Of the 10, only car finance company and 4th largest mortgage lender in the U.S., General Motors Acceptance Corporation (GMAC), received a capital injection from the Treasury after May 2009, but this was through the TARP's Automotive Industry Financing Program. The CAP was closed on September 11th 2009 and, by November, the 10 banks required to raise additional Tier 1 capital had done so to the tune of \$77 billion. This had been achieved by issuing new equity in the markets, converting existing preferred equity to common equity, and selling business arms and portfolios of assets. The ratio of Tier 1 common capital to risk-weighted assets across the 19 institutions included in the SCAP increased from 6.7% to 8.5% by the end of 2009 (Bernanke, 2010). It was the banks themselves and the markets of which they were part that acted on the scenarios of the SCAP apparatus and in the name of the preparedness of recapitalisation, and not the regulators, supervisors and the Treasury. Indeed, almost a month-to-the-day after the results of the SCAP were announced, a number of the

19 firms that it included began to pay back the TARP monies which, from the previous autumn, had funded their public recapitalisation (Dash, 2009; *The Economist*, 2009d).

In contrast to the SCAP exercise, the results of the first EU bank stress test in July 2010 gave a clean bill of health to all but 7 of the 91 institutions that it covered. In conjunction with the European Central Bank (ECB), the 2010 test was coordinated by the Committee of European Banking Supervisors (CEBS), a grouping of national regulators and central bankers that had been reporting to the European Commission and addressing regulatory convergence issues in the single market process since 2004. 91 institutions were included in the test ‘in descending order of size, so as to cover at least 50% of the respective national banking sector, as expressed in terms of total assets’, and, together, they accounted for 65% of total bank assets in Europe (CEBS, 2010: 2). The test’s adverse macroeconomic scenario quantitatively anticipated - with country-specific variations, and the addition of ‘a postulated aggravation of the sovereign debt crisis ... differentiated across countries’ (p. 4) - a mild ‘double-dip recession’ for the EU27 that amounted to a flat lining of GDP in 2010 and a contraction of -0.4% in 2011, compared with the sharp fall of -4.2% in 2009. Of the 7 institutions projected to have a cumulative Tier 1 capital shortfall (i.e. below a 6% threshold) of €3.5 billion against the adverse scenario, 5 were Spanish regional banks that were widely known to be struggling following the downturn in their national property market. Similarly, the results of the second EU stress exercise, this time conducted by the recently minted European Banking Authority (EBA) and announced in July 2011, found that just 9 banks failed the adverse scenario of the test to the tune of €2.5 billion, categorising a further 15 institutions as ‘near-fail’ because their core Tier 1 capital ratios were projected to be between 5% and 6% under the more adverse scenario (EBA, 2011).

It was not the case, then, that the SCAP restored confidence in U.S. banks because the test results cast their preparedness for the future in a positive light, far from it. Furthermore, and by the very nature of the scenario-based stress scenarios that were its operating element, the success of the SCAP apparatus could not be a matter of the correctness, proof or empirical validity of the results

that were produced. Risk information about the solvency of U.S. banks could not be found by markets and analysts to be right in realist terms at the time at which it was made available by the SCAP, just as the results arising from the CEBS and EBA exercises could not be judged to be incorrect when they were released in the summers of 2010 and 2011 respectively. As such, and as Millo and MacKenzie (2009) suggest more broadly of the historical emergence and consolidation of financial risk management, it is not the ‘facticity’ (Latour, 1988) of techniques for dealing with the financial future in the present that necessarily matters to understanding their prevalence over recent decades, even when those techniques typically claim to render the future knowable as risks. Following Michael Power (2007), and combining institutional economic sociology with the actor-network theory of Bruno Latour, what Millo and MacKenzie (2009) highlight is that the rise of risk management in financial organizational life is a story of ‘hybrid human-machine networks’, and the ‘integration’ and ‘fusion of knowledge’ of risk calculations into managerial and regulatory practice (pp. 639-641). So, to paraphrase from Millo and MacKenzie (2009), the suggestion is that the ‘remarkable success’ of the SCAP did not hinge on the ‘accuracy’ of its results. Rather, what mattered was the ‘practical usefulness’ of the stress testing technique, its growing ‘reputation among the different organizational market participants’, and its ‘constitutive (or performative)’ power, that is, its capacity to socially and materially bring into being and produce action on that which it names.

