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Bailouts, Capital, or CoCos

Can Contingent Convertible Bonds Help Banks Cope with Financial Stress?

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EXECUTIVE SUMMARY

Since the 2008 financial crisis, banking regulators' capital enhancement efforts have focused on permitting systemically important financial institutions to issue alternative forms of debt and quasi-debt instruments as a means of meeting their Basel III primary capital (Tier 1) and secondary capital (Tier 2) requirements. Among these alternatives are so-called contingent convertible capital securities (CoCos). Financial institutions are able to issue CoCos to investors as bonds with the stipulation that they will convert into equity if the institution fails to meet a given capital ratio.

This policy analysis evaluates two types of CoCos—"write-down" and "going-concern" CoCos—on the bases of the different metrics and mechanisms each uses to convert bonds into equity. It shows that so far, few (if any) of the CoCos that institutions have used to satisfy their countries' capital requirements—many of which were issued prior to robust research on how to structure CoCos effectively—have met the standards necessary for them to achieve their intended purposes. Most of the CoCos issued to date have been write-down CoCos, which rely on backward-looking accounting measures to evaluate an institution's creditworthiness and use risk-based capital standards to trigger a bond-equity conversion. Rarer are going-concern CoCos, whose market-based conversion triggers incentivize businesses and bank managers to take on increased leverage and more risk.

This policy analysis draws lessons from recent European experiences with both write-down and going-concern CoCos and concludes that, given their deficiencies, neither includes the design elements necessary to help financial institutions meet Basel III Tier 1 or Tier 2 capital standards. As a result, U.S. regulators should continue to approach CoCos with skepticism and caution. One alternative to CoCos they might consider is a modified version of the regulatory "off-ramp" provision of the 2017 Financial CHOICE Act, which holds the potential to increase bank capital while providing significant regulatory relief.

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INTRODUCTION

The 2008 financial crisis revealed fundamental flaws in the way regulators handled financial distress in large, complex financial institutions that often led to delays in containing and correcting those problems. In several cases, the ultimate result was that the government injected massive amounts of taxpayer monies into troubled institutions, forced them to merge with somewhat stronger institutions (also with the help of taxpayer support), or placed them into conservatorship.

A major factor behind regulators' slow response to these institutions' distress was that they took a flawed approach to measuring the capital adequacy of financial institutions. Rather than examine the current market value of an institution's equity, many regulators relied on backward-looking book values of equity, which delayed their recognition of a firm's true financial condition. For example, a 2009 study found that each of the five largest banks that either failed or was merged during the financial crisis had reported Tier 1 Basel regulatory capital ratios in excess of 12 percent—considerably more than the regulatory minimum of 8 percent—one quarter before failure.[1]

Some observers argue that such problems could be avoided by having the Basel requirements refer to market rather than book values of capital.[2] In times of financial distress, however—in which the market value of equity can plunge rapidly—such a policy change could compel firms that were already suffering from market capital shortages to meet the new Basel requirements through asset fire sales. These sales could accelerate the decline of multiple firms' asset values and increase the severity of their capital losses. Furthermore, rewriting the Basel capital requirements so that they refer only to market values would not address any of the process or procedural issues related to measuring hard-to-value and nontraded assets. Indeed, predicating the Basel requirements on market values would simply trade one set of measurement problems for another.

In the aftermath of the 2008 financial crisis, both U.S. and international regulators tried to address some of these regulatory issues and limit problems associated with systemic risk through a combination of increased regulation and legislation.[3] In particular, they imposed higher minimum book-capital requirements and applied stiffer regulations to certain systemically important financial institutions (SIFIs). According to conventional measures, these efforts have substantially increased SIFIs' capital ratios. However, many of the weaknesses of the previous regulatory and supervisory regime, including its flawed approach to measuring capital adequacy, have remained unaddressed. Consequently, many experts believe that the new regulatory regime, with its higher capital requirements, will not suffice to rule out future bailouts.[4]

As a further means for bolstering bank capital, more recent reform proposals would allow alternative forms of debt and quasi-debt instruments to count toward financial institutions' primary capital (Tier 1) and secondary capital (Tier 2) requirements. Most prominent among these have been proposals that would encourage SIFIs to issue contingent convertible capital securities (CoCos) and use them to meet some part of their regulatory capital requirements.[5] European regulators in particular have embraced CoCos and have incorporated certain types into their Basel III capital standards. In contrast, U.S. regulators have been reluctant to allow CoCos to qualify toward their regulatory capital standards.

This policy analysis examines how effective CoCos have been at resolving the challenges they were designed to address and whether an alternative policy measure would better fulfill the same ends. First, it describes the most common types of CoCos that financial institutions have issued since the 2008 crisis. Next, it evaluates the argument that CoCos can play an important role in promoting financial stability, especially by ensuring that SIFIs remain adequately capitalized during times of financial distress. After reviewing three of Europe's most significant postcrisis experiences with CoCos, it finds that historically they have failed to perform as regulators had intended.

As a result, this analysis concludes by proposing a simple alternative to CoCos—one capable of accomplishing their objectives while avoiding their shortcomings.

WHAT ARE COCOS?

Sold to shareholders as bonds, CoCos convert into equity if the issuing financial institution's Tier 1 capital ratio (the value of its equity and reserve-based capital to the value of its risk-weighted assets) drops below a certain threshold. They are therefore considered hybrid securities and are designed to provide an additional source of equity capital for banks and SIFIs to use in times of financial distress.[6] As this policy analysis shows, CoCos can also enhance market discipline and address problems associated with the "too-big-to-fail" paradigm, in which regulators, believing that SIFIs cannot be allowed to collapse, feel compelled to inject massive amounts of taxpayer funds into struggling institutions.

There are three basic forms of CoCos. One type, commonly called "going-concern" or "bail-in" CoCos, convert existing debt into common equity when a specific conversion event, or "trigger," occurs.[7] Going-concern CoCos do not result in the injection of new funds into a troubled institution. Instead, they simply convert existing debt instruments on a firm's balance sheet into common equity, thereby increasing its capital, facilitating deleveraging, and restoring capital adequacy.

The second form, "write-down" or "bail-out" CoCos, are debt instruments whose values are written down when a trigger is breached.[8] Write-down CoCos simultaneously reduce a firm's assets and its liabilities, thereby facilitating the firm's reorganization at the point of nonviability. The resulting bailout can be permanent, temporary, partial, or total. Because write-down CoCos reward stockholders at the expense of the CoCo investors, they reverse the traditional rules of seniority, placing shareholders' interests ahead of those of a particular set of debt holders.

The third form of CoCos, capital access bonds, resemble option securities in that they permit firms to issue new equity to their bondholders on prenegotiated terms when a triggering event occurs. Capital access bonds commit the investors who hold these bonds to injecting new funds into a troubled institution. Because such securities have not been widely issued, however, they will not be discussed here.

Problems That CoCos Attempt to Address

CoCos aim to resolve four systemic issues that the 2008 financial crisis revealed within the global financial system. First, the crisis showed that highly levered firms have an incentive to take on greater risk, which can distort the pricing of that risk. Second, it showed that a firm's shareholders are often reluctant to issue new equity when that firm is experiencing financial distress. Although new equity capital helps protect a bank's creditors, it harms existing shareholders (and helps debt holders) by diluting the value of the bank's equity. Third, the crisis showed that although troubled institutions can reduce their leverage by selling assets, doing so can lead to fire-sale losses (in which institutions attempt to sell off assets at dramatically reduced prices, reducing their overall value to dangerously low levels). Cumulative fire sales can also result in a "death spiral," where depreciating asset holdings lead to more and more fire sales. If several institutions experience distress at once, asset prices can plummet across the board, afflicting an entire sector of the financial system at once. This was certainly the case in 2008, when multiple death spirals led the asset-backed securities markets to experience particularly severe contagion effects.

Fourth, the crisis showed that regulatory delays in addressing financial distress tend to contribute to the perception that some institutions are "too big to fail"—that is, that regulators or political leaders must provide outsized protection to certain financial institutions rather than suffer the economic consequences of allowing them to fail.

