



HARVARD Kennedy School

**MOSSAVAR-RAHMANI CENTER**  
for Business and Government

# **Understanding CoCos: What Operational Concerns & Global Trends Mean for U.S. Policymakers**

**Robert W. Greene**

June 2016

## **M-RCBG Associate Working Paper Series | No. 62**

The views expressed in the M-RCBG Fellows and Graduate Student Research Paper Series are those of the author(s) and do not necessarily reflect those of the Mossavar-Rahmani Center for Business & Government or of Harvard University. The papers in this series have not undergone formal review and approval; they are presented to elicit feedback and to encourage debate on important public policy challenges. Copyright belongs to the author(s). Papers may be downloaded for personal use only.

This working paper was originally submitted on March 29, 2016, to the majority staff of the U.S. House of Representatives Committee on Financial Services and to Harvard University's John F. Kennedy School of Government as a Policy Analysis Exercise (PAE) in partial fulfillment of the requirements for the degree of Master in Public Policy. Professor Robert Glauber served as Faculty Advisor and Executive Dean John Haigh served as PAE Seminar Leader.

The views expressed in this working paper reflect those of the author and should not be viewed as representing the views of any member of the U.S. House of Representatives, any staff member of the U.S. House of Representatives Committee on Financial Services, nor those of Harvard University or any of its faculty.

## Acknowledgments

I deeply thank Joe Carapiet, Jim Clinger, and Dino Falaschetti of the House Financial Services Committee’s majority staff for their consistent support and helpful guidance of this research, and for the opportunity to serve as a Fellow with the Committee.

I would also like to deeply thank Professor Robert Glauber for his valuable feedback and insights not only on this project, but also throughout our time working together at the Kennedy School, as well as Executive Dean John Haigh, whose comments were critical to improving this research.

This study would not have been possible without data provided by Dealogic and Moody’s. I am deeply grateful to both firms, and in particular thank Juan Torres and Joseph Young of Dealogic, as well as Mark LaMonte of Moody’s, for their research support and insights. I also thank the Mossavar-Rahmani Center for Business and Government for financially supporting this project.

Finally, I gratefully acknowledge support and helpful insights from James Friedman, Alberto Gallo, Ashleigh Grant, Scott Leland, Herman (Dutch) Leonard, Marshall Lux, Stephen Matteo Miller, Jennifer Nash, Hester Peirce, Tim Roberts, and Peter Sands. All errors are my own.

## Table of Contents

Executive Summary.....	2
1. Introduction .....	3
2. Understanding General Arguments For and Against CoCos .....	5
A. Arguments for allowing or requiring banks to issue CoCos .....	6
B. Reasons given in opposition to CoCo issuances.....	7
3. Structuring CoCos: Theoretical Benefits, Costs, and Risks of Various Design Options .....	9
A. Type of loss-absorption mechanism & conversion/write-down rate .....	10
B. Trigger type(s), rule(s) & level(s).....	11
C. Other important structural elements .....	14
4. Understanding Today’s Global CoCo Market.....	15
A. The birth of CoCos: 2009-2010 .....	19
B. Basel III & the 2011-15 CoCo issuance boom .....	20
C. Understanding the buy-side market .....	25
5. Policy Options .....	27
6. Risks, Benefits, Costs & Operational Concerns of Policy Options.....	29
A. Concerns surrounding getting CoCo structure right.....	29
B. Concerns surrounding CoCo issuance volume & buy-side activity .....	31
C. Recent market incidents highlight troubles with CoCos .....	33
D. Untested nature of CoCos.....	34
E. Benefits and costs of CoCo issuances relative to common equity.....	35
7. Policy Recommendation.....	37
Appendix A: Sources for Selected Figures .....	40
Appendix B: CoCo Issuances Used in Buy-Side Market Estimates .....	41

## Executive Summary

Contingent convertible capital instruments (CoCos) are debt-like securities treated as regulatory capital that, upon a trigger event occurring, either (1) convert to equity or (2) are written-down. Their existence necessitates regulations prescribing acceptable trigger type(s) and level(s), loss absorption mechanism(s) (conversion or write-down) and rate(s) (impacting loss allocation), issuance size, and other structural elements (such as maturity and coupon payment policies).

Academics disagree on how CoCos should be structured. Many proposals endorse market-value triggers, which are harder to game than book-value triggers, but may drive equity price plunges as trigger levels near. Proponents largely support conversion CoCos, yet some favor dilutive conversion rates (and high issuance amounts) to drive shareholder pressure on management to avoid conversion, while others fear that the threat of dilution will prompt equity fire sales. High-trigger conversion CoCos aim to automatically recapitalize weakening bank balance sheets; low-trigger CoCos could aid in bank resolution. CoCos, supporters note, can improve banks' capital positions in stressful times but avoid reductions in lending due to high equity requirements; yet some CoCo critics argue that high bank equity levels are not socially costly. Critics also note that triggers will likely be improperly set, driving early or late conversions that cause market turmoil. Moving-average, discretionary, or multiple trigger structures fail to address this critical concern.

Regulations and tax and accounting rules preclude U.S. CoCo issuances. Yet since 2009, many foreign jurisdictions have embraced CoCos, largely via Basel III-related rules. By Q3 2015, over \$300 billion in CoCos had been issued. Most have low book-value and discretionary triggers; over half are write-down CoCos (counter to most academic proposals). Regulatory treatment and funding cost gaps drive banks to issue CoCos, but some executives fear that the costs of a CoCo triggering will dwarf funding cost savings. Institutional investors dominate the buy-side market; most believe CoCos are mispriced and many note that market fragmentation is driving illiquidity.

As U.S. policymakers consider the efficacy of CoCos, the global market gives reason for pause. CoCos are untested; survey data suggests a global price plunge will occur when the first CoCo is triggered. Recent CoCo price drops resulting from fear that Deutsche Bank would suspend CoCo coupon payments show how CoCo regulations, accounting rules, and structure can drive market stress. Whether or not a deep enough buy-side market for large volumes of U.S. CoCos exists is unclear: issuances worth 10 percent of large U.S. banks' assets would likely exceed \$650 billion. Prohibiting hedge fund holdings, as some suggest, could shrink market capacity over 10 percent.

These concerns aside, in theory issuances of high-trigger dilutive conversion CoCos, relative to equity, offer unique benefits (at a lower cost of funds and with less pressure on short-term return on equity) of (1) recapitalizing stressed balance sheets automatically and (2) driving shareholder pressure on management to avoid risk-taking that may cause conversion. Attaining these ends is difficult and entails tolerance for CoCo rule design errors and adverse market reactions to ill-designed CoCos or a CoCo triggering. If Congress aims to avoid these outcomes, prioritizes bank regulation simplicity, and is alarmed by global CoCo market risks, then allowing U.S. banks to issue CoCos is not advised; similarly-sized equity issuances are preferable (despite higher short-term costs). But supposing superb CoCo rule design and few global disruptions, incentivizing large U.S. banks to issue high-trigger dilutive conversion CoCos could be a better policy choice.

# Understanding CoCos: What Operational Concerns & Global Trends Mean for U.S. Policymakers

**Robert W. Greene**

*Harvard University, John F. Kennedy School of Government*

## 1. Introduction

Broadly, this study aims to assess (1) whether or not U.S. banks should be allowed or required to issue **“contingent convertible capital instruments” (CoCos)** – hybrid debt-like securities treated as regulatory capital – to meet regulatory capital requirements; and (2) how Congress and/or U.S. regulators should think about establishing regulations that set forth the permitted structural qualities of these instruments, thus enabling CoCos to be issued by U.S. banks. **CoCos are herein defined as regulatory capital instruments that, upon a certain trigger event occurring, (1) convert to common equity or (2) are fully or partially written-down.**<sup>1</sup> Existing regulations and tax and accounting rules preclude U.S. bank CoCo issuances.<sup>2</sup>

This research was originally produced to inform the deliberations of Congressman Jeb Hensarling – Chairman of the U.S. House of Representatives Committee on Financial Services (the Committee) – and majority staff of the Committee as they worked to develop legislation that, if passed, would enable U.S. banks meeting “high, but simple, capital requirements” to be exempted from many regulations brought about by The Dodd-Frank Wall Street Reform & Consumer Protection Act (Dodd-Frank) and the Bank for International Settlement’s (BIS) International Regulatory Framework for Banks (Basel III), including existing complex U.S. bank regulatory capital requirements.<sup>3</sup> Thus the benefits, costs, risks, and operational considerations of enabling CoCo issuances by large U.S. banks<sup>4</sup> are assessed not just broadly, but also in the context of this particular legislative proposal. Accordingly, this research examines whether or not allowing or requiring large U.S. banks to meet the proposed regulatory capital threshold for regulatory relief with CoCo issuances would better achieve, relative to requiring an equivalent

---

<sup>1</sup> This definition is based on the FSOC’s 2012 study on CoCos, which profiles varying CoCo definitions. Financial Stability Oversight Council, *Report to Congress on Study of a Contingent Capital Requirement for Certain Nonbank Financial Companies and Bank Holding Companies* (2012), at 5.

<sup>2</sup> See generally *ibid.*

<sup>3</sup> See Rep. Jeb Hensarling, “Remarks at American Bankers Association Summit” (Mar. 15, 2016) (noting that “The bold and better alternative you will see from committee Republicans will provide vast regulatory relief for financial institutions in exchange for meeting high, but simple, capital requirements.”). This and all other references to legislative ideas considered by Chairman Hensarling and Committee majority staff were informed by late 2015 and early 2016 discussions with staff [hereinafter “Committee staff discussions”].

<sup>4</sup> For purposes of this research, “large U.S. banks” refers to U.S. banks that have been deemed to be G-SIBs by the Financial Stability Board: Bank of America, Bank of New York Mellon, Goldman Sachs, Morgan Stanley, State Street Bank, and Wells Fargo. At the request of the Committee’s majority staff, this research focuses its analysis on large U.S. banks.

volume of equity issuances, the Chairman’s laudable goals of reforming U.S. bank capital regulation to be simpler, more “pro-growth,” and more “pro-consumer.”<sup>5</sup>

To start, **Section 2** briefly explores the debate surrounding the bank-specific and economy-wide costs of issuing debt relative to equity, what it means for CoCos, and broad arguments for and against allowing or requiring banks to issue these instruments. The idea that allowing CoCo issuances to count as regulatory capital could, relative to requiring bank equity issuances of equal volume, place less immediate pressure on a bank’s returns on equity (ROE) and lower both bank and economy-wide costs resulting from high capital levels (while providing equity-like benefits in downturns) is presented. Why those who believe that high volumes of bank equity issuances entail few economy-wide cost and little meaningful pressure on ROE oppose using CoCo issuances to meet regulatory capital requirements is also discussed.

Most arguments for and against allowing banks to issue CoCos, however, stem from particular structural elements of the instruments. **Sections 2 and 3** present public policy benefits attributed by supporters of proposals to permit or require that banks issue CoCos, which include the following (some of which are mutually exclusive) advantages: (1) improving a bank’s ability to absorb losses during times of market or idiosyncratic stress, (2) facilitating pressure on management to prevent CoCo conversion by avoiding excessive risk-taking or preemptively issuing equity, (3) increasing bank liquidity at times of stress, and/or (4) enabling the orderly resolution of failing financial institutions. For any of these theoretical benefits to be realized assumes that policymakers appropriately set complex structural criteria under which debt-like hybrids are treated as CoCos.

**Section 3** briefly examines academics’ arguments for and critiques of various CoCo structural designs and features, and notes that the most important structural element of a CoCo is its trigger, which if set at an appropriately high level, could in theory enable CoCos to drive pre-planned recapitalizations of banks during times of market-stress. Low triggers, on the other hand, aim to enable the orderly resolution of failing banks. Why appropriately structuring trigger levels and metrics is difficult and why error in designing a trigger could produce high economy-wide costs is explored, as are the potential benefits and risks of dilutive versus non-dilutive CoCo conversion rates. Limitations of the academic debate surrounding CoCos are also discussed.

Notably, bank regulators in Europe and Asia – enabled by Basel III’s endorsement of CoCos – have set criteria under which hybrid debt-like instruments can count towards regulatory capital requirements as CoCos. In doing so, foreign jurisdictions have given birth to a global CoCo market. Yet the structure of CoCos that dominate the global marketplace, as **Section 3** and

---

<sup>5</sup> Rep. Hensarling, *supra* note 3. For a helpful overview of why simple bank regulation could be beneficial to address complex financial risks, see Andrew G. Haldane, & Vasileios Madouros, “The dog and the frisbee’ (speech at the Federal Reserve Bank of Kansas City’s 366th economic policy symposium, Aug. 2012).

analyses in **Section 4** using data provided by Moody's and Dealogic suggest, could ultimately result in more, not less, banking system risk. Why banks have chosen to issue CoCos and how structural characteristics have impacted the buy-side market is also examined.

To consider what the implications of global CoCo market structure and academic debates over the efficacy of CoCos mean in the U.S. policy context, three broad policy options – based in the context of Chairman Hensarling's reform proposal – are presented in **Section 5**: (1) requiring that large U.S. banks issue CoCos to meet a “high, but simple” capital requirement threshold that triggers regulatory relief, (2) allowing large U.S. banks to issue CoCos to meet this threshold, and (3) not allowing large U.S. banks to issue CoCos, and instead, requiring equity issuances equal to the volume of CoCos issuances required in Option 1 to meet the threshold.

Although the unique theoretical appeals of certain structural features are highlighted, due to the inherently complex nature of CoCos, a precise structure is not endorsed. Rather, **Section 6** broadly outlines the risks, costs, benefits, and operational limitations surrounding policy options presented and, more generally, any proposal to require or allow large U.S. banks to issue CoCos. In doing so, **Section 6** draws upon academic literature as well as trends in the growing global CoCo market (including the early 2016 plunge in price of Deutsche Bank CoCos). Notably, no CoCo has ever been triggered, and the untested nature of CoCos contributes to the risks and potential costs of incentivizing U.S. banks to issue this complex form of regulatory capital, as do buyers' potential reactions to CoCo market turmoil. This section also examines what the buy-side market for U.S. CoCos might look like, possible operational limitations facing Congress in setting CoCo structural parameters, and notable potential benefits and costs of CoCo issuances (and certain CoCo structural features) relative to equity issuances.

The study concludes with a policy recommendation (**Section 7**), which sets forth assumptions and decisions that Congress should make – and risks to be aware of – before requiring or allowing large U.S. banks to issue CoCos to meet the “high, but simple” threshold being proposed for regulatory relief. High-trigger-level dilutive conversion CoCos, which have desirable properties in theory, should only be embraced in the U.S. if policymakers are (1) confident that Congressional and Federal Reserve (Fed) actions will result in well-structured CoCos being issued, (2) tolerant of the financial market risks that stem from particular CoCo designs, and (3) believe that global CoCo market concerns or the costs of any CoCo triggering will not undermine the net benefits of incentivizing large U.S. banks to issue CoCos relative to common equity issuances. Reasons to be skeptical that these conditions will be met are provided.

## **2. Understanding General Arguments For and Against CoCos**

The academic debate over CoCos began shortly before the financial crisis and has accelerated in its aftermath. Most research surrounds the costs, benefits, and risks of various

structural permutations that could be required by regulators in order for debt-like hybrids to be treated as CoCos (and thus also treated as regulatory capital). Before theoretical policy trade-offs surrounding important structural nuances are examined in **Section 3**, however, **Section 2** explores broader policy arguments for and against requiring or allowing banks to issue CoCos, as well some of the benefits and risks of issuing CoCos from the perspective of a large bank.

### **A. Arguments for allowing or requiring banks to issue CoCos**

Academic proponents of permitting or requiring banks to issue CoCos note that, depending on CoCo structural designs allowed or permitted by statute and/or regulation, *CoCo issuances can result in some of the following benefits (of which some are mutually exclusive)*.<sup>6</sup>

- (1) improving a bank's ability to absorb major losses by ensuring equity capital levels will be sufficiently high as a bank's balance sheet comes under stress
- (2) incentivizing CoCo and/or equity holders, as well as bank management, to engage in private risk monitoring for fear of CoCos being triggered
- (3) increasing bank liquidity at times of stress
- (4) avoiding taxpayer bailouts by enabling bank restructuring or the bailing-in of failing financial institutions
- (5) limiting dilution to ROE relative to equity issuances of equal volume.

