

Disruptive technology and regulatory conundrums: The emerging governance of virtual currencies

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Abstract

Regulatory agencies care about their reputation, which helps sustain their authority. As innovation can introduce uncertainty in governance, delaying action or overlooking danger can negatively affect agencies' standing. Aware of these reputation risks, agencies rely on a set of methods to govern the unknown. These methods, we argue, are: (1) categorization, if the innovation is considered identical to known regulatory categories; (2) analogy, if the innovation is considered similar to known categories, and; (3) new categorization, when new classifications are deemed necessary to address the innovation. Each method shapes governance by triggering the application of existing regulations (categorization and analogy), calls for either technical and regulatory fixes (analogy), or calls for broader regulatory undertakings (new categorization). Agencies' choice of methods, we argue, is shaped by concerns over performative reputation (i.e., showing the ability to fulfill core tasks), which in turn is affected by agencies' ability to demonstrate technical rigor (i.e., technical reputation).

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1 | INTRODUCTION

The unpredictable impact of innovation on societies and economies poses challenges for governance and creates uncertainty¹ for how to best address concerns stemming from technological change (Hasselbalch, 2018; Taeihagh, 2021). In the early stages of technology diffusion, regulatory bodies can be the first to be called upon by policymakers and the public to define the problem at hand and shape initial governance (Price, 1998). When approaching new innovation, agencies draw from a variety of methods to address the unknown. They might declare the innovation identical (i.e., categorization), similar (i.e., analogy) or new (i.e., new categorization) vis-à-vis existing regulatory categories (see Cartwright, 2021; Grant, 2016; Maor, 2010; Stokes, 2017). That said, privileging one method over another has consequences for the emerging governance. Categorization and analogy can provide some solutions by using existing governance structures to address the challenges posed by the innovation (see Grant, 2016; Stokes, 2017). However, new categorization suggests the inadequacy of existing frameworks and might legitimize broader regulatory intervention. Our research question is: What explains the choice of methods in responding to innovation? In answering the question, we will reveal the importance of the relationship between conceptual adaptivity and reputation.

There is no shortage of research that explains organizational behavior. However, the literature is often vague in addressing the methods by which changes are selected² According to the knowledge co-production literature, because new regulations are costly, agencies have an incentive to choose analogy (or categorization), which might lead to technical solutions using existing processes (Stokes, 2017). The historical institutionalist literature argues that agencies are able to emphasize their authority by deeming the innovation not dissimilar from existing categories (Maor, 2010). In what situation, however, would agencies suggest the more costly method of developing new regulation, something that the European Banking Authority (EBA) and European Security and Market Authority (ESMA) did regarding Crypto-Assets (CAs)?

We argue that one answer lies in concerns over agencies' reputation. Agencies' survival depends on their ability to defend themselves against reputational threats, which is key to their authority and ability to withstand external attacks (Busuioc & Rimkutė, 2020; Carpenter, 2002, 2010; Rimkutė, 2018). A crucial component to agencies' reputation is performative. Performative reputation stems from an agency's perceived ability to meet outcomes and satisfy key aims (Busuioc & Rimkutė, 2020; Carpenter, 2002, 2010). It follows that agencies are more likely to act in ways that facilitate the fulfillment of key functions to protect their standing. As agencies also derive their legitimacy and (technical) reputation from manifest expertise (Carpenter, 2001, 2010), the choice of a given method must also show technical competence.

Consequently, agencies, in their choice of method, will act to preserve their performative and technical reputation, with reputational concerns being shaped by the conceptual adaptivity of frameworks and regulations. Conceptual adaptivity describes the adaptability of regulatory definitions according to their vagueness, complexity, and evidence. A concern with reputation allows us to explain how agencies confront innovation and why they might differ in their choice of methods. We explore such dynamics by analyzing the case of Virtual Currencies (VCs) and Crypto-Assets (CAs) in the context of the EU, which is characterized by a pronounced regulatory approach to VCs and CAs.

This paper contributes to, first, the emerging scholarship on innovation governance and emerging technologies (Asquer & Krachkovskaya, 2021; Brass & Sowell, 2021; Hasselbalch, 2018; Taeihagh, 2021), knowledge co-production analysis (Stokes, 2017), and historical institutionalism (Cartwright, 2021; Maor, 2010), by bringing under a unified framework the classification

methods agencies have relied upon when approaching novel innovation. The selection of methods contributes to explaining how governance is initially shaped when addressing technological change. Second, we add to the reputational organization literature (Busuioc & Rimkutė, 2020; Carpenter, 2010; Rimkutė, 2020) by exploring how reputational concerns inform the choice of methods agencies rely upon to approach the unknown. Although scholarship has explored the role of reputation in shaping agencies' behavior, the primary focus has been on explaining the predominance of a reputational type vis-à-vis another in communication (Busuioc & Rimkutė, 2020; Rimkutė, 2020) or the overarching outcome stemming from varied reputational concerns (Carpenter, 2010; Maor, 2010; Rimkutė, 2018). We focus instead on how one form of reputation, that is, performative reputation, can be safeguarded given the conceptual adaptivity of rules and frameworks, which is key to technical reputation. In so doing we contribute to our understanding of how bureaucratic rationality works.

The article will proceed as follows. First, we establish the methods agencies and institutions rely on to address the unknown. Second, we discuss how reputation informs agencies and institutions' choice of methods. Third, as part of our case studies into the European Central Bank (ECB), the EBA and the ESMA in the context of VCs and later CAs, we provide a content analysis of their key reports presenting an overview of which methods agencies use the most. Fourth, we continue our case studies by looking at how agencies address challenges posed by VCs and CAs.³ Fifth, we clarify how concerns about reputation help inform the choice of methods and governance outputs.

2 | ANALOGY, CATEGORIZATION, AND NEW CATEGORIZATION

As the features of the unknown are unclear, analogical reasoning might be especially relevant when uncertainty, triggered by technological change, exists. Governance literature has examined the role of “reasoning by analogy” (Dörfler & Gehring, 2021; Schwarz-Plaschg, 2018, p. 139) in relation to problems of bounded rationality (Figueira & Martill, 2021), which points to the human limits on interpreting available information (Jones, 1999; Simon, 1995). More generally, analogical arguments appear as a valuable heuristic tool to make sense of complex realities (Schwarz-Plaschg, 2018). Such arguments have, for instance, been utilized to navigate fuzzy foreign policy situations (Houghton, 2001), and collective decision-making problems where multiple equilibria coexist (Dörfler & Gehring, 2021). The outcomes of analogical reasoning can lead institutional bodies to acknowledge the similarity and dissimilarity with existing categories (Mertes & Pennings, 2011) justifying the choice of one method vis-à-vis another.

The three methods agencies use include categorization, analogy, and new categorization as tools to address technological novelty. Scholarship engaged with technological change has primarily discussed analogy and, to a lesser extent categorization (see Stokes, 2017; Grant, 2016). However, this literature ends up downplaying the relevance of another method, new categorization, and thus provides a partial picture of how agencies function when confronted with innovation.