Many believe that CoCos, if properly designed, could help solve all four of these

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problems. Indeed, the twofold attraction of CoCos is that they could help financial firms meet regulatory capital requirements and automatically absorb losses in times of financial distress—independent of government intervention. In addition, many European countries grant CoCos more favorable tax treatment than they do common equity. If CoCos were to receive a similar tax treatment in the United States, they would likely be more appealing to American issuers.[9] CoCos can also be attractive to investors because they typically have higher interest rates than ordinary bank debt securities and because their returns correlate more strongly with returns on other debt securities than with returns on equity.[10]

Proponents also argue that properly designed CoCos would induce stockholders and managers to operate a company responsibly in hopes of avoiding a conversion altogether. Furthermore, in the case of going-concern CoCos, any conversion that does occur results in an automatic recapitalization, which helps the institution absorb any losses on its own. Not only does automatic recapitalization reduce the likelihood of taxpayers' needing to sponsor a government-issued bailout, it also lowers any further costs that arise due to regulatory inaction or poor oversight. In short—and in theory—automatic recapitalization increases a firm's access to its own sources of funding and liquidity, allowing it to continue operating independently.[11]

The validity of the above argument hinges on two central questions. The first is whether the threat of a bond–equity conversion would in fact incentivize management and shareholders to take the steps necessary to avoid triggering one. The second is whether CoCos would sufficiently restore an institution's capital adequacy in the event of a conversion. In short, effective CoCos should help provide financial institutions with a sufficient cushion following a conversion, thereby assuring both market participants and regulators of those institutions' ability to continue in business even after experiencing a significant loss of capital. The objectives of the conversion itself should be to minimize the probability of contagion and mitigate the risk of spillover effects across other institutions.

Satisfying the above objectives requires addressing three principal categories of CoCo design: the choice and structure of a conversion trigger, the capital ratio necessary to trigger a conversion, and the equity value that a CoCo bond should assume upon conversion. Each of these issues is considered in the following sections.

COCO DESIGN

Several factors are involved in structuring an optimal conversion trigger. The first relates to whether the bond–equity conversion trigger should be automatic or discretionary (and, if it is discretionary, whether such discretion should be exercised by management or by regulators). The second is whether the trigger's threshold should refer to an accounting-based or a market-based measure of a firm's financial condition. The third is whether the capital ratio necessary to trigger a conversion should be relatively high (when the institution remains solvent) or low (when the institution is close to failure).[12] The final considerations relate to the value that CoCo bonds should take upon conversion and the amount of capital that an institution should receive post-conversion. Each of these features can critically affect the extent to which the CoCos achieve their intended effects.

Automatic vs. Discretionary Triggers

Many of the CoCos issued to date have had discretionary triggers, leaving the decision of whether or not to trigger a conversion to either financial regulators or the financial institution's management. Both parties appreciate having the discretion to initiate a conversion because it gives them the flexibility to determine when, and under what circumstances, to recapitalize or close the institution.

However, granting both regulators and management the discretion to trigger a conversion

carries unique risks.[13] In the first place, it can introduce unnecessary uncertainty into the process. As history has demonstrated (most recently through the experiences of the Great Recession), regulatory discretion can lead to costly delays in addressing financial distress, especially in the absence of the appropriate regulatory oversight.[14] Additionally, relying on regulatory discretion undermines the information content of a firm's asset prices, which are meant to inform such discretion.[15] Finally, regulatory discretion can fail if regulators have insufficient information about an institution's financial health, if they fail to supervise or examine an institution properly, or if they encounter political pressures to save an institution. There is also the risk that regulators will become unduly concerned about any potential contagion effects that might result from their "permitting" a large financial institution to fail.[16]

Similar issues are involved in allowing bank management the discretion to trigger a conversion.[17] Management can face incentives to delay a conversion out of fear that conversion would come at the expense of their jobs or their institution's investment capital. There is also the risk that management would delay conversion because of the possibility that it would dilute the equity of existing shareholders and board members. Management may even choose to avoid conversion entirely, gambling instead on the chance of a government-issued, taxpayer-funded bailout.[18]

Accounting-Based vs. Market-Based Triggers

Because of the weaknesses of discretionary triggers, CoCo proponents have typically favored automatic (nondiscretionary) triggers determined according to either accounting-based or market-based values of a firm's equity. These proponents argue that because contingent capital would convert to common equity, it is the only security that is junior to common equity.[19]

Those who favor nondiscretionary triggers also tend to prefer ones that rely on market-based, rather than accounting-based, measures of capital, since the latter are lagging indicators of a firm's financial condition.[20] Accounting-based measures are also easier for a firm's management to manipulate, and their retroactive nature can exacerbate regulatory delays in addressing any severe financial problems, especially ones likely to cause contagion effects.[21] In contrast, market-based measures are more readily available, timely, and forward-looking than accounting-based measures. They are also harder to manipulate, and their integrity is less likely to be compromised, because they are not subject to regulatory or managerial discretion.[22]

There are, however, problems with relying on both accounting-based and market-based measures of equity. Market-based triggers can cause unnecessary conversions, whereas accounting-based triggers can avoid causing necessary conversions.[23] Interestingly, almost all of today's regulator-approved CoCos have had accounting-based triggers, which mainly refer to risk-based capital ratios.

Despite the supposed benefits of market-based triggers, there are circumstances in which conflicts between equity holders and CoCo investors make it uncertain whether, or under what terms, a conversion will occur.[24] Such conflicts are mainly due to the fact that equity holders, unlike investors, tend to prefer either a delayed conversion or no conversion at all. Moreover, equity holders have an incentive to manipulate the firm's stock price upward to avoid conversion. In contrast, CoCo investors have an incentive to prefer earlier conversions and may have an incentive to manipulate a firm's stock price downward. These conflicting interests can also complicate decisions related to the post-conversion value of a CoCo's equity, making the final outcome of a conversion uncertain.[25]

To address the conflict of interest between CoCo investors and equity holders, economists Charles W. Calomiris and Richard J. Herring propose a conversion policy based on a 90-day average of the ratio between the market value of a firm's equity and the sum of that same market value and the book value of the firm's debt. They claim this policy would

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clarify the price that CoCo equity should assume upon conversion.[26] However, the hybrid nature of this metric, which averages a forward-looking indicator (the market value of a bond's equity) with a backward-looking one (the book value of an institution's debt) over a 90-day period is incredibly complex. If anything, their proposal seems to substitute one set of problems for another—or two others, since their metric is vulnerable to the weaknesses of both lagging accounting-based measures and volatile market-based ones.

Other CoCo design proposals are similarly complex. For example, the Squam Lake Group suggests implementing a dual-trigger CoCo, which would require regulators to determine both that a financial system was experiencing a systemic crisis and that an individual firm had violated its debt covenant (for instance, by allowing its risk-based capital to drop below a predetermined threshold) prior to conversion.[27] Yet this proposal lacks sufficient details necessary for its implementation. It also suffers from the same flaws as Calomiris and Herring's proposal, in that it includes all the weaknesses of both discretionary triggers and accounting-based triggers.[28]

Trigger Level

The ratio of the conversion trigger threshold to a firm's existing or expected capital levels can critically influence shareholders' and managers' incentives to ward off a conversion. It can also affect the likelihood of a firm retaining (or restoring) its viability post-conversion. In general, high trigger levels (where conversion occurs after a firm has lost a relatively small amount of capital) tend to encourage more responsible banking practices and increase the chances that a firm will be able to recapitalize itself in the event of a conversion. In particular, capital trigger levels at or above 7 percent are a typical feature of going-concern CoCos, which primarily aim to prevent firms from ever reaching the point of insolvency. A high trigger should motivate management to raise more capital before the firm experiences significant problems or loses access to financial markets.

The threat of a triggering event should also cause management and shareholders to curtail leverage and reduce risk taking.[29] High-trigger CoCos make the threat of share value dilution more imminent, encouraging shareholders and management alike to reduce risk, deleverage, and raise more capital.[30] As the proximity of a firm's capital ratio to the trigger threshold increases, the market value of its equity decreases, and a post-conversion wealth transfer—from management to CoCo bondholders—becomes more likely.

