

From Risk Models to Loan Contracts: Austerity as the Continuation of Calculation by Other Means

Pierre Pénét and Grégoire Mallard

This article analyses how financial actors sought to minimise financial uncertainties during the European sovereign debt crisis by employing simulations as legal instruments of market regulation. We first contrast two roles that simulations can play in sovereign debt markets: 'simulation-hypotheses', which work as bundles of constantly updated hypotheses with the goal of better predicting financial risks; and 'simulation-fictions', which provide fixed narratives about the present with the purpose of postponing the revision of market risks. Using ratings reports published by Moody's on Greece and European Central Bank (ECB) regulations, we show that Moody's stuck to a simulation-fiction and displayed rating inertia on Greece's trustworthiness to prevent the destabilising effects that further downgrades would have on Greek borrowing costs. We also show that the multi-notch downgrade issued by Moody's in June 2010 followed the ECB's decision to remove ratings from its collateral eligibility requirements. Then, as regulators moved from 'regulation through model' to 'regulation through contract', ratings stopped functioning as simulation-fictions. Indeed, the conditions of the Greek bailout implemented in May 2010 replaced the CRAs' models as the main simulation-fiction, which market actors employed to postpone the prospect of a Greek default. We conclude by presenting austerity measures as instruments of calculative governance rather than ideological compacts.

Introduction

For many, the 2008 financial crisis demonstrated the colossal failure of market actors to model the future and anticipate risk events. This was especially true of their ability to predict the prospect that sovereign (country) issuers would default on their debt. Until 2008, investors and Credit Rating Agencies (CRAs)

considered the sovereign bond market a safe haven for a wide range of reasons. Following World War II, sovereign debt rescheduling and defaults remained quite low among developed economies and, although most advanced economies saw their credit positions erode in the 2000s due to a conjunction of factors (including higher public spending, lower capacity to tax, and low GDP growth), market actors – from investors and market regulators to anticipatory knowledge producers like rating agencies – assumed the trend of trustworthiness would last (Reinhart and Rogoff, 2009).¹ But the European sovereign debt crisis beginning in 2009 proved everyone wrong: sovereign defaults could still trigger devastating financial and economic consequences, even at the heart of the Western world.

The 2012 Greek default – the largest sovereign default in recent history and the epicentre of the European debt crisis – undermined the credibility of CRAs and led investors, regulators, and public officials to blame credit ratings for their lack of foresight in the months leading up to the Greek sovereign crisis. CRAs are often accused of bestowing generous ratings to debt instruments that default at a much higher rate than anticipated (Reinhart, 2002). For 18 months, between September 2008 and spring 2010, CRAs displayed rating inertia before issuing multi-notch downgrades of Greek sovereign bonds, a dramatic pattern of rating migration that significantly forced Greece out of international capital markets. Greece is not an isolated case, as evidenced by similar problem of valuation in the months leading up to the Asian sovereign crisis in the 1990s. In 2008, the downgrade of the ratings of billions of dollars worth of risky credit derivatives in the U.S. prompted global panic across capital markets, an event widely cited as one of the main causes of the subprime mortgage crisis and the 2008 financial meltdown (Carruthers, 2010; Rona-Tas and Hiss, 2011).

Recent research in the social studies of finance locates rating agencies' failure to anticipate risk events in the organisational and cognitive practices that CRAs adopt under conditions of uncertainty (Knorr-Cetina, 2011; Callon, 1998; Callon and Muniesa, 2005; Millo and MacKenzie, 2009). These studies are keen to present failure of calculation devices to anticipate risk events as a disaster waiting to happen. Under conditions of performativity, the demise of calculative technologies occurs in a linear and orderly fashion: complex procedures 'perform' markets until built-in errors resulting from dangerous assumptions and internal inconsistencies are revealed. For instance, MacKenzie (2011) shows how CRAs adapted to the problem of valuing ABS-CDOs by 'borrowing' the techniques of

calculation they used to rate other, less sophisticated, financial instruments.² Finding an endogenous solution within the cognitive and organisational realities of their existing evaluation practices both minimised uncertainty and made ABS-CDOs profitable. As the crisis revealed, however, this lateral borrowing had its own hidden problems. As a result of their methodological choices, CRAs underestimated correlation values, a central cause of the subprime market collapse.³ In this case, CRAs produced the “illusion that irreducible uncertainty could be transformed into manageable risk” (Nelson and Katzenstein, 2014, p. 29), when in fact they just swept uncertainty under the carpet. But when the carpet moved, all the uncertainty was left out in the air.

According to this commonly held view, CRAs’ simulations worked as pro-cyclical instruments: they produced focal points, or conventions (Nelson and Katzenstein, 2014), which accentuated the effects of market logics: when everything worked well (and home prices kept rising), they entertained the illusion that prosperity would last forever; when the crisis abruptly changed market actors’ expectations, they dramatised its effects. This view fits with the ‘performativity thesis’ (MacKenzie, 2006; MacKenzie, Muniesa and Siu, 2007) developed by social studies of finance scholars. As Doug Holmes (2009, p. 384) candidly admits, paraphrasing the words of European Central Bank President Trichet,⁴ “words [and simulations] are action, communicative action”, which produces real effects on the economy. In this view, a simulation works as an ordered system of normative beliefs and testable hypotheses about the future, which solves coordination problems and/or enables speculative strategies (Knorr-Cetina, 2011). Reciprocally, the failure of past instruments of calculation is invariably portrayed as an epiphany, a Kuhnian moment of collective lucidity during which market actors realise that everything was false, which by its suddenness (rather than gradual epistemological change) accentuates the discontinuity of the crisis.

In many narratives about the 2008 crisis, the collapse of US home prices and its effects on the global banking system indeed worked as a ‘paradigmatic shift’ (Kuhn, 1970) for the market actors, here playing the role of Kuhnian scientists. This view is not restricted to popular accounts of the crisis, but is also shared among authors working in the social studies of finance (MacKenzie, 2011). This Kuhnian understanding of the world of finance may not be

surprising, as the social studies of finance scholars often see traders (Callon, 1998; Mitchell, 2007; Muniesa and Callon, 2007), back office financial engineers (Lepinay, 2011), central bankers (Holmes, 2009) and other market actors as “analogs to [Kuhnian] scientists, who can be shown to be making, in the guise of merely discovering, market realities” (Riles, 2010, p. 795). For instance, in the words of Doug Holmes (2009, p. 384), the interventions of central bankers are “carefully calibrated communications informed by a keen technical acumen and formulated by a small group of individuals working within central banks”.⁵ In this view, predicting market events and simulating market dynamics follow the same hypothetical-deductive logic of science: like scientists and other experts, market futurologists build *simulation-hypotheses* in good faith by relying on macro-economic theories, which they test through the observation of past and present market trends, and which have the real effect of reinforcing market trends – thus reinforcing their own assumptions.

This article offers a very different view of the role of the kind of simulation produced by CRAs and other financial actors, like the European Central Bank (ECB), during the Greek financial crisis. Indeed, we contend that the projections of the future produced by CRAs and then by the ECB worked as *fictions* – or ‘placeholders’, a concept crafted by Annelise Riles (2010) to talk about the role of collaterals in the market for derivatives – rather than as *hypotheses*. Drawing on the work of Hans Vaihinger, Riles (2010, p. 802) distinguishes between fiction and hypothesis by reminding us how “a fiction differs from a hypothesis ... because the latter is ‘directed toward reality and demands verification’, whereas the fiction ‘induces only an illusion of understanding’.”

Thus, whereas scientists (or market actors, according to social studies of finance scholars) believe in the veracity of their hypotheses (and by extension, their simulation, if one equates the two), we posit that market actors do not believe in their fiction – at least “not in the traditional sense of ‘belief,’” for “a fiction does not pretend to resolve, in actuality, the indeterminacy of future risks associated with [market transactions]; it is rather a command, or a mutual agreement, a normative constraint, simply to act as if” (Riles, 2010, p. 882). Recalling the classical Knightian distinction between risk and uncertainty (Knight, 1921), a fiction, or a placeholder (be it a simulation, or another calculative device), does not convert uncertainty into risk by convincing market

actors that their beliefs about the future are mostly right in the sense that the probability of their occurrence is higher compared to that of other scenarios. Rather, a *simulation-fiction* sweeps uncertainty under the carpet,⁶ and proposes to market actors a dramaturgy that they can follow to script their actions in the financial world so they can avoid the acceleration of an impending crisis, while the causes of such a crisis still threaten the world of an imminent catastrophe.

Simulation-fictions thus engineer market realities in such a way that decision-making remains possible even under conditions of uncertainty, even though this means that people have to act in a way that does not reflect their true perception of the likelihood of worst-case scenarios. As Riles (2010, p. 803) adds, the placeholder “is a technique for working with and in the meantime”, when uncertainty cannot be reduced to risk, but when action is nevertheless required: the placeholder’s “central feature is that it forecloses the question [or uncertainty] of the moment for the near future, not by resolving it, but by papering over it”.

Here we identify two such simulation-fictions that European policymakers mobilised to defuse the disastrous effects that the expected (and then actual) Greek sovereign default raised after 2009: first, the ratings produced by the CRAs (and in particular those of Moody’s), from September 2008 until June 2010; second, the Economic Adjustment Programme for Greece signed in May 2010 by Greek authorities and the Troika (the International Monetary Fund [IMF], European Central Bank [ECB], and European Commission [EC]). Both were in fact legal fictions,⁷ as both were written either in the form of ratings that had regulative/legal value,⁸ or in legally binding agreements passed by international organisations and a sovereign country. As we claim, both types of simulation-fictions should therefore be analysed not only for the type of economic theories (seen as bundles of hypotheses) that were embedded in these simulations, but for the type of legal and economic interventions that their use allowed market actors to deploy.

This move from seeing ‘simulations as hypotheses’ to ‘simulations as fictions’ therefore leads us to challenge the common view that CRAs merely ‘misread’ the Greek crisis, or that the architects of the bailout plan of Greece were purely motivated by monetarist ideological beliefs (as in Blyth, 2012).⁹ We claim that a purely internal approach to ratings and financial regulations – as only crystallisations of macro-economic theories rather than as legal compacts – has

limited value to explain the dynamics of simulation-formulation and simulation–revision in the sovereign risk market. In general, such a reading of the European response to the Greek crisis (in which analysts mainly see the reflection of a dominant monetarist paradigm) hypothesises that people’s relationship to their own ‘beliefs’ is absolutely immediate and sincere – a hypothesis that we reject.

