

# The Whys and Hows of CoCo Issuance

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Though the regulatory landscape post-crisis remains far from fixed, contingent capital, or CoCos, appear likely to form part of policymakers' toolkits. There is undoubtedly widespread support from regulators the world over to have instruments that can be converted from debt to equity at times of financial market stress. Yet there is little consensus as to what the trigger for conversion should be.

Before looking at the question of designing the right trigger, it's worth noting why there is so much support among regulators for CoCos. A proper CoCo requirement, alongside common equity, would be more effective as a prudential tool and less costly than a pure common equity requirement. CoCos can create strong incentives for the prompt recapitalisation of banks after significant losses of equity but before the bank has run out of options to access the equity market. That dynamic incentive feature of a properly designed CoCo requirement would encourage effective risk governance by banks, provide a more effective solution to the 'too-big-to-fail' problem, reduce forbearance risk - supervisors' reluctance to recognise losses of book equity - and address uncertainty about the appropriate amount of capital banks need to hold, and the changes in that amount over time. If a CoCo requirement had been in place in 2007, the disruptive failures of large financial institutions and the systemic meltdown after September 2008 could have been avoided.

## A better backstop

Why would CoCos have avoided a systemic meltdown? In a nutshell, the answer involves the way in which banks', and other financial firms', attitudes towards managing their risk and their capital are shaped by regulation. Several of the world's largest financial institutions - including Fannie Mae, Freddie Mac, Citigroup, UBS, AIG, Bear Stearns, Lehman Brothers and Merrill Lynch - had amassed huge and concentrated asset risks relating to subprime mortgages and other risky investments, but they maintained equity capital that was too small to absorb the losses that resulted from those risky investments. And, as they lost equity capital from 2007 through 2008, they did not replace most of what was lost. As a result, relative to risk, equity capital proved inadequate to insulate these firms, and many others, from insolvency when their losses and risks expanded in September 2008.

Internal bank risk management and external prudential regulation and supervision failed precisely because they did not envision and require the appropriate amount of equity relative to risk. The regulatory failure was not that equity capital requirements were too low *per se*. After all, as of mid-2006, Citigroup's ratio of the market value of equity relative to the market value of assets was nearly twice that of Goldman Sachs; and yet, Citigroup, not Goldman Sachs, was the institution whose losses produced insolvency. The difference occurred because Citigroup's risk exposures, including off-balance sheet risks associated with implicit liability to clean up problems in special purpose entities and special investment vehicles, were disproportionately larger than those of Goldman Sachs.

Examples of failures to constrain risk within a firm's capacity to bear loss abound. Chief executives and boards appeared to have lacked an effective framework or the willingness to apply the appropriate tools to measure risk correctly or to constrain aggregate risk within prudent limits. Banks that rewarded risk managers more prior to the crisis not only saw smaller crisis-related losses, but also had lower ex-ante volatility, which provides strong evidence that management decisions not to prioritise and empower risk management were a central contributor to the crisis. Examples of these problems may be found in the bankruptcy of Lehman Brothers, the losses sustained by UBS and AIG, the collapse of Northern Rock, the forced merger of Bear Stearns, the collapses of Indy-Mac, Washington Mutual and Wachovia, as well as the string of losses reported by Citibank, Merrill Lynch, and Bank of America. The studies of these experiences have questioned whether anyone, including corporate board members, senior management, or supervisors, even comprehended their exposures to subprime mortgage risks.

## A regulatory failure

These failures to maintain adequate capital and to exercise effective governance of risk are all the more remarkable because regulators and supervisors have been focusing on the problems of risk measurement and capital

budgeting for more than two decades. Risk-based capital is precisely the measure that the Basel Committee says it has been targeting all along when setting its minimum standards for capital. Despite widespread agreement that risk-based capital should be the focus of prudential capital regulation, both bank risk managers and supervisors failed to measure risk correctly, and failed to require sufficient capital commensurate with that risk.

Why did the regulatory system perform so badly? Partly the fault was in the minimum regulatory capital standard itself. The numerator of the minimum riskbased capital ratio failed to capture an institution's capacity to absorb loss. The denominator failed to reflect an institution's exposure to risk. And the minimum ratio was set much too low to provide an adequate margin of safety for the financial system. The deeper problem, however, was distorted incentives that caused underestimates of risk exposures, and discouraged the timely replacement of lost equity capital.

### **Distorted incentives**

With respect to the first of these problems, the process for measuring risk, on which capital requirements are based, encourages the understatement of risk. Under existing rules, banks and rating agencies control the measurement of risk used by regulators. Bankers and rating agencies, however, suffer from conflicts of interest that offer benefits to them when they understate bank risk.