High triggers can also minimize the chance that shareholders will create an abrupt drop in share value by switching from a low-risk, low-probability-of-default portfolio to a high-risk, high-probability-of-default portfolio. However, if a debt-induced downward spiral in equity value does occur when CoCos are on the balance sheet, then shareholders can either reduce leverage and increase capital as intended or opt to declare bankruptcy before conversion.[31]

In contrast, CoCos with relatively low capital ratio triggers (for example, 5 percent) are better suited for facilitating an orderly, private-sector failure resolution process in the event that an institution approaches the point of nonviability. Low triggers provide management and stockholders with relatively weak incentives to control risk, and some researchers have raised concerns about runs and negative spillovers if a firm's capital ratio nears an extremely low threshold, which can signal bankruptcy.[32]

Conversion Price

A CoCo's conversion price and the number of shares converted can also influence both shareholders' and managers' incentives. In general, the outcome of a conversion depends on whether that conversion affects a predetermined number of shares, based on an ex ante fixed price; an ex post number of shares, based on their market price at the time of conversion; or some combination of the two.[33]

Ex post pricing, which sets the value of a CoCo's equity at its market price upon conversion, can significantly dilute stock value for existing shareholders, since a CoCo's ex

post market price is often much lower than its original purchase price. This dilution can have the positive effect of incentivizing shareholders and management to avoid unnecessary risk taking in the interest of reducing the likelihood of a conversion.

In contrast, CoCos with an ex ante fixed price (one set prior to conversion) will clearly limit stock dilution and significantly reduce incentives to avoid a triggering event. Indeed, it is virtually impossible to avoid situations in which going-concern CoCos will not cause at least some wealth transfer from CoCo holders to existing shareholders.[34] In the case of write-down CoCos, however, no wealth transfer occurs, because in most cases, the subsequent write-down wipes out any preexisting equity claims. As a result, some researchers suggest that write-down CoCos are better at mitigating management and shareholder risk taking because they provide greater incentives to reduce leverage.[35] This factor could explain the preponderance of write-down CoCos relative to going-concern CoCos among institutions today.

Summary of Design Issues

When it comes to CoCo design, if the goal is to minimize the likelihood of a trigger event while motivating management and stockholders to reduce both leverage and risk-taking, then the evolving literature tends to favor going-concern CoCos with high, fixed, market-based triggers and a sharply diluting conversion rule at the then-market price. If the intent is for CoCos to facilitate a modified bankruptcy at the point of an institution's nonviability, however, write-down CoCos remain a plausible option. However, the literature also suggests that although neither type of CoCo design is foolproof, write-down CoCos in particular provide minimal incentives to reduce the likelihood of conversion and are clearly the least desirable alternative.

Finally, the extensive research on CoCo triggers and related structures remains largely silent on the exact administrative mechanism that should initiate the conversion of a CoCo bond into equity. Who monitors the CoCos: investors or regulators? How should the trigger mechanism be enforced? By the courts or through some other legal action? The literature on discretionary CoCos addresses these issues somewhat. Yet even in these cases, the design process is rife with uncertainty and open to conflicts of interest. This situation further complicates the problems inherent in pricing CoCos with different structures and features.

COCOS IN PRACTICE

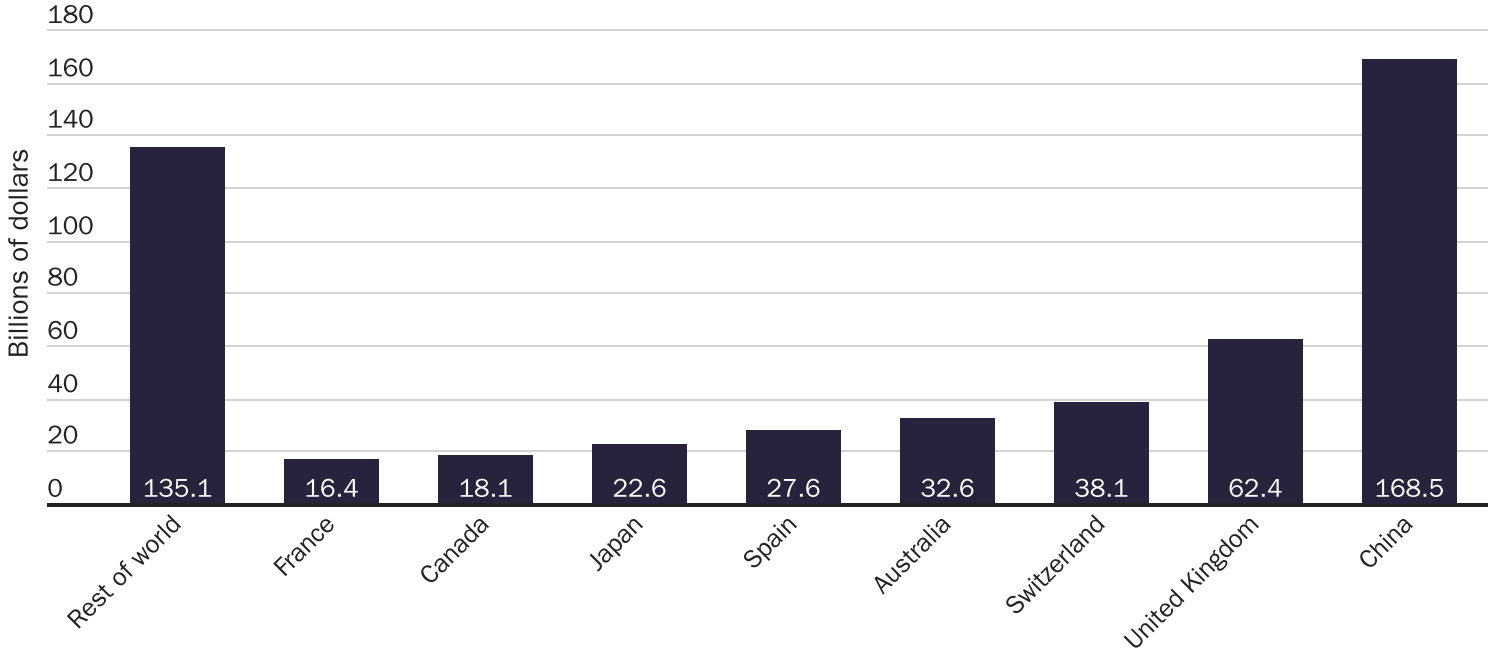
To examine how well CoCos have fulfilled their objectives in recent practice, we should first review the quantity, category, and origin of the CoCos that have been issued over the past several years. Although regulators in many nations allow CoCos to satisfy some part of banks' regulatory capital requirements, the $521 billion of CoCos employed for this purpose thus far remains quite small compared to the approximately $5.3 trillion of bank equity capital worldwide.[36] Figure 1 shows the dollar value of outstanding CoCos of institutions headquartered in various countries from 2009 through 2015.

There are two easy explanations for why most CoCos have so far originated mainly outside the United States. First, European and Asian-Pacific regulators have proactively incorporated CoCos into their Basel II, Basel III, and home-country capital standards, whereas U.S. regulators have yet to embrace CoCos in the same way. Second, and probably most important, European tax authorities have determined that interest expenses on CoCos are tax-deductible (as interest payments on other bank-issued debt instruments are), whereas the U.S. Internal Revenue Service has not yet ruled the same.[37] According to a 2013 survey, 64 percent of CoCos originated in countries where their interest payments were tax-deductible, while about 20 percent originated in countries where their interest payments were not tax-deductible. (The survey did not determine the tax status of the remaining 16 percent.)[38]

"The [CoCo] design process is rife with uncertainty and open to conflicts of interest."