In the method of categorization, agencies declare the innovation a good fit vis-à-vis existing regulatory categories. No significant dissimilarities are detected. An agency considers the phenomenon as belonging to a given category of knowns and claims jurisdictional authority allowing for the application of existing frameworks (see Grant, 2016). For instance, when considering food produced using new technologies (e.g., UV-treated food), EU frameworks provided criteria for its classification as ‘Novel Food’ (i.e., categorization) from which the application of existing control measures follow (see EFSA, 2016).

Analogy is often defined as the default method to deal with technological change (Stokes, 2017). Through analogical reasoning people “learn about a new situation (the target analog) by relating it to a more familiar situation (the source analog) that can be viewed as structurally parallel” (Holyoak & Thagard, 1997 in Shapiro & Stone Sweet, 2002, p. 122). With the method of analogy, agencies will deem the innovation similar to existing categories thereby legitimizing the application of rules and frameworks already in place. The method can be linked to the act of what Shannon et al. (2019) calls “satisficing”, which is, “choosing an alternative that is satisfactory, but not optimal” (Shannon et al., 2019, p. 8). In the case of analogy, some overlap is deemed to exist with the target category, but it is incomplete preparing the ground for further intervention. Analogy lends itself to “recombinant regulation,” that is the application of existing regulatory frameworks to simile-like realities (Stokes, 2017, p. 9). But because similarity does not equate sameness, it legitimizes the proliferation of “technical fixes” (Stokes, 2017, p. 76). However, the degree of analogy might lead to different policy responses (Dörfler & Gehring, 2021). It follows, we argue, that cases of a less pronounced similarity might bring agencies to suggest regulatory fixes triggering modification(s) of existing regulation.

When agencies and institutions do not deem existing categories relevant and the solutions provided by analogy or categorization are considered unsatisfactory, organizations can engage in new forms of categorization, which involves the construction of a new category. This method can be a response to unsatisfactory outcomes stemming from applying existing regulations thus spurring regulatory innovation. This method is turned to when there is no satisfactory source analog with which the innovation can successfully be compared, making the other methods unsuitable.

New categorization is tricky, however. Constructing a new category might imply both admitting a lack of regulatory authority and the presence of a regulatory void. The innovation is considered dissimilar from existing categories justifying the appropriateness of new regulation (Stokes, 2016). New regulation is costly to implement as it implies problems of coordination and persuasion between different actors with competence over the innovation (Stokes, 2017). It is also more costly than regulatory fixes as the breadth of the new regulatory undertaking is broader in scope increasing problems of coordination. That said, despite the potentially high cost of new categories and new regulations, EU agencies keep highlighting the limits of existing regulatory categories, suggesting new frameworks or regulations, as the case of payment instruments, schemes, and arrangements (PISA) demonstrates (ICA-TF, 2020).⁴

The costs involved in new categorization, the limits of analogy, and the potential unsuitability of applying existing categories leads us to investigate the factors that inform which method is selected over another. Central to the decision, we argue, is institutional reputation, and in particular the interplay between performative and technical reputation.

3 | REPUTATIONAL CONCERNS

Reputation is central to agencies being able to successfully cultivate public support, safeguard their autonomy from political actors (including the principal) and offers some protection from politically motivated attacks (Busuioc & Rimkutė, 2020; Carpenter, 2002, 2010). Narratives around reputation establish how agencies are prepared to act in the face of innovation, with reputation often depending on whether or not the agency has the legitimacy to respond to the innovation. In this regard, the question of legitimacy functions as a causal story that supports an agency's reputation. Legitimacy is a moving target of “moving interpretations” (Stone, 1989, p. 284) that help to identify whether an agency should act when confronted with innovation. The role of reputation is key to how regulatory bodies select different methods.

A rationalist-legalist approach would, however, point instead to the flexibility of existing rules, guidelines, and regulation (Koremenos et al., 2001) to explain variation in the application of rules to innovation. Yet, the ability to be successfully flexible can depend on the reputation of the agency. Without ensuring technical reputation, it is harder for a regulatory agency to legitimately defend an interpretation between alternative options. In short, “[T]echnical expertise” can be used “as an effective legitimizing device” (Fjørtoft, 2022, p. 558).

Alternatively, a Principal Agent (PA) perspective (see Pollack, 1997) would emphasize the pursuit of power for why agencies take flexible approaches to addressing innovation. Agencies can use flexibility to claim the innovation is no different from existing categories and increase their slack vis-à-vis the principal. This strategy would allow agencies, according to historical institutionalist accounts, to acquire competence over new technology (Maor, 2010), and therefore, increase their power vis-à-vis other organizations. New information can also explain a new jurisdictional claim (Maor, 2010), further expanding an agency's power by extending its reach. However, agencies may also reject jurisdictional claims (Maor, 2010), as the ECB partially did in the case of VCs. Rejection might happen because agencies do not want to risk their reputation by taking on responsibilities for matters that are beyond their purview. Relatedly, institutional capacity may inform agencies' reticence in asserting jurisdictional authority (Wilson, 1989) which brings us back to a concern about reputation (see Maor, 2010).

Salience of competing frames might clarify why some classifications gain or lose relevance (Hasselbalch, 2016; Vollmer, 2013) or why new categories are required. Salience matters. But what happens if salience is not relevant because the public is not paying attention or stakeholders' opinions have not yet been formed? Even in such cases, salience does not overcome concerns around reputation. The identification of an issue being salient for a particular agency refers back to the legitimacy of that agency being appropriate for the specific issue.

Exploring organizational reputation is fundamental in analyzing the challenges posed by innovation. As amply demonstrated by organizational reputational literature (Busuioc & Rimkutė, 2020; Carpenter, 2010; Carpenter & Krause, 2012; Rimkutė, 2020), reputation allows agencies to ensure broader legitimacy and authority, which in turn facilitates the implementation of decisions and the ability to influence emerging governance. Regulatory bodies undoubtedly derive their legitimacy from their ability to fulfill core tasks (Majone, 1996; Weiler, 2012). Being seen as unable to do so would compromise agencies' reputation and, as a result, their capacity to assert their authority and ensure compliance (Carpenter, 2010). Consequently, performative reputation, which pertains to an agency's ability to demonstrate efficiency and effectiveness, remains a key concern for regulatory bodies (Rimkutė, 2020).

There are multiple reasons affecting how agencies and institutions perceive threats to their performative reputation. Changing perceptions on the appropriateness of methods or policies might be linked to scandals (Campbell-Verduyn & Hütten, 2019), changes in the size of the market (ECB, 2015), political conflict (Porter, 2003), salience and framing (Hasselbalch, 2016), new information (Maor, 2010), focusing events (Busby, 2010), and bureaucratic cultures (Lütz et al., 2019). All these dynamics inform how agencies and institutions perceive their ability to satisfy key aims, which in turn affects the choice of methods to best approach innovation.