In her account of account of the continuities in the history of scientific techniques of quantification, Lorraine Daston (1995) makes a similar distinction to that which Millo and MacKenzie (2009) draw when analysing the practical usefulness and performative power of financial risk management. For Millo and MacKenzie (2009: 641, *original emphasis*), what it is of particular import to the practicality and performativity of financial risk management is that knowledge about the future appears as ‘*methodologically valid*’ and ‘not always realistically valid’. Meanwhile, for Daston (1995: 8), quantification, as one of the main ‘aspects of how scientists come to know’, is not simply marked by a drive for ‘accuracy’, but also for ‘precision’. While the former

‘presupposes that a mathematical model can be anchored in measurement; precision concerns the clarity, distinctness, and intelligibility of concepts, and, by itself, stipulates nothing about whether and how those concepts match the world’ (p. 8). For Daston, moreover, the search for precision – and, thus, for concepts and methods of quantification that are held by a scientific community to be credible, valid, and useful - is necessarily and always affectively charged. As she has it, there is a contingent ‘web of affect-saturated values’ that circulates within and through scientific communities and their ways of knowing (p. 4). And, in relation to techniques of quantification specifically, collectively held desires within those communities for ‘communicability’, ‘impersonality’ and ‘impartiality’ inform and imbue the drive for precision and, ultimately, their performative power (pp. 8-10).

The implications of Daston’s insights are that stress testing, as deployed in the SCAP, held a performative power because it appeared to markets and analysts to be applied with precision and was thus animated by a positive affective charge. And, in direct contrast, the EU tests ‘misfired’ and failed to performatively enrol a public of markets and analysts - to borrow and extend terms from J.L. Austin (1962) - because they were mistrusted and seemed to be imprecise and far from impartial in their application. To be clear, what Daston has in mind when she identifies the significance of ‘emotional forces’ is ‘the mental states of collectives, in this case collectives of scientists, not of lone individuals’ (pp. 4-5). These are mental states that make the apparent rationality of scientific endeavours possible, such that affect and rationality are not opposites but two sides of the same coin. This is quite different from the study of financial markets that, with rare exceptions (e.g. Pixley, 2004), typically views affective energies as arising out of the ‘animal spirits’ which are said to be a psychological trait of all irrational individuals who speculate on the markets (e.g. Akerlof & Shiller, 2009). Such Keynesian and behavioural perspectives see affect in financial markets as the outcome of inborn emotions, and not as relational feelings that, ‘born ... of the unknowability of the future’ (Pixley, 2004: 3), circulate and generate effects (Ahmed, 2004).

Signalling and acting through a subtle but significant change in financial risk management, the SCAP stress tests were, then, a practical and useful intervention in markets that had been rocked by the ‘mispricing of risk’ and ‘excessive risk taking’. The tests made it possible to act on an anticipated financial future that had escaped the probabilistic calculations which prevailed in the run up to the crisis, such as those that underpinned the ratings given to sub-prime related assets by Standard & Poor’s, Moody’s and Fitch as the principal bond rating agencies (Carruthers, 2010; Langley, 2008). Some high-profile figures did continue to defend the old paradigm and suggest that, in the terms of Nobel prize winning economist Myron Scholes, ‘a lot of models ... were pretty good, but the inputs were awful’ (as cited in *The Economist*, 2009c). However, the main techniques that were performed prior to the crisis were now widely mistrusted, and felt to have an Achilles heel of one kind or another. It had become apparent, for example, that hedging default risks through bespoke credit derivative contracts was only effective if and when markets were liquid. VAR models, moreover, were now rounded-on for ruling-out and not testing to the ‘long tail’ of risk because they assumed a normal distribution. As Nassim Nicholas Taleb’s (2007) hugely influential metaphor of the ‘black swan’ suggested and as the crisis so starkly demonstrated, not only was the normal bell-shaped distribution curve of probability a poor guide to the frequency of the random and unexpected which are also likely to be correlated, but it fed a dangerous complacency. This was especially the case when all manner of banks had deployed broadly the same risk management models which, as the crisis set in, required them to sell sub-prime assets into an illiquid market where there were no buyers.

Amidst this tumult, and as the workings of the SCAP exercise began to be felt on Wall Street, the credibility and reputation of the anticipatory techniques of stress testing gained ground. So, when *The New York Times* reported on the eve of the results of the SCAP stress tests, they were animated by ‘hope more than fear’ (Leonhardt, 2009). By way of further example, when *The Economist* (2008: 11) magazine published a special report on international banking in May 2008, financial risk managers were cast as ‘professionally gloomy’ and taking ‘a hard look at themselves’.

But, in a similar report published exactly a year later and in the same month as the results of the SCAP, there was said to be a ‘revolution within’ banks’ in-house financial risk management practices (*The Economist*, 2009c: 14). Crucial to this ‘revolution’ were the techniques of stress testing, especially as they came to have greater clarity and intelligibility. Stress testing was in the process of becoming of strategic significance to banks, ‘more important to boards as they seek to define institutions’ risk appetites’ (p. 14). With guidance and support from regulators and supervisors, stress testing was also becoming ‘more demanding’ and ‘coherent’ in terms of the scenarios that were deployed (pp. 14-15), entailing what Andrew Haldane (2009: 15) of the Bank of England describes as ‘a multi-factor risk scenario that is sufficiently extreme to constitute a tail event’.

