

**DYNAMIC REGULATION VIA CONTINGENT CAPITAL AND BLOCKCHAIN
TECHNOLOGY**

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ABSTRACT

Contingent capital securities are a hitherto largely overlooked dynamic regulatory mechanism. This essay evaluates the use of contingent capital securities in a dynamic regulatory context, including the use of feedback effects for optimized timing and information for regulation and anticipatory regulation.

Keywords: Growth of Technology, Innovation, Regulation of Innovation, Pacing Problem, Dynamic Regulation, Feedback Effects, Optimized Information for Regulation, Anticipatory Regulation

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I. Introduction

The literature on dynamic regulation recognizes that the existing regulatory infrastructure contributes to suboptimal regulatory outcomes,¹ especially when faced with ever increasing disruptive innovation.² Regulatory challenges presented by disruptive innovation are largely associated with facts-based, ex-post, trial-and-error-rulemaking with stable and presumptively optimal rules in the existing regulatory framework,³ the timing of regulation, and ever increasing unknown future contingencies in rulemaking.⁴ Because facts-based, ex-post, trial-and-error-rulemaking cannot anticipate regulatory issues created by innovation, rulemakers may not at all or much too late realize what new regulatory demands apply to a given innovation and associated regulatory issue. Rulemakers' near exclusive reliance on stable and presumptively optimal rules,⁵ created to attain permanent solutions for perceived regulatory issues,⁶ ignores the ever-changing environment for rules driven by the exponential growth of technology and the associated exponential growth of innovation. The timing of regulation in an environment of exponential innovation is a primary problem for regulators. Formal rulemaking in the existing regulatory infrastructure is almost always too time-consuming⁷ because the speed of product innovation often makes regulations pertaining to an innovative product obsolete before such regulations are finalized.⁸ Finally, the existing regulatory infrastructure with stable and presumptively optimal rules is largely incapable of addressing the unknown future contingencies associated with disruptive innovation.

¹ Wulf A. Kaal, *Evolution of Law: Dynamic Regulation in a New Institutional Economics Framework*, in FESTSCHRIFT ZU EHREN VON CHRISTIAN KIRCHNER 1211 (Wulf A. Kaal, Matthias Schmidt & Andreas Schwartz eds., 2014) [hereinafter *Evolution of Law*]; Wulf A. Kaal, *Dynamic Regulation of the Financial Services Industry*, 48 WAKE FOREST L. REV. 791 (2013); Wulf A. Kaal, *Dampening Financial Regulatory Cycles via Dynamic Regulation – A Comment on Professor McDonnell*, 65 FLA L. REV. F. 32 (2013); Wulf A. Kaal, *Dynamic Regulation via Governmental Contracts*, in LIBER AMICORUM PETER NOBEL (2015); Wulf A. Kaal, *Dynamic Regulation for Innovation*, in PERSPECTIVES IN LAW, BUSINESS AND INNOVATION (Mark Fenwick, Wulf A. Kaal, Toshiyuki Kono & Erik P.M. Vermeulen eds., forthcoming 2016), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2831040); Wulf A. Kaal, *Dynamic Regulation to Curtail Excessive Corporate Risk-Taking: A Response to Professor Schwarcz*, 65 ELJ ONLINE 2061 (2016); Wulf A. Kaal & Timothy A. Lacine, *The Effect of Deferred and Non-Prosecution Agreements on Corporate Governance: Evidence from 1993-2013*, 70 BUS. LAW. 61 (2014).

² Kaal, *Dynamic Regulation for Innovation*, *supra* note 1.

³ Karl R. Popper, THE POVERTY OF HISTORICISM (1957); Christian Kirchner, *Evolution of Law: Interplay Between Private and Public Rule-Making A New Institutional Economics-Analysis*, 4 ERASMUS L. REV. 161 (2012).

⁴ Wulf A. Kaal & Erik P.M. Vermeulen, *How to Regulate Disruptive Innovation – From Facts to Data*, U. St. Thomas (Minn.) Legal Stud. Res. Paper No. 16-13), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2808044, 57 JURIMETRICS (forthcoming 2017).