Again, some of these benefits are only tied to particular CoCo design permutations. **Section 3** explores in greater depth the academic debate surrounding costs and benefits of varying CoCo structural features.

Academic supporters generally agree, however, that regardless of benefits brought about by particular CoCo structures, a key benefit of allowing banks to meet regulatory capital

---

<sup>6</sup> For a more comprehensive discussion of these and other benefits, *see, for example*, Mark Flannery, "No Pain, No Gain: Effecting Market Discipline via Reverse Convertible Debentures," in *Capital Adequacy beyond Basel: Banking, Securities and Insurance* (ed. Hal Scott, 2005); Steve Strongin et al., *Ending 'Too Big to Fail, Effective Regulation: Part 5* (Goldman Sachs Global Markets Institute, Dec. 2009); Charles W. Calomiris & Richard J. Herring, "How to Design a Contingent Convertible Debt Requirement That Helps Solve Our Too-Big-to-Fail Problem," *Journal of Applied Corporate Finance*, vol. 25, no. 2 (2013): 39-62; George Pennacchi et al., "Contingent Capital: The Case of COERCs," *Journal of Financial and Quantitative Analysis*, vol. 49 (Jun. 2014): 541-574; Squam Lake Working Group on Financial Regulation, "An Expedited Resolution Mechanism for Distressed Financial Firms: Regulatory Hybrid Securities," (Council on Foreign Relations Working Paper, Apr. 2009); Boris Albul et al., "Contingent Convertible Bonds and Capital Structure Decisions," (Working Paper. Haas School of Business, University of California–Berkeley, Mar. 2010); Enrico Perotti & Mark Flannery, "CoCo design as a risk preventive tool," *VOX Policy Portal, Centre for Economic Policy Research* (Feb. 2011).



requirements by issuing these instruments is that *the cost of issuing CoCos is in theory expected to be less expensive for both banks and the broader economy than the cost of issuing equity*.<sup>7</sup> Proponents point out that because CoCos would be debt-like (treated like debt from a regulatory perspective), issuing these instruments would not directly pressure a bank's ROE (at least in the short-term), and would thus enable banks to meet regulatory capital requirements at a lower cost to loan growth relative to equity issuances.<sup>8</sup> This is because, as opponents of high bank equity requirements note, the downward pressure on ROE caused by perpetually high levels of equity inherently increases the relative cost of lending for banks, in turn driving banks to shrink their asset size by lending less and reducing financial intermediation overall.<sup>9</sup>

In other words, CoCos could in theory mitigate both bank-specific and economy-wide costs brought about by bank overcapitalization (which CoCo supporters argue reduces overall lending due to pressures on bank returns brought about by perpetually high equity levels) during times of market stability while providing a cushion (via loss absorption mechanisms explored in **Section 3**) during downturns. Thus CoCo issuances could possibly provide many safety-and-soundness benefits of equity issuances (assuming CoCos are well-structured) at a cost closer to that of issuing debt. From a bank's perspective, pressure on ROE brought about by higher equity issuance levels is particularly concerning in that it could drive shareholders to demand banks cut costs by buying back debt or lowering compensation, in addition to reducing leverage (again this presumably results in economy-wide costs of lower lending levels).<sup>10</sup> There is not complete academic consensus, however, regarding whether or not higher bank common equity issuances in the long run would entail meaningful economy-wide costs or even lower bank ROE.<sup>11</sup>

## **B. Reasons given in opposition to CoCo issuances**

If significant economy-wide costs do not stem from high equity issuance volumes by banks, then the appeal of permitting CoCo issuances to count towards regulatory capital requirements certainly diminishes. Professor Anat Admati of Stanford University and her co-authors, for example, argue that the costs of high bank equity requirements are overstated because (1) increased equity issuance requirements would not prevent banks from operating at an "optimal" scale, (2) ROE costs would not translate into social costs, (3) in down-turns a bank's

---

<sup>7</sup> See, for example, Calomiris & Herring, *supra* note 6, at 42 (noting that "a draconian increase in equity requirements would raise the costs of finance for banks. That increase in cost would translate into a contraction of banking activity—most importantly, bank lending.").

<sup>8</sup> See *ibid.*, at 9; Anat Admati et al., *Fallacies, Irrelevant Facts, and Myths in the Discussion of Capital Regulation: Why Bank Equity is Not Socially Expensive* (Stanford Graduate School of Business, Working Paper No. 2065, 2013), at 44-47 (opposing CoCos, but explaining the arguments of CoCo proponents and why these hybrid securities are considered "debt-like.").

<sup>9</sup> See, for example, Calomiris & Herring, *supra* note 6; Alexey Levkov & Clark Peterson, "Too Much of a Good Thing: The Implications of Higher Bank Capital Requirements," *Banking Perspective* (Clearing House, Q4 2014).

<sup>10</sup> See "The people versus the bankers," *The Economist* (Feb. 13, 2013).

<sup>11</sup> Anat Admati and her co-authors are highly critical of the perspective that higher common equity requirements result in economy-wide costs. Anat Admati et al., *supra* note 8.

ROE would benefit from high equity requirements, and (4) raising equity requirements will not greatly augment loan levels.<sup>12</sup> CoCo issuances, they argue, are a poor substitute for higher equity requirements, which benefit financial stability by lowering the likelihood of bank failure and increasing shareholders' capacity to absorb the downside risks of banking (without relying upon a triggering event).<sup>13</sup> They also note that *equity shares – unlike CoCos – trade in a “well-established liquid market”* (CoCo market liquidity concerns are explored in **Section 6**).<sup>14</sup>

Another policy concern held by academics who oppose allowing banks to issue CoCos is that the triggering of CoCos in a crisis situation would likely spur the triggering and sell-off of other CoCos, thus spreading the effects of a crisis (in other words, *CoCos could transform idiosyncratic bank risk into systemic bank risk*).<sup>15</sup> Also, the notion that CoCos would promote proactive risk monitoring assumes that a CoCo's trigger (various trigger types are examined below) is appropriately structured to incentivize equity issuances sufficiently in advance of severe bank distress; yet **Section 3** illustrates this assumption can hardly be certain. Critically, *a triggering event that occurs too late or too early would have destabilizing effects*.<sup>16</sup>

As **Section 6** will explore, CoCos remain untested in real-life stress events. Some industry participants worry that *CoCos may end up being a bad deal for banks* and share concerns surrounding how CoCos across the market will respond once the first CoCo is triggered; for example, as CoCos were being introduced, UBS CEO Oswald Grübel called the instruments “very dangerous,” noting that “[a]s soon as “you get near these trigger levels – you don't have to hit them – what do you think shareholders will do? They will get the hell out of that stock.”<sup>17</sup> A related issue is that a CoCo triggering event, while improving a bank's capital position, would not prevent banks from continuing losses on poor investments; CoCos will only delay serious financial stress.<sup>18</sup>

Again, CoCos are by nature incredibly complex instruments, so as with potential benefits, many risks and potential costs associated with CoCos depend on the structural nuances allowed and/or required by regulators, which are explored below.

---

<sup>12</sup> *Ibid.*

<sup>13</sup> *Ibid.*

<sup>14</sup> *Ibid.*, at 43-44.

<sup>15</sup> See Avinash D. Persaud, *Why Bail-In Securities Are Fool's Gold* (Peterson Institute for International Economics, Policy Brief, PB14-23, Nov. 2014); Charles A.E. Goodhart, “Are CoCos from Cloud Cuckoo-Land?,” *VOX Policy Portal, Centre for Economic Policy Research* (Nov. 2014); Hilary J. Allen, “CoCos Can Drive Markets Cuckoo,” *Lewis & Clark Law Review*, vol. 16 (2012): 125-167.

<sup>16</sup> See Goodhart, *supra* note 15 (exploring the difficulty in designing triggers and the consequences of miscalculated triggers); Persaud, *supra* note 15, at 1; Suresh Sundaresan & Zhenyu Wang, “On the Design of Contingent Capital with Market Trigger,” (Federal Reserve Bank of New York Staff Reports, no. 448, Nov. 2011); Edward S. Prescott, “Contingent Capital: The Trigger Problem,” *Federal Reserve Bank of Richmond Economic Quarterly*, vol. 98, no. 1, (First Quarter 2012): 33-50.

<sup>17</sup> Patrick Jenkins, “Bankers fear cocos are another crisis in the making,” *Financial Times* (Mar. 5, 2011).

<sup>18</sup> Oliver Hart & Luigi Zingales, “A New Capital Regulation for Large Financial Institutions,” *American Law & Economics Review*, vol. 13, no. 2 (2011): 453-490.

### 3. Structuring CoCos: Theoretical Benefits, Costs, and Risks of Various Design Options

Allowing or requiring that large U.S. banks meet regulatory capital requirements via CoCo issuances inherently entails (1) reforms to U.S. tax and accounting standards and (2) that Congress and/or regulator(s) (presumably, the Fed)<sup>19</sup> determine what structural components enable debt-like hybrid securities to be treated as CoCos. The reforms to tax and accounting rules that must occur for a U.S. CoCo market to exist were closely examined in a 2012 report published by the Financial Stability Oversight Council.<sup>20</sup>

The benefits, costs, and risks of some CoCo structural elements that Congress and/or the Fed could presumably endorse have been explored in academic literature. Trade-offs surrounding other structural components, however, appear to be less thoroughly examined and understood. There are broadly seven major structural components to any CoCo issuance:

- ***Type of loss absorption mechanism.*** Upon a trigger event occurring, will a CoCo convert to equity or will its value be written-down?
- ***Loss absorption conversion rate.*** At what rate will shareholders be diluted upon CoCos converting to equity? Will CoCo write-downs be partial or full?
- ***Type of trigger.*** Three broad options exist: (1) discretionary, (2) mechanical, or (3) both. If mechanical, will the trigger be market-value or book-value?
- ***Trigger rule(s) and level(s).*** Will there be just one trigger or multiple triggers? For mechanical triggers, (1) what type of ratio(s) will be used and (2) will numerical thresholds used be high (to achieve preemptive recapitalization) or low (a “bail-in” instrument)? For discretionary triggers, under what circumstances can a regulator/firm activate conversion?
- ***Coupon deferment.*** Will CoCo issuers be permitted to defer coupon payments at discretion? May coupon payments be mandatory or only discretionary? Under what conditions can regulators step in to halt coupon payments?
- ***Maturity.*** Must CoCos be perpetual securities? What regulations, if any, will surround a CoCo’s call date?

---

<sup>19</sup> The Federal Reserve is the primary banking regulator for the “large U.S. banks” listed earlier and to which this report continuously refers. *See supra* note 4.

<sup>20</sup> Financial Stability Oversight Council, *supra* note 1, at 16-18.

- ***Size of a CoCo requirement.*** How many CoCos will regulators require/permit a bank to issue towards a prescribed regulatory capital level?

As a recent study on CoCos concluded, ***the market incentives brought about by CoCos “can create or destroy value, depending on their design.”***<sup>21</sup> The potential benefits, costs, and risks of structural permutations are examined below.

### **A. Type of loss-absorption mechanism & conversion/write-down rate**

Broadly, academic proposals for bank CoCo issuances support ***conversion CoCos*** – instruments that convert into common equity shares upon a triggering event occurring. If conversion occurs far in advance of bank insolvency, these instruments in theory offer the benefit of boosting book equity levels upon a trigger level being reached.<sup>22</sup> The threat of severe shareholder dilution upon conversion would in theory pressure management to issue equity in advance of conversion (to avoid triggering events), and better yet, drive shareholders to pressure management to avoid risks that increase the likelihood of conversion altogether.<sup>23</sup>

Thus proponents of ***dilutive CoCo conversion*** rates note that the threat of dilution brings about private risk monitoring that averts a crisis.<sup>24</sup> As one economist put it, “the prospect of death by dilution” would prompt shareholders “to task management to undertake the necessary measures to avoid dilution.”<sup>25</sup> Some point out that increasing the threat of dilution to shareholders will lower the cost of CoCo issuance.<sup>26</sup> Research shows that the threat of dilution upon triggering events occurring incentivizes banks to maintain lower leverage in order to decrease the likelihood of conversion.<sup>27</sup> Yet some academics caution against dilutive conversion rates, arguing that the threat of dilution upon a trigger event occurring could generate price uncertainty and could prompt crisis-intensifying runs.<sup>28</sup>

***A conversion rate could occur via the market value of shares or via a fixed amount,*** and the former would clearly be more dilutive to existing equity holders. Calomiris, Herring, and others argue that conversion should be based on market price in order to maximize the dilutive

---

<sup>21</sup> Charles P. Himmelberg & Sergey Tsyplov, “Incentive Effects and Pricing of Contingent Capital” (Working Paper, Jan. 2014).

<sup>22</sup> See Financial Stability Oversight Council, *supra* note 1.

<sup>23</sup> Calomiris & Herring, *supra* note 6.

<sup>24</sup> *Ibid.*; Thomas F. Huertas, *Too big to fail, too complex to contemplate: What to do about systemically important firms*, (presented at the Financial Markets Group, London School of Economics and Political Science conference, “Too Big to Fail, Too Interconnected to Fail?,” Sep. 2009).

<sup>25</sup> *Ibid.*

<sup>26</sup> Strongin et al., *supra* note 6, at 11.

<sup>27</sup> Himmelberg & Tsyplov, *supra* note 21.

<sup>28</sup> See, for example, Sundaresan & Wang, *supra* note 16.

effect of conversion, which would in turn (especially if coupled with a high market-value trigger – explained below) prompt proactive risk monitoring by shareholders and management.<sup>29</sup> On the other hand, the Squam Lake Group supports conversion based on a fixed amount of shares because market-value conversions would heighten the risk of manipulation by management and “death spirals.”<sup>30</sup> These concerns highlight the interwoven nature of CoCos’ structural features, explored in greater depth below.

Notably, despite suggesting the term “conversion,” CoCos can alternatively be written-down upon a triggering event occurring. For *write-down CoCos*, write-downs could be partial or full. Yet *academic literature on CoCo issuances largely discourages or does not endorse write-down instruments*. Research finds that write-down CoCos intensify bank risk-taking when accompanied with a high trigger because there is no risk of shareholder dilution and an inadequate loss absorption buffer.<sup>31</sup> Another recent study notes that the wealth transfer effect from CoCo holders to equity holders brought about by a write-down CoCo reaching a triggering event will result in heightened risk-taking in non-crisis times.<sup>32</sup> Write-down CoCos are also more expensive to issue.<sup>33</sup> *Partial write-down CoCos* are impractical because banks would have to pay out cash during a time of market distress.<sup>34</sup> A write-down feature can, however, be appealing to banks that are not publicly listed,<sup>35</sup> although again, this research is focused primarily on assessing the trade-offs associated with the potential for large U.S. bank (with deep and liquid market for common equity shares) CoCo issuances.<sup>36</sup>

## B. Trigger type(s), rule(s) & level(s)

Perhaps the most critical – and most widely discussed – components of any CoCo requirement relate to its trigger. *There are three broad types of triggers: book-value, market-value, and discretionary*. Examples of *book-value triggers* (triggers dependent on accounting-value calculations) include common equity tier one (CET1) capital ratios, common equity ratios, and leverage ratios. On the other hand, *market-value triggers* rely upon a metric that incorporates the market capitalization of a firm or some other market-based indicator of a bank’s vitality. Mechanical trigger (book-value or market-value) levels could be set at high or low levels. Broadly, a *high trigger level* would drive bank recapitalization in advance of serious bank

---

<sup>29</sup> See, for example, Calomiris & Herring, *supra* note 6.

<sup>30</sup> Squam Lake Working Group on Financial Regulation, *supra* note 6.

<sup>31</sup> Stefan Avdjiev et al., *CoCo Bond Issuance and Bank Funding Costs* (Working Paper, Becker Friedman Institute for Research in Economics, University of Chicago, Sep. 2015).