Second, innovation can pose challenges to the technical reputation of an agency or institution, which stems from technical expertise and knowledge (Carpenter, 2010; Carpenter & Krause, 2012). Technical reputation is key in the EU, which relies heavily on expertise (Busuioc & Rimkutė, 2020). Technical reputation constitutes “the means through which EU agencies deliver outcomes (e.g., protect us from risk or prevent crises) crucial to their superior capacity” (Carpenter, 2010 in Rimkutė, 2020, p. 386).⁵ Even in their communication, agencies prioritize

performative and technical reputation over other reputational concerns (Rimkutė, 2020). In short, the unknown that accompanies innovation can be threatening to performative reputation and agency's expertise in that area.

Deviating from rules and regulations might affect technical reputation and how other institutional entities perceive the agencies and their standing. Conceptual adaptivity pertains to matters of interpretation and to the "discursive ambiguity" of rules as "words and phrases can have more than one meaning" (Best, 2012a, p. 677). Any "definitional vagueness" (see Black, 1937, p. 430; Maor, 2010) might lead to high conceptual adaptivity. However, the degree of conceptual adaptivity, which depends on both the ambiguity of the texts and the ideational environment in which they are placed, can mitigate any reputational threats by providing flexibility. Such flexibility also contributes to the choice of methods.

Conceptual adaptivity can increase agencies' room to maneuver as interpretations will be less clearly constrained. Instead, low conceptual adaptivity is more likely to constrain agencies' choices. Low adaptivity may be tied to complex definitions (i.e., the fulfillment of numerous criteria) or nested definitions (i.e., placement into a category is dependent on being classified into another first).⁶ For instance, according to the EBA (2019) assets could qualify as e-money only if they fulfill each of the criteria (i.e., complex definition) listed in the Second Electronic Money Directive. However, CAs could not be deemed "funds", according to the Payment Service Directive, "unless they qualified as electronic money for the purposes of the EMD2" (EBA, 2019, p. 14) (i.e., nested definition). Low adaptivity could, however, highlight the necessity to take further, and possibly new action given the unsuitability of existing rules and frameworks, should the low adaptivity stem from new evidence suggesting the inappropriateness of existing definitions.⁷

Agencies' reputation is also informed by how they interpret innovation. In this regard, agencies rely on norms and principles to support their interpretation of innovation. Recalling widely accepted norms and key principles can provide legitimacy. Doing so highlights the significance of the concept of moral economy, which reflects the "hegemony of a particular set of moralities at any one point in time" (Campbell-Verduyn & Hütten, 2019, p. 129). The concept of moral economy can explain increased concerns or new considerations in particular moments in time. For example, the 2008 financial crisis brought new attention to questions of fairness and responsibility in finance (Campbell-Verduyn & Hütten, 2019). Within the context of interpretability and conceptual adaptivity, moral economy contributes to legitimize interpretations, especially when vagueness exists. Recalling principles widely accepted in the polity would allow agencies to further justify its interpretation and shield itself from external attacks.

In addressing performative concerns, agencies must maintain technical rigor. Technical rigor, in turn, is affected by conceptual adaptivity. Consequently, we offer the following descriptive argument: high conceptual adaptivity grants agencies more room to maneuver in adapting existing rules and frameworks, whereas low conceptual adaptivity is more likely to legitimize recourse to new categorization given the presence of more fixed classifications.

4 | THE EUROPEAN CENTRAL BANK, EUROPEAN SECURITY AND MARKET AUTHORITY AND EUROPEAN BANKING AUTHORITY

The ECB, EBA and ESMA have been particularly involved in the emerging governance of VCs. The innovation posed by VCs showed the potential to challenge their core functions. The birth of what was originally greeted as 'private money' (i.e., VCs) caught the ECB's attention. VCs raised concerns over the ECB's ability to carry out effective monetary policy. VCs could, for instance, have "an impact

TABLE 1 Content analysis.

File	Analogy Reference	Categorization	New categorization
EBA (2014)	1	-	3
EBA (2016)	-	-	1
EBA (2019)	1	3	3
EBA Total	2	3	7
ECB (2012)	10	1	-
ECB (2015)	4	-	2
ECB -TF (2019)	3	2	5
ECB -TF (2020)	6	4	2
ECB Total	23	7	9
ESMA (2019)	13	7	2
Total	38	17	18

Abbreviation: ESMA, European Security and Market Authority.

on price stability and monetary policy if they affect the demand of central bank's liabilities and interfere in the control of the supply of money" (ECB, 2012, p. 33). Meanwhile, the EBA was preoccupied with how VCs could impact financial integrity as the agency remains primarily concerned with the "safety and soundness of markets and convergence of regulatory practice" (2014, p.5). ESMA's attention (2019) centered around the impact that VCs might have on the level playing field and the stability of the EU's financial system, which the agency is also tasked with safeguarding. The EBA and ESMA act on a double level. First, both agencies can make recommendations to the Commission suggesting the appropriateness of regulatory intervention. Second, they ensure supervision of key entities such as credit rating agencies (ESMA) or across the European banking sector (EBA).

All three bodies, the ECB, EBA and ESMA, saw reputational concerns increase. The ECB was concerned with a potential for the public to perceive it as responsible in case of VCs-led disruptions which could risk its reputation (ECB, 2012). In the case of the ESMA and the EBA, reputational risk was also related to increased exposure. Both agencies had launched public warnings on VCs since 2013. This press exposure resulted in them being publicly recognized as key actors involved in the handling of VCs and CAs. Furthermore, EU parliamentary questions, which some literature has used as an indicator of increased reputational threats (Rimkutė, 2020), show how the ECB, EBA and ESMA faced increased scrutiny. The three bodies were the most cited EU agencies (in addition to Europol) in the European Parliament's questions on VCs and CAs in the 2009–2014 term (see European Parliament, 2022).⁸

Table 1 illustrates to what extent the EBA, ECB (including the ECB task force on Crypto-Assets), and ESMA, applied the methods of categorization, analogy and new categorization to classify the innovation posed by VCs and CAs. The table provides a count of how many times the agencies referred to a specific method in their relevant reports.⁹ The analysis covers eight reports published between 2012 and 2020 by all three bodies, and was carried out using NVivo software. The limited number of reports constitutes a limitation to the analysis. Nevertheless, the detailed information in the reports offers a valuable source of information on the choice of methods by the relevant governing bodies.¹⁰

Our content analysis reveals that the proportion of analogy and categorization vis-à-vis new categorization (expressed as word counts) is significantly greater in both the ECB and ESMA,

which is consistent with what the literature suggests.¹¹ The EBA, however, is an exception. With the EBA, new categorization is greater.¹² These outcomes remain unchanged when considering the number of references within the text (see Table 1). While this count is crude, it does suggest some differences in the selection of methods used. Our thesis is that performative reputation and technical reputation help explain the choice of methods.

5 | VIRTUAL CURRENCIES AND CRYPTO-ASSETS

5.1 | The European Central Bank

To navigate reputational concerns, the ECB mostly relied on methods of analogy and categorization to address problems stemming from VCs. Concerns triggered by stablecoins were instead primarily solved through new categorization.