⁵ See Kaal, *Evolution of Law*, *supra* note 1, at 1212 (“[T]he institutional infrastructure for rulemaking was geared towards the creation of rules for governing a relatively stable society with less upward mobility and relatively stable economic and market environments.”); Kaal, *Dynamic Regulation of the Financial Services Industry*, *supra* note 1; Kaal, *Dynamic Regulation via Government Contracts*, *supra* note **Error! Bookmark not defined.**; Kaal & Lacine, *supra* note **Error! Bookmark not defined.**

⁶ Kaal, *Evolution of Law*, *supra* note 1, at 1218.

⁷ Cass R. Sunstein, *Is the Clean Air Act Unconstitutional?*, 98 MICH. L. REV. 303, 371 (1999); Thomas O. McGarity, *Some Thoughts on "Deossifying" the Rulemaking Process*, 41 DUKE L.J. 1385, 1386 (1992).

⁸ Jo Ann S. Barefoot, *Disrupting FinTech Law*, 18 FINTECH L. REP. Mar./Apr. 2015, at 10.

Given the pace of innovation,⁹ future contingencies in rulemaking are likely to substantially increase, making the dynamic anticipation of future contingencies more important for rulemaking.

The issuance of contingent capital securities (CCS) is a promising dynamic regulatory mechanism that can help address the aforementioned suboptimal regulatory outcomes associated with disruptive innovation. Contingent capital¹⁰ is an automatic mechanism for increasing capital while reducing debt with the long-term benefit of lowering leverage.¹¹ The conversion feature of contingent capital shows great promise to provide a mechanism for general risk control in financial institutions¹² and could enhance regulatory capital requirements by creating a regime for providing countercyclical

⁹ See *supra* notes 1, 4 & 8 and accompanying text.

¹⁰ For purposes of this article, the term “contingent capital” or “contingent capital securities” (“CCS”) will be used. There are other names for the same concept. See Squam Lake Working Group on Financial Regulation, *An Expedited Resolution Mechanism for Distressed Financial Firms: Regulatory Hybrid Securities* (Council on Foreign Relations, Ctr. for Geoeconomic Studies, Working Paper, Apr. 2009) [hereinafter Squam Lake Working Group], <http://www.cfr.org/world/expedited-resolution-mechanism-distressed-financial-firms-regulatory-hybrid-securities/p19002> (referring to “regulatory hybrid securities”); *CoCo Nuts: Lloyds Is First Out of the Gate with a New Kind of Capital*, *ECONOMIST* (Nov. 5, 2009), http://www.economist.com/node/14816673?story_id=14816673 (referring to “CoCos” as a short form for the concept of contingent capital.); Mark J. Flannery, *Stabilizing Large Financial Institutions with Contingent Capital Certificates* (October 6, 2009) (unpublished comment) (on file with the University of Florida, Department of Finance, Insurance and Real Estate) (referring to “contingent capital certificates”); Julie Dickson, Superintendent, Office of the Superintendent of Fin. Insts. Can., *Too-Big-to-Fail and Embedded Contingent Capital: Remarks to the Financial Services Invitational Forum 4* (May 6, 2010), <http://www.osfi-bsif.gc.ca/eng/docs/jdlh20100506.pdf> (referring to “embedded contingent capital”).

¹¹ John C. Coffee, Jr., *Systemic Risk After Dodd-Frank: Contingent Capital and the Need for Regulatory Strategies Beyond Oversight*, 111 *COLUM. L. REV.* 795, 806 (2011) (promoting contingent capital as an alternative to bankruptcy or bailouts). Coffee suggests a contingent capital design where “(1) The conversion ratio would be deliberately designed to protect the debt holders from loss by instead diluting the existing equity holders, and (2) the debt security would convert into a fixed return preferred stock with cumulative arrearages and significant voting rights.” Coffee avers that converting the debt security into preferred stock creates a “countervailing voting constituency to offset the voting power of risk-tolerant common shareholders, thereby reducing the pressure on corporate managers to accept greater risk and leverage.” Under Coffee’s proposal, conversion would be triggered when the common stock price significantly decreases. *Id.*