<sup>32</sup> Stephanie Chan & Sweder Van Wijnbergen, *Coco Design, Risk Shifting and Financial Fragility* (Tinbergen Institute Discussion Paper 16-007/VI, Jan. 2016).

<sup>33</sup> Stefan Avdjiev et al., *supra* note 31.

<sup>34</sup> See Stefan Avdjiev et al., “CoCos: a primer,” *BIS Quarterly Review* (Sep. 2013): 43-56 [herein after “Avdjiev et al., *CoCos: a Primer*”].

<sup>35</sup> Dirk Bleich, “Contingent convertible bonds and the stability of bank funding: the case of the partial writedown” (Discussion Paper No 28/2014, Deutsche Bundesbank, Oct. 2010).

<sup>36</sup> See Committee staff discussions, *supra* note 3.

stress while a *low trigger level* would make resolution easier or improve a bank's chance to recover from market turmoil, in theory reducing a perceived need for bailouts.<sup>37</sup>

Many market-value-trigger proponents argue for *a single, high-level market-value trigger level* for dilutive conversion CoCos to increase preemptive pressure from shareholders on management to avert bank failure and resolution by preemptively issuing capital.<sup>38</sup> These proponents (including Mark Flannery, father of the CoCo idea) argue that these triggers are transparent and credible, and if coupled with dilutive conversion, could incentivize the issuance of equity far in advance of a trigger event occurring.<sup>39</sup> Thus a market-value trigger could incentivize banks to maintain a sustainable market value of equity; a benefit not achieved by regulatory metrics met simply with equity issuances measured using book value and “fair value” measures.<sup>40</sup>

Yet because high-trigger conversion CoCos do not serve as a “bail-in” mechanism like low-trigger CoCos – meaning recapitalization would not take place in times of serious distress – some argue for *multiple, staggered market-value trigger levels* to provide banks with a “graduated safety net.”<sup>41</sup> Professor John Coffee of Columbia Law supports staggered triggering because he fears an “all or nothing” CoCo trigger would be ineffective due to political resistance and its highly adverse market effects.<sup>42</sup> Without a single, high-level trigger, however, theoretical preemptive risk monitoring benefits envisioned by Calomiris and Herring – brought about by shareholders’ pressure on management to avoid severely dilutive effects of conversion upon a trigger event occurring – would likely be diminished. On the other hand, *criticisms of market-value triggers include*:<sup>43</sup>

- (1) market-value triggers are more volatile than book-value triggers
- (2) publicly-traded equity prices can be irrational, sporadic, and/or influenced by non-bank-specific factors, resulting in unnecessary or early conversions

---

<sup>37</sup> See Financial Stability Oversight Council, *supra* note 1.

<sup>38</sup> See, for example, Boris Albul et al., *supra* note 6; Perotti & Flannery, *supra* note 6; Calomiris & Herring, *supra* note 6.

<sup>39</sup> See, for example, Calomiris & Herring, *supra* note 6; Andrew Haldane, *Capital Discipline* (based on presentation at American Economic Association, Jan. 9, 2011); Flannery, *supra* note 6.

<sup>40</sup> See Calomiris & Herring, *supra* note 6.

<sup>41</sup> See Haldane, *supra* note 39; John C. Coffee Jr., “Systemic Risk after Dodd-Frank: Contingent Capital and the Need for Regulatory Strategies beyond Oversight,” *Columbia Law Review*, vol. 111 (2011): 795-847.

<sup>42</sup> See *ibid.*

<sup>43</sup> See Avdjiev et al., *CoCos: a Primer*, *supra* note 34 (presenting an objective assessment of costs and benefits associated with structural options); Perotti & Flannery, *supra* note 6 (who support CoCos but note criticisms); Strongin et al., *supra* note 6; Sundaresan & Wang, *supra* note 16; Martijn Boermans et al., “The Future of CoCos,” *VOX Policy Portal*, Centre for Economic Policy Research (Nov. 2014); Hart & Zingales, *supra* note 18.

- (3) managers could “deliberately talk down” the bank’s value to secure cheap equity financing<sup>44</sup>
- (4) the risk of voluminous CoCo sales and equity price volatility as a market-value trigger is approached
- (5) market-value triggers could result in a “death spiral”: fears of triggering would prompt runs dragging down the share price.

To overcome most of these concerns, Calomiris and Herring support using a lengthy *moving-average market-based trigger*, which would make manipulation more difficult and reduce concerns that the uncertain timing of share price fluctuations could drive equity sell-offs.<sup>45</sup> Of course like any other trigger, this still necessitates a trigger-level (or acceptable range) be embraced via regulation, which could in turn result in a trigger being set too high or too low, thus bringing about destabilizing effects.<sup>46</sup> *Another proposed alternative is to require CoCos be issued with both market-wide and bank-specific market-value triggers.*<sup>47</sup> Both this approach and the moving-average proposal are criticized on the basis that either trigger would likely only be activated once a bank’s health had already deteriorated substantially.<sup>48</sup>

Concerns over the drawbacks of market-value triggers – particularly surrounding the risk of sharp equity price declines taking place upon a conversion CoCo’s market-value trigger level being neared – has led some academics to embrace book-value triggers, noting that book-value triggers are essential to avoiding “death spirals.”<sup>49</sup> The Squam Lake Group appears to endorse a *single, low-level book-value trigger* to “transform an undercapitalized or insolvent bank into a well capitalized bank at no cost to taxpayers.”<sup>50</sup> Some economists advocate for *multiple, staggered book-value trigger levels* to mitigate the “death spiral” risk of a single trigger level.<sup>51</sup> Yet *book-value triggers are often disparaged because these triggers:*<sup>52</sup>

- (1) lag in reporting and thus contribute to uncertainty during times of stress

<sup>44</sup> *Ibid.*, at 486 (noting that if “the trigger is activated when equity prices are low, the manager could deliberately talk down the value of the bank to activate the trigger and obtain equity on the cheap”).

<sup>45</sup> Calomiris & Herring, *supra* note 6 (addressing a concern brought up by Sundaresan & Wang, *supra* note 16).

<sup>46</sup> See *supra* note 16 and accompanying text.

<sup>47</sup> See Robert L. McDonald, “Contingent Capital with a Dual Price Trigger” (Working Paper, Feb. 2010).

<sup>48</sup> See, for example, Linda Allen & Yi Tang, “What’s the Contingency? A Proposal for Bank Contingent Capital Triggered by Systemic Risk” (Working Paper, Nov. 2015).

<sup>49</sup> See, for example, Boermans et al., *supra* note 43; Jan De Spiegeleer & Wim Schoutens, “Multiple Trigger CoCos: Contingent Debt Without Death Spiral Risk,” *Financial Markets, Institutions & Instruments*, vol. 22, iss. 2 (2013): 129-141.

<sup>50</sup> Squam Lake Working Group on Financial Regulation, *supra* note 6.

<sup>51</sup> Spiegeleer & Schoutens, *supra* note 49.

<sup>52</sup> See *ibid.*; Pennacchi et al., *supra* note 6; McDonald, *supra* note 47.

- (2) rely upon accounting rules which enable regulators and management to improperly skew the value of assets
- (3) could fail to trigger in times of stress (in fact Andrew Haldane of the Bank of England finds that Tier 1 capital ratios for banks remained stable during the years prior to the crisis and actually rose in the lead up to 2008).<sup>53</sup>

Thus some book-value trigger proponents (notably, the Squam Lake Group) also embrace complementary **regulator discretion triggers** (in theory made somewhat predictable via a clear policy statement by regulators) because objective metric-based triggers “are likely to be imprecise, subject to revisions, and measured with time lags.”<sup>54</sup> Similarly, some market-value trigger proponents argue for regulatory discretion to “rule” in late-stage CoCo conversion.<sup>55</sup> There does not appear to be academic support for CoCos triggered exclusively by regulatory discretion, although one recent study advocated for CoCos triggered based on metrics that estimate “aggregate systemic risk” and “macroeconomic decline.”<sup>56</sup>

Critically, **any theoretical benefits attributed to CoCo trigger type(s), rule(s), and/or level(s) assume that the trigger will be activated neither too early nor too late, and that the market will broadly react as anticipated and without serious systemic distress resulting from its activation**; again, the consequences of a book- or market-value trigger level that is too high or low could be severely destabilizing.<sup>57</sup>

### C. Other important structural elements

As explained above, there are many other important structural elements that Congress and/or the Fed would need to consider when determining what structural components allow a large U.S. bank-issued debt-like trigger-activated hybrid instrument to be treated towards regulatory capital requirements (and thus be a CoCo). One is **whether or not CoCos should be permitted (or required) to be perpetual securities**. Some economists support maturing CoCos (with one advocating for random retirement as maturity approaches).<sup>58</sup> Non-perpetual instruments are more marketable but of course also bring about refinancing risk.<sup>59</sup>

Similarly, **whether or not a CoCo’s coupon is taxable and/or cancellable** also impacts the ability of the instrument to theoretically achieve intended policy objectives. If a CoCo

---

<sup>53</sup> Haldane, *supra* note 39.

<sup>54</sup> See Squam Lake Working Group on Financial Regulation, *supra* note 6.

<sup>55</sup> Perotti & Flannery, *supra* note 6.

<sup>56</sup> Allen & Tang, *supra* note 48.

<sup>57</sup> See *supra* note 16 and accompanying text.

<sup>58</sup> See, for example, McDonald, *supra* note 47; Flannery, *supra* note 6.

<sup>59</sup> See George M. von Furstenberg, “Who or What has been Hobbling CoCos: Three Essentials for Making CoCos a Success,” *The Capco Institute Journal of Financial Transformation* (Journal 36, Feb. 2013).



coupon is not tax deductible, then a bank's incentive to issue CoCos is obviously reduced.<sup>60</sup> Some economists suggest that CoCo coupon tax deductibility may increase incentives to invest in a bank near the CoCo conversion level in order to preserve this tax benefit.<sup>61</sup> Issues surrounding the cancellation of coupons – under what circumstances a CoCo coupon can be cancelled or suspended, and regulators' authority to cancel or suspend a coupon – are hardly discussed in existing academic literature. There also does not appear to be substantial academic debate regarding *whether or not regulators would permit calls on CoCos*, and if so, under what conditions and after how long could a CoCo be callable.

Some academics have explored what would be an appropriately sized CoCo issuance. According to many proponents, *large-sized CoCo issuances* are necessary to strengthen the threat of dilution faced by shareholders.<sup>62</sup> Others note, however, that if CoCos constitute a substantial funding source for banks, conversion in a time of crisis could prompt a “death spiral” via an untimely and excessive selling of shares.<sup>63</sup> Only a few studies present estimates on precisely how many CoCos should be issued. Also, *within what timeframe would a CoCo issuer be required to replace converted CoCos?* Calomiris and Herring argue within one-year of the conversion.<sup>64</sup> But could large banks replace converted CoCos upon a triggering event in enough time? **Section 4** explores the buy-side market for CoCos, but first examines the evolution of the global CoCo market from its inception in 2009 through 2015.

## 4. Understanding Today's Global CoCo Market

As opposed to the U.S. – where regulations, tax law, and accounting standards preclude CoCo issuances<sup>65</sup> – many foreign jurisdictions have embraced CoCos through the adaptation of Basel III as well as other national regulatory decisions. In fact, *between 2009 and Q3 2015, approximately \$344 billion in CoCos issuances took place.*<sup>66</sup> Before creating a regulatory framework in which large U.S. banks issue CoCos, policymakers must take into consideration (1) how U.S. bank-issued CoCos would fit into the global marketplace for these securities and (2) what factors have driven banks to issue CoCos. In order to inform U.S. policymakers on

---

<sup>60</sup> See *infra* note 93 and accompanying text.

<sup>61</sup> Nan Chen et al., “Contingent Capital, Tail Risk, and Debt-Induced Collapse,” (Working Paper, Mar. 2015).

<sup>62</sup> See, for example, Strongin et al., *supra* note 6; Calomiris & Herring, *supra* note 6.

<sup>63</sup> De Spiegeleer & Schoutens, *supra* note 49; Boermans et al., *supra* note 43.

<sup>64</sup> *Ibid.*

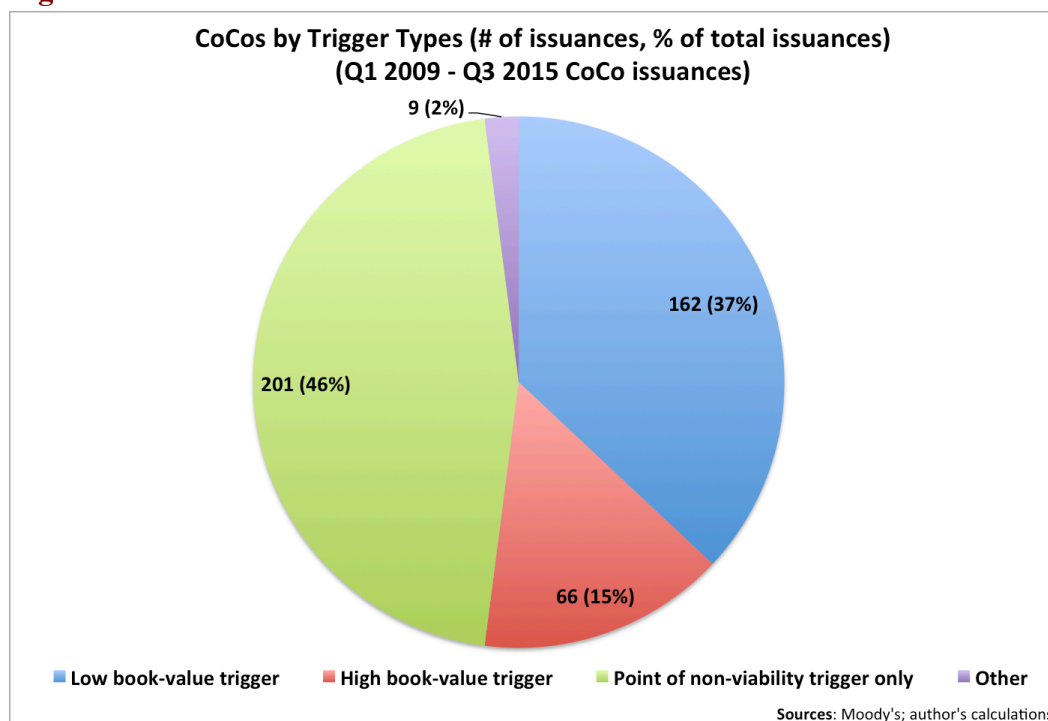
<sup>65</sup> See *supra* note 20 and accompanying text.