Figure 1A

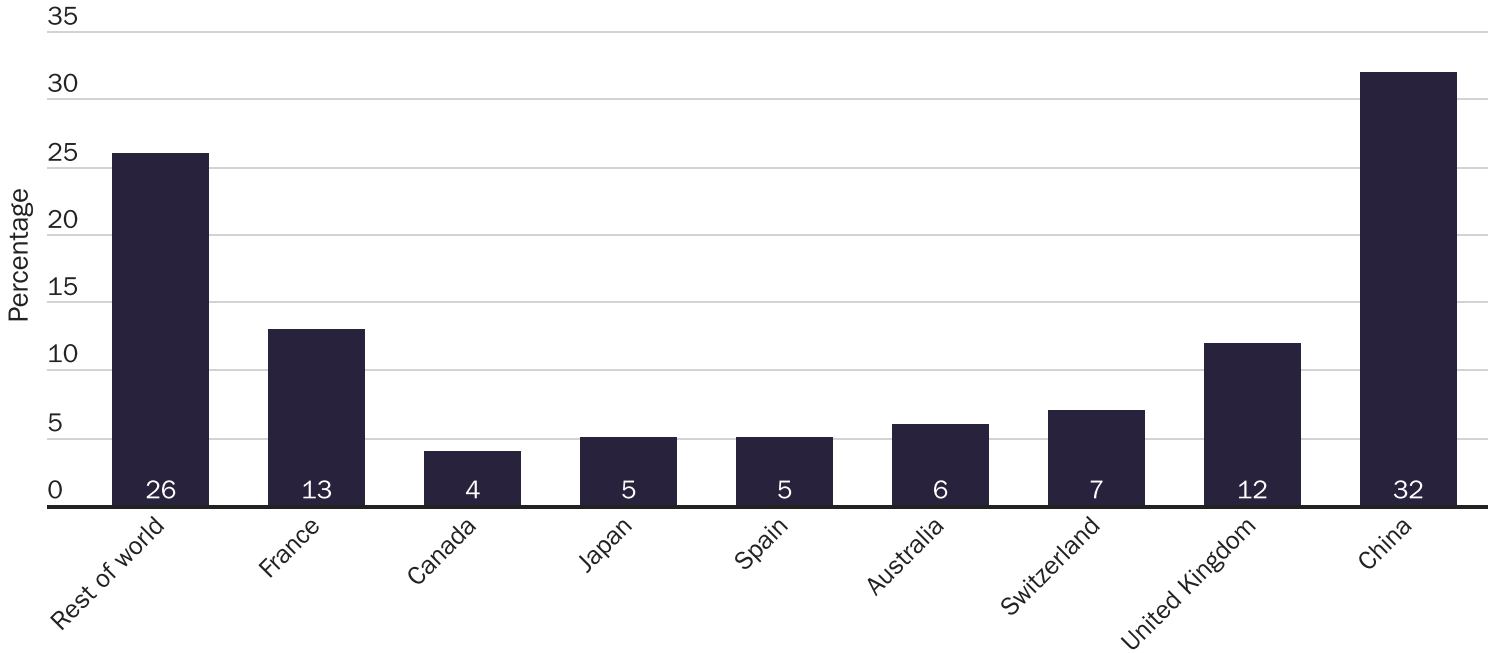
CoCo issuance by dollar value, 2009–2015



Source: Stefan Avdjiev et al., "CoCo Issuance and Bank Fragility," Bank for International Settlements Working Paper no. 678, November 2017.

Figure 1B

CoCo issuance by percentage, 2009–2015



Source: Stefan Avdjiev et al., "CoCo Issuance and Bank Fragility," Bank for International Settlements Working Paper no. 678, November 2017.

Figure 2 shows the estimated breakdown of CoCos issued by type as of 2016. Note that fewer than one-third of all CoCos issued during that period were going-concern CoCos that would convert debt into equity. The remaining 70 percent provided for some form of write-down of the CoCo debt as a loss-absorbing mechanism.

The high proportion of write-down CoCos relative to going-concern ones may seem odd, considering that the latter are more effective at curtailing management and shareholder risk-taking. This predominance can be largely explained, however, by the fact that European and Asian-Pacific regulators generally had incorporated write-down CoCos into their Basel II and Basel III country capital standards before researchers had revealed either the weaknesses of those standards or the incentive problems associated with write-down CoCos.

In Europe, Basel III capital standards explicitly provide for CoCos to count toward Tier 1 and Tier 2 capital, but only in limited amounts and only when those CoCos possess certain characteristics.[39] The Basel III capital requirements are now extremely complex and continue to evolve. The revised framework has increased from 2 ratios under Basel II capital rules (based on risk-weighted assets) to more than 12 ratios under Basel III rules. The Basel III standards are also based on risk-weighted assets, with total capital requirements ranging from 8.5 percent to 16.5 percent of total risk-weighted assets. (The 8.5 percent figure applied until 2016 and increases to 10.5 percent in 2019.)[40]

Figure 3 categorizes the CoCos issued between 2009 and 2015 according to their trigger types. The majority rely on either low book-value triggers or triggers that initiate conversions only when an institution nears the point of nonviability, when it is extremely unlikely that the institution will be able to restore its own capital following conversion.

Roughly 90 percent of all the CoCos issued between 2011 and 2016 used the Common Equity Tier 1 capital ratio (common equity plus retained earnings-to-risk assets) as their

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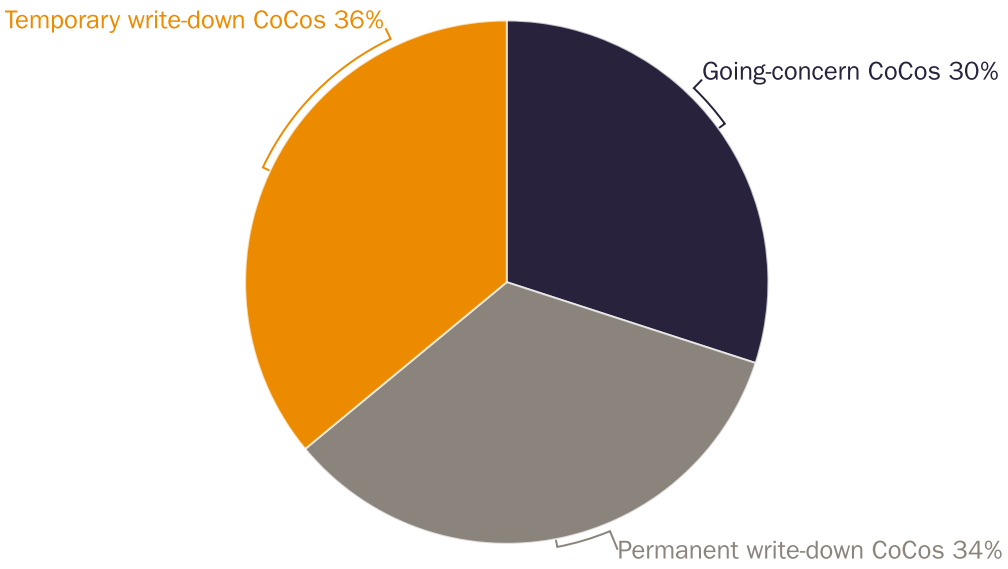
Figure 2

Outstanding CoCos by loss-absorption capacity, 2016

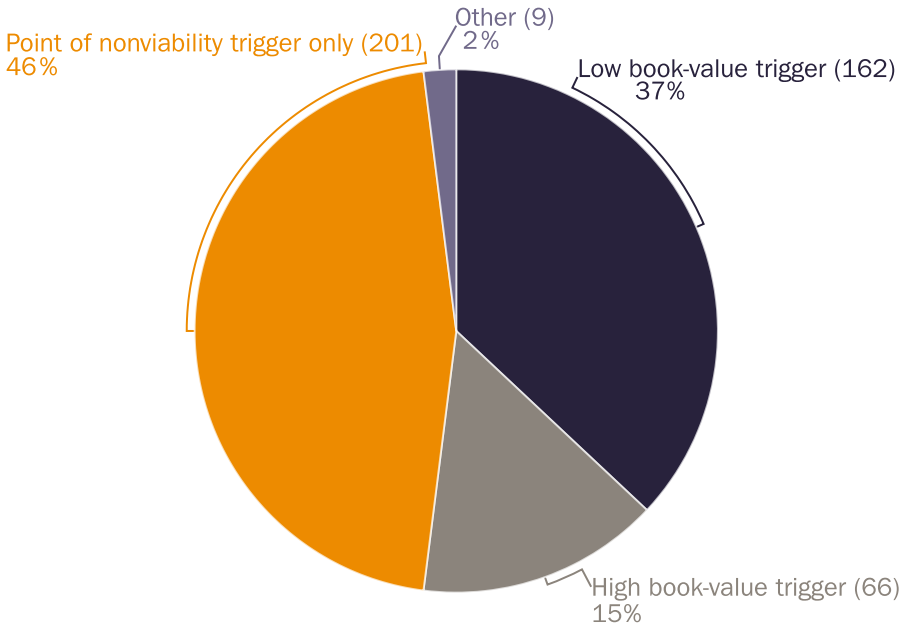


Source: Richard J. Herring, “CoCos: A Promising Idea Poorly Executed,” in *Achieving Financial Stability: Challenges to Prudential Regulation*, ed. Douglas D. Evanoff, George G. Kaufman, Agnese Leonello, and Simone Manganelli, *World Scientific Studies in International Economics*, vol. 61 (Hackensack, NJ: World Scientific, 2017).