By its own admission, the ECB's ability to fulfill its core functions depends on public perception: “[s]ince central banks are the institutions to which people look in order to establish how much trust to place in money, they are very much concerned about their reputation” (ECB, 2012, p. 45). This “reputation uniqueness” (Carpenter, 2001, p. 5 in Maor & Sulitzeanu-Kenan, 2013), “refers to the demonstration by agencies that they can create solutions (e.g., expertise, efficiency) and provide services (e.g., moral protection) found nowhere else in the polity” (Maor & Sulitzeanu-Kenan, 2013, p. 35). According to the central bank, VCs “are able to have a reputational impact” because “[t]hey are about money and about payments and therefore, for the general public, they clearly fall under the responsibility of central banks, even though this might not be the case from a statutory and legal point of view” (ECB, 2012, p. 45). A narrative portraying VCs as real money might legitimize a set of expectations on the ECB's behavior in case of disruption, which the central bank might not be tasked to perform. These concerns informed the ECB's approach to VCs and evolved over time.

In its first report on the subject in 2012, the ECB discussed the “moneyness” of VCs by bringing into the conversation the General Theory of Money (GTM). In so doing, the ECB appeared to portray an analogy between VCs and money. According to the theory, ‘real’ money should be, first, a medium of exchange that is used as an intermediary. Second, money is a unit of account that should permit the measuring of the value of goods and services. Third, money needs to act as a store of value that can be saved and later retrieved. The ECB (2012) highlighted how VCs present some of the key features attributed to money (i.e., medium of exchange and unit of account) albeit with some limitations on the extent of its use. VCs were discursively labeled as “unregulated, digital money [...] used and accepted within a specific virtual community” (ECB, 2012, p. 5). The character of VCs as a form of money was originally confined to membership of a shared cyberspace. The ECB labeled VCs as money only within a virtual community “where individuals interact and share common goals” (2012, p.11). However, the GTM (or at least some aspects of it) has been interpreted inconsistently in relation to VCs (see Hazlett & Luther, 2020) showing some degree of conceptual adaptivity. Unsurprisingly, then, the ECB's approach in 2012 was short-lived.

Any reference to the moneyness of VCs was removed from the new definition in the 2015 ECB report. From that point forward VCs could not be considered “a full form of money as defined in the economic literature” (ECB, 2015, p. 4). The ECB defended this change by appealing to new evidence, which, as stated by the central bank, justified a re-examination of earlier findings. The central bank highlighted the distinctness of VC, rather than its function as money. It was the persistent fluctuation in value, according to Yves Mersch, 2018, member of the executive board of the ECB, that also rendered the “label ‘currency’ a misnomer” (2018, p.3).

With the increasing diffusion of VCs since 2012 risks stemming from a growth in use and diversification were amplified. In constructing a new definition for VCs, the ECB (2015, p.25) concluded that “it should no longer contain the word “money”, rather VCs should be classified as “a digital representation of value”. Rejecting any moneyness in the definition of VCs also allowed the ECB to further distinguish VCs from fiat money. Sustaining the analogy between VCs and money might have generated erroneous expectations about VCs and also the functions to be performed by the ECB, potentially affecting an understanding of their performative reputation.

While similarities with the money category were progressively set aside, discourse increasingly focused on payment systems and the method of analogy. According to the ECB, VC schemes “work much like retail payment system” (2012, p.17) and manifest “payment system-like characteristics” (2015, p.27). Although payment systems and VCs share some commonalities (e.g., operational and credit risks), traditional payment systems do not involve financial intermediaries in their payment structure (ECB, 2012). Although incomplete, the overlap with payment systems allowed the ECB to argue (2012, p.6) that VCs “fall within central banks’ responsibility as a result of characteristics shared with payment systems.” By asserting its competence through analogy, the ECB seemed to legitimize actions directed to ensure performative reputation. Payment system stability is listed as one of the primary interests of the ECB (ECB, 2012). However, analogy implies incomplete identification. Dissimilarities with traditional payment systems combined with subdued concerns over payment system stability led to light touch approaches. More specifically, the lack of systemic risk, as assessed by the ECB, seemed to exclude the appropriateness of broader intervention and privileged recourse to monitoring (ECB, 2012, 2015).

The ECB task force on CAs (i.e., Crypto-Assets Task Force) (ICA-TF), which was established in 2018 with the aim of assessing the innovation, labeled CAs as “a new type of asset[s] recorded in digital form that [...] does not represent either a financial claim on, or a financial liability of, any natural or legal person [...]” (2019, p.3). Despite recourse to new categorization, solutions ranged from proposing new regulations to technical fixes. Interpretations varied because of the intensity and type of the threat. For instance, fears over emerging national initiatives and the resulting “regulatory arbitrage” (ICA-TF, 2019, p. 4) seemed to drive most concerns. The task force considered a “broad approach to regulation” as a better suited solution to protect the “resilience of the financial system to crypto-asset market-based shocks” potentially threatened by diverging national regulatory initiatives (ICA-TF, 2019, p. 4). Instead, when examining the impact of CAs on the financial market infrastructures (FMIs), risks were considered not pervasive. The task force suggested monitoring (i.e., technical fixes) and provided a list of possible solutions if significant risks were to manifest (e.g., revising FMI participation requirements) (ICA-TF, 2019). In short, new categorization led to calls either for new regulations or future adjustments depending on the severity of the threat perceived.

In 2019, the launch of Libra, Facebook’s stablecoin increased concerns for performative reputation. Stablecoins showed the potential to more seriously threaten the provision of public goods which the ECB is entrusted to safeguard.¹³ According to Fabio Panetta (2020), member of the Executive Board of the ECB, “[a] large take-up of stablecoins could replace sovereign money—a public good offered for centuries by the State to its citizens—with a “club good”, whereby payment services are offered to a select group of people in exchange for platform membership and personal data”.

The ECB’s task force, in addressing the innovation, seemed to oscillate between new categorization and analogy to address possible reputational concerns. The task force acknowledged how stablecoins could pose risks to payment system stability and examined the innovation against the definition of payment systems and payment schemes (see ICA-TF, 2020). As payment system stability constitutes one of the core competences of the ECB (2015), concerns over the impact of stablecoins required addressing.

The analogy with payment systems, and the consequent extension of ECB oversight, was made possible due to the broad definition of payment systems in the Systemically Important Payment Systems (SIPS) regulation. In the SIPS regulation, payment systems are described as “a formal arrangement between three or more participants with common rules and standardized arrangements for the execution of transfer orders between the participants” (ICA-TF, 2020, p. 9). Even the ECB task force acknowledged that “transfer order and participants are defined in broad terms” and argued how “[t]he Eurosystem’s oversight framework will cover stablecoin arrangements that qualify as payment systems, regardless of the technology used and organisational setup” (2020, pp.9–31). However, the task force maintained an emphasis on the necessity to monitor any further developments and suggested how “further guidance regarding the interpretation of current requirements” might be necessary (ICA-TF, 2020, p. 25).

The applicability of the framework was not only legitimized by the vagueness of the SIPS definition, but also because of the so-called neutrality principle, which refers to “the [required] ability of legal mechanisms to comprehend changes independently of specific technologies” (Matulionyte, 2017, p. 265). Connecting technical solutions to existing principles and norms might further allow the agency to shield itself from attacks to its technical reputation when vagueness in definitions exists.