This growing faith in stress testing techniques continued to hold as the European exercises were undertaken during the summers of 2010 and 2011. A notable feature of the coverage of the EU tests in the specialist media, for example, are comparisons with the SCAP. Not only is the latter filled with positive meanings when compared with the former in these commentaries, but stress testing techniques are roundly praised. By way of a broadly typical illustration, consider an extended ‘Analysis’ piece in the *Financial Times* during the week in which the results of the 2011 EU stress tests were due to be released. Here Patrick Jenkins and Brooke Masters (2011) acknowledge that ‘internal tests that model for isolated stresses’ were reasonably well established in banking organisations for the best part of a decade before the crisis, and that during this period ‘regulators began to use their own scenarios to evaluate soundness’. But, as they continue, ‘only since the financial crisis has stress-testing become a vital part of the regulatory arsenal’. This is because ‘Attempts by increasingly sophisticated tests to model the effects of simultaneous, interdependent changes reflect the big lesson of the financial crisis – that systemic risk resulting from the interconnectedness of an increasingly complex financial sector can be economically disastrous’. Stress testing is, then, widely regarded in positive terms as an anticipatory financial risk management technique which currently has considerable efficacy. It is ‘all the rage in the post-

financial crisis world' (FT Reporters, 2010: 16). Stress testing has, in our terms, the organisational practicality, kudos and scientific status to potentially inspire confidence amongst its market public, engendering their action in the present and on the basis of its quantitatively imagined futures.

What led suspicion and scepticism to animate the European exercises of both 2010 and 2011 was thus the seeming imprecision with which stress testing techniques were applied. Stress testing in the hands of the CEBS and EBA lacked scientific validity, conceptual and methodological clarity and, in effect, the performative power that operated when these techniques were deployed in the SCAP apparatus. Even before the 2010 EU test gave a clean bill of health to all but 7 of the 91 banks that it covered, for example, *The Economist* (2010b) magazine expressed fears that the exercise would be 'stress-test lite'. This was said to be likely because, as the backwash from the global financial crisis had come to take the form of a fiscal crisis in certain European states (especially the so-called 'PIGS' of Portugal, Ireland, Greece and Spain), it was 'tricky politically' for the test 'to factor in Europe's sovereign-debt jitters'. When the results of the 2010 test were made public (CEBS, 2010), it became plain that the adverse scenario it deployed did include projected discounts or 'haircuts' for banks that held sovereign debt instruments in their portfolios. But, the adverse scenario's 23.1% discount on Greek sovereign debt instruments was, in particular, greeted as 'too benign' such that 'the exercise as a largely wasted opportunity' (FT Reporters, 2010: 16). Immediately prior to the 2010 test, major European banks were themselves producing well-publicised adverse scenarios that anticipated the default of the Greek state on its outstanding obligations, a resulting Greek exit from the Euro and even the collapse of the European Monetary Union (Evans-Prittchard, 2010). As such, and as the Lex Column (2010: 24) put it in the *Financial Times*, 'The aim of the exercise was to address uncertainty about the health of Europe's banking sector ... In that respect the stress tests have failed'. Indeed, and as if to justify the negativity that animated the exercise in July 2010, Irish banks which had passed the test's adverse scenario had to recapitalised as part of the joint EU and IMF bailout shortly thereafter.

The EBA spent the months preceding the 2011 test undertaking the kind of close interaction with banks that had characterised the process of the SCAP. Much of this activity was intended to enrol a market public in an exercise that would, apparently, be different this time around. For example, in June 2011, and having received the first round of banks' results, the EBA very publicly issued new guidance to all banks to run their tests again and, in effect, sought to address the sources of the imprecision that had engendered mistrust in the 2010 tests. Banks were instructed to assume potential bond rating downgrades on sovereign debt. With Greek debt triple-C rated at the time (the lowest possible rating before default), this guidance essentially introduced politically problematic sovereign default into the adverse scenario for the 2011 test by the back door (EBA, 2011a; Jenkins and Masters, 2011). Nonetheless, when only 9 out of 91 banks failed the test a month later and to the tune of a meagre €2.5 billion, the exercise was again affectively charged with distrust, doubt and a degree of frustration amongst markets and analysts. And, again, it was the failure to clearly factor-in the possible default on around €100 billion worth of Greek sovereign debt that was to the fore. For the Lex Column (2011: 34) in the *Financial Times*, the EBA's tests prolonged a 'state of denial ... even as such an event in Greece now seems inevitable'. With so much of the scientific validity of stress testing techniques turning on their capacity to address the problem of so-called 'disaster myopia' resulting from the neglect of 'tail risk' by VAR models, the imprecision of EU tests which failed to anticipate a potentially disastrous uncertainty that was largely taken-for-granted in markets thus continued to forestall the revival of risk in European banking.