To demonstrate this point, this article shows how CRAs’ projected scenarios for Greece were initially quite plausible but that they quickly became mere fictions that allowed regulators to avoid pushing the Eurozone (but not Greece) into a deeper crisis. In the first section, we cover CRAs’ views on the Greek economy during the period of September 2008 through December 2009. We show that their initially contrarian risk predictions were not inaccurate but instead reflected a highly plausible rating scenario among other equally plausible scenarios. However, as our inspection of rating reports reveals, Moody’s continued to use previously assigned investment-grade ratings while the Greek crisis amplified. By doing so, Moody’s sought to avoid echoing in their reports the uncertainties which the European sovereign debt crisis posed to their valuation of risk, while maximising the continuity between ratings. Such use of ratings is more akin to producing a fiction than to updating a system of testable hypotheses. In that sense, these simulations helped market actors deal with the crisis in a context in which reducing uncertainty to risk would have accentuated rather than attenuated the worst effects of the crisis.

In the second and third sections, focusing on the period of January through June 2010, we reintroduce governance mechanisms and legal reasoning in the transaction chains that led to the suspension of credit ratings and their replacement by an austerity contract. In the second section, we show that Moody’s failure to anticipate the deepening financial crisis in the fall of 2009 – what analysts label as a ‘rating failure’ (Reinhart, 2002) to anticipate sovereign risk events – was in fact the purposeful result of Moody’s intention to avoid legal frictions arising from regulatory reliance on ratings. Indeed, since the creation of the European Economic and Monetary Union in 1994, European regulators have applied a rating threshold (based on the CRAs’ simulations) to define the acceptable quality of collateral for refinancing purposes.¹⁰ The building of ratings into public governance frameworks raised enormous problems: the simulations no longer functioned as mere crystallisations of macro-economic hypotheses. Instead, they held regulatory agencies hostage to the CRAs’ rating downgrades,

which, in turn, forced the CRAs to entertain a fiction, which consisted in denying that Greece would default on its debt. Not until the European Central Bank (ECB) removed the legal value of ratings could Moody's update its simulation (or, they would have had to face the disastrous consequences that such an update would have produced on the Eurozone).

In the third and last section of this article, we show how the Troika modelled its first austerity programs to extract the uncertainty that a Greek default raised for the Eurozone economy from the realm of normal calculative (and speculative) strategies, and put in its place a new *dispositif* of calculation/governance for times of exception. The adoption of this austerity plan, drafted in an emergency situation, helped the ECB remove the regulative value of CRAs' ratings in May 2010: the bailout plan, which set up instruments of calculation of last resort, put an end to the usefulness of the legal fiction entertained by Moody's, as it sheltered the Eurozone economy from the risk of a Greek default. This was achieved by two processes, which we call the 'collateralisation of politics through law', and the adoption of new forms of 'hardened calculation'.

Seeing Like a Rating Agency (Under Radical Uncertainty)

The European sovereign debt crisis presents puzzling developments for students of technologies of calculation and the role they play in 'performing' the economy. Sovereign debt instruments do not mobilise the highly formalised models that CRAs use to rate other classes of assets, most notably structured financial instruments. In fact, CRAs use more qualitative analytical techniques to formalise sovereign risk and arrive at a judgment about the political *willingness* of a country to repay its debt on time and in full.¹¹ In contrast to most of the models analysed by scholars in the social studies of finance (Callon, 1998; Muniesa and Callon, 2007; Lepinay, 2011), in the case of simulations produced by CRAs, their level of abstractness remains relatively low, as the production of these models does not involve the highly complex algorithms which are used to predict future market trends in other financial settings.

For instance, our examination of the press releases (Moody's, 2008) and two rating reports (Moody's, 2009a; 2009b) published by Moody's between

September 2008 and October 2009 suggests three persistent and complementary views supporting Moody's initial 'A' investment-grade rating for Greek government bonds: First, *Greek fundamentals and government resolve and credibility*: Moody's emphasised the potentially destabilising effect of Greece's poor economic performance, weakening competitiveness, and growing debt levels in both the public and private sectors. At the same time, however, they noted Greece's intention to monitor deteriorating fundamentals in relation to other risk factors, including political ones (the Greek government's resolve to shore up creditworthiness, as well as its margin for manoeuvre and capacity to implement efficient reform).¹² Second, *lender of last resort*: in 2008, the prospect of a sovereign debt crisis involving a Eurozone member had little precedent and did not lend itself to easy calculation. A member of the European currency zone, Greece did not control exchange rate or monetary policy. The ECB's decision to extend external support was thus crucial, especially given Greece's soon-to-be non-existent access to capital markets. Since the legal rules and procedures contained in the European Stability and Growth Pact had made external support from the ECB conditional, Moody's had to issue a judgment about the Greek government's willingness to repay its debt in time and in full, but they also had to imagine and evaluate the probability of another element: the willingness of the ECB to assume its role of lender of last resort, should Greece need them to do so. For CRAs and specifically Moody's, the prevailing belief that the ECB would not let a member default made the prospect of a Greek default highly unlikely. According to Moody's rationale, liquidity risk could only materialise if the ECB refused to approve external support for a Eurozone member, a possibility Moody's considered extremely unlikely. Third, *market prices and borrowing costs*: Moody's also acknowledged the significance of market price fluctuation on Greek government borrowing costs. Moody's did not expect a direct causal relationship between higher borrowing costs and liquidity crisis, as long as the Greek government sustained credibility and foreign support remained plausible. This is why, despite soaring spreads and increasing risk fears expressed in CDS spreads, Moody's did not downgrade Greek sovereign bonds in the fall of 2008.

If some of the simulations produced by CRAs about the credit trustworthiness of nations have been highly politicised and controversial (at least after the Greek bailout), in fact, CRAs are wary of destabilising the market consensus when they simulate the risk of a credit default. They often work as

procyclical forces, as they produce focal points that market actors use to coordinate their actions. In the case of ratings of sovereign debt, the low level of abstraction of their models might explain why CRAs have a tendency to follow market valuation as well as each other's gradual downgrades.¹³ Such 'mimetic' or 'herd-like' behaviour (DiMaggio, 2003) is typical of organisations like the ECB whose communicative function is extremely sensitive (Holmes, 2009, p. 384).

Furthermore, CRAs typically pay attention to other forms of valuation (like market prices of borrowing costs for each nation) in their simulation of credit events, as they cannot act as 'experts' usually do (Gieryn, 1983, 1995), by drawing a boundary between their work (abstract, scientific, testable and verifiable) and that of lay people (principled, unscientific, and based on fictions). In computing the creditworthiness of sovereign issuers, CRAs not only pay attention to domestic economic fundamentals and institutional criteria such as the presence of a lender of last resort. They also consider competitive market forms of valuation like the 'real' interest rates obtained by each nation on the sovereign debt market and they also look at the ratings assigned by other agencies. Then, it might be the case that CRAs act like Kuhnian scientists: they work within the bounds of a widely agreed-upon paradigm (or convention), which they seek to adapt to the situation (to a limited extent) each time the market produces a new price for a nation's borrowing costs, until a body of accumulated evidence against their paradigm can be interpreted in a coherent way by an alternative paradigm.

This view of the CRAs' prospective work holds true at least until the Greek crisis took a turn for the worse in the fall of 2009. After the collapse of Lehman Brothers in September 2008, CRAs did not immediately revise their hypotheses about Greece's ability to repay its debts: fears that the American financial meltdown would spill over into Europe did not immediately damage market perceptions of Greek economic trustworthiness. Although sovereign CDS and bond spreads were on the rise, CRAs did not change their ratings of Greek government bonds until the end of 2009, with the exception of S&P, which downgraded Greek bonds by one notch in January 2009. Moody's maintained an 'A1' rating for Greece from November 2002 until December 2009 (see Table 1). Until October 2009, Moody's' projected scenario was eminently plausible and, in fact, accurate: market fears had eased and Greek bond and CDS spreads declined

to almost pre-crisis levels, thus confirming the relatively optimistic scenarios CRAs had predicted. For weeks, Greek officials used Moody's contrarian views to convince financial parties to invest more heavily in its debt. Their appeal was predicated on the logic that Moody's' countercyclical perception of future events was more rewarding for all parties than the 'consensual' market perception reflected in sovereign bond and CDS spreads.

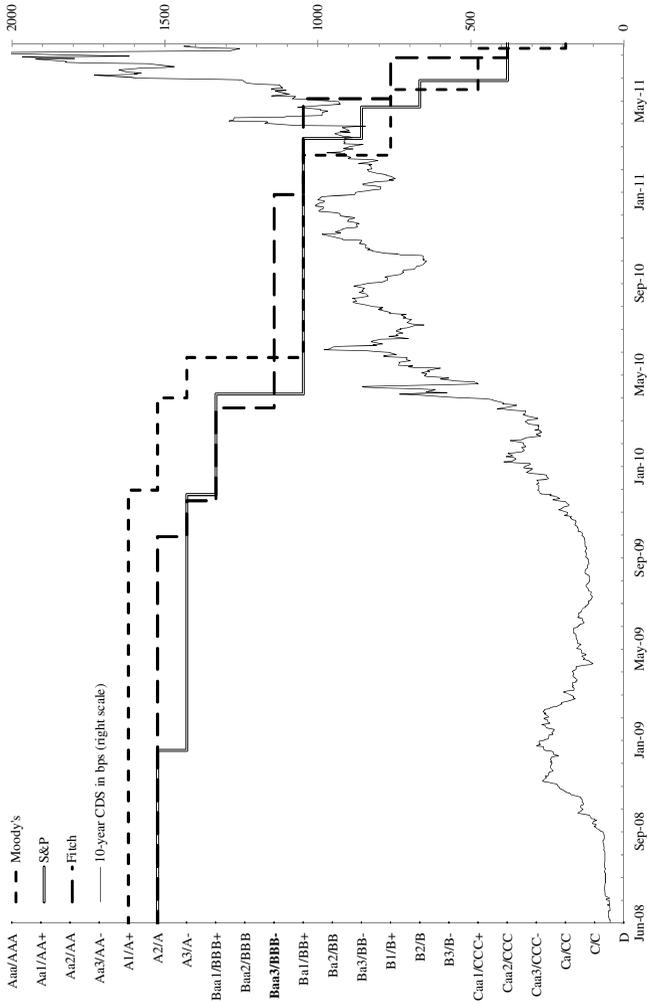


Table 1: The Greek sovereign-debt crisis: historical ratings and CDS spreads (June 2008-July 2011). Source: Bloomberg

As ratings grew increasingly inconsistent, they did affect market volatility, but not in a way that supports the performativity thesis: particularly in the case of Moody's, which left their rating unchanged until the end of 2009, the CRAs' predictions worked in a countercyclical rather than procyclical fashion: rating optimism kept market prices of borrowing costs down.