¹² Wulf A. Kaal, 26 *Notre Dame J.L., Ethics & Pub. Pol’y* 281 (2012); Raghuram G. Rajan, *Too Systemic to Fail: Consequences, Causes, and Potential Remedies* 25, 28 (Bank for Int’l Settlements, Working Papers No. 305, 2010), <http://www.bis.org/publ/work305.pdf> (“[C]ontingent capital is like installing sprinklers . . . [W]hen the fire threatens, the sprinklers will turn on.”). But see Christian Koziol & Jochen Lawrenz, *Contingent Convertibles. Solving or Seeding the Next Banking Crisis?*, 36 *J. BANKING & FIN.* 90, 91 (2012), for a suggestion that CoCo bonds may “create negative externalities, in the sense that the (destabilizing) risk-shifting problem induced by CoCo bonds may overcompensate the (stabilizing) effect of providing a pre-committed recapitalization to banks.” Through the use of a “dynamic continuous-time framework” the authors conclude that “the beneficial impact of CoCo bonds crucially hinges on the assumption if bank managers have substantial discretion over the bank’s business risk.” *Id.* at 101. The authors contend that if complete contracts can be written, CoCos are clearly beneficial. If allowing for incomplete contracts, however, the authors argue that “CoCo bonds always distort risk taking incentives. Therefore, equity holders have incentives to take excessive risks . . . Thus, CoCos may be an example where individually rational decisions can have systemically undesirable outcomes.” *Id.*

regulatory capital.¹³ By internalizing bank failure costs, contingent capital may be able to help minimize moral hazard,¹⁴ help avoid financial contagion,¹⁵ and limit systemic risk.¹⁶

This article has five parts. Part II outlines the core elements of the theory of dynamic regulation and dynamic regulatory mechanisms. Part III describes the central tenets of contingent capital securities and their function in financial markets. Part IV explains how contingent capital securities can function as a dynamic regulatory mechanism. Part V concludes.

II. Dynamic Regulation

Supplementing the regulatory infrastructure with dynamic elements can help address suboptimal regulatory outcomes.¹⁷ Dynamic regulation as a regulatory supplement can help address the shortcomings of the existing rulemaking framework and curtail increased demands on the institutional infrastructure.

The timeliness and quality of information is the focus of rulemaking in a dynamic framework.¹⁸ The increased availability of relevant, decentralized, and timely information for rulemaking in a dynamic framework can help facilitate rulemakers' predictions and anticipation of otherwise unforeseeable contingencies, making anticipatory action by rulemakers possible. Increased information for rulemaking via feedback effects facilitates anticipation of future contingencies in the rulemaking process and enables the rulemaker to modify the next action in the rulemaking process.

Feedback effects are a central tenet of the theory of dynamic regulation. Feedback effects in a dynamic regulatory framework can enhance the availability of institution-specific and decentralized information to support the rulemaking process.¹⁹ Rather than acquiring the necessary information ex-post after rules have emerged as suboptimal, feedback effects help increase the availability of relevant information for rulemaking ex-

13 See William C. Dudley, President & Chief Exec. Office, Fed. Reserve N.Y., Some Lessons from the Crisis, Remarks at the Institute of International Bankers Membership Luncheon (Oct. 13, 2009), <http://www.newyorkfed.org/newsevents/speeches/2009/dud091013.html> (proposing that CCS can be used to adequately capture risk).

14 See Mark J. Flannery, *No Pain, No Gain? Effecting Market Discipline via "Reverse Convertible Debentures,"* 15 (Nov. 2002) (unpublished manuscript) (Program on International Financial Systems at Harv. L. Sch.) ("Frequent trigger evaluations eliminate moral hazard incentives and expose the RCD to surprisingly low default risk."), <http://bear.warrington.ufl.edu/flannery/No%20Pain,%20No%20Gain.pdf>.