> "Roughly 90 percent of all the CoCos issued between 2011 and 2016 used the Common Equity Tier 1 capital ratio as their trigger."

Figure 3

CoCos by trigger type (number issued and percentage of total), Q1 2009–Q3 2015



Source: Robert W. Greene, "Understanding CoCos: What Operational Concerns and Global Trends Mean for U.S. Policymakers," Mossavar-Rahmani Center for Business and Government Associate Working Paper no. 62, June 2016.

trigger. Another 8 percent of the CoCos issued used the Tier 1 capital ratio (common equity plus retained earnings and preferred stock) and a high trigger of at least 7 percent. The remaining 2 percent of the CoCos issued used the total risk-based capital ratio (the ratio of Tier 1 and Tier 2 capital to risk-based assets).[41]

Recent European Experiences with CoCos

Problems at three major European banks, two of which had outstanding CoCos at the time of distress, can provide clues as to how effective these securities are at achieving their intended purposes. These problems began in early 2016 with Germany's Deutsche Bank and culminated the following summer with the resolution of Spain's Banco Popular Español and the Italian government's rescue of Monte dei Paschi di Siena in June.

DEUTSCHE BANK. Concerns about the health of Deutsche Bank first surfaced in early January 2016 after the bank reported a loss for 2015. That loss heightened investors' fears that the bank might not be able to make coupon payments on its outstanding CoCos, which were write-down securities with a low trigger (5.125 percent of the bank's Tier 1 capital ratio). As European capital standards required, payments on these CoCos would occur at the issuer's discretion, missed coupon payments would not be cumulative, and regulators retained the authority to trigger a bailout at any time.[42]

Deutsche Bank's reported loss initiated an abrupt decline in the prices of its CoCo bonds the following year. Evidence suggests that this decline may have provoked a contagion effect, with other major European banks experiencing a similar decline in the value of their CoCo bonds at the same time.[43] Prices also became increasingly volatile as uncertainty about Deutsche Bank's financial condition persisted, compounded by fears that it would miss a coupon payment. Interestingly, in late December 2016, regulators issued an opinion (one largely favorable to Deutsche Bank) that

attempted to clarify when a bank could make coupon payments after failing to meet capital adequacy standards. Despite this, the value of Deutsche Bank's CoCos remained low until September of the following year. After a brief upward spike, however, they fell sharply again, partly in response to the U.S. Department of Justice's decision to fine Deutsche Bank $14 billion for its role in the fraudulent sales of risky mortgage-backed securities in the years leading up to the financial crisis. (That fine was subsequently reduced to $7.2 billion.)

The prices of the bank's credit default swaps on both its senior and junior debt followed a similar pattern, as did the prices of other banks' CoCos. Deutsche Bank's CEO John Cryan went public on September 30, 2016, to defend the bank's condition, while several other analysts also confirmed that the bank was liquid and basically sound.[44]

Deutsche Bank's recent experience illustrates the asset death spiral associated with poorly structured CoCos and the uncertainties they can create. It also validates several academics' concerns that the discretionary aspect of write-down CoCos could increase the possibility of missed coupon payments and heighten confusion regarding the degree of regulatory intervention necessary to trigger a partial or total write-down.[45]

BANCO POPULAR ESPAÑOL. The European Central Bank's decision in June 2017 to declare Banco Popular Español (or Banco Popular for short) a failing or likely to fail institution prompted Europe's recently established Single Resolution Board to merge it with Banco Santander, which purchased all the shares of Banco Popular for a total price of €1.[46] Banco Popular's troubles were a result of its having accumulated bad mortgage debt prior to the 2008 crisis. Making matters worse, the bank's management easily papered over its losses, taking advantage of the fact that Spanish banking authorities had encouraged their practice of relying on book-value accounting and had a long-standing habit of putting off recognizing any new losses.

Banco Popular had foundered for several years after the 2008 financial crisis. In May 2016, it announced that it would have to raise €2.5 billion in additional funding to bolster its sagging capital, but this value was actually far lower than the €6.7 billion that JPMorgan Chase estimated the bank would need to support both its stock and CoCo bond prices.[47] In just two days—from May 27 to May 28, 2016—the bank's stock fell 32 percent. In April 2017, Banco Popular itself made downward adjustments to its 2016 financial statement, while Moody's downgraded its senior unsecured debt, triggering another sharp drop in the value of both its shares and its bonds.

Like Deutsche Bank, Banco Popular's CoCo bonds had qualified as Additional Tier 1 (AT1) capital. Unlike Deutsche Bank, however, these were high-trigger (7 percent), going-concern CoCos, which were set to convert into equity at a price not lower than €1.549 per share. The 7 percent trigger ratio was based on the Common Equity Tier 1 risk-based capital ratio. Like all CoCos that qualified for AT1 capital status, Banco Popular's contract included a cancellation clause, and missed coupon payments were noncumulative.

On June 6, 2017, however—before conversion ever took place—the European Central Bank (ECB) declared Banco Popular in danger of failing. The next day, Europe's Single Resolution Board merged the bank into Banco Santander, cutting short any conversion of the bank's CoCos into equity. The move altogether eliminated its subordinated debt, along with any claim its equity holders or CoCo investors had to that debt. As in Deutsche Bank's case, the CoCo bond and equity prices exhibited a death spiral, with hedgers taking short positions against those assets and triggering further sales of stock.[48] In Banco Popular's case, therefore, going-concern CoCos did not function as envisioned, insofar as they failed to induce management and shareholders to reduce risk, curtail leverage, and raise more capital.

MONTE DEI PASCHI DI SIENA. In December 2016, the Italian government and the ECB put forward a "precautionary recapitalization" of Monte dei Paschi di Siena (or Monte),

"In Banco Popular's case, going-concern CoCos failed to induce management and shareholders to reduce risk, curtail leverage, and raise more capital."

> "The prospect of government intervention and supervisory discretion will likely continue to undermine the role that CoCo bonds are meant to play in institutions' capital structures."

Italy's oldest bank. Like many other Italian banks, Monte had been suffering since the 2008 financial crisis, plagued by significant asset quality problems, difficulties in passing recent regulatory stress tests, and a capital shortage. Indeed, more than 35 percent of Monte's gross loans were nonperforming for the first three quarters of 2016.[49]

Although the bank had no outstanding CoCo bonds, it did have subordinated debt. As part of its recapitalization effort, the Italian government provided Monte €6.6 billion in support and wrote down its investors' claims by €2.2 billion. The government's support program followed on the heels of an announcement it had made the week prior, in which it voiced its intent to provide a €20 billion support package to the entire Italian banking system.

Monte's condition was undeniably deteriorating. It needed capital and had failed in its attempts to raise more funds and find a merger partner. Like Banco Popular, its asset quality problems had reached the point at which it began experiencing a drop in liquidity: during the first nine months of 2016, it lost €20 billion in deposits, and between November and December, deposits fell from 7.6 percent to 4.8 percent of its total activities. In the final month of that year, Monte lost an additional €2 billion in deposits.[50]

The Italian government's official rationale for using taxpayer funds to support Monte was that without doing so, investors would take an even bigger hit under the European Union's new Bank Recovery and Resolution Directive, which specifies the order in which creditors are prioritized to take losses but prohibits such prioritization of losses for insolvent banks.[51] Part of the reasoning behind this unusual structure was the EU's concern about potential contagion effects on other Italian banks, since they had asset quality problems as well.