While the classification of stablecoins within SIPS was possible due to conceptual adaptivity of the SIPS text, the classification of stablecoins as payment schemes (i.e., set of standardized rules for the transfer of funds) was more problematic. The ICA-TF argued, “stablecoin arrangements also incorporate a function to provide end users with a means of payment similar to payment schemes” (2020, p.24). However, nested definitions impeded any analogy.

Payment schemes are concerned with payment instruments. However, most stablecoins could not be classified as payment instruments. This problem was then addressed in PISA, a new framework adopted by the ECB and the Eurosystem. PISA aimed at extending the supervisory powers of the Eurosystem “to any electronic payment [...] irrespective of the qualification of the asset as funds under the PSD2” (ICA-TF, 2020, p. 9). The new definition in PISA labeled payment instruments as concerning devices or procedures necessary to initiate a transfer of value, extending the reach of the new framework to digital tokens. The definition of a payment scheme came also to include reference to transfer of value. In short, PISA extended and re-structured the principles that governance bodies of payment schemes were required to follow. Fabio Panetta, member of the ECB executive board, in commenting on PISA, argued that the rapid technological innovation in the “payments ecosystem” required “a forward-looking approach in overseeing digital payment solutions”, which was necessary to ensure the soundness of payment systems (ECB, 2021) for which the ECB bears responsibility.

A difference in conceptual adaptivity seemed to shape the discourse on stablecoins and payment systems on the one hand, and stablecoins and payment instruments on the other. In the former case, the vagueness of the definition enabled the reliance on existing frameworks. In the latter case, a new definition of payment instruments and schemes was necessary given the low adaptivity of definitions.

5.2 | The EU agencies: The European Banking Authority and the European Security and Market Authority

The EBA relied on categorization, analogy, and new categorization to shape the early governance of VCs. The EBA, in addressing VCs, emphasized possible “reputational risks [for regulatory authorities] [...] if the analysis of the risks and the identification of the regulatory response have

been incomplete [...] or if the regulatory measures chosen were not suitable to mitigate the risks” (2014, p.36). Also, risks to VCs were also primarily constructed in terms of terrorist financing (TF) and money laundering (ML) (see European Parliament, 2016), which are also under the EBA mandate.

The EBA proposed a novel definition of VCs as “a digital representation of value that is neither issued by a central bank nor a public authority” (2014, p.5). According to the agency the innovation did not present key features akin to currency: significant liquidity, convertibility with other currencies, or broad acceptance (EBA, 2014). VCs satisfied functions attributed to money according to the GTM only to a limited extent (EBA, 2014). Instead, the EBA seemed to recognize the uniqueness and novelty of the innovation and expressed support for a “substantial body of regulation” (2014, p.5) to address risks. The distinctive features of the innovation were considered to amplify exposure to TF and ML risks, which were deemed high by the EBA and were recognized as key challenges from the start (see EBA, 2014). Such considerations might also explain why recourse to new categorization was higher for the EBA (see Table 1).

The EBA (2019, p.22) also responded to concerns pertaining the “financial soundness” of payment and credit institutions through categorization. Since most CAs could not qualify as financial services, such assets could be labeled as “other business activities” and “activities other than payment services” (EBA, 2019, p. 24). This categorization could be used by competent authorities to extend their supervisory powers (i.e., recombinant regulation) over credit or payment institutions to reduce the “operational” and “reputational risks” stemming from CAs (EBA, 2019, p. 24). Reliance on categorization was also enabled by lower performative reputational concerns. Existing frameworks were thought to provide “robust supervisory powers” able to mitigate risks concerning “institutions’ other business activities, including crypto-asset activity” (EBA, 2019, p. 24).¹⁴

The debate around VCs moved progressively away from moneyiness and increasingly toward fraud, regulatory arbitrage, and investor protection. ESMA become another key interlocutor in the emerging governance of CAs. Their approach focused on analogy and new categorization.

ESMA’s concerns centered around the possible classification of CAs as financial instruments, which would make the assets subject to the Markets in Financial Instruments Directive among other EU regulations. ESMA, for instance, argued that “[i]f the crypto-assets are considered akin to equity securities, then a similar logic of using information requirements set out in the equity securities note would apply” (2019, p.23). Reference to “akin” suggests that the overlap was conceived as present but incomplete. The conversation around CAs seemed to recognize similarities between CAs and financial instruments pointing to analogy.

However, two key concerns became apparent. First, the national transposition of EU regulation on financial services had generated discrepancies in its application between member states giving rise to regulatory arbitrage on CAs. Consequently, these variations posed a risk, although limited, to the level playing field. This outcome represented a concern for ESMA, which is tasked with avoiding inconsistent interpretation of EU rules and ensuring supervisory convergence. Second, while analogy seemed to dominate in ESMA’s discourse (2019), the extent of the overlap with known classifications, and consequently the type of fixes, varied. More generally, complex provisions and new underlying technology risks highlighted constraints on conceptual adaptivity. To address challenges, the agency suggested governance solutions on a case-by-case basis (e.g., technical changes to requirements, new technical standards, regulatory revisions, etc.). The more pronounced the dissimilarities with existing categories were, the more ESMA’s solutions leaned toward regulatory fixes while still maintaining the general applicability of existing regulatory frameworks.

Instead, for those CAs that were not classifiable as financial services or akin to other categories, the focus was on new categorization and new, broader regulatory undertakings. The ESMA suggested a bespoke EU regime as “the most appropriate course of action” vis-à-vis the “do nothing option” (2019, p.41). In this case we are confronted with more pronounced concerns over regulatory arbitrage. The emerging national approaches represented a significant concern for the level playing field because the national initiatives were not part of a defined EU framework.

The EBA echoed some of these reflections. Concerns for the level playing field due to the emergence of diverging national regulations prompted the EBA to suggest a Cost-Benefit Analysis (CBA) to be carried out by the Commission to evaluate the merits of a harmonized regulation, which the EBA supported.¹⁵

When no existing categories seemed appropriate to address risks stemming from VCs regarding market integrity, the EBA emphasized new categorization and new regulation. ESMA employed new categorization when reliance on the more complex legal categories of financial instruments did not seem fitting and concerns for the level playing field were more acute.

6 | CONCEPTUAL ADAPTIVITY AND REPUTATION

Reference to conceptual adaptivity enables us to make some brief comments about why similar risks to performative reputation were dealt with by different methods, and why similar methods might lead to different governance solutions. While the focus on a single case study (VCs and CAs) and a limited number of reports (eight) warrants caution in generalizing findings, the analysis nevertheless suggests a descriptive argument identifying a tentative pattern in agencies' behavior, which can be further tested in subsequent research.

Our analysis suggests that when reputational concerns are low, and conceptual adaptivity is also low, new categorization is the possible outcome (Table 2, row 1). In such cases, agencies are, however, unlikely to suggest much if any (pervasive) action. Agencies might discuss future solutions to address potential new risks. The ECB task force's stance regarding CAs and FMIs illustrate such dynamics. Instead, when reputational concerns are low, but conceptual adaptivity is high, agencies opt for either analogy or categorization (Table 2, row 2). Both choices present lower implementation costs vis-à-vis new, bespoke regulation. The key difference between opting for analogy or categorization is also that in the former case we can expect more ambiguity. Analogy might soon lead to increasing demands for further regulatory and technical adjustments. The interaction between reputational concerns and conceptual adaptivity as outlined in row 2 allows us to clarify how the ECB, in managing its concerns for performative reputation, embraced some analogy between VCs and payment systems.