15 GOLDMAN SACHS GLOBAL MARKET INST., EFFECTIVE REGULATION: PART 5: ENDING "TOO BIG TO FAIL" (2009) [hereinafter GOLDMAN SACHS, EFFECTIVE REGULATION], <http://www.goldmansachs.com/our-thinking/archive/effect-reform-part-5.pdf> (showing what could have happened if contingent capital had been in place during the recent economic crisis.). *Id.* at 6 The authors also note that if the appropriate triggers are in place, it could prevent bank runs; though if the trigger is based on market prices, it could worsen bank runs. *Id.* at 3.

16 Coffee, *supra* note 11, at 806 (suggesting that contingent capital should be designed to create a standard for SIFIs).

17 Kaal, *Dynamic Regulation of the Financial Services Industry*, *supra* note 1; Kaal, *Evolution of Law*, *supra* note 1.

18 Kaal, *Dynamic Regulation of the Financial Services Industry*, *supra* note 1; Kaal, *Evolution of Law*, *supra* note 1.

19 *Id.*

ante and anticipate necessary revisions before rules emerge as suboptimal.²⁰ Feedback effects can occur in several settings including feedback processes between different public and private rulemakers, feedback processes between outcomes and institutions, intra- and interjurisdictional feedback processes, and feedback processes between rules and rulemaking processes.

To accomplish anticipatory rulemaking, the dynamic regulatory framework relies on the use of institution-specific, decentralized, and timely information²¹ in combination with feedback effects.²² The combination of feedback processes, enhanced information for rulemaking, and institution-specific ex-ante experimentation facilitates the anticipation of future contingencies for rulemaking. Adapting rules to such identified future contingencies becomes the focal point for rulemaking in a dynamic framework.²³ Finally, anticipatory dynamic regulation can help minimize costly and suboptimal ex-post trial-and-error experimentation with stable and presumptively optimal rules.

Dynamic regulation uses several tools to accomplish anticipatory rulemaking. For instance, deferred prosecution agreements (DPAs)²⁴ and venture capital investments provide at least some estimation as to where innovative trends exist and what possible regulatory challenges may be associated with them.²⁵ DPAs and venture capital investment decisions increase the availability of relevant, decentralized, and timely information for rulemaking and facilitate feedback effects.

Dynamic regulatory tools, such as DPAs and venture capital investments, can serve as regulatory supplements enabling rulemakers' adaptation to regulatory contingencies if and when they arise because feedback effects associated with such dynamic regulatory tools provide relevant, timely, decentralized, and institution-specific information ex-ante. By increasing the availability of information ex-ante, dynamic regulatory tools help lower unforeseen contingencies in the rulemaking process pertaining to innovation. Improved information for rulemaking also helps to maintain certainty in the rulemaking process.

III. Contingent Capital

For purposes of this article, contingent capital is the predefined conversion of a certain percentage of financial institutions' debt securities into equity securities. Contingent capital is an automatic mechanism for increasing capital while reducing debt with the long-term benefit of lowering leverage.²⁶ Strained financial institutions may find the automatic conversion of debt into equity via contingent capital securities an attractive

²⁰ Kaal, *Dynamic Regulation of the Financial Services Industry*, *supra* note 117; Kaal, *Evolution of Law*, *supra* note 1.

²¹ Information on the functioning of financial institutions, including information pertaining to how financial institutions, or decision makers in financial institutions, actually act and how they are expected to react to unforeseen contingencies in the future, helps incorporate dynamic elements into financial regulation. Several mechanisms can increase timely information for rulemaking; these include: 1. contingent capital, 2. Government contracts in the form of Non- and Deferred Prosecution Agreements, 3. venture capital finance allocation, and 4. crowdfunding.

²² Kaal, *Evolution of Law*, *supra* note 117.

²³ *Id.*

²⁴ Kaal & Lacine, *supra* note 1.

²⁵ Kaal & Vermeulen, *supra* note 4.