In fact, the real 'shock' that destroyed the CRAs' confidence in the validity of their simulation-hypotheses occurred after Greece unexpectedly revised its 2009 deficit projection upward from 3.7% of GDP to 12.5% on October 2009. This decision stunned markets and significantly damaged the country's credibility in data reporting. As a result, Greek sovereign CDS and government bond spreads began to widen again in October 2009, signalling deteriorating perceptions of Greece's creditworthiness. By December, markets were already pricing Greek sovereign bonds in the speculative-grade debt category and Greek sovereign CDS spreads had risen well above those of Ireland, Portugal, and Spain (Gaillard, 2012). The deficit revision significantly undermined the risk scenario that Moody's had predicted for Greece: only one item of Moody's rationale (external support) could be said to remain unchanged. But these market predictions did not drive the CRAs to change their ratings in similar ways, nor in a coordinated fashion.

In spite of these developments, Moody's did not downgrade Greek government bonds, but continued instead to use its existing rationale for investment-grade rating to make sense of the uncertainties arising from increasingly negative perceptions of Greek sovereign risk – even as the limits of plausibility of their investment-grade rating were being tested. The deteriorating Greek economic situation also coincided with growing disagreements within Moody's. In an interview conducted by the first author of this article,¹⁴ a senior sovereign rating analyst at Moody's mentioned that the rating gap forming between Moody's on the one hand and S&P and Fitch on the other (see Table 1) was a constant source of frictions between him and Pierre Cailleteau, then chief sovereign officer. These frictions about Greek sovereign ratings were nothing new: a "heated debate" had already broken out in 2001, he reminded, about the projected upgrade of Greece's sovereign debt. Since then, he explained to us, Pierre Cailleteau's risk views prevailed and "Moody's substituted to macroeconomic analysis of Greek fundamentals a more political and institutional analysis of solvency, a risk Moody's deemed inexistent". This view prevailed from

2004 to 2009, even after it was reported that the government of Greece had issued wrong budget statements: after 2009, Moody's deep-seated expectation of ECB support predicated their evaluation of Greece's new risks.

Beginning in October 2009, Moody's relied on this expectation as a cognitive antecedent that conferred meaning on any new risk information pertaining to Greece's deteriorating economic situation. Thus, despite the Greek government's weakening fundamentals, declining scope for financial manoeuvres, lowered credibility, and borrowing costs that had risen above those of any other European country previously deemed comparable, Moody's reaffirmed its investment-grade rating. The single-notch downgrade issued by Moody's on December 22, 2009, still maintained Greece in the 'A' investment-grade range and was widely viewed by market actors as "softer" than expected.¹⁵ Moody's press releases published in December 2009 (2009c; 2009d) justified (albeit somewhat warily) an investment rating for Greece that challenged market fears that Greece's deteriorating economic situation could result in a significant liquidity risk. In the note, 'Investor Fears of Liquidity Risks in Greece are Overdone', Moody's reaffirmed its prevailing confidence in the ECB and described the prospect of a Greek default as "extremely unlikely". Only in the highly remote case that Greek government debt became ineligible as collateral, the note claims, would liquidity risk become a possibility.

Until the end of 2009, the initial gap between CRAs' perception of Greece's trustworthiness and the more conservative views embedded in market prices essentially expressed a conflict between *equally plausible* risk scenarios that were resolved in favour of CRAs. Thus, we could still say that simulations produced either by market actors or CRAs functioned as (testable) hypotheses produced by expert agencies. After all, between January and October 2009, CRAs' (and specifically Moody's) rating inertia seemed to have 'proved' the plausibility of CRAs' simulations, with CDS and sovereign bond spreads returning to their pre-crisis levels after a temporary surge in the fall of 2008. CRAs were thus able to calm down markets from 2008 to October 2009. But after the revision of Greek statistics, their scenario was permanently damaged. As such, Moody's was embroiled in a dynamic cognitive process whereby constitutive use of rating models created diminishing informational returns on ratings for every piece of new information collected.¹⁶

After Greece's October deficit revision announcement and its destabilising consequences for the Greek government's fundamentals, borrowing costs, and overall credibility, the simulation produced by Moody's could no longer be characterised as a (testable) hypothesis, but, as we claim, as a fiction (or placeholder) which allowed Greece (and more importantly, the Eurozone) to avoid facing the worst effects that a further downgrade would have occasioned. By calling investor fears over Greek government liquidity 'misplaced' and 'exaggerated', Moody's seemed to hope it could once again shape investors' perceptions about the Greek government's ability to repay its debt and encourage market parties to bring about the conditions that would justify an 'A' investment-grade scenario. As market actors failed to respond to Moody's call, Moody's rationale for its investment-grade rating became significantly more contrarian and the possibility that market actors would bring their predictions to pass more remote. That Moody's refrained from downgrading Greece to the 'B' range might suggest a path dependency of ratings that could be interpreted as a Kuhnian blindness (as simulation-hypotheses are shaped by 'sticky' paradigms, e.g. paradigmatic assumptions which are not easily falsifiable by facts). But we suggest instead that such rating inertia manifested Moody's awareness of the destabilising effects that its downgrade would produce, and their willingness to avoid deteriorating the situation – an awareness that already existed in the fall of 2009, but that became more manifest in 2010, as we show in the next section.

Calculating vs. Governing: The CRAs/ECB Standoff

As explained above, investors expected the ECB to commit to provide external support and to agree to step in as lender of last resort, should the need arise, even if in the European institutional and historical context, the ECB was not vested with the authority to act as lender of last resort.¹⁷ But Moody's expectation that the ECB – or, for that matter, the Eurozone stakeholders – would assume these responsibilities was considerably challenged in January 2010, when ECB President Jean-Claude Trichet announced stricter credit policy.

Since the 1990s, European financial institutions have routinely used ratings to define the risk weight of their financial exposure: ratings have thus played the role of safeguards in normal times, but at the cost of limiting the ability of the ECB to play the role of lender of last resort in times of crisis. Indeed, under the Capital

Adequacy Directive, the ECB applies a rating threshold to define the acceptable quality of collateral for refinancing purposes.¹⁸ In October 2008, the ECB lowered the normal 'A3/A-' threshold to a more relaxed 'Baa3/BBB-' to enhance provisions of liquidity to the Eurozone. CRAs, specifically Moody's, anticipated further amendments to the ECB's collateral framework rating threshold, to accommodate the rapidly changing Greek economic situation. Instead, the contrary happened: on January 14, 2010, the ECB President Jean-Claude Trichet reaffirmed the intention to let the 'Baa3/BBB-' threshold expire in January 2011 and revert to the normal, tighter collateral framework.¹⁹ This decision increased fears that liquidity risk could materialise if CRAs lowered ratings, which would bring Greek bonds closer to ineligibility for refunding purposes. Representing Moody's, Pierre Cailleteau called the decision "hard to believe" and "not credible", and further wondered "why the ECB would have lowered the bar to help the banks and then raise it again at the price of creating a pretty significant European crisis?" He finally concluded: "It's kind of a game theory ... In this story we've shown a lot of composure".²⁰

When regulators appeal to ratings produced by CRAs for 'governmentality' purposes (Foucault, 2009) such as defining acceptable investing practices, credit standards, and accounting norms, they inevitably alter the rules governing the market reception of ratings, and thereby the purpose of simulations. When ratings are given regulative influence, they cease to be simply fluctuating hypotheses about the future. Instead, they become fixed market rules, and the mechanisms governing their reception are no longer deliberative but legally binding: investors and other financial parties must comply with the enforceable standards which regulators have developed in reference to these ratings. As a result, CRAs can no longer produce ratings in isolation from their predicted outcomes. Rather, they must anticipate how their predictions about long-term future risks will affect their environment – what Espeland and Sauner (2007) define as 'reactivity'. They must assess whether their simulation-fiction has other qualities that surpass accuracy: for instance, if they provide real effects by avoiding further escalation of the crisis.

After Trichet's (dramatic) decision not to further amend the rating threshold which defined the acceptable quality of collateral for refinancing purposes, CRAs (especially Moody's) took into account the potentially

destabilising consequences of their predictions on issuers when assessing new threats and the likelihood of new worst-case scenarios. A ‘chink’ appeared in the ECB’s inflexible stance, as evidenced in the complaint expressed by Ewald Nowotny, head of the Austrian Central Bank: “[t]he fate of Greece, and if you are going to be more dramatic, the fate of Europe, depends on the judgment of one rating agency. That is an unacceptable situation”.²¹ The ECB’s decision thus changed the meaning that further downgrades would have on Greece’s ability to borrow. It also changed the relationship between Moody’s simulation and ‘reality’: the simulation no longer functioned as a hypothesis to be tested by the ‘real’ and observable market performance of Greece, but rather, as a fiction which for many real market actors was preventing disaster.

Furthermore, Moody’s could avoid confronting its rating with real market performance: having faced prohibitive borrowing costs since January 2010, the Greek credit market had largely become fictional (see table 2).²² Greek banks had lost wholesale market access to fund their operations and the Greek government was left with little means to propose a financial support package of its own. As a result, Greek banks increasingly relied on Eurosystem credit channels to fund their operations. It was therefore critical to Greece’s ability to roll over its debt that its sovereign bonds remain eligible as collateral in exchange for low-interest loans from the ECB. The move of Moody’s ratings from simulation-hypothesis to simulation-fiction was thus made critical by the ECB’s decision.