Monte's experiences demonstrate that, at least in Europe, regulators are still inclined to protect financial institutions with policies that treat them as though they are "too big to fail." Given the emergency provisions in place across the EU (like the ones that the ECB and the Italian government implemented in the cases above), the prospect of government intervention and supervisory discretion will likely continue to undermine the role that CoCo bonds are meant to play in institutions' capital structures. This outcome, in turn, could weaken the discipline that CoCo bonds are supposed to provide.

Given the deficiencies inherent in CoCo design and implementation, U.S. regulators should continue to regard these securities with skepticism and caution. Other alternatives—ones not subject to the shortcomings discussed above—could better satisfy the objectives that many have tried—and failed—to accomplish through CoCos.

AN AMENDED FINANCIAL CHOICE ACT: A BETTER WAY?

One of the principal attractions of most CoCo proposals is that their favorable tax treatment (which, at least outside the United States, they share with other forms of debt) makes them a lower-cost debt option to equity.[52] Yet given their myriad vulnerabilities and complexities, there may be a better way to achieve CoCos' intended effects—one that is not driven by tax provisions.

U.S. regulators should look instead at revising Title VI of the Financial CHOICE Act of 2017, which the House of Representatives passed that June. As written, the act provides regulatory relief from some of the Dodd-Frank Act's most burdensome regulations in addition to certain Basel III regulations.[53] Specifically, it exempts institutions with a capital ratio of at least 10 percent (defined as Tier 1 equity capital divided by total on– and off–balance sheet assets) from:

> (1) any federal law or regulation addressing capital or liquidity requirements or standards; (2) any federal law, rule, or regulation that allows a federal financial agency to object to a capital distribution; (3) specified considerations as

> to whether the banking organization poses a risk to the stability of the financial system of the United States; and (4) other specified federal laws, rules, and regulations.[54]

The act's regulatory off-ramp provision measures capital according to book value, making it vulnerable to some of the same criticisms that apply to CoCos with accounting-based triggers. Yet with suitable modifications, the off-ramp provision could provide a genuine alternative to costly prudential regulations.[55] An amended off-ramp provision should differ from the House version in the following ways:

- It should measure a consolidated financial institution's equity by its market value, not by its book value. A market-based equity-to-asset ratio would capture the risk signals that accounting-based measurements can mask, such as fluctuations in monetary policy, shifts in stock or commodity prices, and other standard market risk measures.[56]
- The current act's 10 percent capital ratio exemption threshold is too low. As of 2018, 10.5 percent is the current Basel III minimum capital ratio. Institutions should not be afforded relief just because they meet this minimum.
- Instead of the act's present all-or-nothing approach to regulatory relief, a modified off-ramp provision should allow for incremental regulatory relief depending on a bank's capital level. As an example, banks with capital ratios between 15 percent and 18 percent could qualify for marginal regulatory exemptions. Those with capital ratios between 18 percent and 20 percent could also be exempt from stress tests and related liquidity requirements.
- The plan should also impose increasingly strict regulatory requirements whenever a firm's capital ratio declines below the regulatory relief tranches.
- The plan should require regulators to demonstrate how they plan to monitor risk taking among institutions that are transitioning between off-ramp capital thresholds. Regulators, not institutions, should bear the cost of these monitoring and enforcement measures.

The proposed tiered regulatory relief program responds to the critical question: When do we want intervention to occur? The answer is: long before a severe problem presents itself or an institution comes close to bankruptcy. As to the form that intervention should take, the above proposal assumes that intervention can (and often should) begin as freedom *from* intervention, and it contains several complementary attributes related to that assumption.

First, the plan creates a positive financial incentive for institutions to have higher capital ratios. Higher capital ratios allow institutions of various sizes to make more informed choices about how to balance the cost of their regulatory burden with the cost of their capital holdings. Smaller institutions, for example, may choose to hold higher levels of capital to avoid large compliance costs. (Estimates show that regulatory costs for small banks with fewer than $100 million in assets amount to 9.8 percent of their noninterest operating expenses, whereas those costs drop to 5.5 percent for banks with assets between $1 billion and $10 billion.)[57]

Second, the plan would subject well-capitalized institutions to less burdensome regulations than undercapitalized institutions. Doing so would provide institutions that were better off with a competitive advantage in the marketplace, since their exemptions would signal that they were low-risk and highly capitalized. Healthy, less regulated, well-capitalized, and viable institutions should, all else being equal, have a lower cost of funding overall. Additionally, it is hard to imagine that management and boards of directors would want massive increases in regulation owing to an erosion of their capital. The opportunity for regulatory relief would provide management with ample incentive to act in ways that would protect their

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institution's regulatory independence.

Third, the above changes would make regulators responsible for monitoring an institution's capital position and determining whether to continue granting regulatory relief if that position declined. Regulators would also need to justify those decisions publicly. In addition, because firms with fewer regulations would have higher levels of capital, regulators would be better able to react to warning signals and reimpose prudential regulations long before those institutions reached critically low capital levels. Under the current regulatory environment, the government must wait until banks demonstrate a critical need for capital before intervening. Often, these late-stage interventions are far more burdensome, not to mention costlier, than earlier ones.

Fourth, tying an institution's capital ratio to regulatory costs would make it easier for the public to monitor regulatory oversight, which would in turn improve regulatory accountability. If an institution's capital ratio fell below the regulatory relief tranches and regulators failed to act, their lack of response would be public and transparent.

Fifth, the plan would modify the procedure for reexempting formerly eligible institutions whose capital had fallen below the necessary off-ramp threshold. Section 601 of the Financial CHOICE Act requires that an institution qualifying for the off-ramp provision maintain a quarterly capital ratio of 10 percent. The responsible federal regulator has the discretion to declare an institution in noncompliance, giving it a year to recomply or lose its exemption status. As written, however, this requirement is too lenient, gives too much discretion to the regulator, and provides institutions with too much time to comply before losing their off-ramp status. To correct these weaknesses, the act should require that a market-based trigger determine an institution's compliance and that institutions whose capital declines below a certain threshold lose their exemptions immediately. The act should also implement a one-year waiting period before allowing an institution to re-petition for off-ramp relief.

Although the above modifications would tighten Title VI's current provisions, they would still provide institutions with enough flexibility to make choices that would help them avoid costly regulations. As a result, the best way to view this program is as a refined effort to incentivize lower risk taking on behalf of financial institutions and to prompt corrective action and early intervention from regulators, in line with the aims of the Federal Deposit Insurance Corporation Improvement Act. If an institution falls below the capital requirements necessary for regulatory relief, the first step should be to revoke its relief status. Furthermore, by setting those capital requirements above the Basel III minimum, the act would allow regulatory intervention to occur long before an institution became insolvent. Whereas CoCos historically have functioned more as an instrument for reinjecting capital into an institution at or past the point of failure, this proposal focuses on preventing an institution from ever reaching that stage.

Finally, the costs of structuring and implementing this modified off-ramp program would fall principally upon the regulators, not upon the financial institutions, whose main expenses would include only those related to assessing the tradeoffs between regulatory compliance and the loss of capital. At present, institutions have had to make these determinations by devoting a significant number of their staff members solely to regulatory compliance. Smaller institutions have struggled to meet these burdens, regardless of their actual capital or compliance levels, and many have been forced to merge into larger institutions as a result. This modified proposal would grant these and other firms the level of regulatory protection they need and—with prudent conduct—the level of regulatory relief they deserve.