If reputational concerns are medium or high (Table 2, row 3), and conceptual adaptivity is low, new categorization is more likely, as the EBA's approach toward VCs shows. The agency appeared mostly concerned with address problems pertaining TF and ML, for which risk exposure was high. Suggesting new regulation was the answer.

When reputational concerns are medium or high and the conceptual adaptivity is generally medium-high, analogy or categorization is likely (Table 2, row 4). Technical fixes (e.g., re-interpretation of existing discretionary rules, increased surveillance, etc.) or regulatory fixes (i.e., modifications to regulation) might follow. In such scenario, oversight or adjustments tend to be more pronounced than in cases where low reputational risks exist (Table 2, row 2).

It is worth acknowledging that the type of adjustment (e.g., regulatory or technical) might also depend, in the presence of similar reputational concerns (e.g., Table 2, row 4), on the features

TABLE 2 Case studies.

Reputational concerns (performative)	Conceptual adaptivity	Method	Governance output	ECB (including the CAs task force)	EBA	ESMA
1 Low	Low	New categorization	Technical fixes	CAs, a new type of asset not representing a financial claim or a financial liability (CAs and FMIs)		
2 Low	Medium/High	Analogy or categorization	Technical fixes/recombinant regulation	Analogy between VCs and payment systems	Categorization of CAs as “other business activities”	
3 Medium/High	Low	New categorization	New frameworks (proposed or adopted)	Stablecoins and payment instruments	VCS, which are not money	CAs, which are not financial services
4 Medium/High	Medium/High	Analogy or categorization	Regulatory fixes/technical fixes/recombinant regulation	Analogy between stablecoins and SIPS		Analogy between CAs and financial instruments

Abbreviation: CAs, Crypto-Assets.

Source: Authors' elaboration based on Stokes (2016, 2017); Cartwright (2021); Maor (2010), Best (2012a, b).

of the source analog and the deriving conceptual adaptivity. For instance, the vagueness of the definition for payment systems allowed for simpler adjustments in the case of stablecoins. A less pronounced conceptual adaptivity due to nested definitions or dubious applications of rules, although still allowing for analogy, can justify demands for regulatory fixes. This was evident in the case of ESMA and CAs when the analogy concerned financial services.¹⁶

7 | CONCLUSION

Scholarship on innovation governance and emerging technologies has focused, for instance, on regulatory responses either emphasizing concerns over regulatory performance (Asquer & Krachkovskaya, 2021) or without fully acknowledging the role of reputation in governance (Brass & Sowell, 2021; Taeihagh, 2021), which is a lacuna that we also found in the co-production literature (Stokes, 2017). We attempted to shed light onto bureaucratic behavior by exploring how reputational considerations might affect the choice of methods and, consequently, governance solutions. In discussing early approaches to VCs, we investigated the methods and motivations beyond performative concerns to consider the role played by technical reputation via conceptual adaptivity. In doing so, we also contributed to historical institutionalism, which while recognizing the role played by reputation (Maor, 2010), has not fully accounted for elements affecting technical reputation.

Literature on VCs has analyzed the applicability of existing regulatory frameworks, for instance, in relation to ML (Campbell-Verduyin, 2018), discussed the empowering or disempowering of private and public actors due to the structure of VCs and blockchain, and evaluated different regulatory solutions (Campbell-Verduyin, 2017). Existing analysis has also considered self-regulating approaches undertaken by private actors operating in the US (Whitford & Anderson, 2021). However, we considered the methods regulatory agencies relied upon to first classify the unknown and with what possible regulatory consequences, with a focus on the ECB, EBA and ESMA.

In linking reputational concerns to methods, we also expanded the focus of organizational reputational literature, which has been vague on the choice of methods of classification by which governance is constructed and how reputation features in the choice of methods. The result of the analysis is a tentative synthesis framework linking reputation to methods of classification with suggested or adopted governance outputs, which might be tested in future research.

To conclude, agencies rely on categorization, analogy, and new categorization to approach technological change. The choice of methods is affected by reputational concerns. While concerns over performative reputation motivates action, technical expertise informs what solutions are available. Our analysis suggests how categorization and analogy are the more likely approaches to tame uncertainty if conceptual adaptivity is high. That said, recourse to new categorization might lead to suggestions of regulatory undertakings if: (1) the innovation is understood to affect an organization's fulfillment of key functions; and (2) conceptual adaptivity of definitions and regulations is low.

The case of VCs is not exhaustive of the complexity of technological innovation, but it is illustrative of how reputational needs contribute to shaping agencies and institutions' approaches to innovation.

DATA AVAILABILITY STATEMENT

Sample coding can be accessed here: <https://doi.org/10.6084/m9.figshare.22589530.v1>. Access to material is restricted due to copyrights considerations and permission to use material. The

data that supports the findings of the study are available from the corresponding author upon reasonable request.

CONFLICT OF INTEREST STATEMENT

No conflict of interest.

ENDNOTES

- ¹ We consider uncertainty as reflecting unpredictability (see Best, 2012b).
- ² Literature has discussed approaches to innovation such as Technical Assessment (TA) or Regulatory Impact Assessment (RIA) (Hasselbalch, 2018). Although TAs and RIAs implicitly or explicitly discuss problems of classification (see European Commission, 2020 for an example), analysis of the methods by which changes are selected has received more limited attention.
- ³ VCs represent a broader category than CAs (ICA-TF, 2019).
- ⁴ The electronic payment instruments, schemes, and arrangements framework.
- ⁵ Scholarship has discussed moral reputation (i.e., the agencies' attitudes to represent themselves as "a carrier of moral values") and "procedural reputation" (i.e., the degree of "adherence to procedures and legal requirements") (Christensen & Gornitzka, 2019, pp. 888–889) in addition to technical and performative reputation. Schmidt and Wood (2019)'s analysis of throughput legitimacy is linked to procedural mechanisms of accountability and transparency in agencies and, therefore, procedural concerns. However, a quantitative text analysis of 45 EU agencies (Rimkutė, 2020) demonstrated how EU regulatory agencies remain mostly concerned with performative and technical reputation.
- ⁶ Rather than analyzing ambiguity as a strategic choice (Best, 2008), or consider how "legitimacy concerns shaped staff views on ambiguity" (Best, 2012a, p. 681), we explore how reputational concerns lead to a given interpretation of ambiguity.
- ⁷ According to Maor (2010), new information might increase reputational concerns.
- ⁸ We used "virtual currencies", "crypto-assets" and "cryptocurrencies" as key words. We identified 42 EP questions. The European Security and Market Authority (ESMA) (7 per cent), EBA (14 per cent) and ECB (12 per cent) were the most mentioned EU bodies (in addition to Europol, 9.5 per cent).
- ⁹ We coded the text as analogy when agencies used expressions such as "resembling", "similar to". We coded the mention as categorization when classification into a category was clearer (e.g., "CAs can be classified as..."). When agencies labeled regulatory categories not fitting the innovation or highlighted its novelty, we coded the text as signaling new categorization.
- ¹⁰ The paper has also benefitted from background research with EU officials and has been drafted using material downloaded from the agencies' websites. Mistakes, including those related to interpretation of reports, are our own. We offer the following disclaimer: mentioned agencies are in no way liable for copyright or other intellectual property right infringement nor for any damage caused by third parties through this publication. They do not endorse this publication.
- ¹¹ ECB: $\chi^2 = 473.43$, p -value $< 2.2e-16$, confidence interval = 0.7762113 and 1. ESMA: $\chi^2 = 664.9$, p -value $< 2.2e-16$, confidence interval = 0.9141734 and 1. EBA: $\chi^2 = 26.282$, p -value = 1.475e-07, confidence interval = 0.5927629 and 1.
- ¹² The content analysis yielded the following word counts: EBA: Categorization = 98, Analogy = 32; New Categorization = 228. ESMA: Categorization = 199; Analogy = 639; New Categorization = 63. ECB: Categorization 217; Analogy 866, New Categorization 279. We removed stopwords.
- ¹³ Stablecoins are 'digital units of value currencies [...] and rely on a set of stabilization tools to minimize fluctuations in their price' (ICA-TF, 2019, p. 3)
- ¹⁴ Instead, the EBA (2019), in discussing the accounting treatment of CAs, seemed to suggest the novelty of CAs and highlighted the need for convergence to avoid undermining the level playing field.