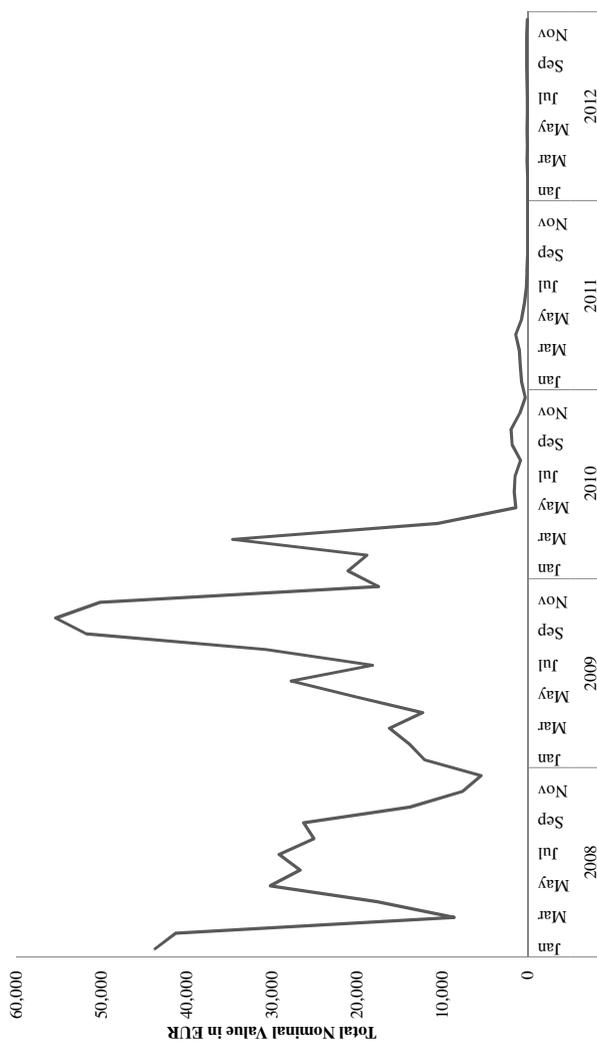


Table 2: Monthly Trading Volumes in Greek Government Bonds in HDAT²³ (2008-2012)

The ECB's rating-sanctioned collateral framework produced a rating standoff in which a downgrade was as undesirable for Moody's as it was for Greece (and the Eurozone). Fitch and S&P issued multi-notch downgrades in March and April 2010 respectively, with S&P relegating Greece to junk-bond status on April 22. With its rating well-anchored in the investment-grade category, Moody's remained the only strong holdout, effectively serving with Fitch as a buffer against the prospect of Greek speculative status. Because the ECB determined the eligibility of collateral by applying the higher of the lowest two ratings,²⁴ the ECB thus used Fitch's 'BBB-' rating, the lowest within the investment-grade category, only because Moody's was still rating Greece in the investment-grade category.

Moody's was thus operating under a strong and ever-increasing incentive not to translate its pessimism about Greece's financial future into a downgraded rating. Had it matched S&P's speculative rating, Moody's would have rendered Greek government bonds ineligible as ECB collateral. A downgrade into the junk status would have almost certainly catalysed a significant liquidity crisis, which in turn would have forced Moody's – and other CRAs – to issue another downgrade (which itself would have to take into account the consequences of its own downgrade on Greek finances). Like a receding horizon, rating accuracy moved ever out of reach; no matter what considerations Moody's took, downgrading Greek sovereign bonds in an orderly fashion was no longer a possibility, nor a desired outcome for anybody. There was no alternative to the simulation-fiction, which nobody 'believed' to be true, but whose fictional quality everyone believed essential.

The deepening European sovereign crisis posed in the most acute terms the problem of credit access for Eurozone sovereign countries. The fundamental contradiction expressed in regulatory reliance convinced European regulators to reverse the ECB President's decision of January 2010, announcing in a circular dated May 3, 2010, the suspension of the minimum rating threshold in the ECB collateral eligibility requirements of debt instruments issued or guaranteed by the Greek government:

3 May 2010. ECB announces change in eligibility of debt instruments issued or guaranteed by the Greek government

The Governing Council of the European Central Bank (ECB) has decided to suspend the application of the minimum credit rating threshold in the collateral eligibility requirements for the purposes of the Eurosystem's credit operations in the case of marketable debt instruments issued or guaranteed by the Greek government. This suspension will be maintained until further notice.

The Greek government has approved an economic and financial adjustment programme, which has been negotiated with the European Commission, in liaison with the ECB, and the International Monetary Fund. The Governing Council has assessed the programme and considers it to be appropriate. This positive assessment and the strong commitment of the Greek government to fully implement the programme are the basis, also from a risk management perspective, for the suspension announced herewith.

The suspension applies to all outstanding and new marketable debt instruments issued or guaranteed by the Greek government. (ECB, 2010b)

The ECB's decision was an event of historical importance. Indeed, since the 1990s public regulators have increasingly relied on CRAs' forecasting capacities to carry out their tasks of market surveillance and monitoring (Partnoy, 1999; Cantor, Gwilym and Thomas, 2007), and ratings have been routinely used in bank capital requirements and prudential regulations in the U.S. and Europe since the 1930s (Flandreau, Gaillard and Packer, 2011) – a reflection of the twentieth century hegemony of indicators in global market governance (Davis et. Al, 2012; Bhuta, 2012; Halliday, 2012; Sinclair, 2005; Abdelal, 2007).²⁵ In September 2012, the minimum credit rating threshold was permanently suspended for all Eurosystem's sovereign credit operations (ECB, 2012), thus marking the end of an 80-year era.

The ECB's decision served as a useful liquidity backstop and was widely interpreted as a strategic attempt to diffuse the risk of a potential Moody's downgrade. Crucially and ironically, however, the decision also removed the

incentive for Moody's not to downgrade (Gaillard, 2012, p. 185). Without any incentive to stick to its simulation-fiction, a month later on June 14, Moody's knocked Greek bonds down four-notches, to speculative status. The four-notch downgrade was puzzling for several reasons. First, it was, at the time of issuance, the sharpest downgrade Moody's had ever issued on a sovereign issuer.²⁶ Second, Moody's' dramatic rating action was not motivated by any significant change in Greek fundamentals. Paradoxically, the downgrade occurred when Greece's prospects had improved significantly, following the ECB's decision to suspend its minimum rating threshold. Finally, the downgrade followed by less than a month Pierre Cailleteau's departure (effective May 17) from Moody's, a coincidence that was mentioned by our interviewee as a possible factor explaining the severity of the downgrade. In light of these inconsistencies, observers widely interpreted Moody's' rating action as "inevitable" and merely corrective.²⁷ The decision "could not be described as unexpected" said Poul Thomsen, deputy director of the IMF's European Department: "all Moody's did was bring its own rating into line with those of other agencies, which had lowered their ratings before the government unveiled its economic program".²⁸ The downgrade meant Moody's was "only catching up to the reality markets were trading on weeks ago".²⁹

The downgrade effectively resorbed Moody's' whopping 3 and 4 notch gap with S&P and Fitch, respectively. Crucially, the timing of the decision – following the ECB's suspension of its minimum threshold for Greece – ensured the downgrade would have "minimal" effect.³⁰ Effectively, the day of the downgrade, the euro advanced nearly 1% against the dollar. The historical magnitude of the downgrade and its specific timing suggest the ECB's modification of its collateral framework essentially 'liberated' Moody's to downgrade Greece's government without jeopardising the country's ability to qualify for low-interest loans.³¹ Past studies have concluded that regulatory reliance on ratings favours high ratings (Gaillard, 2012). We propose that this is the case because high ratings create incentives for ratings inertia. They can only do so temporarily, however, ultimately giving way to more dramatic patterns of rating change.

From a governance point of view, the ECB decision of May 2010 consecrated the continuation of calculation by other means. The ECB rejected ratings-based risk models and opted in favour of a contractual and interventionist approach to decide when to lend money to sovereign borrowers, and at what cost.

This decision recognised that the set of rating-implied rules and conditions governing the extension of credit and collateral policies in the Eurozone had become inapplicable. CRAs' ratings were no longer relevant as information for price setting mechanisms, for as transactions had disappeared altogether, so had risk, and therefore the capacity of ratings to compute probabilities of default.

In their effort to change the rules underpinning risk governance, European regulators substituted contractual terms and conditions of the bailout for their typical model-based rating scenarios: as evidenced in the press release reproduced above, the decision to suspend the application of the minimum rating threshold in the collateral eligibility requirements of debt instruments issued or guaranteed by the Greek government was concomitant to the adoption of the first Economic Adjustment Programme for Greece on May 2. The ECB decision came the very same day that the Troika (the IMF, ECB, and EC) first approved a bailout of Greece, which, the Troika expected, would restore confidence in the Euro and allow Greece to regain market access. This substitution in the ECB decision of May 2010 thus signalled the ambition of international lenders to continue calculation by other means.

Austerity-Sanctioned Risk Contracts: The Return of Law

The Collateralisation of Politics through Law

Political economists often downplay the legality of market regulations, which they often reduce to explicit or implicit economic theories.³² For instance, as Mark Blyth (2012, p. 2) defines it, austerity is best defined as a macroeconomic policy that encourages “a form of voluntary deflation in which the economy adjusts through the reduction of wages, prices, and public spending to restore competitiveness, which is (supposedly) best achieved by cutting the state’s budget, debts, and deficits”. Here, no mention is made of the type of legal arrangement by which such policies are enacted: whether the promoters of such policy are national governments, international organisation (like the IMF) or international private actors (like associations of bankers); whether the austerity measures are placed as conditionality clauses in a lending agreement, or as a budgetary law, etc. According to political economists, austerity only matters as an

economic policy, and the twentieth-century history of austerity can be told by following the rise and fall of the influence of economic experts in various governments (with Keynes on one side, and then Friedman on the other side). Scholars in the social studies of science share the same lack of interest for the legality of loan contracts through which ‘austerity’ is implemented in specific countries. In general, with the notable exception of Annelise Riles (2011), they pay little attention to law, contracts, and other legal tools as instruments of market governance. When they mention the importance of law in the construction of markets, they often reduce legal instruments to yet another set of ‘technologies of calculability’ (Callon, 1998) that work as analogs to the simulation-hypotheses crafted by the highly skilled and creative engineers operating in financial markets. Just like the algorithms developed by backoffice financial geeks (Lepinay, 2011), legal contracts provide hypotheses about the future behaviour of market actors, and are updated after hypotheses are revised based on observed behaviour (Callon and Muniesa, 2005). Therefore, scholars in the social studies of science believe that legal contracts can reduce uncertainty into calculable risk, which market actors try their best to compute correctly.