CONCLUSION

A 2012 report by the Financial Stability Oversight Council succinctly summarized the benefits and problems with using CoCos

as a means for enhancing financial stability.[58] CoCos can help a struggling financial institution raise additional equity, absorb losses, and remain liquid. They can also encourage its managers to raise capital, and they can facilitate an orderly and timely resolution of any failure. But CoCos also have their drawbacks. Their complexity can make them difficult to price and create uncertainty as to whether conversion will actually occur soon enough to absorb losses. Once initiated, a conversion might also trigger a run on its issuer by raising doubts about the issuer's health, as shown in the cases of Deutsche Bank and Banco Popular. In other cases, uncertainty surrounding the likelihood of a conversion has become a source of contagion and systemic risk.[59]

The current regulatory approach to incorporating CoCos into capital requirements, which predated much of the recent work on how CoCos should be structured, does not meet the standards of optimal design that would enable them to function effectively. Most of the CoCos issued thus far have been of the write-down form and are based on backward-looking accounting measures with triggers geared to risk-based capital standards. Few are going-concern CoCos with market-based triggers, which would discourage owners and managers from taking on increased leverage and risk.

Given Europe's experiences with CoCos, and considering the conceptual difficulties involved in designing CoCos that would avoid similar problems in the future, U.S. regulators should continue to approach CoCos with skepticism and caution. An alternative worth considering is a modified version of the regulatory off-ramp proposal contained in the Financial CHOICE Act, which would provide greater relief from burdensome regulations as an institution's capital increases.

"An alternative worth considering is a modified version of the regulatory off-ramp proposal contained in the Financial CHOICE Act."

NOTES

1. Andrew Kuritzkes and Hal Scott, "Markets Are the Best Judge of Bank Capital," *Financial Times*, September 23, 2009. For the required Basel II Tier 1 minimum standard, see "Basel II," Investopedia, https://www.investopedia.com/terms/b/baselii.asp.

2. Shadow Financial Regulatory Committee, "Reforming Bank Capital Regulation," Shadow Statement no. 160, March 2, 2000.

3. In the United States, Congress concluded that regulators had perpetuated the "too big to fail" paradigm and responded by passing the Dodd-Frank Act in 2010.

4. Neel Kashkari, "New Bailouts Prove 'Too-Big-to-Fail' Is Alive and Well," *Wall Street Journal*, July 9, 2017.

5. Mark Flannery was one of the first to propose such an instrument. Mark J. Flannery, "No Pain, No Gain? Effecting Market Discipline via 'Reverse Convertible Debentures,'" in *Capital Adequacy Beyond Basel: Banking, Securities, and Insurance*, ed. Hal S. Scott (Oxford: Oxford University Press, 2005), pp. 171–95. For a more recent article, see Mark J. Flannery, "Stabilizing Large Financial Institutions with Contingent Capital Certificates," *Quarterly Journal of Finance* 6, no. 2 (2016): 1–26.

6. George M. von Furstenberg, *Contingent Convertibles (CoCos): A Potent Instrument for Financial Reform* (Singapore: World Scientific Publishing, 2014).

7. Patrick Bolton and Frédéric Samama, "Capital Access Bonds: Contingent Capital with an Option to Convert," *Economic Policy* 27, no. 70 (2012): 275–317. For a comprehensive discussion of the case for CoCos and the key criteria they must satisfy, see George M. von Furstenberg, "Contingent Capital to Strengthen the Private Safety Net for Financial Institutions: Cocos to the Rescue?" Bundesbank Series 2 Discussion Paper no. 2011,01 (2011); and Financial Stability Oversight Council, "Report to Congress on Study of Contingent Capital Requirement for Certain Nonbank Financial Companies and Bank Holding Companies," Washington, July 2012.

8. Stan Maes and Wim Schoutens, "Contingent Capital: An In-Depth Discussion," *Economic Notes by Banca Monte dei Paschi di Siena SpA* 41, no. 1–2 (2012): 59–79; John C. Coffee, "Bail-Ins Versus Bail-Outs: Using Contingent Capital to Mitigate Systemic Risk," Columbia Law and Economics Working Paper no. 380, October 2010; and Mark J. Flannery, "Contingent Capital Instruments for Large Financial Institutions: A Review of the Literature," *Annual Review of Financial Economics* 6, no. 1 (2014): 225–40.

9. Stefan Avdjiev, Anastasia Kartasheva, and Bilyana Bogdanova, "CoCos: A Primer," *BIS Quarterly Review* (September 2013): 43–56.

10. In *Contingent Convertibles (CoCos)*, von Furstenberg argues that for CoCos to be attractive capital market investments, they must be able to help meet regulatory capital requirements, be rated investment grade, and have tax-deductible interest payments.

11. Researchers have devoted significant attention to this issue. See, for example, Boris Albul, Dwight M. Jaffee, and Alexei Tchistyi, "Contingent Convertible Bonds and Capital Structure Decisions," *SSRN Electronic Journal*, January 2015; Bolton and Samama, "Capital Access Bonds"; Charles W. Calomiris and 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* 25, no. 2 (2013): 39–62; Christopher L. Culp, "Contingent Capital vs. Contingent Reverse Convertibles for Banks and Insurance Companies," *Journal of Applied Corporate Finance* 21, no. 4 (2009): 17–27; Flannery, "No Pain, No Gain?"; Flannery, "Stabilizing Large Financial Institutions"; George Pennacchi, Theo Vermaelen, and Christian C. P. Wolff, "Contingent Capital: The Case for COERCs," *Journal of Financial and Quantitative Analysis* 49, no. 3 (2014): 541–74; Surexh Sundaresan and Zhenyu Wang, "On the Design of Contingent Capital with a Market Trigger," *Journal of Finance* 70, no. 2 (2015): 881–920; and von Furstenberg, *Contingent Convertibles (CoCos)*.

12. Christoph Henkel and Wulf A. Kaal, "Contingent Capital in European Union Bank Restructuring," *Northwestern Journal of International Law and Business* 32, no. 2 (2012): 191–262. Henkel and Kaal propose distinct trigger types that are either transaction based, automatic, statute based, or regulation based.

13. Julie Dickson, "Too-Big-to-Fail and Embedded Contingent Capital," remarks at the Financial Services Invitational Forum, Cambridge, Ontario, May 6, 2010, http://www.osfi-bsif.gc.ca/Eng/Docs/jdlh20100506.pdf.

14. Calomiris and Herring, "How to Design a Contingent Convertible Debt Requirement."

15. Sundaresan and Wang, "On the Design of Contingent Capital."

16. Sundaresan and Wang, "On the Design of Contingent Capital."

17. Bolton and Samama, "Capital Access Bonds."

18. Similar gambling took place by Lehman Brothers management prior to its failure.

19. Stefan Avdjiev et al., "The Real Consequences of CoCo Issuance: A First Comprehensive Analysis," Vox CEPR Policy Portal, December 22, 2017.

20. In "How to Design a Contingent Convertible Debt Requirement," Calomiris and Herring note that regulatory capital requirements employ a mixture of book-value and fair-value measures of capital when determining compliance.

21. For a detailed discussion of the various kinds of manipulation that can be involved with different CoCo structures, see Robert L. McDonald, "Contingent Capital with a Dual Price Trigger," *Journal of Financial Stability* 9, no. 2 (2013): 230–41. For a description of recent CoCos issued by Lloyds, Rabobank, and Credit Suisse, see Michalis Ioannides and Frank S. Skinner, "Contingent Capital Securities: Problems and Solutions," in *Derivative Securities Pricing and Modelling*, ed. Jonathan Batten and Niclas Wagner (Castle Hill, Australia: Emerald Press, 2011).

22. See Sundaresan and Wang, "On the Design of Contingent Capital." The loss-of-information argument is a variant of Goodhart's law, which says, in paraphrased form, that when a measure becomes a target, it ceases to be a good measure. Charles Goodhart, "Problems of Monetary Management: The U.K. Experience," in *Papers in Monetary Economics* (Sydney: Reserve Bank of Australia, 1975). See also Urs W. Birchler and Matteo Facchinetti, "Self-Destroying Prophecies? The Endogeneity Pitfall in Using Market Signals for Prompt Corrective Action," Working Paper, Swiss National Bank, 2007.

23. A similar argument can be found in Philip Bond, Itay Goldstein, and Edward Simpson Prescott, "Market-Based Corrective Actions," *Review of Financial Studies* 23, no. 2 (2010): 781–820.