¹⁵ EBA official, personal correspondence, 13 September 2022.

¹⁶ Further research might explore which definition structure (e.g., complex or nested definitions) might be more conducive to regulatory adjustments.

REFERENCES

- Asquer, A., & Krachkovskaya, I. (2021). Uncertainty, institutions and regulatory responses to emerging technologies: CRISPR gene editing in the US and the EU (2012–2019). *Regulation & Governance*, 15(4), 1111–1127. <https://doi.org/10.1111/rego.12335>
- Best, J. (2008). Ambiguity, uncertainty, and risk: Rethinking indeterminacy. *International Political Sociology*, 2(4), 355–374. <https://doi.org/10.1111/j.1749-5687.2008.00056.x>
- Best, J. (2012b). Bureaucratic ambiguity. *Economy and Society*, 41(1), 84–106. <https://doi.org/10.1080/03085147.2011.637333>
- Best, J. (2012a). Ambiguity and uncertainty in international organizations: A history of debating IMF conditionality. *International Studies Quarterly*, 56(4), 674–688. <https://doi.org/10.1111/j.1468-2478.2012.00744.x>
- Black, M. (1937). Vagueness. An exercise in logical analysis. *Philosophy of Science*, 4(4), 427–455. <https://doi.org/10.1086/286476>
- Brass, I., & Sowell, J. H. (2021). Adaptive governance for the Internet of Things: Coping with emerging security risks. *Regulation & Governance*, 15(4), 1092–1110. <https://doi.org/10.1111/rego.12343>
- Busby, J. W. (2010). *Moral movements and foreign policy*. Cambridge University Press.
- Busuioac, M., & Rimkutė, D. (2020). The promise of bureaucratic reputation approaches for the EU regulatory state. *Journal of European Public Policy*, 27(8), 1256–1269. <https://doi.org/10.1080/13501763.2019.1679227>
- Campbell-Verduyn, M. (2017). *Bitcoin and beyond: Cryptocurrencies, blockchains and global governance*. Routledge.
- Campbell-Verduyn, M. (2018). Bitcoin, crypto-coins, and global anti-money laundering governance. *Crime, Law and Social Change*, 69(2), 283–305. <https://doi.org/10.1007/s10611-017-9756-5>
- Campbell-Verduyn, M., & Hütten, M. (2019). Beyond scandal? Blockchain technologies and the legitimacy of post-2008 finance. *Finance and Society*, 5(2), 126–144. <https://doi.org/10.2218/finsoc.v5i2.4137>
- Carpenter, D. P. (2001). *The forging of bureaucratic autonomy: Reputations, networks, and policy innovation in executive agencies, 1862–1928*. Princeton University Press.
- Carpenter, D. P. (2002). Groups, the media, agency waiting costs, and FDA drug approval. *American Journal of Political Science*, 46(3), 490–505. <https://doi.org/10.2307/3088394>
- Carpenter, D. P. (2010). *Reputation and power: Organizational image and pharmaceutical regulation at the FDA*. Princeton University Press.
- Carpenter, D. P., & Krause, G. A. (2012). Reputation and public administration. *Public Administration Review*, 72(1), 26–32. <https://doi.org/10.1111/j.1540-6210.2011.02506.x>
- Cartwright, M. (2021). Historical institutionalism and technological change: The case of uber. *Business and Politics*, 23(1), 67–90. <https://doi.org/10.1017/bap.2019.23>
- Christensen, T., & Gornitzka, Å. (2019). Reputation management in public agencies: The relevance of time, sector, audience, and tasks. *Administration and Society*, 51(6), 885–914. <https://doi.org/10.1177/0095399718771387>
- Dörfler, T., & Gehring, T. (2021). Analogy-based collective decision-making and incremental change in international organizations. *European Journal of International Relations*, 27(3), 753–778. <https://doi.org/10.1177/1354066120987889>
- European Banking Authority. (2014). EBA Opinion on ‘virtual currencies’. EBA/Op/2014/08.
- European Banking Authority. (2016). Opinion of the European banking authority on the EU commission’s proposal to bring virtual currencies into the scope of directive (EU). 2015/849 (4AMLD).
- European Banking Authority. (2019). *Report with advice for the European commission on crypto-assets*. EBA Report.
- European Central Bank. (2012). *Virtual currency schemes*. ECB.
- European Central Bank. (2015). *Virtual currency schemes, a further analysis*. ECB.
- European Central Bank. (2021). *Eurosystem publishes new framework for overseeing electronic payments*. ECB. Press Release, 21 November.
- European Central Bank’s Internal Crypto-Assets Task Force (ICA-TF). (2019). *Crypto-Assets: Implications for financial stability, monetary policy, and payments and market infrastructures*. Report. ICA-TF.