In contrast, we claim that legal instruments of financial governance adopted by the Eurozone backers in May 2010 (and the subsequent abandonment of ratings as instruments of governance) need to be analysed as technologies of calculability that work as simulation-fictions rather than as simulation-hypotheses. On the one hand, we thus agree with sociologists of finance that legal technologies are also a ‘method of calculation’: we claim that the bailout plan of Greece in May 2010 was a method of calculation of last resort, which European leaders used to compensate for the lack of alternative instruments of public governance of risk in times of crisis. But we show that the main goal of the bailout plan was to create a new fiction according to which the uncertain effects of a future Greek default on the Eurozone could be erased by legal means. The main goal of the bailout plan was to avoid leaving the likelihood of a Greek default as a calculable ‘risk’, whose likelihood, timing and effects, could be the object of market actors’ calculative (and speculative) strategies. By removing the prospect of a default from the realm of normal calculative strategies, the bailout plan also aimed to silence those speculating about the uncertainties that Greece’s financial situation raised for the Eurozone economy as a whole.³³

Austerity measures appealed, by design, to the Troika and the Greek Government because they provided an affordable solution to governance and political problems specific to the European sovereign debt crisis. If in the immediate context of spring 2010, there was little alternative to austerity, it did not mean, however, that European regulators viewed austerity as a macro-economic theory in which they 'believed' whole-heartedly. In our view, the adoption of the Economic Adjustment Programme for Greece in May 2010 did not reflect the victory of hard-core 'monetarist' ideologues, as the story has been told in other contexts, like Chile (Dezalay and Garth, 2002), and as it is being told for the contemporary period (Blyth, 2012). Rather, this plan responded to the European leaders' pragmatic concern for avoiding an imminent worst-case scenario (if CRAs further downgraded Greece's debt), and providing a new charade that could sweep the radical uncertainty that a Greek default raised for the Eurozone economy under the carpet for more time. This bailout plan thus worked as placeholder whose central feature, in the words of Riles (2010, p. 803), "is that it forecloses the question of the moment for the near future, not by resolving it, but by papering over it, we might say, by creating a dummy solution subject to future reevaluation".

Here, we thus approach austerity as an instrument of public market governance in times of epistemological crisis. It is within this context, we argue, that the motivations behind austerity measures expressed a willingness to maintain the illusion of calculation by other (exceptional) means rather than an attempt by liberal ideologues to solve financial hardship with policy measures justified by their preferred macro-economic theory. The ECB decision of May 2010 represented a shift in paradigm in how European regulators intended to lend credit to Greece and at what cost. Invited by the Greek government, the IMF/ECB mission visited Athens from April 21 to May 3 and the mission agreed to provide bilateral financial assistance on a quarterly basis from 2010 to 2013. The financing package of EUR 110 billion sheltered Greece from international bond markets by covering the estimated external financing Greece needed to roll over its debts over a 36-month period. Greece's 15 partner Eurozone countries contributed EUR 80 billion, in relation to their shares in ECB capital, through bilateral lending centrally pooled by the European Commission.³⁴ On May 9, the IMF approved a parallel request for EUR 30 billion through a Stand-By

Arrangement. The activation of stability support was conditioned to an ambitious multi-year coordinated framework for policy adjustment and financing supported by the Troika.

In their effort to change the rules underpinning risk governance, lenders pursued two complementary goals. On the one hand, the Troika contemplated the abolition of Greek political uncertainty, a process we show is best described as the collateralisation of Greek politics through law, e.g. the removal of political uncertainties from the calculation of credit risk by the 'legalisation' and contractualisation of economic policy – although they failed to anticipate the crisis of legitimacy that 'traditional' parties would suffer from the acceptance of such plans that basically abolished Greece's say in its financial destiny. On the other hand, lending parties substituted the legal terms and conditions of the bailout for their typical model-based rating scenarios and thus maintained the illusion of calculation by other means.

This framework known as the 'Economic Adjustment Programme for Greece' followed a process of 'hardened' legalisation (Abbott and Snidal, 2001). It found its legal existence in several documents reflecting program discussions conducted on a quadrilateral basis between the Greek authorities and the Troika: a report prepared separately by the IMF and the EC, two Letters of Intent (LoI) sent to the EC and IMF by the Greek authorities, a Memorandum of Economic and Financial Policies (MEFP) drafted by the IMF, a Memorandum of Understanding (MoU) drafted by the EC, and a Technical Memorandum of Understanding (TMOU).³⁵ A memorandum is a written document that expresses convergence of views between two (bilateral) or more (multilateral) concerned parties and indicates a common line of action. A memorandum is typically considered an interpretative document: it does not stand by itself, but rather, it clarifies the interpretation of other documents, either by underlining "an agreement to disagree", or a consensus about the specific interpretation of treaty provisions.³⁶

The bailout plan thus turned 'soft' political budgetary commitments by Greek leaders into clear and legally-binding commitments whose implementation would be assessed by independent committees – the three characteristics of 'hard' as opposed to 'soft' law listed by Abbott and Snidal (2001). Indeed, the MoU drafted by the Troika contained extremely clear and detailed policy terms and financial conditions for the Greek bailout. The

adjustment program adopted in May 2010 reflected a significant multilateral effort to codify lending conditions to Greece in strict legal terms: the MEFP and MoU specified a list of macroeconomic and structural measures and a detailed time frame for their implementation by the Government of Greece and the Bank of Greece between Q2-2010 and Q2-2013. Moreover, the bailout program was put into effect without Greek parliamentary approval, which meant that the program obtained the force of law in addition to clarifying Greece's obligations under previously signed treaties (like the European Stability and Growth Pact, and the Maastricht Treaty, which created the European Economic and Monetary Union in 1994). This high density of legality was meant to reassure stakeholders that this time, Greece could no longer act irresponsibly by cooking its books.³⁷

The program thus sought to abolish political uncertainty by making Greece's legislative process a fixed term (one fixed by international and domestic law), and no longer a flexible variable that could be manipulated by Greece's political coalitions. Until the implementation of the adjustment program, the Greek government had kept full discretion and sovereign prerogative over its legislative process. Under a rating-based model of governance, political resolve – i.e. margin for manoeuvre and capacity to implement efficient reform – was a central calculative component in the computation of Greece's rating, as evidenced in Moody's 2008 and 2009 reports. In contrast, the legal terms and conditionality of the adjustment program adopted by the Troika 'collateralised' the high Greek political uncertainty through law, e.g. by locking in the application of fiscal consolidation measures within the contract itself.

The May 2010 program posed as a pre-condition to the bailout a list of detailed policy measures to be gradually implemented during the period of the program, in order for the European backers of the Programme to release each new chunk of financial help. The MoU specified detailed economic policy measures that lending parties would use as benchmarks for assessing Greek policy performance in the context of quarterly reviews under the financial assistance program: each of the 13 quarterly disbursements was thus conditioned upon the observance of quantitative performance indicators and structural benchmarks listed in the MEFP and MoU and specified in the TMoU.³⁸ These policies included measures pertaining to fiscal consolidation, financial sector regulation and supervision, and structural reforms.³⁹

These contract features demonstrated the Troika's ambition to remove Greek political frictions from lending transactions. By seeking to reduce the highly ambiguous present of Greece's politics to absolute certainty, the bailout plan worked as a placeholder, which, as Riles (2010, p. 803) writes "is the precise opposite of pragmatist ways of thinking about the ambiguity or open-endedness of the present as an open zone of endless possibility and unpredictability that have so inspired the social studies of finance", which tends to reduce everything (including the realm of calculative practices) to politics, and which ignores the power that law has over politics.

Calculation by Other Means

Under the views of the Troika, the collateralisation of political uncertainties through law was a central condition in Greece's return to capital markets, the acknowledged objective of the program. For lack of a market, lending parties assumed the rebuilding of market continuity and risk calculation could originate directly from within the features of the program. In substituting the terms and conditions of the bailout for their typical model-based rating scenarios, the Troika promoted a radically different 'style' of calculation. In removing political uncertainties from the computation of risk scenarios, the austerity contract afforded the direct extraction of numbers from policy implementation and the control of the legislative process. While risk assessment and sovereign prerogatives were neatly separated under a rating-based regime of market governance, such an austerity contract allowed for linear and authoritative calculation, something we term 'hardened calculation'.

Policy recommendations (ex-ante conditions) and strict conditionality (ex-post controls) respectively provided the computational basis and enforcement insurance for the calculation of Greek economic and financial prospects. The fiscal effort was frontloaded, fully specified until 2013, and most measures were deemed permanent.⁴⁰ Troika-enforced supervision through quarterly stress tests and reviews also guaranteed that the program generated a constant and significant flow of updated information throughout its duration. Such an ambitious adjustment program, lenders hypothesised, would limit implementation risks and provide market actors with the indispensable informational resource to begin calculating again. In addition, the program

imposed a structural overhaul of Greece's statistical capacity by requiring the timely monthly publication of statistics on Government revenue, expenditure, and financing.

As the Greek crisis had started when the government announced that prior statistics on its prospected budget deficit had been wrong by a wide margin, the rebuilding of informational continuity required a significant effort to produce large and reliable information that would help market actors begin calculating again. In granting full independence to the Greek Accounting Office (GAO), the agency in charge of monitoring and reporting government data, the Troika recognised that budget data misreporting revealed in October 2009 was the result of problems with data sources and political interference with the disclosure of some fiscal operations.

The strengthening of Greek statistical capacity (increase in frequency and speed of public data reporting), combined with the information generated by the terms and conditions of the program provided a comprehensive framework for the calculation of future economic and financial outcomes of planned policies. This logic of prospective planning generated valuable outputs in the form of tables displaying scenarios and roadmaps about Greece's future economic and financial prospects, in both the medium and long term. For instance, the IMF made projections for public sector debt sustainability until 2025 (see Table 3) and for pension expenditures until 2050. The EC/MoU provided only two scenarios for government debt ratios until 2020. The IMF assessed public debt sustainability against a variety of underlying macroeconomic assumptions ranging from very cautious to very optimistic. Under the IMF's baseline scenario, public debt would peak at 150% in 2013 then decline to 120% in 2020 (see table 4).

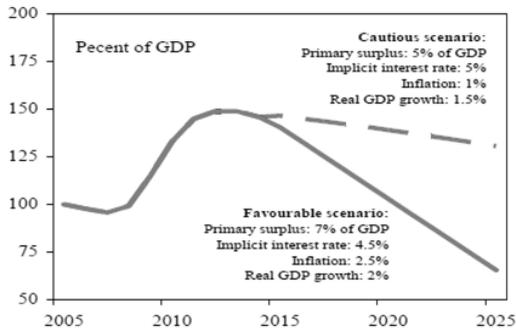


Table 3: European Commission, 'The Economic Adjustment Programme for Greece', May 26, 2010, p. 30

Figure A1. Greece: Public Debt Sustainability Analysis (Percent of GDP)

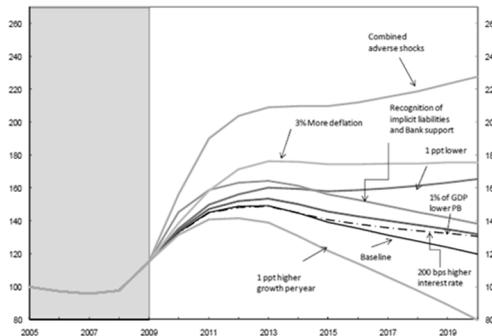


Table 4: International Monetary Fund, 'Greece: Staff Report on Request for Stand-By Arrangement', Annex 1. Public Debt Sustainability, p. 35.