24. Sundaresan and Wang, "On the Design of Contingent Capital," argue that for a unique equilibrium price of the bank's stock to exist, there can be no transfer of value between initial shareholders and CoCo investors either prior to or at the time of conversion. However, George Pennacchi and Alexei Tchistyi, "On Equilibrium When Contingent Capital Has a Market Trigger: A Correction to Sundaresan and Wang," *Journal of Finance* 74, no. 3 (2019): 1559–76, point out an error in Sundaresan and Wang's analysis, indicating that the wealth-transfer restriction need only apply at the time of conversion. See also Natalya Martynova and Enrico C. Perotti, "Convertible Bonds and Bank Risk-Taking," De Nederlandsche Bank Working Paper no. 480, August 2015, for a similar argument about conflicting incentives.

25. Martynova and Perotti, "Convertible Bonds."

26. Calomiris and Herring, "How to Design a Contingent Convertible Debt Requirement."

27. Kenneth R. French et al., *The Squam Lake Report: Fixing the Financial System* (Princeton: Princeton University Press, 2010).

28. In "Contingent Capital with a Dual Price Trigger," McDonald also argues for a dual-trigger approach, but unlike the approach taken in *The Squam Lake Report*, his proposal uses both a market-based stock price and a broad-based financial firm market index.

29. Ceyla Pazarbasioglu et al., "Contingent Capital: Economic Rationale and Design Features," staff discussion note, International Monetary Fund, January 25, 2011, https://www.imf.org/external/pubs/ft/sdn/2011/sdn1101.pdf.

30. Coffee, "Bail-Ins Versus Bail-Outs."

31. Non Chen et al., "Contingent Capital, Tail Risk, and Debt-Induced Collapse," *Review of Financial Studies* 30, no. 11 (2017): 3722–58, https://doi.org/10.1093/rfs/hhx067. Indeed, the Swiss regulatory authority in 2010 proposed that a dual CoCo structure for capital with high-trigger securities (7 percent) should serve as a buffer to Tier 1 capital and that additional low-trigger securities (5 percent) should serve as loss-absorbing capital in the event of distress.

32. Financial Stability Oversight Council, "Report to Congress."

33. Avdjiev, Kartasheva, and Bogdanova, "CoCos: A Primer."

34. Martynova and Perotti, "Convertible Bonds."

35. Martynova and Perotti, "Convertible Bonds."

36. Stefan Avdjiev et al., "CoCo Issuance and Bank Fragility," Bank for International Settlements Working Paper no. 678, November 2017. It is estimated that worldwide banking assets are about $27 trillion and capital is about $5.3 trillion. See http://stats.bis.org/statx/srs/table/b1.

37. To put this tax issue in perspective, U.S. banks had a tax rate of 35 percent and in 2016 paid about $303 billion in dividends. If all dividends were tax-deductible, the total loss to the Treasury would have been about $32 billion, which is less than the estimated cost of banking regulation and substantially greater than the anticipated loss in revenue if payments on CoCos were to be deemed tax-deductible. Federal Deposit Insurance Corporation, "Commercial Banks: Historical Statistics on Banking," https://www5.fdic.gov/hsob/HSOBRpt.asp. Admati et al. argue that the cost of capital versus debt is overestimated. Anat R. Admati et al., "Fallacies, Irrelevant Facts, and Myths in the Discussion of Capital Regulation: Why Bank Equity Is Not Expensive," Stanford University Business School Working Paper no. 2065, October 22, 2013. In "CoCos: a Primer," Avdjiev, Kartasheva, and Bogdanova suggest that as of 2016, about 64 percent of CoCos in circulation had been issued in countries that regarded interest on CoCos as tax-deductible, while about 20 percent had been issued in countries where CoCo interest payments were not tax-deductible. They did not determine the tax status of the remainder.

38. Avdjiev, Kartasheva, and Bogdanova, "CoCos: A Primer."

39. Bank for International Settlements, "Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systems," June 2011.

40. The Shadow Financial Regulatory Committee has long argued against relying on risk-weighted assets as a measurement criterion. See, for example, Shadow Financial Regulatory Committee, "Alternatives to the Proposed Risk-Based Capital Standards," Statement no. 323, February 13, 2013. For a detailed discussion of the Shadow Committee's view, see Robert A. Eisenbeis, "The Shadow Financial Regulatory Committee's Views on Systemic and Payments System Risks," paper presented at the 91st Annual Conference of the Western Economic Association, Portland, Oregon, June 2016. The same remarks also appear in Robert A. Eisenbeis, "The Shadow Financial Regulatory Committee's Views on Systemic and Payments System Risks," in *Innovative Federal Reserve Policies during the Great Financial Crisis*, ed. George G. Kaufman, Dougas D. Evanoff, and A. G. Malliaris (Singapore: World Scientific Publishing, 2019), pp. 285–302.

41. Maryka Daubricourt, "Contingent Capital Instruments: Pricing Behaviour," ESCP Europe Applied Research Paper no. 6, October 2016.

42. See "Additional Tier 1 (AT1) RegS May 2014," Deutsche Bank, https://www.db.com/ir/en/at1-regs-may-2014.htm.

43. "Europe's CoCos Provide a Lesson on Uncertainty," Office of Financial Research Working Paper 17–02, April 2017.

44. William Canny and Donal Griffin, "Deutsche Bank CEO John Cryan Defends Bank as Some Clients Pare Exposure," *LiveMint*, September 30, 2016.

45. William R. Cline, "Systemic Implications of Problems at a Major European Bank," Peterson Institute for International Economics Policy Brief no. 16–19, October 2016.

46. Mark Russell, "The Resolution of Banco Popular," UK Finance, June 22, 2017.

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48. "FAQ: EU's Differing Treatment of Ailing Banks," Moody's, June 21, 2017, https://www.moodys.com/research/Banks-Europe-FAQ-EUs-differing-treatment-of-ailing-banks--PBC_1077213.

49. Jim Edwards, "Italy's Banks Might Need €52 Billion Bailout," Business Insider, November 29, 2016.

50. James David Spellman, "Italy Shores Up Failing Bank: A Template for Rescuing Europe's Other Weak Banks?," European Institute, January 2, 2017.

51. See "Directive 2014/59/EU of the European Parliament and of the Council of 15 May 2014 Establishing a Framework for the Recovery and Resolution of Credit Institutions and Investment Firms," *Official Journal of the European Union*, December 6, 2014; and European Commission, "EU Bank Recovery and Resolution Directive (BRRD): Frequently Asked Questions," news release, April 15, 2014.

52. Depending on their features, however, certain CoCos may be harder to price and tend to be somewhat more expensive than other forms of debt.

53. The "off-ramp" concept is outlined in Title VI of the Financial CHOICE Act of 2017 and was endorsed in a modified form by the Financial Economists Roundtable that same year.

54. Financial CHOICE Act of 2017, H.R. 10, 115th Cong., 2017.

55. Financial Economists Roundtable, "Statement on Bank Capital as a Substitute for Prudential Regulation," September 20, 2017,

http://www.financialeconomistsroundtable.com.

56. The Shadow Financial Regulatory Committee has criticized the use of such measures on many occasions, and the 2008 financial crisis proved how deficient such measures were in reflecting an institution's soundness. See Kuritzkes and Scott, "Markets Are the Best Judge of Bank Capital"; and Financial Economists Roundtable, "Bank Capital as a Substitute for Prudential Regulation."

57. See Drew Dahl et al., "Compliance Costs, Economies of Scale and Compliance Performance: Evidence from a Survey of Community Banks," Federal Reserve Bank of St. Louis, April 2018, Chart 3, https://www.communitybanking.org/-/media/files/compliance%20costs%20economies%20of%20scale%20and%20compliance%20performance.pdf.

58. Financial Stability Oversight Council, "Report to Congress."

59. Robert A. Eisenbeis, "The Fed and Structural Reforms to Reduce Interconnectedness and Promote Financial Stability," in *Public Policy & Financial Economics: Essays in Honor of Professor George G. Kaufman for His Lifelong Contributions to the Profession*, ed. Douglas D. Evanoff, A. G. Malliaris, and George G. Kaufman (Singapore: World Scientific Publishing, 2018), pp. 117–46.

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