<sup>66</sup> Moody's Investors Service, CoCo Monitor database (Q3 2015) [*hereinafter* “Moody's CoCo database”] (sum of the approximate dollar-value of CoCos at time of issuance). Dutch Rabobank's March 2010 \$13.8 billion issuance of CoCo-like securities was not treated as regulatory capital at the time of issuance – thus it does not meet this study's definition of a CoCo – so it is excluded from the Moody's CoCo database throughout this research. All 438 other CoCo issuances are included in analyses throughout this research using the Moody's CoCo database, and banks categorized as Chinese banks include CoCo- and/or debt-issuing banks located in both Hong Kong and China. See *Appendices A & B* for a better understanding of how Moody's data was used to produce Figures 1-4, 7-10, 12 & B1.

these matters, this research explains how and why the global CoCo market has evolved, and uses Moody’s, Dealogic, and BIS data to examine sell-side and buy-side global CoCo activity.<sup>67</sup>

**Figures 1 and 2** illustrate the extent to which *real-world CoCo issuances are divorced from CoCo structures encouraged by many academic CoCo proponents*. CoCos with book-value and point of non-viability (PONV)<sup>68</sup> triggers (discretionary triggers), as well as CoCos solely with PONV triggers, dominate the global marketplace. Write-downs are the dominant method of loss absorption amongst outstanding issuances, and for almost all of these write-down CoCos, the full value of the security is written-down upon a trigger event occurring.<sup>69</sup>

**Figure 1**

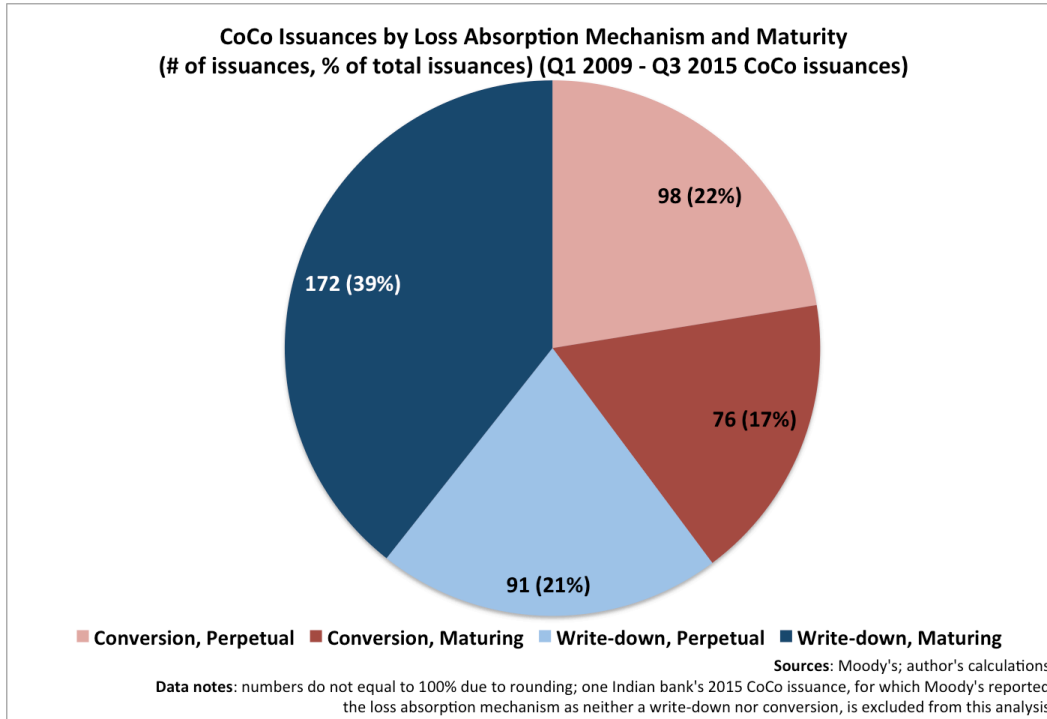


<sup>67</sup> See *supra* note 66 for a description of the Moody’s CoCo database and how it is used throughout this research. Section 4, sub-section C (Figures 8 through 10) of this research uses the Moody’s CoCo database and data provided to the author by Dealogic [*hereinafter* “Dealogic CoCo dataset”] to analyze the buy-side market for CoCos. The Dealogic CoCo dataset contains buy-side activity estimates for about 65 recent CoCo issuances. Comparable, compatible categories of buy-side activity at the time of issuance only exist for 55 issuances. For some of these issuances, the ISIN number provided was part of a multiple-ISIN issuance in the Moody’s CoCo database, precluding the ability to match buy-side activity provided by Dealogic with Moody’s issuance data; these issuances are thus excluded from buy-side analyses presented in this research. The remaining 41 issuances, however, are used to develop Figures 8 through 10. These CoCo issuances were worth USD \$49.6 billion at the time of issuance, and their regional/national break-down, in terms of U.S. dollar volume at time of issuance, is as follows: China (23%), Eurozone (30%), Switzerland (14%), U.K. (17%), and other (17%). Thus while overweight Eurozone, this sample is roughly equivalent in terms of national-breakdown of issuance to the existing global market.

<sup>68</sup> PONV is a term which stems from Basel III’s definitions for regulatory capital and usually means that the national bank regulator either (1) determines conversion of CoCos is necessary to avoid the firm’s non-viability or (2) that the bank needs a public capital injection to stay viable, in which case CoCos must first be triggered first.

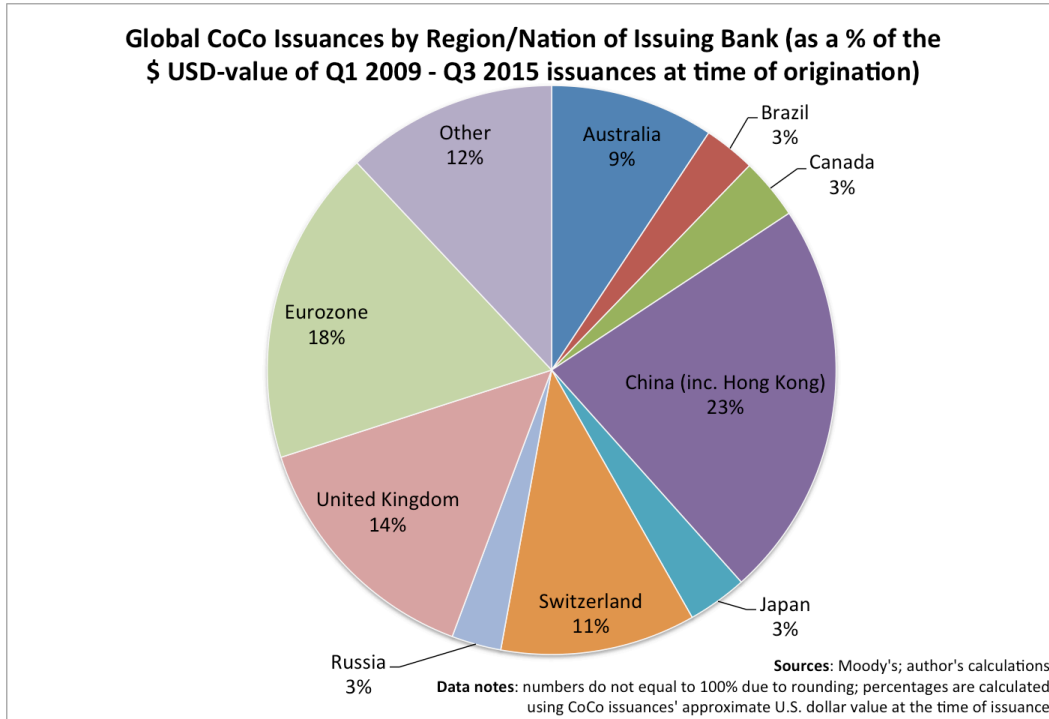
<sup>69</sup> Avdjiev et al., *CoCos: a Primer*, *supra* note 34.

**Figure 2**

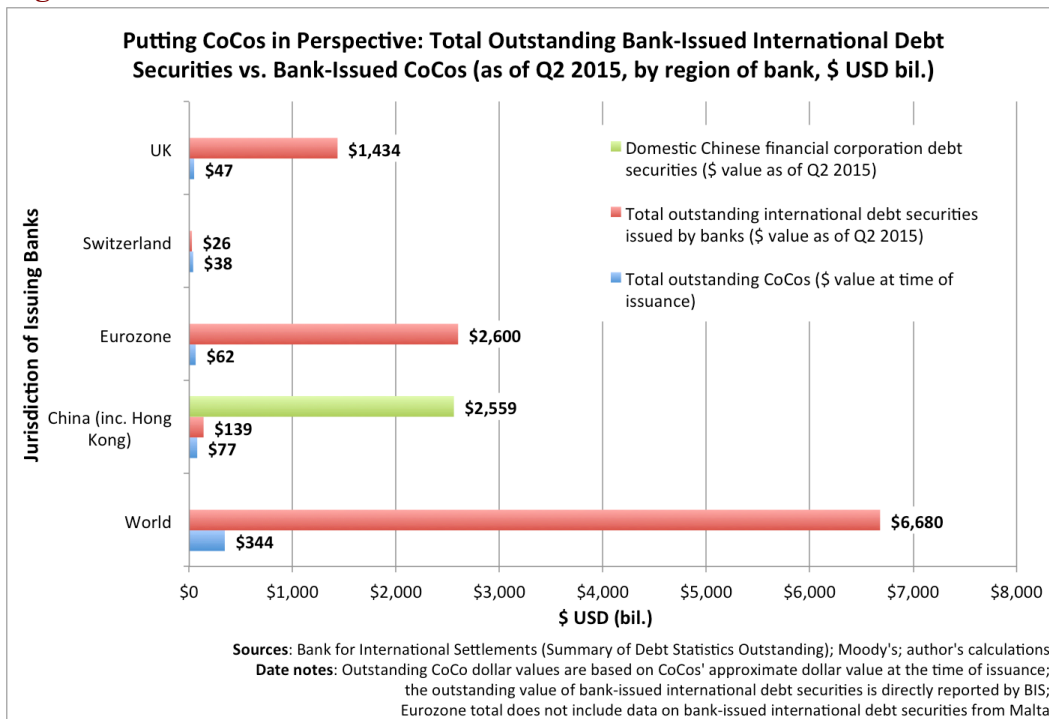


Before examining how Basel III and regulatory decisions helped bring about the evolution of the global CoCo market, it is worth highlighting the geographic diversity of these issuances and that, despite recent growth, outstanding CoCo issuances constitute a relatively small market, as shown in **Figures 3 and 4**.

**Figure 3**

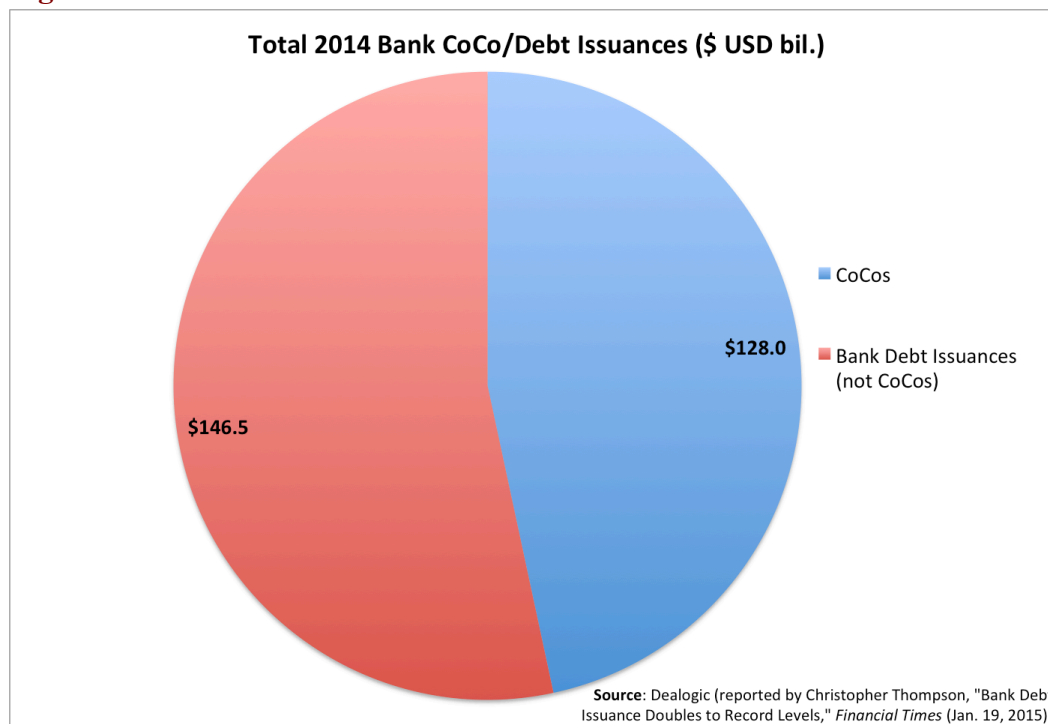


**Figure 4**



Yet while outstanding CoCo issuances pale in comparison to global bank-issued international debt instruments,<sup>70</sup> in 2014, CoCos accounted for \$128 billion of the \$274.5 billion in bonds issued by banks (illustrated by Financial Times-reported Dealogic data in **Figure 5**).<sup>71</sup> As **Figure 7** will illustrate, however, significantly fewer CoCos were issued in 2015.

**Figure 5**



How regulatory shifts drove the evolution of the global CoCo market from its birth in 2009 through Q3 2015 is explored below.

### **A. The birth of CoCos: 2009-2010**

The aftermath of the financial crisis brought about calls for heightened bank capital, and under pressure by the British government to increase capital levels, Lloyds Banking Group

<sup>70</sup> On the other hand, the Q2 2015 outstanding dollar-value of Chinese bank-issued international debt instruments was valued at less than the dollar-value (at the time of issuance) of outstanding Chinese bank-issued CoCos (this is because Chinese financial firms' debt financing largely comes from domestic debt securities, as Figure 7 also illustrates). A similar market breakdown exists in Switzerland, where Q2 2015 domestic financial corporation debt securities outstanding equaled \$98 billion. Moody's CoCo database, *supra* note 66; Bank for International Settlements, *Summary of Debt Securities Outstanding* (BIS Statistics Explorer, accessed Mar. 2016).

<sup>71</sup> Christopher Thompson, "Bank Debt Issuance Doubles to Record Levels," *Financial Times* (Jan. 19, 2015). Notably, this total is less than the total reported using Moody's data. This discrepancy is likely because the Moody's CoCo database reports the approximate dollar-volume of CoCo issuances at the time of issuance, as opposed to the market value of the CoCos. There are also likely differences between how CoCos are defined in each dataset.

became the first banking institution to issue CoCos in November 2009.<sup>72</sup> Lloyds exchanged existing securities for over thirty series (worth approximately GBP 7.5 billion) of “enhanced capital notes” (ECNs),<sup>73</sup> which used a book-value trigger.<sup>74</sup> The decision by British regulators to allow Lloyds to issue the notes in fulfillment of regulatory capital requirements enabled Lloyds to exit the Government Asset Protection Scheme by raising its capital ratio, and to avoid majority government ownership (which owned 40 percent of Lloyds at the time).<sup>75</sup>

In November 2009, the European Union’s (EU) Capital Requirements Directive II (CRD II) created EU regulatory legitimacy for CoCos to be treated as Tier 1 capital; investors also anticipated that CoCos would be treated as regulatory capital once Basel III was finalized when the Basel Committee released a Consultative Document in which it announced that it was contemplating the consideration of CoCos as regulatory capital.<sup>76</sup> These developments gave birth to the first true CoCo issuance, which occurred in July 2010 when Italian bank UniCredit issued approximately €500 million (\$641 million at the time) of CoCos that would be written down if its total risk-based capital ratio fell below 6 percent, or at regulator’s discretion.<sup>77</sup>

In August 2010, the Basel Committee released a proposal that discussed criteria under which debt-like hybrids could count as regulatory capital.<sup>78</sup> Shortly after Basel III was finalized in December 2010, the Basel Committee clarified minimum structural criteria under which debt-like hybrids with triggers could be treated as regulatory capital: these documents enabled a global boom in CoCo issuances.<sup>79</sup>

## **B. Basel III & the 2011-15 CoCo issuance boom**

Basel III eliminates the distinction between Upper and Lower Tier 2 capital that existed under Basel II, and divides Tier 1 capital into Common Equity Tier 1 – which must make up at

---

<sup>72</sup> Moody’s CoCo database, *supra* note 66.

<sup>73</sup> *Ibid.*; Avdjiev et al., *supra* note 31.

<sup>74</sup> Moody’s CoCo database, *supra* note 66.

<sup>75</sup> See Kjell B. Nordal & Nicolas Stefano, *Contingent Convertible Bonds (Cocos) Issued by European Banks* (Norges Bank, Staff Memo NR. 19, 2014); Paul Davies, *CoCos in the Courts* (Commercial Law Centre Blog, University of Oxford, Faculty of Law, Nov. 2015); Eric S. Halperin, “CoCo Rising: Can the Emergence of Novel Hybrid Securities Protect from Future Liquidity Crises,” *International Law & Management Review* (Winter 2011).

<sup>76</sup> See Jennifer Hughes, “UniCredit points way for hybrid bonds,” *Financial Times* (Jul. 13, 2010); Basel Committee on Banking Supervision, *Consultative Document: Strengthening the resilience of the banking sector* (Dec. 2009), 5.