In providing full specification of a unified and consistent set of macroeconomic and structural policies recommended for implementation, the Troika pursued the deliberate strategy to displace the calculative machinery from the backstage and place it in the front stage – whereas CRAs typically concealed criteria and motives underpinning their rating decision. In their ambition to rebuild calculation, lending parties resorted to “dramaturgical techniques” (Mallard and Lakoff, 2011) designed to stage consensus between lending parties

and reassure investors of the credibility of the program's terms and conditions. For instance, the wording of the EC/MoU is indicative of this ambition: in presenting the list of fiscal consolidation policies that Greece must implement, the EC used the present tense, suggesting that they had already been put into effect, although most of these policies had not yet been adopted by, let alone introduced to the Greek Parliament. This consensus was also manifested in similar paragraphs that seemed to have been copied and pasted across documents, thus allowing the four parties to speak with one voice.

The staging of the program's credibility, however, was not without apparent doubts and contradictions, most specifically arising from the IMF. Undeniably, policy makers were convinced that the program had a chance of success. However, they also acknowledged the possibility that austerity measures might be harmful to the Greek economy and fail to work, suggesting that they were aware that these roadmaps and scenarios were fictional. Program reports drafted separately by the EC and the IMF display notable divergences regarding the risk that the program entailed. As far as the EC was concerned, these doubts remained in the backstage. Paradoxically, considering the historical preference of the IMF for austerity plans (Blyth 2012), it was the IMF which was more prompt in conceding that the program presented "obvious" and "substantial" risks by recognising the "unprecedented", "exceptional", and "extraordinary" scale and frontloading of the Greek adjustment effort (IMF, 2010, p. 8, 23).⁴¹ Correspondingly, the IMF was more willing than European regulators to express its doubts regarding the performance of the program by showing the "sensitivity" of its projected scenario against the prospect of adverse shocks (see table 4), and the "unsustainable dynamics" (IMF, 2010, p. 36) that could ensue from such a fiscal shock.

In its policy analysis, the IMF not only relied on neoliberal economic theory but also on Keynesian concepts, like "negative fiscal multipliers",⁴² which it argued, could lead Greece straight toward a prolonged recession. In contrast, the EC remained constantly optimistic in the front stage, sticking to a dramaturgy that emphasised the literal reading of the statistics produced by the new calculative agencies. Although lending parties were aware of the fictional nature of their road maps and risk scenarios for Greece, they exerted significant effort to make them authoritative. In fact, the insistence that the EC placed on obtaining

calculable benchmarks by which it could assess Greece's legal compliance with the terms of the new loan contract might explain why austerity prevailed over more Keynesian policies. Indeed, from the evaluative point of view austerity packages have the advantage of simplicity over Keynesian stop-and-go counter-cyclical policies. The only targets that Greece had to meet under the austerity contract were targets that the Greek state could control: raising taxes, cutting pensions, laying off civil servants. For instance, the EC/MoU requires that the

Parliament adopts legislation to improve the efficiency of the tax administration and controls, implementing recommendations provided by the European Commission and IMF. In particular, they put in place an effective project management arrangement ... to implement the anti-evasion plan to restore tax discipline through: strengthened collection enforcement and recovery of tax arrears ... ; a reorganized large taxpayer unit focused on the compliance of the largest revenue contributors; a strong audit program to defeat pervasive evasion by high-wealth individuals and high income self-employed ... ; and a strengthened filing and payment control program. (EC, 2010, p. 63)

The evaluation of such hard remedies was easily performed and offered a direct test of the Greek government's willingness to enforce the policies agreed upon by the Troika (and forced onto the Greek government, which acknowledged the harshness of the treatment). In parallel, the EC remained constantly optimistic in the front stage, sticking to a dramaturgy that emphasised the literal reading of the statistics produced by the new calculative agencies.

In contrast, it would have been difficult to index the gradual allocation of European funds to Greece on its 'economic recovery', as the latter depended not only on the Greek government's intentions and implemented policies, but also on a larger context. Thus, if the goal of the Troika was to harden the calculability of Greece's economic policies, it was preferable not to use the targets fixed by Keynesian economic policies (a rising demand and economic growth) and emphasise instead the side of the equation that the Greek state could directly control: budgetary cuts. In characteristic fashion, economic growth in Greece was not listed among the criteria that the Troika retained to determine further

allocations of funds, and although the set targets progressed, the Greek economy entered a five-year depression.

The Troika's insistence on hardened calculability and thus austerity demonstrated that the real uncertainty, which the ECB was concerned with, and which it swept under the carpet, was the effect that the Greek crisis could have on the rest of the Eurozone. The dramatic scenarios that were agitated at the time – that Greece would be expelled from the Eurozone, that its economy would return to the drachma, and that some other Southern European country (like Spain) would come next after Greece – were those scenarios that raised the biggest threats to the Eurozone economy, as they raised a problem for which the EU design had given no solution: the possibility of an orderly bailout and/or the possibility of an orderly 'exit' from the Eurozone. When the Troika thus decided to 'help' Greece by legalising its political process and by hardening the calculability of Greece's financial efforts, it did so to shield the rest of the Eurozone from the institutional uncertainty revealed by the Greek crisis, rather than to shield the Greek economy from the uncertainty that an exit from the Eurozone would bring.

Conclusion

In this article, we stick to the constructivist premise of performativity studies and expand it to encompass legal reasoning and market governance of risk, two dimensions of capital markets relatively under-explored in previous literature on ratings. Here, we show that regulatory reliance on CRAs ratings had long embedded the two opposite and conflicting worlds of governance and calculation, beginning at least in the 1930s, and remaining until the ECB May 2010 decision to no longer use CRAs' ratings as instruments of governmentality. The ECB decision to no longer rely on ratings in its regulation did not mean, however, that the world of governance (which typically involves legal frameworks contracted by sovereign actors and international organisations tasked with designing them), and that of calculation (which often relies on automated procedures and expresses the algebraic and continuous world of standardised models and algorithms), were forever divorced. Rather, as we show, the ECB decision came alongside the substitution of a normal *dispositif* of calculation and

soft-law regulation by a new set of instruments that hardened both the calculative and legal instruments by which Greek finances would be governed in times of crisis. In many ways, the Eurozone institutions added to the normal calculative agencies of financial governance another dispositif of calculation/governance for exceptional times. The adoption of austerity, we claim, must be assessed within this context of epistemological crisis.

The ideological debates about the worth of the austerity plan enforced as a precondition to the loan contract that was extended to Greece in 2010 are actually indexed on the types of uncertainties that the regulatory institutions (the IMF, the EC and the ECB) in charge of the Eurozone's financial governance decided to prioritise. As the Troika prioritised the shielding of the Eurozone economy, rather than that of Greece (whose economy was already in shambles, and only became worse as a result of the new policies), from the uncertainty of an institutional dead end at the EU level and an economic collapse, they chose to harden the legal and calculative framework imposed upon Greece's budgetary policy at the cost of ignoring the effect of the remedy on Greece's economic health. This choice led them to present a list of targets for Greece that looked like an austerity package.

However, the choice of an austerity plan was not due to the strength of supply-side economists in the hallways of the EC and the IMF. In this case, doubts based on economic theory (of Keynesian inspiration) economists working in these institutions did express doubts, even though they remained confined within reports. But 'austerity' gave a moral and economic rationale to a cover-up effort whose main function was to hide the uncertainties that had been exposed by the Greek crisis in the flawed EU institutional framework. If these institutions had prioritised another type of uncertainty – for instance, the uncertainties that an austerity plan raised for the Greek economy – then the regulative agencies would have adopted a different mix of economic policies, like a mix of supply-side and Keynesian demand-sustaining policies.

This article yields other findings. Indeed, we challenged the common view that CRAs merely 'misread' the Greek crisis, and we showed instead that at the early stages of the crisis, CRAs (especially Moody's) adapted strategically to cognitive inconsistencies and credibility concerns by helping the EU regulative agencies hide the uncertainty that the Greek crisis raised for the Eurozone economy. As such, CRAs produced simulation-fictions that helped the Eurozone

institutions buy time until they proposed their new *dispositif* of calculation/governance. We demonstrated that after the revelation of the Greek budgetary crisis in October 2009, Moody's produced simulation-fictions when rating the Greek debt, and that such fictional use of ratings was encouraged by the ECB's regulatory reliance on ratings. Moody's stuck to its past pre-crisis ratings until June 2010 because it anticipated the potentially destabilising consequences that further downgrades would have on Greece's borrowing costs. Our analysis of the Greek sovereign debt crisis thus points to a non-linear, complex web of cognitive, legal, and political transactions, that complicates previous understandings of the market infusion of ratings, most notably those produced by theories of performativity, which see ratings as pro-cyclical forces that can turn into endogenous factors of financial crises.

Notes

¹ For instance, no rated Western countries defaulted until 1997.

² ABS-CDOs (asset-backed securities collateralised debt obligations), were a new class of risky credit derivatives resulting from a securitisation process. In particular, rating ABS-CDOs required the computation of correlation values to encode the probability that different issuers within a diversified pool of assets would default simultaneously. Unable to compute such correlations of default from existing information, CRAs borrowed the techniques of calculation they used to rate corporate CDOs.

³ This non-contingent path to failure is consistent with research developed by other science studies scholars on disaster events resulting from technical failure (Perrow, 1984; Vaughan, 1996).

⁴ For Holmes (2009, p. 384), "When Trichet speaks, he is not merely expressing an interpretative account or commentary; he is making the economy itself as a communicative field and as an empirical fact".

⁵ Individuals who all have PhDs, and who try, to the best of their knowledge, to reduce uncertainty to risk by applying the best models to market realities, thereby making their views of the market 'real'.

⁶ A claim that fits with Nelson and Katzenstein's (2014, p. 1) observation that market actors like central bankers live in a world of both "risk and uncertainty".

⁷ We use the term "legal fiction" rather than "convention" (Nelson and

Katzenstein, 2014, p. 12), as the latter excludes “explicit agreements or formal institutions” (such as the ‘Economic Adjustment Program’), and largely ignores the legality of what these authors – as well as other authors working in the tradition of the French school of conventions – term “conventions,” which are reduced to “templates for understanding how to operate in contexts that are experienced as shared and common.” In addition, a convention is a story that people tell, which seems valid to them, until proven false (a bit like a hypothesis). In contrast, a fiction is a story that people tell although they have reasons to believe it is not accurate.

⁸ The ratings produced by the CRAs, as we explain below, had regulatory effects on market actors until May 2010 in Europe.