Conclusions: more stress

The techniques of stress testing were, in various ways, part of the scientific repertoires of financial risk management prior to the present crisis. Coming against the backdrop of the rise, consolidation and crisis of probabilistic risk techniques, however, it was the U.S. Treasury's SCAP initiative of Spring 2009 that propelled these techniques to prominence. Moreover, and as the

analysis offered here has shown, what distinguished the SCAP from previous applications of stress testing techniques was that the scenarios it deployed were notably comprehensive as quantitative imaginaries of the financial future. While these developments were rooted in the fungibility of risk calculations and their creative experimentations, the SCAP was nonetheless a very public embrace of anticipatory techniques designed to ensure preparedness for the ‘black swans’ of low-probability, high-impact events.

This subtle but significant change in financial risk management resonated, furthermore, with a broader anticipatory turn in the techniques at play in the contemporary liberal government of terrorism, pandemics and ecological disaster, and with catastrophe planning techniques in particular. Both bank stress testing and catastrophe planning are problematizations of the future that work primarily with uncertainties rather than risk probabilities. They engender action in the present through enactment-based knowledge which features extreme multi-factor event models, inventories (not archives) and estimates of vulnerability. The SCAP, by implication, was not simply a return to the precautionary regulations and mechanisms that prevailed through the Bretton Woods era and into the 1980s, or a continuation of the immediate pre-crisis preemptive logics of securitisation, structured finance and derivatives. Instead, the SCAP indicated a move towards preparedness as a mechanism by which banks, through their capital reserves, manage the financial future in the present.

Once stress testing techniques were brought to the fore with such success by the SCAP exercise, regulators and supervisors began to commit themselves to furthering and deepening the integration of these tools into their own practices and the risk management systems of banks (*The Economist*, 2010a; Tarullo, 2010). In the U.S., for example, bank stress testing has been a far from one-off exercise. The SCAP inaugurated a now annual stress testing exercise, under the auspices of the Federal Reserve’s Comprehensive Capital Analysis and Review (CCAR). CCAR ‘builds on lessons learned during the financial crisis about the importance of taking a forward-looking and

comprehensive approach to assessing capital adequacy' (Board of Governors, 2011: 2). It requires that banks project their capital adequacy across three scenarios:

a baseline scenario generated by the bank holding company and reflecting its expectations of the most likely path of the economy; a stress scenario generated by the bank holding company that is tailored to stress its key sources of revenue and most vulnerable sources of loss; and an adverse "supervisory stress scenario" generated by the Federal Reserve' (p. 12).

The 'key innovation' of CCAR, however, is that Federal Reserve officials examine, and may object to, the annual capital plans submitted to them by the 19 largest bank holding companies (p. 3). These plans cover a two-year horizon, must have a view as to how the new Basel III international capital adequacy standards of December 2010 will be met before the implementation deadline of 2019, and include intended 'capital actions' such as the repayment of any outstanding TARP monies, the payment of dividends and share repurchases and issuance (p. 5). As such, while making risk information about banks publicly available for market consumption was a primary objective of the SCAP – and, indeed, is a main driver in the regular and additional stress tests that the wide-ranging reforms of the Dodd-Frank Act of 2010 now require of U.S. banks - CCAR 'includes, but is much broader than, an assessment of stress scenario results and a firm's sensitivity to different assumptions about potential losses' (p. 18). In our terms, CCAR firmly positions stress testing techniques in relation to the supervision of the preparedness of U.S. banks for the financial future.

Such on-going experimentation and expansion in the application of stress testing techniques has, of course, also included the EU-wide exercises of 2010 and 2011 which failed to restore confidence in the capitalisation and solvency of European banks. As has been shown here, and in contrast to the SCAP, the EU tests were affectively charged by doubts, fears and frustrations about their methodological weaknesses. Political expediency, it seemed, undermined the EU tests which did not sufficiently factor possible troubles in Greek and European sovereign debt into the

quantitative imaginaries of their stress scenarios. By comparison, the SCAP had been ‘precise’ in Lorraine Daston’s (1995) terms: it brought to the fore and conceptually stabilised a somewhat latent anticipatory turn in financial risk management techniques that was filled with positivity by markets and analysts. The SCAP, in effect, had what it takes for the application of stress testing techniques by regulators and supervisors to performatively enrol a market public. The turning point that this produced in the global financial crisis, as confidence was restored in U.S. banks, was not replicated in the Eurozone which, at present, remains in the eye of the storm.

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