²⁶ Coffee, *supra* note 11, at 805 (averring that contingent capital can counter leverage debt). For a reading that is critical in the context of automation of financial regulation, see generally AMAR BHIDÉ, A CALL FOR JUDGMENT: SENSIBLE FINANCE FOR A DYNAMIC ECONOMY (2010).

alternative to being forced into restructuring or liquidation.²⁷ Under a contingent capital regime with a voting rights increase, the conversion feature of contingent capital securities could have the potential to change the control dynamic, the power, and the dependencies within systemically important financial institutions (SIFIs).²⁸ Shareholders, management, and creditors could equally be affected. In the United States, section 165(b) of the Dodd-Frank Act authorizes the Board of Governors of the Federal Reserve to utilize contingent capital.²⁹ Section 115(c) of the Dodd-Frank Act requires a study on the feasibility of contingent capital in the United States.³⁰

Policy makers and academics³¹ support contingent capital as a policy tool because it shows great promise for internalizing bank failure costs,³² stabilizing SIFIs, and preparing SIFIs for future financial crises.³³ They have identified several core objectives associated with contingent capital securities: to signal default risk,³⁴ to provide incentive to increase

27 See Coffee, *supra* note 11, at 805.

28 Given this potential, CCSs could help fill a void left by regulators' inability to supervise financial institutions effectively, often the result of insufficient public funding.

29 Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, § 165(b)(1)(B), 124 Stat. 1376, 1424 (2010) (codified at 12 U.S.C. § 5365 (2012)).

30 *Id.* § 115(c) at 1404 (codified at 12 U.S.C. § 5325 (2012)).

31 See, e.g., DAVID SKEEL, *THE NEW FINANCIAL DEAL: UNDERSTANDING THE DODD-FRANK ACT AND ITS (UNINTENDED) CONSEQUENCES* 84–85 (2011). See also Coffee, *supra* note 11, at 801–08 (promoting contingent capital as an alternative to bailouts).

32 See DAVID SKEEL, *THE NEW FINANCIAL DEAL: UNDERSTANDING THE DODD-FRANK ACT AND ITS (UNINTENDED) CONSEQUENCES* 84–85 (2011); Coffee, *supra* note 11 at 803-08; Flannery, *supra* note 14, at 12; Robert L. McDonald, *Contingent Capital with a Dual Price Trigger* (Feb. 15, 2010) (unpublished manuscript), <http://ssrn.com/abstract=1553430>. McDonald proposes a model for contingent capital where debt converts to equity if both (1) “the firm’s stock price is at or below a trigger value,” and (2) “the value of a financial institution’s index is also at or below a trigger value.” *Id.* at [i]. McDonald concludes that the dual trigger proposal’s strength is its reliance on market prices, and its disadvantage is the index trigger, which could potentially create a situation where it might be profitable to manipulate the index or try to force bankruptcy. *Id.* at 12–13; see also Darrell Duffie, *Contractual Methods for Out-of-Court Restructuring of Systemically Important Financial Institutions* (Preliminary Draft, Nov. 9, 2009), <http://www.darrellduffie.com/uploads/policy/DuffieRestructuringOutOfCourt2009.pdf> (focusing on possible triggers of Distress-Contingent Convertible Bonds/Debt (essentially CCS)).

33 Flannery, *supra* note 14, at 2.

34 See Raghuram Rajan, *Opinion, More Capital Will Not Stop the Next Crisis*, *FIN. TIMES* (London), (Oct. 1, 2009), <https://www.ft.com/content/a830fcf6-aed1-11de-96d7-00144feabdc0> (suggesting that CCS should be used to raise capital “when regulators see a crisis coming”); Dudley, *supra* note 13 (proposing that CCS can be used to adequately capture risk).

capital,³⁵ to prevent bailouts,³⁶ to decrease risk taking,³⁷ to minimize moral hazard,³⁸ to avoid financial contagion,³⁹ and to limit systemic risk.⁴⁰