<sup>77</sup> See Hughes, *supra* note 76; Moody’s CoCo database, *supra* note 66. A CoCo-like issuance by Dutch cooperative bank Rabobank took place in March 2010, but is not counted as a CoCo throughout this research because the issuance did not count towards regulatory capital. See *supra* note 66.

<sup>78</sup> Basel Committee on Banking Supervision, *Proposal to ensure the loss absorbency of regulatory capital at the point of non-viability* (Aug. 2010).

<sup>79</sup> See Basel Committee on Banking Supervision, *Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systems* (Dec. 2010); Basel Committee on Banking Supervision, Annex: *Final elements of the reforms to raise the quality of regulatory capital issued by the Basel Committee* (Jan. 2011). See also Basel Committee on Banking Supervision, *Basel III definition of capital - Frequently asked questions* (Oct. 2011).

least 4.5 percentage points of a banks' risk-weighted assets at all times – and remaining “Additional Tier 1” (AT1) capital. Combined, Tier 1 capital must make up at least 6 percent of a bank's risk-weighted assets. Preferred shares and CoCos can count towards AT1 capital requirements. To count towards AT 1 capital requirements under Basel III, **AT1 CoCos** must:<sup>80</sup>

- be a perpetual security
- have discretionary and cancellable coupon payments
- have a call date of at least 5 years after the date of issuance
- have the ability to be triggered at what regulators deem the PONV (in other words, the instrument must have a regulatory discretionary trigger)
- have a minimum trigger level for write-down or conversion equal to or greater than a CET1 capital ratio of 5.125 percent

Additionally, under Basel III, banks must maintain total capital levels worth at least 8 percent of total risk-weighted assets, made up of Tier 1 and Tier 2 (T2) capital. T2 capital may consist of CoCos, subordinated debt, preferred shares, or CET1 capital. To count towards T2 capital requirements under Basel III, **T2 CoCos**:<sup>81</sup>

- can have a longer-term call date
- may include mandatory coupon language
- must be able to be triggered at the regulator's discretion (via the PONV)
- need not be a perpetual security
- need not have a numerical trigger

The requirement that CoCos be triggered at the national regulator's discretion (the PONV) can be fulfilled via either (1) a statutory obligation established in the jurisdiction of the operating bank or (2) contractual language within the CoCo.<sup>82</sup>

As alluded to above, Basel III helped provide clarity to the nascent CoCo market, and has certainly spurred its 2011-15 boom. **Figure 6** profiles why banks have chosen to issue CoCos in recent years, and highlights the extent to which ***both the regulatory treatment of CoCos and funding cost concerns discussed in Section 2 have driven CoCo issuances by banks.*** **Figure 7** illustrates how patterns of CoCo issuances have shifted in recent years.

---

<sup>80</sup> See *supra* note 79. See also Avdjiev et al., *supra* note 31; European Securities and Markets Authority, *Statement, Potential Risks Associated with Investing in Contingent Convertible Instruments* (Jul. 31, 2014); Avdjiev et al., *CoCos: a Primer*, *supra* note 34.

<sup>81</sup> See *supra* notes 79 & 80 for sources that set forth the T2 CoCo classification established under Basel III.

<sup>82</sup> For a helpful overview of the PONV, see Jeffrey Oakes & Connie Milonakis, “Considerations when issuing CoCos into the US,” *International Financial Law Review* (May 2013); Morrison Foster, “IFLR Webcast: Contingent Capital and Related Developments” (Apr. 2013).

**Figure 6**

<b>Why do Banks Issue CoCos?</b>	
<b>Report</b>	<b>Reason(s) Given</b>
Goldman Sachs (2011) <sup>83</sup>	“Ultimately, debt treatment is critical for regulators – even if today they see the market’s response as a secondary consideration. If banks cannot issue contingent capital in size, or if investors shun the securities, then contingent capital will not be a viable solution to the problem of too big to fail.”
Deutsche Bank (2011) <sup>84</sup>	“The possibility of counting CoCos towards regulatory capital under Basel III acts as an incentive to issue instruments of this kind.”
Bank for International Settlements (2013) <sup>85</sup>	“CoCo issuance patterns are largely driven by the way Basel III is applied, or supplemented, by national regulators.”
Martijn Boermans et al. (2014) <sup>86</sup>	“Financial markets expect banks to issue more CoCos following the implementation of the [EU’s] new Bank Recovery and Resolution Directive requirement that a troubled bank must first write down a part of its liabilities before it qualifies for external support.”
Moody’s (2015) <sup>87</sup>	“Banks typically favour CoCos for their contractual loss-absorption features, which make them eligible to meet a share of Basel III risk-based capital and supplementary leverage requirements.”
Stefan Avdjiev et al. (2015) <sup>88</sup>	“The pressure on banks to recapitalize following the financial crisis and the regulatory treatment of CoCos are the main drivers of CoCo issuance”
Moody’s (2016) <sup>89</sup>	Asian banks “have issued CoCos to fund rapid balance sheet growth and to meet capital requirements in jurisdictions that have made progress in early adoption of the Basel III capital framework.” European banks “[take] advantage of the relatively low costs associated with CoCos (compared to common equity).”

<sup>83</sup> Louise Pitt et al., Goldman Sachs, *Contingent Capital: Possibilities, problems and opportunities* (Goldman Sachs Global Markets Institute, Mar. 2011).

<sup>84</sup> Deutsche Bank, *Contingent Convertibles: Bank bonds take on a new look* (Deutsche Bank, EU Monitor 79, May 2011).

<sup>85</sup> Avdjiev et al., *CoCos: a Primer*, *supra* note 34.

<sup>86</sup> Boermans et al., *supra* note 43.

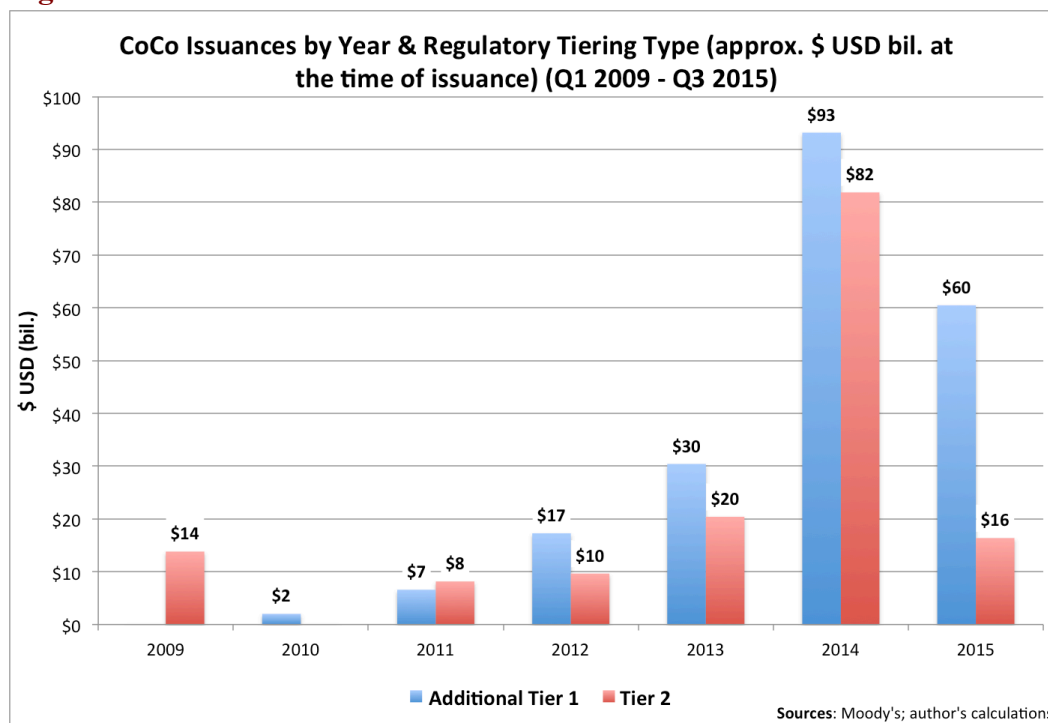
<sup>87</sup> Moody’s Investors Service, Global Credit Research, “Announcement: Moody’s: Global issuance of contingent capital instruments drops by 44% year-on-year in first nine months of 2015” (Sep. 2015).

<sup>88</sup> Stefan Avdjiev et al., *supra* note 31.

<sup>89</sup> Moody’s Investors Service, Global Credit Research, “Announcement: Moody’s: Global CoCos issuance falls in 2015; Asian, European banks still dominant” (Feb. 2016).



**Figure 7**



Europe's early embrace of Basel III explains why 61 percent of 2011 issuances were from banks located in the Eurozone.<sup>90</sup> Similarly, Swiss regulators finalized CoCos rules in late 2011 as part of the "Swiss Finish" which required the largest Swiss banks to hold three-times as much capital and permitted CoCos to count towards 9 percent of risk-weighted assets; by 2012 and 2013, Swiss banks had further boosted global CoCo issuances, accounting for 28 and 29 percent of global totals, respectively.<sup>91</sup> Issuance growth in 2012 and 2013 was further heightened by Australia's 2011 embrace of Basel III – Australian banks issued more CoCos (in U.S. dollar-value at issuance terms) in 2012 and 2013 than any other country besides Switzerland.<sup>92</sup>

***Tax laws also played a factor in issuance growth: in 2013, over 64 percent of CoCos were issued in jurisdictions where debt interest payments were tax deductible.***<sup>93</sup> The German experience is indicative of the importance of tax treatment. Until May 2014, the German tax code precluded CoCo issuances because it was not clear that coupon payments for AT1 CoCos were tax deductible, but that month, the German government finalized tax code changes to allow

<sup>90</sup> Moody's CoCo database, *supra* note 66 (calculated as a share of the sum of approximate USD-values of 2011 CoCo issuances at the time of issuance).

<sup>91</sup> *Ibid.* See Pennacchi et al., *supra* note 6; Christian McNamara et al., Swiss Finish to Basel III (Yale Program on Financial Stability Case Study, Mar. 2015).

<sup>92</sup> Moody's CoCo database, *supra* note 66; Ashley Lee, "Australian Basel III-bonds come of age," *International Financial Law Review* (Mar. 2014).

<sup>93</sup> Avdjiev et al., *CoCos: a Primer*, *supra* note 34.

banks to deduct AT1 CoCo interest payments.<sup>94</sup> Just one month later, the first German CoCos – three issuances worth \$4.725 billion – were issued by Deutsche Bank.<sup>95</sup>

**Figure 7** illustrates massive issuance growth in 2014 and 2015 relative to 2012 and 2013. As a Moody's analysis notes, this is in large part because of regulatory changes in Europe and Asia.<sup>96</sup> In 2014 and 2015, Chinese banks, which did not issue any CoCos before 2014, accounted for 34 and 26 percent of the dollar-volume of global CoCo issuances, respectively.<sup>97</sup> This surge began when Chinese regulators began enforcing regulations stemming from Basel III.<sup>98</sup> By Q3 2015, global CoCo issuances declined relative to 2014 due to a variety of market factors; the summer 2015 Greek debt crisis delayed issuances, as did uncertainty about a pending rate hike by the U.S. Federal Reserve.<sup>99</sup> There were also significantly fewer issuances by Asian banks due to Chinese growth concerns, diminished bank asset growth, and other poor market conditions.<sup>100</sup>

Regulatory shifts have driven not just the scope but also the structure of CoCo issuances and are a major driver behind the 2015 drop-off in T2 issuances. Notably, Eurozone banks issued no T2 CoCos in 2014 or through Q3 2015.<sup>101</sup> On the other hand, Australian, Canadian, and Chinese banks were responsible for over 90 percent of 2015 T2 CoCo issuances (40, 20, and 33 percent, respectively), and in 2014, Chinese banks accounted for half of T2 CoCo issuances.<sup>102</sup> This is in large part because Total Loss-Absorbing Capital (TLAC) rules for large global banks and the EU's 2015 "minimum requirement for own funds and eligible liabilities" (MREL) incentivize large European banks to issue senior unsecured debt instead of CoCos to meet T2 capital requirements.<sup>103</sup> CoCos are more expensive to issue than senior unsecured debt: the yield to maturity of CoCos is generally significantly higher, and CoCos are generally rated five notches or more below senior unsecured debt originated by the same issuer.<sup>104</sup>

Also for policy-driven reasons, there were relatively fewer low-trigger CoCos issued in 2015 than in 2014 or 2013. One driving factor is that in April 2014, the European Central Bank announced that it would not allow CoCos with CET1 triggers below 5.5 percent to be counted

---

<sup>94</sup> See Annika Breidhardt, "Germany gives banks legal certainty on CoCos," *Reuters* (Apr. 10, 2014); Florian Lechner, "Germany: Ministry clears tax treatment of AT1 capital," *Bank + Insurance Hybrid Capital* (May 2015).

<sup>95</sup> Moody's CoCo database, *supra* note 66.

<sup>96</sup> See Moody's Investors Service, Global Credit Research, "Announcement: Moody's: Bank CoCo issuance will remain strong in 2015" (Feb. 2015).

<sup>97</sup> Moody's CoCo database, *supra* note 66.

<sup>98</sup> See Gabriel Widau, "Bank of China in record \$6.5bn Coco sale," *Financial Times* (Oct. 16, 2014).

<sup>99</sup> See Moody's Investors Service, *supra* note 87.

<sup>100</sup> See *ibid.*; Moody's Investors Service, *supra* note 89.

<sup>101</sup> Moody's CoCo database, *supra* note 66.

<sup>102</sup> *Ibid.* (calculated as a share of the sum of approximate USD-values of CoCo issuances at the time of issuance).

<sup>103</sup> See Jason Webb, "Tier 2 CoCo flood may turn to trickle as TLAC, MREL doubts linger," *SNL* (Jun. 25, 2015); Avdjiev et al., *supra* note 31.

<sup>104</sup> Avdjiev et al., *CoCos: a Primer*, *supra* note 34.

towards AT1 capital requirements in stress tests.<sup>105</sup> Another driver is that Swiss banking regulators, who once pushed banks to issue low-trigger CoCos, announced in 2015 the phase-out of low-trigger CoCos.<sup>106</sup> Yet as **Figure 1** illustrated, as of Q2 2015 only 15 percent of global CoCo issuances were structured with high-triggers; again, the CoCos in the global market are largely structured counter to the recommendations of most academics who favor CoCos.

### C. Understanding the buy-side market

The effect of regulatory shifts on instrument design has certainly impacted CoCo market buy-side activity, which as estimates in **Figures 8 through 10** illustrate, is dominated by asset/fund managers, hedge funds, and banks (largely via private banks acting on behalf of high-net worth clients) in the primary market.<sup>107</sup> For example, **Figure 8** reveals that traditional fund and asset managers are disproportionately invested in write-down rather than conversion instruments; this is likely because of restrictions on the ability of fixed-income funds to invest in conversion CoCos.<sup>108</sup> Investments in discretionary trigger only CoCos, on the other hand, are avoided by hedge funds as **Figure 9** shows; this attests to the fact that many sophisticated investors perceive CoCo triggers as a source of instrument mispricing.<sup>109</sup> **Figure 10** illustrates that hedge funds also disproportionately prefer perpetual CoCos, which are inherently riskier and more difficult to price than maturing CoCos.

---

<sup>105</sup> See *European Central Bank*, Press Release, “ECB to give banks six to nine months to cover capital shortfalls following comprehensive assessment” (Apr. 29, 2014) (cited in Andreas Cahn & Patrick Kenadjian, *Contingent Convertible Securities: from Theory to CRD IV* (Institute for Law and Finance, Working Paper Series No. 143, 2014)).