⁹ In doing so, we claim that social scientists should study calculation technologies not only for their predictive purpose (whether they produce accurate or inaccurate predictions about the future likelihood of specific events), but also for their “constitutive purpose” (Mallard and Pénét, 2013), e.g. the use of some knowledge of the future (anticipatory knowledge) to constitute present uncertainties.

¹⁰ Until October 2008, the ECB applied an “A3/A-” threshold.

¹¹ Data collection for this research reflected the general concern to capture the ways in which anticipatory knowledge producers “see” risk and simulate credit events in times of crisis. The first and second sections draw on rating reports and press releases published by Moody’s between October 2009 and September 2010 (available on the agency’s website). In the event of a rating action, CRAs typically issue a rating report to subscribers via a press release. In these reports, CRAs establish a dialogue with investors and provide explanatory guidance that can be difficult to pass along in ratings alone. Weaving together various threads of meaning and context, these reports give prime access to the rationale behind rating actions. Since the motivations behind rating actions are not always clear, these materials deserve careful attention.

¹² In addition, Moody’s sought to contextualise the Greek economic situation relative to countries with comparable fundamentals by rating all 16 country members of the Eurozone. Until October 2009, Moody’s justified its “A” investment-grade rating for Greece by arguing that its financial situation was not materially different from that faced by other equivalent European countries.

¹³ As this article demonstrates, mimetism and procyclicality also set the stage for dramatic corrective rating actions further down the road.

¹⁴The interview was conducted under condition of anonymity in Paris in summer 2013.

¹⁵ *The Financial Times*, “Moody’s gives Greece breathing space on debts,” 23 December 2009.

¹⁶ Rating inertia appeared to be the path-dependent outcome of a non-linear process of knowledge production and credibility assurance: so long as Moody’s could use existing risk rationales, in whole or in part, to make sense of new risk information, Moody’s had an incentive to uphold ratings. Indeed, rating inertia guaranteed that new risk threats would vindicate Moody’s previous views. Therefore backward reasoning helped Moody’s maintain continuity between ratings, thereby preserving the consistency of opinion that marked it as a credible producer of valid anticipatory knowledge (Mallard and Pénéet, 2013).

¹⁷ The European Union and the U.S. offer two contrasting styles of financial regulation. The U.S. system is built on ad hoc policy rules while European regulations, in contrast, rely heavily on institutionalised rules and norms. For instance, the ECB’s provision of liquidity to 17 sovereign countries is restricted on conditions of soundness and rating-based collateral policies. No such eligibility criteria exist in the U.S. where the FED is vested with the authority to act as lender of last resort. Crucially, European regulators lack proper tools for action at both the federal and national levels to deal with cases of emergency (e.g. what happens if a country fails to meet collateral requirements?).

¹⁸ The Capital Adequacy Directive of 1993 and 2006 respectively pioneered and deepened the incorporation of ratings in European market regulations (Kruck 2011, p. 42). For a detailed analysis of the ECB’s collateral policy making, see Eberl and Weber (2014).

¹⁹ “We will not change our collateral framework for the sake of any particular country. Our collateral framework applies to all countries concerned. And that has been said already by the Vice-President, by me and by colleagues. That is crystal clear” (ECB, 2010a).

²⁰ *The Globe and Mail*, Joanna Slater, “The search for villains is on; Banks, hedge funds, currency traders and ratings agencies are all under fire,” March 4, 2010

²¹ *The Financial Times*, “Greece to unveil new austerity plan,” March 3, 2010.

²² Greece met financial needs through issuances of bonds under increasingly adverse conditions. Before requesting international financial assistance in April, Greece had issued bonds at a high price (above 6%).

²³ HDAT is the main electronic platform for trading Greek bonds on the secondary market.

- ²⁴ See clause 178 in the *Guidelines on the Recognition of External Credit Assessment Institutions* (Committee of European Banking Supervisors 2006, p. 35).
- ²⁵ Rating-based regulations can take many other forms. First, regulators typically use ratings as prudential thresholds to restrict the amounts of types of investments of financial institutions. Regulators may also employ rating-based formula in designing differential disclosure requirements. In structured finance, regulators may impose rating eligibility conditions on the issuance of complex instruments. Finally, ratings may also serve as the basis for the computation of capital reserve requirements. In private contracts reliance on ratings as “triggers” is also an important development (Carruthers, 2010, p. 160). For an overview, see Bank for International Settlements (2009).
- ²⁶ Later in 2010, Moody’s would issue a five-notch downgrade on Irish sovereign bonds, the most severe downgrade Moody’s has issued up to date.
- ²⁷ The *Wall Street Journal*, “Greece Downgrade Ripples Only Mildly In Markets,” June 14, 2010
- ²⁸ *Toronto Star*, “IMF says not concerned by Moody’s Greece downgrade,” June 15, 2010.
- ²⁹ *Dow Jones Capital Markets Report*, June 14, 2010 (22:31 GMT).
- ³⁰ *Dow Jones Capital Markets Report*, June 14, 2010 (23:03 GMT).
- ³¹ We are cautious to not overstate this finding. Our claim is consistent with our primary data. Evidently, however, no definitive proof or testimony exist that can provide univocal confirmation. Our thanks to a reviewer for this suggestion. Additional research is needed on the nature of the interface between rating practices and regulatory interventions.
- ³² Similar to Keynes, who famously said that present economic political doctrines are often the remnants of some past economist’s economic theory.
- ³³ Far from dissipating, uncertainties actually grew after the bailout, as the result of deteriorating economic situation and its political manifestations culminating in May 2012 with the surge of Golden Dawn and Syriza in legislative elections.
- ³⁴ The Troika loans carry floating interest rates (3-month Euribor) plus a spread of 3 percentage points, rising to 4 percentage points for amounts outstanding beyond three years.
- ³⁵ Both IMF and EC reports and Greek authorities’ letters of intent showed consensus with regards to the roots of the Greek crisis. These documents used similar sentences and paragraphs, further indicating strong consensus between the quadrilateral parties – or rather, the use of “cut and paste” document-

drafting practices, which reflected the lack of preparation (and emergency character) of the whole process of designing a bailout plan for a Eurozone country.

³⁶ Thus, courts usually do not recognise MoUs as contracts in their own right, but recognise their heuristic validity when assessing possible violations of treaties and agreements which MoUs refer to.

³⁷ We also acknowledge that there is no legal adjudication process that makes IMF recommendations binding on a borrower (Gold, 1983, p. 454). The IMF has always been very cautious not to claim that the conditions of its programs constituted legally binding commitments on the borrowing country's government, as evidenced in Joseph Gold's canonical writings (1972; 1979). But poor compliance does not preclude the assumption that the IMF/ECB program is part of a culture of legality.

³⁸ In order to avoid definitional anxiety and conflict of interpretation about the meaning of reporting standards, the TMoU specified eight indicators subject to quantitative targets: A. Floor of the Modified General Government Primary Cash Balance (Performance Criterion); B. Ceiling of State Budget Primary Spending (Performance Criterion); C. Non-accumulation of Domestic Arrears by the General Government (Continuous Indicative Target), D. Ceiling on the Overall Stock of Central Government Debt (Indicative Target); E. Ceiling on New Central Government Guarantees (Performance Criterion); F. Non-accumulation of External Debt Payments Arrears by the General Government (Continuous Performance Criteria); G. Overall Monitoring and Reporting Requirements; H. Monitoring of Structural Benchmarks (see EC, 2010, pp. 86-90).

³⁹ Structural reforms include policies modernising public administration, strengthening labor markets and income politics, improving the business environment and bolstering competitive markets, managing and divesting state enterprises, and improving the absorption of EU structural and cohesion funds (EC, 2010, pp. 48-49).

⁴⁰ The policies listed in the program were to be permanent (and had to be implemented as such) and exclusive (additional measures were forbidden). In particular, the program explicitly restricted Greece's ability to launch policy initiatives by committing Greek authorities to consult lending parties on the adoption of policies that were not specified in the program (EC, 2010, p. 59, 67).

- ⁴¹ These IMF policy documents are “open” documents, i.e. material reflecting doubts, hesitations, improvisations, and occasional contradictions underpinning legal reasoning. As such they offer a key perspective on the messy and highly ambiguous nature of the processes of reality construction that underwrite any calculative endeavor.
- ⁴² The IMF listed five shocks that may impact Greek future financial and economic prospects. First, absent exchange rating flexibility, the great bulk of fiscal effort relies on internal price adjustment, a process deemed “long and painful.” Second, given the scope and magnitude of the program, the adjustment may take time and “fatigue could set in.” Third, given the relative close economy, fiscal multipliers are likely to be high, and contraction deeper than expected, leading to sharp reduction in tax and fiscal revenues. Fourth, the IMF expects external environment to remain weak and the possibility of contagion from abroad through negative spill over from highly indebted neighbouring partners. Finally, the IMF anticipates complications in coordination between with EC in assessing program performance (IMF, 2010, pp.21-24).

Bibliography

- Abbott, K. and Snidal, D., 2001. Hard and Soft Law in International Governance. *International Organization*, 54(3), pp. 421–56.
- Abdelal, R., 2007. *Capital Rules: The Construction of Global Finance*. Harvard, MA: Harvard University Press.
- Bank for International Settlements, 2009. The Joint Forum: Stocktaking on the Use of Credit Ratings. Basel Committee on Banking Supervision, June 2009.
- Bhatia, A. V., 2002. *Sovereign Credit Ratings Methodology: An Evaluation*. Washington, DC: International Monetary Fund.
- Bhuta, N., 2012. Governmentalizing Sovereignty: Indexes of State Fragility and the Calculability of Political Order. In Davis, K., Fisher, A., Kingsbury, B., and Merry, S. E., eds., *Governance by Indicators: Global Power through Classification and Rankings*. Oxford: Oxford University Press, pp. 132-62.