Contingent capital may support and optimize general risk control in financial institutions.⁴¹ By internalizing bank failure costs, contingent capital can contribute to minimizing moral hazard. Appropriate use of contingent capital triggers could help eliminate moral hazard incentives and can further lower default risk of CCS.⁴² Installing contingent capital may also be more efficient than raising capital requirements because the capital injection is available only when it is needed. When triggered, only enough CCS would convert as is necessary to recapitalize the firm. Contingent capital may also incentivize SIFI management to lower their risk taking on behalf of the financial institution.⁴³ The threat of dilution of stock holdings in combination with a threat of loss due to conversion could help reduce shareholder pressure on SIFI management to take higher risks.⁴⁴ If conversion should have a negative effect on stock price,⁴⁵ management could be further incentivized to maintain and manage risk to avoid reputational loss and

35 See Squam Lake Working Group, *supra* note 10; See also Richard J. Herring & Charles W. Calomiris, Why and How to Design a Contingent Convertible Debt Requirement (Apr. 19, 2011) (unpublished manuscript), <http://ssrn.com/abstract=1815406> (also proposing that a contingent capital requirement would be an incentive to capitalize).

36 See Squam Lake Working Group, *supra* note 10, at 4 (suggesting that hybrid securities would help prevent bailouts); Coffee, *supra* note 11, at 806 (promoting contingent capital as an alternative to bailouts); Herring & Calomiris, *supra* note 35, at 39 (averring that contingent capital could help prevent the “too big to fail” problem).

37 See George Pennacchi, Theo Vermaelen & Christian C.P. Wolff, Contingent Capital: The Case of COERCs 9, 13 (Mar. 2013) (unpublished manuscript), <http://www.ieseg.fr/wp-content/uploads/CoercRev31Mar2013.pdf>. (suggesting that their COERC proposal would reduce the risks of bonds); Dudley, *supra* note 13 (averring that because bank difficulties would trigger conversion, this dilution of shareholders creates an incentive for bank managers to “manage not only for good outcomes on the upside of the boom, but also against bad outcomes on the downside”).

38 See Flannery, *supra* note 14, at 15.

39 See GOLDMAN SACHS, EFFECTIVE REGULATION, *supra* note 15, at 6 (noting that if the appropriate triggers are in place, it could prevent bank runs—though if the trigger is based on market prices, it could worsen bank runs).

40 See Coffee, *supra* note 11, at 806.

41 See Rajan, *supra* note 12, at 28. *But see* Koziol & Lawrenz, *supra* note 12, at 91.

42 See Flannery, *supra* note 14, at 3. Flannery suggests that Reverse Convertible Debentures (RCD) (essentially CCS) could allow for recapitalization without involving outside parties (e.g., taxpayers). The trigger would be automatic based on market value and convert at the current share price. “Issuing RCD as part of a bank’s capital structure will then a) protect depositors and taxpayers via a transparent means of automatic re-capitalization, b) cause shareholders to internalize the costs of risk, c) impose no tax penalty on bank shareholders, and d) reduce the incidence of costly failures.” *Id.*

43 Coffee, *supra* note 11, at 806. Coffee avers that converting the debt security into preferred stock creates a “countervailing voting constituency,” which offsets the voting power of “risk-tolerant common shareholders, thereby reducing the pressure on corporate managers to accept greater risk and leverage.” ; see also Dudley, *supra* note 13 (“If the bank encounters difficulties, triggering conversion, shareholders would be automatically and immediately diluted. This would create strong incentives for bank managements to manage not only for good outcomes on the upside of the boom, but also against bad outcomes on the downside.”).