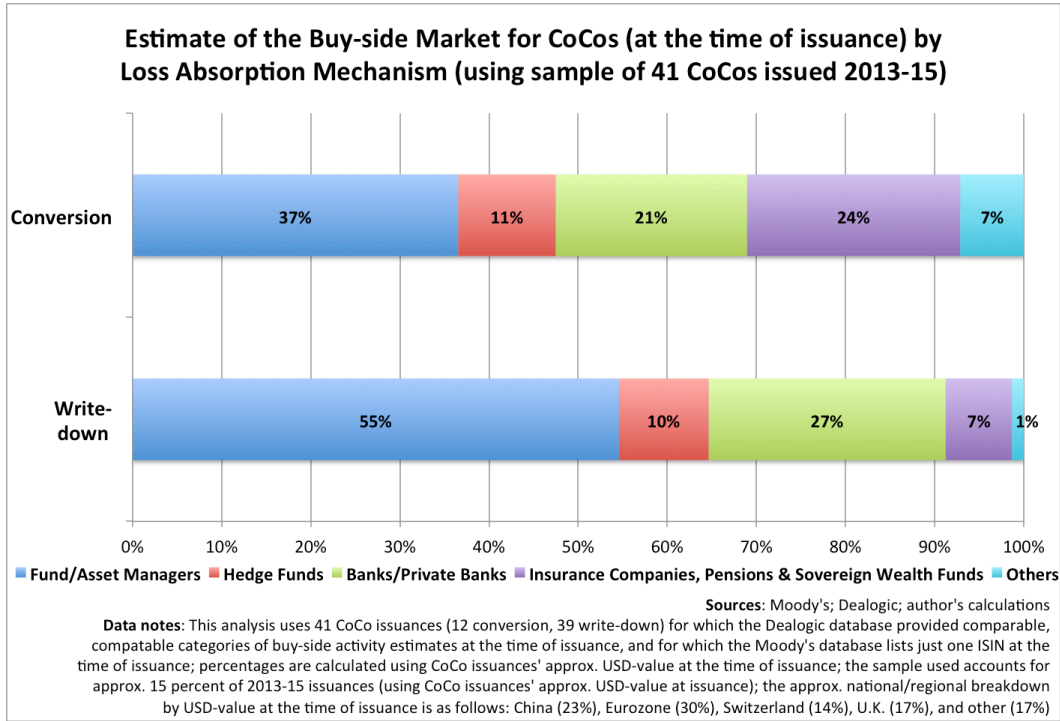
<sup>106</sup> Thomas Hale & Ralph Atkins, “New rules change landscape for Swiss ‘cocos’,” *Financial Times* (Oct. 22, 2015)

<sup>107</sup> An analysis of Dealogic data on CoCo issuances for which private bank purchasing data is available suggests that at least 80 percent of “bank” CoCo purchases (at the time of issuance) have been made by private banks. Dealogic CoCo dataset, *supra* note 67. For a list of the 41 CoCo issuances used to produce Figures 8-10 and an estimate of primary CoCo market that does not take into account CoCo structural characteristics, see *Appendix B*.

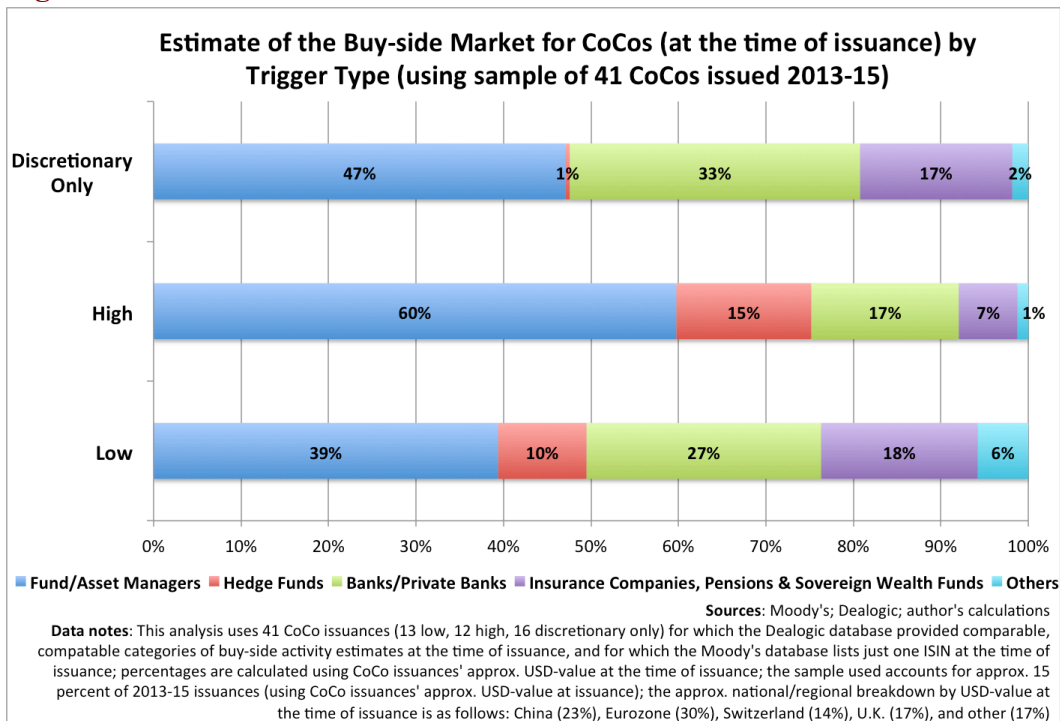
<sup>108</sup> Insight gained from conversations with industry participants.

<sup>109</sup> *Ibid.* See also *infra* notes 119-120 and accompanying text.

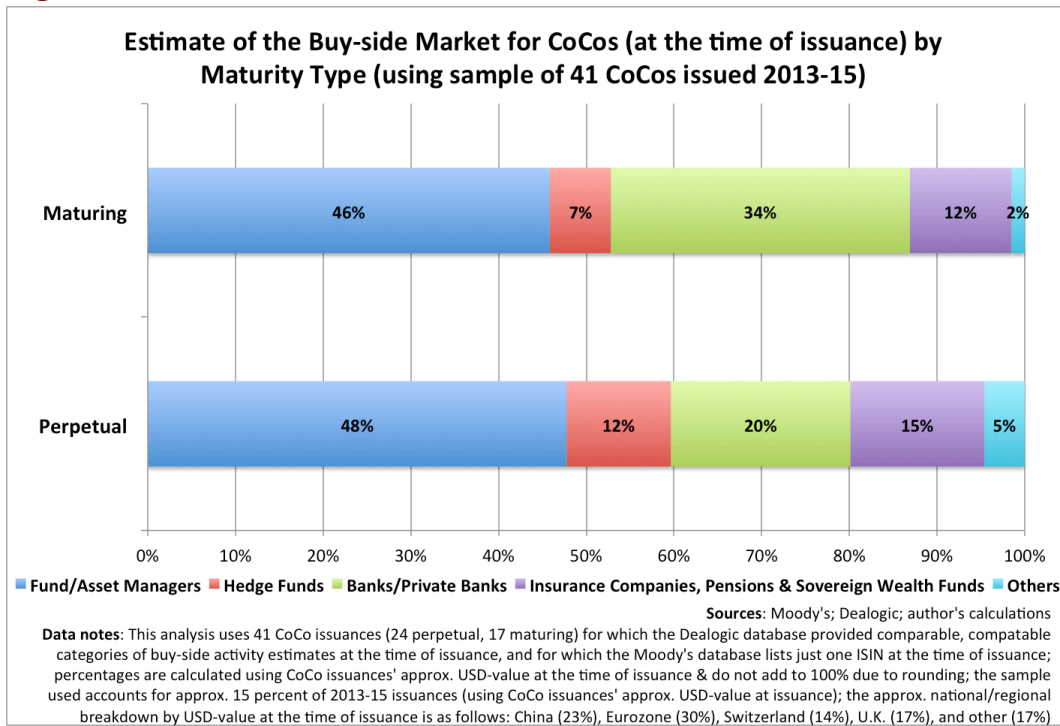
**Figure 8**



**Figure 9**



**Figure 10**



There is seemingly very little data on secondary CoCo market activity broken-down by instrument characteristics. Economists note, however, that the secondary market for CoCos is “illiquid” and “thin.”<sup>110</sup> This market is also impacted by regulations on the types of investors eligible to purchase CoCos, which can vary greatly by jurisdiction. While the United Kingdom recently banned retail investors from investing in CoCos, Australian retail investors have been allowed to invest heavily in these securities.<sup>111</sup>

## 5. Policy Options

The evolution of the global CoCo market reveals the major significance that policy decisions have on the structures of, supply of, and demand for CoCos. The state and fate of this splintered, troublingly-structured market, as well as academic disagreement surrounding the benefits of CoCos and particular CoCo structures, should inform U.S. banking policymakers' understanding of potential benefits, costs, risks, and operational concerns facing considering the efficacy of either requiring or allowing U.S. banks to issue CoCos.

<sup>110</sup> See Paul H. Kupiec, “Will TLAC Regulations Fix the G-SIB Too-Big-To-Fail Problem?” (American Enterprise Institute, AEI Economic Policy Working Paper 2015-08, Nov. 2015), at 6; George M. von Furstenberg, *Contingent Convertibles [CoCos]: A Potent Instrument for Financial Reform* (2014), at 95.

<sup>111</sup> See U.K. Financial Conduct Authority, Press Release, “FCA restricts distribution of CoCos to retail investors” (Aug. 5, 2014); Vera Sprothen, “Australian Investors Snap Up Risky Cocos,” *Wall Street Journal* (May 13, 2015).

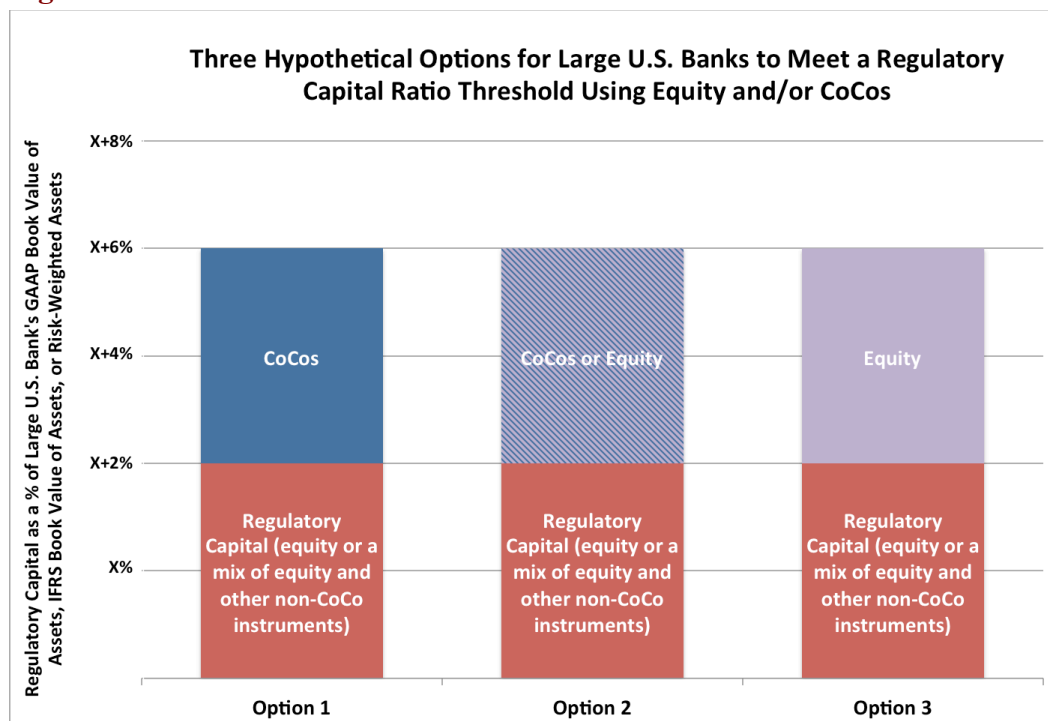
To further explore the trade-offs associated with CoCos in the U.S. context, however, necessitates considering specifically how legislation would require or allow large U.S. banks to issue these instruments. So in addition to broadly exploring the policy trade-offs associated with requiring or allowing U.S. banks to issue CoCos, this research also examines benefits, costs, risks, and operational concerns brought about by requiring or allowing large U.S. banks to issue a significant amount of CoCos in fulfillment of Chairman Hensarling’s proposed “high, but simple” capital threshold for regulatory relief. In lieu of issuing CoCos, this research assumes banks would be required to issue equity of equal volume to meet the threshold. Given these conditions, three broad legislative options (visualized in **Figure 11**) exist:<sup>112</sup>

**Option 1:** *Require large U.S. banks to issue CoCos to meet a portion of a high regulatory capital threshold that prompts various regulatory exemptions.*

**Option 2:** *Allow large U.S. banks to issue CoCos to meet a portion of a high regulatory capital threshold that prompts various regulatory exemptions.*

**Option 3:** *Do not allow large U.S. banks to issue CoCos to meet a portion of a high regulatory capital threshold that prompts various regulatory exemptions. Only permit equity issuances equal to the CoCo volume being considered to meet this threshold.*

**Figure 11**



<sup>112</sup> Options based upon discussions with Committee majority staff. Committee staff discussions, *supra* note 3.

A critical component of any regulatory capital metric is of course the denominator (how bank assets are measured). The trade-offs associated with varying options – total assets measured by Generally Accepted Accounting Principles (GAAP) or total assets measured by International Financial Reporting Standards (IFRS) (which takes into account off-balance sheet items), for example – is outside the scope of this research, but **Figure 12** highlights how these differing measurements could greatly affect the volume of U.S. CoCo issuances.

**Options 1 and 2** necessitate an additional consideration:

*Any legislation that enables U.S. banks to issue CoCos must broadly or narrowly define, and/or delegate authority to the Fed to define, structural parameters under which a debt-like hybrid with at least one trigger is to be treated as regulatory capital (and thus be a CoCo).*

## **6. Risks, Benefits, Costs & Operational Concerns of Policy Options**

Issues surrounding how Congress and/or the Fed could and should go about establishing regulatory parameters to define CoCos are explored below, as are considerations related to the CoCo buy-side market. The impact that global CoCo market trends – and recent disturbances – should have on U.S. policymakers’ perceptions of the potential costs and risks of CoCos is also discussed, as is what the untested nature of CoCos means for the attractiveness of this instrument. How policymakers could go about comparing the net benefits of simply requiring higher equity issuances (Option 3), relative to requiring or allowing CoCo issuances, to meet the threshold for regulatory relief proposed by Chairman Hensarling is also examined.

### **A. Concerns surrounding getting CoCo structure right**

The structural components that Congress and/or the Fed deem sufficient to classify a hybrid debt-like instrument as a CoCo could be broad (for example, regulations permit numerous book-value or market-value triggers with numerous types of thresholds) or narrow (only an 8 percent CET1 ratio trigger is permitted, for example). Over-lenience, however, could prompt banks to issue poorly structured CoCos that amplify instead of mitigate banking risk. Most academic proponents of requiring U.S. banks to issue CoCos seemingly advocate for strict limitations on structural components for CoCos.<sup>113</sup> *To what extent should Congress (1) prescribe CoCo structural requirements in statute, and/or (2) delegate the determination of some CoCo structural elements to the Fed?* Two concerns exist:<sup>114</sup>

---

<sup>113</sup> See Calomiris & Herring, *supra* note 6. Most CoCo proponents do not encourage wide discretion in the conditions under which debt-like hybrid instruments be treated as CoCos.

<sup>114</sup> These concerns were informed by conversations with Committee staff and Professor Robert Glauber, Harvard University. See Committee staff discussions, *supra* note 3.

***(1) Congressional determination of very technical CoCo parameters is ill advised.***

Congress is well-suited to determine the specific policy goals that CoCos should be structured to achieve and to set broad structural requirements to advance these objectives (such as specifying the type of trigger and loss absorption mechanism, for example). It is less clear that Congress should set more intricate structural requirements for CoCos (conversion rate and precise trigger level, for example) via statute. **Section 3** highlighted substantial academic disagreement regarding the appropriateness of various CoCo structural components, and Congress erroneously settling this debate could bring about severe destabilizing effects through the proliferation of poorly structured CoCo issuances. Also, the potential effects of some CoCo components have clearly not been thoroughly examined. Robust analyses should accompany the determination of nuanced and technical CoCo structural details before any U.S. CoCo requirement is put in place.