- Borraz, O., and Besançon, J., 2008. Uncertainties in Regulating Food Safety in France. In Vos, E. and Everson, M., eds., *Uncertain Risks Regulated*. New York: Routledge, pp. 49-67.
- Callon, M., 1998. Introduction: The Embeddedness of Economic Markets in Economics. In Callon, M., ed., *The Laws of the Markets*. Oxford: Blackwell, pp. 1-57.
- Callon, M. and Muniesa, F., 2005. Peripheral Vision: Economic Markets as Calculative Collective Devices. *Organization Studies*, 26(8), pp. 1229-50.
- Cantor, R., and Packer, F., 1996. *Determinants and Impacts of Sovereign Credit Ratings*. New York: Federal Reserve Bank of New York.
- Cantor, R., Gwilym, O. A., and Thomas, S., 2007. The Use of Credit Ratings in Investment Management in the US and Europe. *Journal of Fixed Income*, 17(2), pp. 13-26.
- Carruthers, B. G., 2010. Knowledge and Liquidity: Institutional and Cognitive Foundations of the Subprime Crisis. *Research in the Sociology of Organizations*, 30, pp. 157-82.
- Committee of European Banking Supervisors, 2006. Guidelines on the Recognition of External Credit Assessment Institutions. European Banking Authority, 20 January.
- Dalmedico, A., and Guillemot, H., 2008. Climate Change: Scientific Dynamics, Expertise and Geopolitical Challenges. In Mallard, G., Paradeise, C., and Peerbaye, A., eds., *Global Science and National Sovereignty: Studies in Historical Sociology of Science*. New York: Routledge, pp. 195–221
- Davis, K. E., Kingsbury, B., and Merry, S. E., 2012. Indicators as a Technology of Global Governance. *Law & Society Review*, 46(1), pp. 71-104.
- Dezalay, Y. and Garth, B., 2002. *The Internationalization of Palace Wars: Lawyers, Economists, and the Contest to Transform Latin American States*. Chicago, IL: University of Chicago Press.
- DiMaggio, P., 2003. Endogenizing 'Animal Spirits': Toward a Sociology of Collective Response to Uncertainty and Risk. In Guillen, M. et al., eds., *The New Economic Sociology: Developments in an Emerging Field*. New York: Russell Sage Foundation, pp. 79-100.

- Eberl, J., and Weber, C. 2014. ECB Collateral Criteria: A Narrative Database 2001–2013: Ifo Working Paper.
- European Commission, 2010. The Economic Adjustment Programme for Greece. *Occasional Papers*, 61, 26 May.
- European Central Bank, 2010a. Press Conference: Introductory Statement with Q&A. 14 January.
- , 2010b. Press Release: ECB Announces Change in Eligibility of Debt Instruments Issued or Guaranteed by the Greek Government. 3 May.
- , 2012. Press Release: Measures to Preserve Collateral Availability. 6 September.
- Espeland, W. N., and Sauder, M., 2007. Rankings and Reactivity: How Public Measures Recreate Social Worlds. *American Journal of Sociology*, 113(1), pp. 1-40.
- Ferri, G., Liu, L.-G., and Stiglitz, J. E., 1999. The Pro-cyclical Role of Rating Agencies: Evidence from the East Asian crisis. *Economic Notes*. 28(3), pp. 335-55.
- Flandreau, M., Gaillard, N., and Packer, F., 2011. To Err is Human: U.S. Rating Agencies and the Interwar Foreign Government Debt Crisis. *European Review of Economic History*, 15 (3), pp. 495-538.
- Foucault, M., 2009. *Security, Territory, Population: Lectures at the Collège de France, 1977-1978*. Basingstoke: Palgrave Macmillan.
- Gaillard, N., 2012. The Limits of Sovereign Ratings in Light of the Greek Debt Crisis of 2009–2010. In *A Century of Sovereign Ratings*. New York: Springer, pp. 171-87.
- Gieryn, T. F., 1983. Boundary-Work and the Demarcation of Science from Non-Science: Strains and Interests in Professional Interests of Scientists. *American Sociological Review*, 48, pp. 781-95.
- , 1999. *Cultural Boundaries of Science: Credibility on the Line*. Chicago: University of Chicago Press.
- Gold, J., 1972. *Voting and Decisions in the International Monetary Fund: An Essay on the Law and Practice of the Fund*. Washington, DC: IMF.
- , 1979. *Legal and Institutional Aspects of the International Monetary System: Selected Essays*. Washington, DC: IMF.
- , 1983. Strengthening the Soft International Law of Exchange Arrangements. *American Journal of International Law*, 77, pp. 443-89.

- Halliday, T., 2012. Legal Yardsticks: International Financial Institutions as Legal Diagnosticians and Remedial Agents. In Davis, K. E. et al., eds., *Governance by Indicators: Global Power through Classification and Rankings*. Oxford: Oxford University Press, pp. 180-216.
- Holmes, D., 2009. Economy of Words. *Cultural Anthropology*, 24(3), pp. 381–419.
- International Monetary Fund, 2010. Greece: Request for Stand-By Arrangement. *IMF Country Report*, 10/110, pp. 1-79.
- Knight, F., 1921. *Risk, Uncertainty, and Profit*. New York: Houghton Mifflin.
- Knorr-Cetina, K. 2011. Financial Analysis: Epistemic Profile of an Evaluative Science. In Camic, C., Gross, N., and Lamont, M., eds., *Social Knowledge in the Making*. Chicago, IL: University of Chicago Press, pp. 405-441.
- Kruck, A. 2011. *Private Ratings, Public Regulations: Credit Rating Agencies and Global Financial Governance*. Palgrave Macmillan.
- Kuhn, T. 1970. *The Structure of Scientific Revolutions*. Chicago, IL: University of Chicago Press.
- Lepinay, V., 2011. *Codes of Finance: Engineering Derivatives in a Global Bank*. Princeton, NJ: Princeton University Press.
- MacKenzie, D., 2006. *An Engine, Not a Camera: How Financial Models Shape Markets*. Cambridge, MA: MIT Press.
- . 2011. The Credit Crisis as a Problem in the Sociology of Knowledge. *American Journal of Sociology*, 116(6), pp. 1778-841.
- MacKenzie, D., Muniesa, F. and Siu, L., 2007. Introduction. In MacKenzie, D., Muniesa, F., and Siu, L., eds., *Do Economists Make Markets? On The Performativity of Economics*. Princeton, NJ: Princeton University Press, pp. 1-19.
- Mallard, G., and Lakoff, A., 2011. How Claims to Know the Future Are Used to Understand the Present. In Camic, C., Gross, N., and Lamont, M., eds., *Social Knowledge in the Making*. Chicago, IL: University of Chicago Press, pp. 339-77.
- Mallard, G. and Pénet, P., 2013. Seeing Like a Credit Rating Agency: The Constitution of Financial Uncertainties During the Greek Sovereign Debt Crisis. In Hawthorne, C., ed., *Financial Crises: Identification,*

- Forecasting and Effects on Transition Economies*. New York: Nova Publishers, pp. 164-74.
- Millo, Y. and MacKenzie, D., 2009. The Usefulness of Inaccurate Models: Towards an Understanding of the Emergence of Financial Risk Management. *Accounting, Organizations and Society*, 34(5), pp. 638-53.
- Mitchell, T., 2007. The Properties of Markets. In MacKenzie, D., Muniesa, F., and Siu, L., eds., *Do Economists Make Markets? On The Performativity of Economics*. Princeton, NJ: Princeton University Press, pp. 244-75.
- Moody's. 2008. Greece's political unrest exposes constraints reflected in A1 rating. Announcement: Moody's Investors Service.
- , 2009a. Moody's changes the outlook for Greece's A1 rating to stable. Rating Action: Moody's Investors Service.
- , 2009b. Moody's places Greece's ratings on review for possible downgrade. Rating Action: Moody's Investors Service.
- , 2009c. Moody's: Investor Fears Over Greek Government Liquidity Misplaced. Announcement: Moody's Investors Service.
- , 2009d. Moody's downgrades Greece to A2 from A1. Rating Action: Moody's Investors Service.
- Muniesa, F. and Callon, M., 2007. Economic Experiments and the Construction of Markets. In MacKenzie, D., Muniesa, F., and Siu, L., eds., *Do Economists Make Markets? On The Performativity of Economics*. Princeton, NJ: Princeton University Press, pp. 163-89.
- Nelson, S. and Katzenstein, P. J., 2014. Uncertainty, Risk, and the Financial Crisis of 2008. *International Organization*, forthcoming.
- Partnoy, F., 1999. The Siskel and Ebert of Financial Markets: Two Thumbs Down for the Credit Rating Agencies. *Washington University Law Quarterly*, 77(3), pp. 619-714.
- Perrow, C., 1984. *Normal Accidents: Living with High-Risk Systems*. New York: Basic Books.
- Reinhart, C. M., 2002. Default, Currency Crises, and Sovereign Credit Ratings. *World Bank Economic Review*, 16(2), pp. 151-170.

- Reinhart, C. M. and Rogoff, K. S., 2009. *This Time is Different: Eight Centuries of Financial Folly*. Princeton, NJ: Princeton University Press.
- Riles, A., 2010. Collateral Expertise: Legal Knowledge in the Global Financial Markets. *Current Anthropology*, 51(6), pp. 795-818.
- , 2011. *Collateral Knowledge: Legal Reasoning in the Global Financial Markets*. Chicago, IL: University of Chicago Press.
- Rona-Tas, A. and Hiss, H., 2011. Forecast as Valuation: The Role of Ratings and Predictions in the Subprime Mortgage Crisis in the US. In Becker, J. and Aspers, P., eds., *Worth of Goods: Valuation and Pricing in the Economy*. Princeton, NJ: Princeton University Press, pp. 223-46.
- Sinclair, T. J., 2005. *The New Masters of Capital: American Bond Rating Agencies and The Politics of Creditworthiness*. Ithaca, NY: Cornell University Press.
- Vaughan, D., 1996. *The Challenger Launch decision: Risky Technology, Culture, and Deviance at NASA*. Chicago, IL: University of Chicago Press.

Acknowledgments

The authors would like to acknowledge the support of a McArthur Fellowship generously provided by Northwestern University. For comments, they especially thank Bruce Carruthers, Wendy Espeland, Steve Nelson, Ariel Colonomos, and Cornelia Woll, as well as the participants to the conference on 'Regimes of Calculation and Global Governance' held in September 2013 at the Balsillie School of International Affairs in Waterloo, ON, Canada. An advanced version of this article was presented, in 2014, at a seminar at MaxPo/SciencesPo in Paris. The authors are also grateful to seminar participants for their insights.

Pierre Pénet is a Sociology PhD candidate at Northwestern University and SciencesPo Paris and an incoming postdoctoral fellow at the Graduate Institute Geneva. His recent publications focus on the history of credit ratings, the European sovereign debt crisis, and the study of valuation processes in international art markets.

Grégoire Mallard is Associate Professor in the Department of Anthropology and Sociology of Development at the Graduate Institute of International and Development Studies Geneva. He is the author of *Fallout: Nuclear Diplomacy in an Age of Global Fracture* (University of Chicago Press, 2014) and co-editor of *Global Science and National Sovereignty: Studies in Historical Sociology of Science* (Routledge 2008).