- European Central Bank's Internal Crypto-Assets Task Force (ICA-TF). (2020). *Stablecoins: Implications for monetary policy, financial stability, market infrastructure and payments, and banking supervision in the euro area*. Report. ICA-TF.
- European Commission. (2020). *Proposal for a regulation of the European parliament and of the council on markets in crypto-assets and amending directive (EU) 2019/1937*. COM. 593 final.
- European Food and Safety Authority (EFSA). (2016). Safety of UV-treated milk as a novel food pursuant to Regulation (EC) No 258/97.
- European Parliament. (2016). European Parliament resolution of 26 May 2016 on virtual currencies. (2016/2007(INI)).
- European Parliament. (2022). Parliamentary questions. Available at: <https://www.europarl.europa.eu/plenary/en/parliamentary-questions.html#sidesForm>
- European Security and Market Authority. (2019). *Advice on initial coin offerings and crypto assets, report*. ESMA.
- Figueira, F., & Martill, B. (2021). Bounded rationality and the brexit negotiations: Why Britain failed to understand the EU. *Journal of European Public Policy*, 28(12), 1871–1889. <https://doi.org/10.1080/13501763.2020.1810103>
- Fjørtoft, T. N. (2022). More power, more control: The legitimizing role of expertise in Frontex after the refugee crisis. *Regulation & Governance*, 16(2), 557–571. <https://doi.org/10.1111/regg.12373>
- Grant, E. V. (2016). FDA regulation of clinical applications of CRISPR-CAS gene-editing technology. *Food and Drug Law Journal*, 71, 608.
- Hasselbalch, J. A. (2016). Professional disruption in health regulation: Electronic cigarettes in the European Union. *Journal of Professions and Organization*, 3(1), 62–85. <https://doi.org/10.1093/jpo/jov009>
- Hasselbalch, J. A. (2018). Innovation Assessment: Governing through periods of disruptive technological change. *Journal of European Public Policy*, 25(12), 1855–1873. <https://doi.org/10.1080/13501763.2017.1363805>
- Hazlett, P. K., & Luther, W. J. (2020). Is bitcoin money? And what that means. *The Quarterly Review of Economics and Finance*, 77(C), 144–149. <https://doi.org/10.1016/j.qref.2019.10.003>
- Holyoak, K. J., & Thagard, P. (1997). The analogical mind. *American Psychologist*, 52(1), 35–44. <https://doi.org/10.1037/0003-066x.52.1.35>
- Houghton, D. P. (2001). *US foreign policy and the Iran hostage crisis*. Cambridge University Press.
- Jones, B. D. (1999). Bounded rationality. *Annual Review of Political Science*, 2(1), 297–321. <https://doi.org/10.1146/annurev.polisci.2.1.297>
- Koremenos, B., Lipson, C., & Snidal, D. (2001). The rational design of international institutions. *International Organization*, 55(4), 761–799. <https://doi.org/10.1162/002081801317193592>
- Lütz, S., Hilgers, S., & Schneider, S. (2019). Accountants, europeanists and monetary guardians: Bureaucratic cultures and conflicts in IMF-EU lending programs. *Review of International Political Economy*, 26(6), 1187–1210. <https://doi.org/10.1080/09692290.2019.1632916>
- Majone, G. (1996). *Regulating Europe*. Routledge.
- Maor, M. (2010). Organizational reputation and jurisdictional claims: The case of the US Food and Drug Administration. *Governance*, 23(1), 133–159. <https://doi.org/10.1111/j.1468-0491.2009.01470.x>
- Maor, M., & Sulitzeanu-Kenan, R. (2013). The effect of salient reputational threats on the pace of FDA enforcement. *Governance*, 26(1), 31–61. <https://doi.org/10.1111/j.1468-0491.2012.01601.x>
- Matulionyte, R. (2017). Lending e-books in libraries: Is a technologically neutral approach the solution? *International Journal of Law and Info Technology*, 25(4), 259–282. <https://doi.org/10.1093/ijlit/eax016>
- Mersch, Y. (2018). *Virtual or virtueless? The evolution of money in the digital age*. European Central Bank.
- Mertes, H., & Pennings, G. (2011). The force of dissimilar analogies in bioethics. *Theoretical Medicine and Bioethics*, 32(2), 117–128. <https://doi.org/10.1007/s11017-010-9165-6>
- Panetta, F. (2020). *The two sides of the (stable)coin, Speech*. European Central Bank.
- Pollack, M. A. (1997). Delegation, agency, and agenda setting in the European Community. *International Organization*, 51(1), 99–134. <https://doi.org/10.1162/002081897550311>
- Porter, T. (2003). Technical collaboration and political conflict in the emerging regime for international financial regulation. *Review of International Political Economy*, 10(3), 520–551. <https://doi.org/10.1080/09692290308430>
- Price, E. C. (1998). Does the FDA have authority to regulate human cloning. *Harvard Journal of Law and Technology*, 11(3), 619–642.
- Rimkutė, D. (2018). Organizational reputation and risk regulation: The effect of reputational threats on agency scientific outputs. *Public Administration*, 96(1), 70–83. <https://doi.org/10.1111/padm.12389>

- Rimkutė, D. (2020). Building organizational reputation in the European regulatory state: An analysis of EU agencies' communications. *Governance*, 33(2), 385–406. <https://doi.org/10.1111/gove.12438>
- Schmidt, V., & Wood, M. (2019). Conceptualizing throughput legitimacy: Procedural mechanisms of accountability, transparency, inclusiveness, and openness in EU governance. *Public Administration*, 97(4), 727–740. <https://doi.org/10.1111/padm.12615>
- Schwarz-Plaschg, C. (2018). The power of analogies for imagining and governing emerging technologies. *Nano-Ethics*, 12(2), 139–153. <https://doi.org/10.1007/s11569-018-0315-z>
- Shannon, B. N., McGee, Z. A., & Jones, B. D. (2019). Bounded rationality and cognitive limits in political decision making. In Oxford Research Encyclopedia of Politics. Available at: <https://oxfordre.com/politics>
- Shapiro, M., & Sweet, A. S. (2002). *On law, politics, and judicialization*. Oxford University Press.
- Simon, H. A. (1995). Rationality in political behavior. *Political Psychology*, 16(1), 45–61. <https://doi.org/10.2307/3791449>
- Stokes, E. (2016). Regulatory domain and regulatory dexterity: Critiquing the UK Governance of 'fracking'. *The Modern Law Review*, 79(6), 961–986. <https://doi.org/10.1111/1468-2230.12226>
- Stokes, E. (2017). Recombinant regulation: EU executive power and expertise in responding to synthetic biology. In M Weimer and A de Ruijter, *Regulating Risks in the European Union: The Co-production of Expert and Executive Power* (pp. 59–80). Bloomsbury Publishing.
- Stone, D. A. (1989). Causal stories and the formation of policy agendas. *Political Science Quarterly*, 104(2), 281–300. <https://doi.org/10.2307/2151585>
- Taeiagh, A. (2021). Governance of artificial intelligence. *Policy and Society*, 40(2), 137–157. <https://doi.org/10.1080/14494035.2021.1928377>
- Vollmer, H. (2013). *The sociology of disruption, disaster and social change: Punctuated cooperation*. Cambridge University Press.
- Weiler, J. H. (2012). In the face of crisis: Input legitimacy, output legitimacy and the political messianism of European integration. *Journal of European Integration*, 34(7), 825–841. <https://doi.org/10.1080/07036337.2012.726017>
- Whitford, A. B., & Anderson, D. (2021). Governance landscapes for emerging technologies: The case of cryptocurrencies. *Regulation & Governance*, 15(4), 1053–1070. <https://doi.org/10.1111/rego.12366>
- Wilson, J. Q. (1989). *Bureaucracy: What government agencies do and why they do it*. Hachette.

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