***(2) A legislative embrace of CoCos likely necessitates at least some degree of regulator involvement in structural design.*** Given the complex nature of CoCo issuance structures, and the lack of sufficient research regarding certain components, Congress would likely find it necessary to delegate to a regulator (likely the Fed) determination of some highly technical CoCo structural requirements. This raises concerns that the Fed would structure CoCo rules counter to Congressional objectives, and brings about valid criticisms of over-reliance on regulatory discretion. It also necessitates confidence that regulators can adequately address uncertainties stemming from setting appropriate structure requirements, as well as a tolerance for the risk that poorly designed CoCos proliferate as a result of this delegation of responsibility.

These issues illustrate that ***to exist, CoCos require a level of top-down regulatory discretion given the instrument's (1) central focus on achieving public policy objectives and (2) inherent reliance on a regulatory endorsement of certain structural characteristics to exist.*** The recent drop in the price of Deutsche Bank CoCos, discussed in further depth below, illustrates how poor CoCo design can prompt adverse market reactions far in advance of a bank reaching a stressed capital ratio.<sup>115</sup>

Notably, embracing CoCos with market-value triggers – as many academics suggest – necessitates Congress and/or U.S. banking regulators endorse a CoCo structure that inherently runs counter to the type of CoCo permitted under Basel III. According to a recent survey of institutional investors, however, the biggest risk facing the global CoCo market is that it is too

---

<sup>115</sup> “Discomforting Brew: Investors are reassessing yet another complicated financial instrument,” *The Economist* (Feb. 13, 2016).



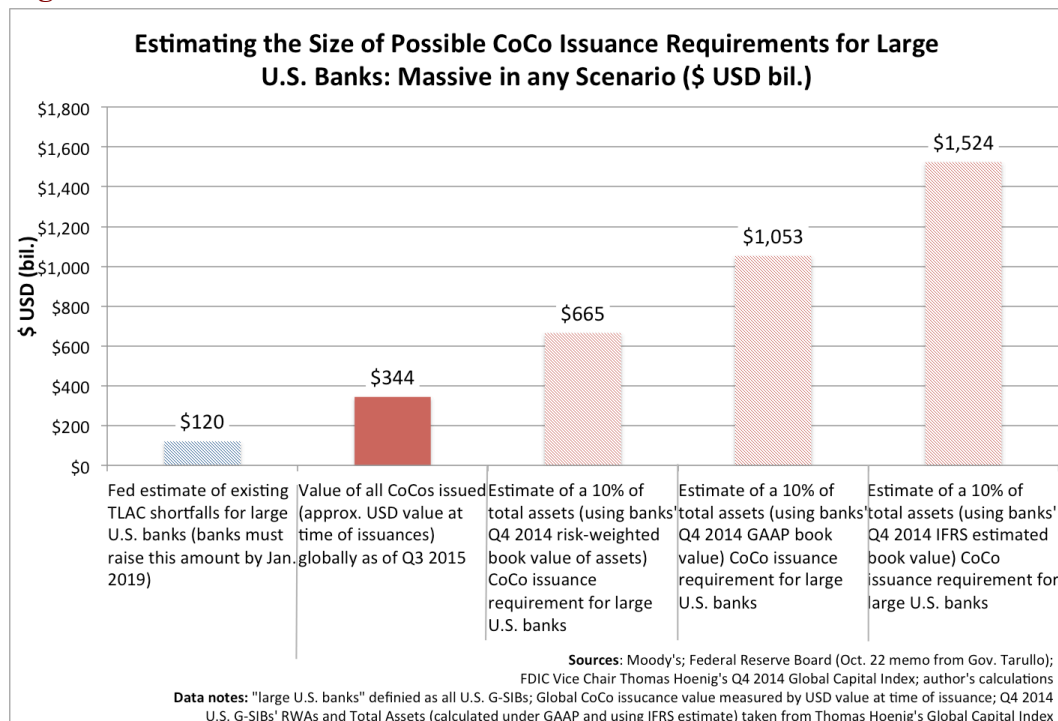
complex; standardization is key to bolstering demand and liquidity in the CoCo market.<sup>116</sup> Thus sizable issuances of market-value-trigger CoCos would further fragment an already splintered and illiquid market,<sup>117</sup> potentially hampering buy-side activity. More buy-side concerns facing U.S. policymakers are explored below.

## B. Concerns surrounding CoCo issuance volume & buy-side activity

Small-volume CoCo issuances would likely result in few private risk-monitoring benefits, as noted in **Section 3. *Were legislation only to allow (and not require) large U.S. banks to issue CoCos (Option 2), Congress and/or bank regulators should require a certain threshold of CoCos be issued in order for the instruments to count towards regulatory capital.*** Of course uncertainty surrounds how policymakers should consider setting this threshold.

Uncertainty also surrounds how the buy-side market would respond to sizable large U.S. bank CoCo issuance volumes. **Figure 12** estimates the volume of issuances brought about by varying hypothetical CoCo issuance requirements for large U.S. banks: ***any meaningful CoCo issuance requirement, regardless of how regulators calculate bank assets, would be massive.***

**Figure 12**



<sup>116</sup> Alberto Gallo et al., "Cocos: Investors call for standardisation, more consistency," *The Revolver* (Macro Credit Research, Royal Bank of Scotland, May 2014).

<sup>117</sup> See *supra* Section 4 (Understanding the CoCo Market Today: Critical to U.S. Policy Formulation); *The Economist*, *supra* note 115; John Glover, "Deutsche Bank CoCo Holders See What Regulators Mean by Risk," *Bloomberg Business* (Feb. 10, 2016).

**Section 4** suggests that the U.S. CoCo primary buy-side market break-down – assuming restrictions on retail investors and bank holdings of CoCos – could reasonably be expected to be as follows: asset managers purchase roughly half of issuances, while hedge funds and private banks investing on behalf of high-net-worth clients split the other half. Certain CoCo proponents, however, want to restrict banks and hedge funds from holding CoCos.<sup>118</sup> **Figures 8 through 10** suggest that *a prohibition on hedge fund purchases of CoCos could shrink the buy-side market for U.S. CoCos by at least 10 percent*. This furthers concern that there could be insufficient buy-side demand and/or a precariously illiquid market for U.S. CoCos.

Bolstering liquidity concerns is that *the investor base for the entire CoCo market is quite “narrow”* – investors must be willing to take on large risks associated with a trigger event that will likely be highly correlated with systemic financial market downturns.<sup>119</sup> Investors list (1) yield and (2) low likelihood of conversion as their two primary investment motivations, and for the most part, view CoCos as mispriced.<sup>120</sup> Given these circumstances, *a trigger event occurring in a foreign CoCo market could prompt sizable sell-offs of U.S. CoCos*. To bolster CoCo effectiveness, Calomiris and Herring argue CoCo investors should also be prohibited from “simultaneously holding a bank’s CoCo and shorting its equity position.”<sup>121</sup> Such a policy may be necessary, but raises enforcement concerns.

Potential political consequences resulting from triggering events and CoCo-related regulatory decisions also merit the attention of U.S. policymakers considering the benefits of CoCos. As an example, when Lloyds moved to act on a regulatory par call included in its 2009 CoCo issuances (in response to Basel III-related regulations necessitating a trigger change), there was an uproar by pensioners on whose behalf asset managers were investing.<sup>122</sup> After a lengthy and litigious process, Lloyds exercised the call, prompting accusations of “disgraceful behavior.”<sup>123</sup> This saga is evident of political obstacles that Columbia Law Professor James Coffee warns could undermine the effectiveness of a high, dilutive single-trigger CoCo.<sup>124</sup> It highlights the experimental, volatile, and regulator-influenced nature of the global CoCo market, as does early 2016 European CoCo market turmoil discussed below.

---

<sup>118</sup> See Calomiris & Herring, *supra* note 6.

<sup>119</sup> Avdjiev et al., *supra* note 31.

<sup>120</sup> Gallo et al., *supra* note 116.

<sup>121</sup> Calomiris & Herring, *supra* note 6.

<sup>122</sup> Lianna Brinded, “This is who actually suffers in the ‘disgraceful’ £2 billion Lloyds bond ripoff,” *Business Insider* (Feb. 27, 2015).

<sup>123</sup> Kit Chellel, “Lloyds Wins Court Approval to Redeem \$5 Billion CoCo Bonds,” *Bloomberg Business* (Dec. 10, 2015); Richard Evans, “Lloyds goes ahead with repurchase of high-interest ‘ECN’ bonds,” *The Telegraph* (Jan. 29, 2016).

<sup>124</sup> Coffee, *supra* note 41.

### C. Recent market incidents highlight troubles with CoCos

Deutsche Bank CoCos issued in May 2014 (structured as write-down instruments with a 5.125 percent CET1 trigger) dropped roughly 20 percent in price between December 2015 and early February 2016 to trade below 75 cents on the Euro before recovering to over 82 cents.<sup>125</sup> The early February plunge in CoCo prices coincided with major drops in the bank's equity prices and bond prices, as well as other signals of the bank's poor health.<sup>126</sup> To calm markets, Deutsche Bank offered to buy back €3 billion in senior unsecured debt.<sup>127</sup>

The sharp price drop in Deutsche Bank's CoCos was the result of a CreditSights report that called into question whether or not the bank had enough "available distributable items" – a "subset" of earnings determined via European and German regulations and accounting rules that can be used for bank bonus, dividend, and coupon payments – to meet CoCo coupon payments.<sup>128</sup> German accounting rules set a particularly narrow definition for what financial resources may be used to pay CoCo coupons.<sup>129</sup> Making matters worse, these rules precluded investors from determining on their own whether an April coupon payment could be made.<sup>130</sup> Concerns were intensified by a European Banking Authority (EBA) paper released in mid-December that suggested European bank regulators could step in to call coupons sooner than originally anticipated as a result of new regulations governing banks' ability to pay out bonuses, coupons, and dividends.<sup>131</sup> Notably, in early 2016, Deutsche Bank's CET1 ratio was over double the CoCo trigger-level;<sup>132</sup> fear of the trigger being reached likely had no impact on the sell-off.

Some have suggested the recent price drop in Deutsche Bank CoCos (1) was a driving factor behind the buy-back offer which occurred and (2) illustrates that CoCos effectively served as an "early warning" signal of trouble at Deutsche Bank.<sup>133</sup> Deutsche Bank's buy-back offer was met with little interest by investors – only €1.3 billion in bonds were purchased.<sup>134</sup> Also, the cumulative effect of equity, bond, and CoCo price declines drove the buy-back offer.<sup>135</sup> As

---

<sup>125</sup> Tim Wallace, "Deutsche Bank investors shun €3bn bond buyback offer," *The Telegraph* (Feb. 23, 2016); Moody's CoCo database, *supra* note 66.

<sup>126</sup> See David Reilly, "Deutsche Bank: What's Behind Its Bond Buyback," *The Wall Street Journal* (Feb. 12, 2016)

<sup>127</sup> Wallace, *supra* note 125.

<sup>128</sup> See Thomas Hale, "Music stops for buyers of bank coco debt," *Financial Times* (Feb. 11, 2016); *The Economist*, *supra* note 115; Reilly, *supra* note 126; Tim Wallace, "Deutsche Bank to bolster market with €4.8bn bond purchases," *The Telegraph* (Feb. 12, 2016).

<sup>129</sup> *Ibid.*

<sup>130</sup> Thomas Stubbington & Christopher Whittal, "CoCos: What's All the Fuss About?," *The Wall Street Journal* (Feb. 11, 2016).

<sup>131</sup> Hale, *supra* note 128.

<sup>132</sup> Deutsche Bank, Press Release, "Deutsche Bank reports preliminary full year and fourth quarter 2015 results" (Jan. 20, 2016).

<sup>133</sup> Holman W. Jenkins, Jr., "Time for a Central Bankers Strike," *The Wall Street Journal* (Feb. 16, 2016).

<sup>134</sup> See Wallace, *supra* note 125.

<sup>135</sup> See Paul Davies, "Why a Deutsche Bank Bond Buyback Would Help," *The Wall Street Journal* (Feb. 10, 2016); Reilly, *supra* note 126.

suggested above, Deutsche Bank’s CoCo issuances appear to have in fact unnecessarily accelerated concerns over the banks’ fiscal health due to a number of structural and regulatory factors – a poorly-designed and opaque trigger, German accounting rules, regulatory uncertainty surrounding coupon payment restrictions resulting from the EBA paper, and uncertainty regarding whether or not regulators would permit Deutsche Bank to eventually exercise a call option – which in turn contributed to a CoCo price drop that subsequently intensified investor fears.<sup>136</sup> In short, throughout the CoCo market turmoil of early 2016, ***Deutsche Bank’s CoCo issuances resulted in undesirable and unintended market reactions.***

Most concerning, the sharp decline in the price of Deutsche Bank CoCos coincided with sizable drops in the price of CoCos issued by Santander, Unicredit, and Banco Popular, as well as the global CoCo price index.<sup>137</sup> As one French bank debt portfolio manager explained, ***“There are discrepancies in the [CoCo] market, not because of fear that Deutsche Bank or whoever will go down, but because some of the bonds are in stable hands and others aren’t. ... In a market where there isn’t any liquidity and isn’t working well, these are the results.”*** Another portfolio manager noted that the resulting market-wide drop in prices was “remarkable” but “not overly surprising.”<sup>138</sup> Now, European banks may be incapable of meeting regulatory capital objectives; as one recent European senior investment banker warned, “If prices stay at these levels, no bank will be able to issue [CoCos] and you end up with an unsustainable capital structure.”<sup>139</sup> U.S. policymakers should consider what a global CoCo price plunge would mean for large U.S. banks were they incentivized or required to issue these untested instruments.

#### **D. Untested nature of CoCos**

***No CoCo has ever been triggered, and the market reverberations of any CoCo being triggered could severely harm the price of and market for U.S. CoCos regardless of how U.S. instruments are structured.*** According to a recent Royal Bank of Scotland Survey, 70 percent of investors predict that the market price for CoCos – regardless of issuer – would drop 20 percent in the event of just one CoCo converting.<sup>140</sup> Professor Charles Goodhart of the London School of Economics echoes similar concerns, noting that “the triggering of a CoCo for Bank A would very likely cause a contagious market reaction in the value of CoCos in many other banks, leading to value destruction, though the extent and likelihood of such contagion can be questioned.”<sup>141</sup> As Bank of England research warns, “[t]here is a risk that investors are underestimating the probability that AT1 [CoCos] will be required to absorb losses,” which in

---

<sup>136</sup> See Hale, *supra* note 128; Thomas Hale & Dan McCrum, “Why coco bonds are worrying investors,” *Financial Times* (Feb. 9, 2016); *The Economist*, *supra* note 115; Editorial Board, “The Trouble with CoCos,” *Bloomberg View* (Feb. 12, 2016).

<sup>137</sup> See Hale, *supra* note 128.

<sup>138</sup> See Stubbington & Whittal, *supra* note 130.

<sup>139</sup> Tim Wallace, “Europe’s banks fear the CoCo market is dead,” *The Telegraph* (Feb. 21, 2016).

<sup>140</sup> Gallo et al., *supra* note 116.

<sup>141</sup> Goodhart, *supra* note 15.

turn is contributing to the systemic CoCo mispricing.<sup>142</sup> Notably, 90 percent of recently surveyed institutional CoCo investors think they understand the product better than the market.<sup>143</sup>

It thus may be the case that as one U.S. money manager and CoCo investor recently noted, ***“The last coco will be issued before the first one is triggered.”***<sup>144</sup> Negative market-wide risks also surround the suspension of CoCo coupon payments, which as the recent Deutsche Bank episode indicated, will likely also prompt massive CoCo price drops. U.S. policymakers should be wary that incentivizing or requiring U.S. banks to enter the volatile global CoCo marketplace has the potential to transform idiosyncratic foreign bank risks into system-wide downturns that more directly impact U.S. banks with outstanding CoCo issuances.