44 Dudley, *supra* note 13.

45 A potential effect of CCS conversion on stock prices will likely be evaluated in future research. See Suresh Sundaresan & Zhenyu Wang, *On the Design of Contingent Capital with Market Trigger* 70 J. Fin. 881, 900 (2015) (suggesting that under their design of contingent capital, where the state-contingent conversion ratio prevents value transfer, the prices would be kept “‘smooth’ at conversion”).

income reduction due to losses in stock options.⁴⁶ Contingent capital could create a regime for providing countercyclical regulatory capital⁴⁷ that further enhances regulatory capital requirements of the Federal Reserve⁴⁸ and under Basel III.⁴⁹

IV. Dynamic Regulation via Contingent Capital

Contingent capital is a dynamic regulatory mechanism that can be used in a dynamic regulatory framework. Contingent capital is a dynamic regulatory mechanism because: 1. Capital injection is available only if and when needed; 2. Signaling to regulators of impending regulatory issues via conversion of CCS to near worthless equity creates feedback effects; and 3. Contingent capital may also incentivize management to lower their risk taking on behalf of the financial institution.⁵⁰ The threat of dilution of stock holdings in combination with a threat of loss due to conversion could help reduce shareholder pressure on SIFI management to take higher risks.⁵¹ If conversion should have a negative effect on stock price,⁵² management could be further incentivized to maintain and manage risk to avoid reputational loss and income reduction due to losses in stock options.

Contingent capital exemplifies and supports the core tenets of dynamic regulation, e.g., feedback effects, improved information for rulemaking, and anticipatory regulation. Contingent capital improves information for rulemaking. Contingent capital securities, when issued and triggered, produce highly valuable, real time, decentralized information on the financial well-being of a given regulated entity. Contingent capital creates feedback effects because the conversion of debt to equity signals to regulators that the respective entity's management that was unable to avoid the trigger from debt to equity which calls for increased regulatory scrutiny. In essence, the occurrence of the trigger from debt to equity creates real-time information for regulatory needs that in centralized system would require months or years to generate. It enables regulators to start a regulatory investigation if and when needed. Contingent capital enables anticipatory regulation because not only can regulators see a triggering event and react to such event real-time before the entity encounters financial calamity but, depending on the disclosure regime that pertains to the respective contingent capital securities, regulators will also be able to understand what financial disclosures can affect the stability of such contingent capital securities. Such

46 Even though there is a trend toward a reduction in stock option compensation, management may still receive a certain percentage of their compensation in stock options. See Guido Ferrarini & Maria Cristina Ungureanu, *Economics, Politics, and the International Principles for Sound Compensation Practices: An Analysis of Executive Pay at European Banks*, 64 VAND. L. REV. 429, 460–61 (2011) (noting that stock option compensation has been curtailed). For example, in France, remuneration requirements ban stock options and limit bonuses.

47 See Dudley, *supra* note 13.

48 See Dodd–Frank Act § 171 (codified as amended at 12 U.S.C. § 5371 (Thomson Reuters 2014 & Supp. 2016)); John H. Cochrane, Opinion., *The More Bank Capital, the Safer the Bank*, WALL ST. J., July 15, 2011, at A15 (stating that “the Federal Reserve wants another 3% for ‘systemically important’ banks,” bringing the total regulatory capital requirement to 10% and that the Federal Reserve’s Dan Tarullo even proposed a 14% capital requirement).

49 Basel III calls for 7% regulatory capital, up from 3%. Press Release, Bank for Int’l Settlements, Group of Governors and Heads of Supervision Announces Higher Global Minimum Capital Standards (Sept. 12, 2010), <http://www.bis.org/press/p100912.pdf>. See also Rajan, *supra* note 86, at 9 (suggesting that CCS should be used to raise capital “when regulators see a crisis coming”).

50 Coffee, *supra* note 11, at 806; see also Dudley, *supra* note 13.

51 Dudley, *supra* note 13.

52 See Suresh Sundaresan & Zhenyu Wang, *On the Design of Contingent Capital with Market Trigger* 70 J. Fin. 881, 900 (2015).

information may allow regulators to anticipatorily adjust their regulatory requirements and the intensity of regulatory investigations.

V. Conclusion

The issuance of CCS is a promising dynamic regulatory mechanism that can help address the suboptimal regulatory outcomes associated with disruptive innovation. Most of the design features of CCS and especially their triggering events are still underdeveloped. Despite these shortcomings, CCS could help allows regulators to anticipate regulatory needs in real-time, supported by feedback effects and improved information for regulation.