### **E. Benefits and costs of CoCo issuances relative to common equity**

Requiring or allowing large U.S. banks to issue sizable amounts of CoCos in order to meet a significant portion of a regulatory capital threshold that prompts regulatory relief (Options 1 and 2) would almost certainly increase the incentives for banks to enter into this arrangement relative to only allowing equity issuances to meet the threshold (Option 3) given the cost advantage to banks of issuing CoCos relative to equity (discussed in **Section 2** and highlighted in **Figure 6**). So to the extent that counting CoCo issuances towards this threshold incentivizes banks to enter into an alternative regulatory arrangement that exempts banks from complex Dodd-Frank and Basel III regulations that decrease lending activity, diminish economic growth, and limit consumer financial product access,<sup>145</sup> Options 1 and 2 could be highly advantageous at achieving the Chairman’s goals of simpler, more “pro-growth,” and more “pro-consumer” financial markets regulation.

Also, ***exclusively relying upon book-value capital metrics (Option 3) to regulate bank vitality may be problematic because the effectiveness of these measurements is diminished by lagging and other distortions like regulatory “forbearance”*** (regulators’ tendency to delay or hide losses so banks can lend and do not have to raise more capital during times of market stress).<sup>146</sup> Oftentimes, the economic value of equity can be much lower than book values

---

<sup>142</sup> See Sam Fleming, “Bank of England warns of risks over buying coco bonds,” *Financial Times* (Jun. 26, 2014).

<sup>143</sup> Gallo et al., *supra* note 116.

<sup>144</sup> *Ibid.*

<sup>145</sup> See, for example, U.S. Government Accountability Office, *Dodd-Frank Regulations: Impacts on Community Banks, Credit Unions and Systematically Important Institutions* (Dec. 2015); Preston Ash et al., “Too Small to Succeed? – Community Banks in a New Regulatory Environment,” *Dallas Fed Financial Insights*, vol. 4 (Dec. 2015): 1-4; Todd Zywicki, “The Dodd-Frank Act Five Years Later: Are We More Stable?” (Testimony Before the U.S. House Committee on Financial Services, Jul. 9, 2015); Ben Gitis et al., “Dodd-Frank at 5: Higher Costs, Uncertain Benefits” (American Action Forum, Jul. 2015); Norbert J. Michel, Ph.D. & John Ligon, “Basel III Capital Standards Do Not Reduce the Too-Big-to-Fail Problem” (Backgrounder #2905, The Heritage Foundation, Apr. 2014); Peter J. Wallison, “The Dodd Frank Act Five Years Later: Are We More Prosperous?” (Testimony Before the U.S. House Committee on Financial Services, Jul. 28, 2015).

<sup>146</sup> See Calomiris & Herring, *supra* note 6.

suggest,<sup>147</sup> and these measures do not capture losses in bank value brought about by drops in intangible asset value.<sup>148</sup> Andrew Haldane of the Bank of England finds that market values of bank equity levels are far better indicators of bank health relative to book-value measures.<sup>149</sup>

These findings undermine the utility of CoCos with book-value triggers. They also, however, strengthen the theoretical appeal of incentivizing sizable issuances of high-market-value trigger CoCos to take advantage of alternative and clearly useful measures of bank solvency: metrics based on the market value of bank equity. Calomiris convincingly argues that market-value CoCos thus offer a unique benefit, relative to book-value equity requirements, of mitigating regulatory forbearance.<sup>150</sup> Similarly, as Haldane appropriately notes, market-value triggers would help regulators overcome “the temptation to forbear.”<sup>151</sup> On the other hand, as explained in **Section 3**, market-value triggers create the serious risk of preemptive equity fire sales in advance of a trigger being reached (even if triggers lag), which could in turn undermine these benefits.

Issuances of high-trigger CoCos, relative to equity, offer the desirable benefits of (1) automatically ensuring bank recapitalization as a bank’s capital position begins to deteriorate and (2) creating pressure on management to manage the bank in such a way to diligently avoid triggering events.<sup>152</sup> Neither equity issuances nor low-level trigger CoCo issuances would achieve these desirable benefits.<sup>153</sup> Yet the preemptive risk management benefits of CoCos are drawn from anticipatory reactions by shareholders to the loss absorption mechanism’s severity, and for these theoretical benefits to be operationalized necessitates a trigger be set neither too low nor too high, which as explained earlier, may be difficult to ensure in practice. Furthermore, ***CoCo conversion itself would simply increase the book value of equity since the funding was already received; no new cash is brought into the firm.***<sup>154</sup> Worse, any one CoCo triggering could set off a “contagious market reaction” that “lead[s] to value destruction,” as explained earlier.<sup>155</sup> Low-trigger CoCos – while perhaps appropriate for dealing with idiosyncratic bank risk – could “bring forward and spread a crisis” when many banks’ assets go bad simultaneously, and depending on tax treatment and issuance amount, could in fact incentivize modest to substantially more leverage.<sup>156</sup>

---

<sup>147</sup> Charles W. Calomiris, “Is a 25% bank equity requirement really a no-brainer?,” *VOX Policy Portal, Centre for Economic Policy Research* (Nov. 2013).

<sup>148</sup> See Calomiris & Herring, *supra* note 6.

<sup>149</sup> Haldane, *supra* note 39.

<sup>150</sup> Charles W. Calomiris, “What’s Wrong with Prudential Bank Regulation and How to Fix It,” (Testimony Before the U.S. House Committee on Financial Services, Jul. 23, 2015).

<sup>151</sup> Haldane, *supra* note 39.

<sup>152</sup> See Calomiris & Herring, *supra* note 6.

<sup>153</sup> See, for example, *ibid.*

<sup>154</sup> See Prescott et al., *supra* note 16.

<sup>155</sup> Goodhart, *supra* note 15.

<sup>156</sup> Persaud, *supra* note 15.

Assuming a well-designed structure, however, recent research finds that had U.S. banks issued CoCos in large-scale prior to the crisis, the instruments would have had a positive effect on crisis mitigation.<sup>157</sup> Another study shows that well-structured CoCos could have positive stabilizing effects during times of market stress.<sup>158</sup> Yet other research finds that banks with CoCo financing are more likely to experience financial distress because CoCos “relax” a bank’s financial constraints via increasing reliance on debt-financing and high spreads on CoCos further increase risk-taking.<sup>159</sup> One recent working paper concludes that equity is superior to CoCos (regardless of structure) at discouraging bank risk.<sup>160</sup> This is in part “because of limited trigger precision, which does not ensure recapitalization in all states of excessive leverage.”<sup>161</sup>

In other words, while the pressure of higher equity issuances on a bank’s ROE is likely higher relative to CoCo issuances of equal volume in the short-term, the costs and risks of equity issuances in the long-term are certainly better understood and more manageable than those that may result from CoCo issuances, and could ultimately be lower. Again, since no CoCo has ever been triggered, *it is difficult to determine the long-term risks and costs brought about by well-designed CoCo issuances relative to equity issuances of equal volume.*

## 7. Policy Recommendation

In theory, some CoCo structures have strong appeal. In particular, relative to equity issuances, high-trigger-level dilutive conversion CoCos (assuming an appropriately set trigger) could offer the unique benefits of (1) ensuring the recapitalization of a bank’s balance sheet before its capital position deteriorates substantially; and (2) driving shareholder pressure on management to avoid bank risk-taking or to preemptively issue equity in order to decrease the likelihood of costly, dilutive CoCo conversions. Thus CoCo issuances also offer the theoretical benefit of avoiding the inherent pressure to a bank’s ROE – and the accompanying economy-wide costs noted by many – caused by perpetually high equity levels maintained during times of growth and stability, while still ensuring that banks will be well-capitalized during times of market stress.

Alternatively, CoCos could ultimately drive large-scale, untimely sell-offs of bank equity shares in the midst of market stress, perhaps driving the CoCos of otherwise healthy banks to be triggered, particularly if U.S. policymakers unintentionally craft rules that drive banks (via the

---

<sup>157</sup> Chen et al., *supra* note 61.

<sup>158</sup> Jens Hilscher & Alon Raviv, “Bank stability and market discipline: The effect of contingent capital on risk taking and default probability,” *Journal of Corporate Finance*, vol. 29 (Dec. 2014): 542-560.

<sup>159</sup> Christian Koziol & Jochen Lawrenz, “Contingent Convertibles. Solving or Seeding the Next Banking Crisis?,” *Journal of Banking & Finance*, vol. 36 (Jan. 2012): 90-104.

<sup>160</sup> Natalya Martynova & Enrico Perotti, “Convertible bonds and bank risk-taking,” (De Nederlandsche Bank, DNB Working Paper No. 480, Aug. 2015).

<sup>161</sup> *Ibid.*

regulatory capital treatment of CoCos) to issue poorly designed instruments (by misidentifying appropriate trigger-levels and conversion rates, for example). The high potential for distress in foreign CoCo markets further undermines the desirability of incentivizing U.S. banks to issue CoCos, regardless of desirable structural features. It remains unclear what important technical elements of CoCos – particularly trigger level(s) and rule(s) – and degrees of leniency in structure granted by regulators maximize the net benefits of bank CoCo issuances.

**RECOMMENDATION:** *Congress should only consider enabling issuances of CoCos if the instruments will be structured as high-trigger dilutive conversion instruments, and enable via statute large U.S. bank CoCo issuances only if there exists a high degree of confidence that:*

- (1) Congress and regulators are well-equipped to define, broadly or narrowly, what structural features of CoCos are best-suited to achieve specific policy goals established by Congress;
- (2) net benefits associated with allowing or requiring CoCo issuances (taking into account risks and uncertainties stemming from technical CoCo structural requirements and the global CoCo market) outweigh the net benefits of simply requiring banks issue an equivalent volume of equity.

*Confidence that the theoretical benefits attributed to sizable well-designed CoCo issuances by large U.S. banks can be operationalized should be tempered by three major concerns:*

- (1) uncertainty surrounding what technical CoCo components (particularly trigger rules and level) are best suited to achieve policy outcomes intended by Congress could result in regulators operationalizing rules that fail to achieve intended outcomes
- (2) destabilizing market-wide effects could be brought about were poorly-designed U.S. CoCos to proliferate (particularly, idiosyncratic bank risks could be transformed to banking system-wide risks)
- (3) a troublingly structured global CoCo market could harm U.S. banking system stability were large U.S. banks to issue these instruments, particularly if a foreign bank's CoCo was triggered.

Even if policymakers endorse broad, desirable conversion CoCo structures like high-level-triggers and substantial dilution rates to achieve desirable policy goals (relative to equity issuances), the proliferation of CoCos still necessitates that U.S. policymakers endorse various intricate parameters (such as trigger level) in order to allow certain debt-like hybrids to be treated as a CoCo. Thus *if U.S. policymakers desire a more simplified U.S. bank regulatory*



*framework, then enabling large U.S. banks to issue CoCos is not advised.* The ability of CoCos to achieve desired policy outcomes is inherently constrained by a natural limit to policymakers' knowledge of variables and factors that can inform what technical structural components of a debt-like hybrid with at least one trigger are best-suited to avert banking stress.<sup>162</sup> This constraint illustrates the need for simplicity in banking regulation.<sup>163</sup>

Granted, allowing or requiring CoCo issuances to count towards a portion of a bank's regulatory capital threshold to bring about exemptions from Basel III and Dodd-Frank rules would, relative to equity issuances of equal volume, further incentivize institutions to enter into the alternative "pro-growth," "pro-consumer" arrangement proposed by Chairman Hensarling. Modestly reducing the threshold, however, is a reasonable option to address this concern. Notably, *the costs of bank equity issuances are more predictable, extensively debated, and cleanly adjustable than those associated with CoCo issuances.* Surely, the short-term economy-wide costs of equity issuances are likely greater than CoCo issuances due to funding cost discrepancies and the pressure on a bank's ROE caused by equity issuances. Yet given the risks and operational constraints facing policymakers in establishing any CoCo rule, unstable global CoCo market conditions profiled throughout this research, and negative market responses that could result from any CoCo being triggered, the long-term net impact to the U.S. economy and American consumers of increased bank equity issuances could likely be preferable relative to well-designed (high-trigger and dilutive) CoCo issuances of equal volumes.

---

<sup>162</sup> For more on how information constraints inherently impede policymakers' decision-making, see Friedrich A. Hayek, "The Pretence of Knowledge" (Nobel Prize Lecture, Dec. 11, 1974).

<sup>163</sup> See Haldane & Madouros, *supra* note 5.

## Appendix A: Sources for Selected Figures

### Figures 1-3 & 7

- Moody's CoCo database, *supra* note 66
- Author's calculations

### Figure 4

- Bank for International Settlements, *supra* note 70
- Moody's CoCo database, *supra* note 66
- Author's calculations

### Figures 8-10 & B1 (*see also Appendix B*)

- Dealogic CoCo dataset, *supra* note 67
- Moody's CoCo database, *supra* note 66
- Author's calculations

### Figure 12

- Memorandum to Board of Governors from Governor Daniel Tarullo (Oct. 22, 2015)
- Moody's CoCo database, *supra* note 66
- Thomas Hoenig, Vice Chairman, FDIC, "Global Capital Index" (Q4 2014)
- Author's calculations

## Appendix B: CoCo Issuances Used in Buy-Side Market Estimates

**Figure B1**

<b>Issuances Used to Produce Buy-Side Estimates in Figures 8-10 &amp; B2</b>	
<b>Issuing Bank/Banking Group</b>	<b>International Securities Issuance Number</b>
Australia and New Zealand Banking Group Ltd.	XS1206978543
Australia and New Zealand Banking Group Ltd.	XS1174138708
Banco Bilbao Vizcaya Argentaria, S.A.	XS1033661866
Banco Bilbao Vizcaya Argentaria, S.A.	XS0926832907
Banco Santander S.A. (Spain)	XS1107291541
Banco Santander S.A. (Spain)	XS1043535092
Bank Dhofar SAOG	XS1233710380
Bank of China Limited	XS1122780106
Barclays Bank PLC	US06740L8C27
Barclays PLC	XS1274156097
Barclays PLC	XS1002801758
Bendigo and Adelaide Bank Limited	AU3FN0021952
BNP Paribas	XS1247508903
China CITIC Bank International Limited	XS1055321993
China CITIC Bank International Limited	XS0985263150
China Construction Bank (Asia) Corp. Ltd.	XS1100009874
Commonwealth Bank of Australia	XS1200840111
Credit Agricole S.A.	XS1055037920
Credit Agricole S.A.	XS1055037177
Credit Suisse AG	XS0972523947
Dah Sing Bank, Limited	XS1021008328
Danske Bank A/S	XS1190987427
Danske Bank A/S	XS1044578273
Emirates NBD PJSC	XS1111114135
Industrial & Comm'l Bank of China (Asia) Ltd.	XS0976879279
Industrial & Commercial Bank of China Ltd	XS1142398285
Industrial & Commercial Bank of China Ltd	XS1142381711
KBC Bank N.V.	BE6248510610
KBC Group N.V.	BE0002463389
Krung Thai Bank Public Company Limited	XS1080078691
National Bank of Abu Dhabi	XS1243334668
Nationwide Building Society*	XS1043181269
Santander UK Group Holdings PLC	XS1244538523
Societe Generale	XS0867614595
Svenska Handelsbanken AB	XS1194054166
Turkiye Vakiflar Bankasi TAO	XS1175854923
UBS AG	CH0214139930
UBS AG	XS0747231362
UBS Group AG	CH0286864027
United Overseas Bank Limited	XS1045409965
Woori Bank	US98105HAD26

For more information on how these issuances were identified and used to produce Figures 8 through 10, and the sources (Moody's & Dealogic) used to obtain these ISINs, *see supra* notes 66 & 67.

\*A "building society" while technically not a bank, is a "mutual institution whose primary business [] comprises taking retail deposits and lending funds on domestic mortgages" (similar to U.S. thrifts). *See* Peter Moles & Nicholas Terry, *The Handbook of International Financial Terms* (1997). Since Nationwide Building Society is a large depository institution that must meet regulatory capital requirements it is included in the analysis.

**Figure B2**