When bank risk is not being measured correctly, it cannot be managed properly. If banks have a strong incentive to understate their risks, then that will prevent them from taking appropriate measures to penalise excessive risk-taking within their firms.

With respect to the second problem - the failure to replace lost capital in a timely fashion - it is instructive to consider how long it took Citigroup and others to deplete their capital during the recent financial crisis. Many months passed between the initial shocks - the first revelations of the spring of 2007, the August 2007 run on asset-backed commercial paper, the Bear Stearns bailout of March 2008 - and the systemic collapse of mid-September 2008. During the year-and-a-half leading up to the systemic collapse, roughly \$450 billion of capital was raised by global financial institutions. Clearly, global capital markets were open, and there were willing investors, especially hedge funds, private equity funds and sovereign wealth funds, as well as wealthy individuals. But, despite persistent and significant declines in their market value of equity relative to assets, many of the financial institutions most deeply affected by the crisis prior to September 2008 chose not to raise sufficient capital.

A top executive at one of those banks confessed to one of us during the summer of 2008 that, despite the need to replace lost equity, the price of stock was too low. Issuing significant equity in the summer of 2008 would have implied substantial dilution of stockholders - including existing management. Institutions that had suffered large losses preferred to wait, hoping for an end to the crisis in the summer of 2008, and a reversal in the sharp decline in the prices of risky assets. After the bailout of Bear Stearns, they also believed that if their situation deteriorated severely, the government would likely step in. That further undermined any incentive to replace equity capital preemptively or even promptly. On balance, the best strategy appeared to be to wait and hope for the best.

### **The case for CoCos**

Of course, these two problems - ex-ante understatement and mismanagement of risk, and the ex-post failure to replace lost equity - are related. If banks realised they would be forced to replace lost capital in a timely fashion, then they would have greater incentive to manage risk properly and maintain adequate equity capital commensurate with that risk, since they would face the prospect of a significant cost (in the form of stockholder dilution) from having to replace lost equity capital in a troubled market.

If regulation failed because of distorted or inadequate incentives to measure and manage risk and to postpone the replacement of lost capital, then it follows that a central focus of reform should be to address those two incentive problems. How can we change bankers' incentives so that they will improve the accuracy of their risk assessments, manage risk better and replace lost equity capital faster? Basel III has placed emphasis on requirements for more and better quality capital and more intensive supervision. Do the increases in capital contemplated by the

Basel Committee offer a solution to the two crucial problems of risk mismeasurement and the failure to replace lost capital in a timely fashion? Will the contemplated enhancements to supervision solve these two problems? History does not provide much reason to be optimistic about either of the proposed solutions.

Although the emphasis on increasing shareholders' equity is a move in the right direction, these reforms will not solve the fundamental problems of risk measurement and maintenance of adequate capital. The measure of shareholders' equity employed by Basel tends to lag its true value, thus avoiding timely recognition of loss. The ability to avoid timely recognition of loss encourages banks to understate risk, since they will not be forced to raise dilutive equity in the wake of losses. And, after unrecognised losses occur, banks' incentives for riskmanagement can become even more distorted, since the temptation to gamble for resurrection can lead thinly capitalised banks to increase risk exposures.

### **Delayed losses**

Why does the Basel approach to capital requirements produce errors and lags in the recognition of loss? Because the measure of shareholders' equity continues to rely on accounting principles which, while they vary from country to country, combine book values, fair values and market values when measuring capital compliance. This permits banks and supervisors - both of whom may stand to benefit from postponing the recognition of loss - to conceal losses in a number of ways.

Not only can supervisors be caught unaware, they may prefer to ignore losses for as long as possible. Forbearance - especially the ever-greening of loans to borrowers who would otherwise be delinquent, by lending just enough to enable them to keep current on their debt service payments - remains a constant challenge for supervisors.

Delayed recognition is not only a technical challenge. Supervisors are subject to substantial political pressure, and those pressures often lead them to prefer to forbear and 'play for time' rather than enforce capital adequacy requirements. The purposeful delays by the US authorities in the 1980s and by the Japanese and Mexican authorities in the 1990s are some of the most visible examples of a widespread phenomenon that has been documented time and time again. Supervisors also may lack incentives to enforce the spirit of prudential rules because they are likely to be challenged in judicial or administrative proceedings for any action that forces an institution to recognise losses, especially when there is some hope that losses will be reversed in time. In some countries, supervisors are personally liable, and subject to criminal penalty, for such supervisory errors, and that legal liability is often used to threaten supervisors against taking aggressive actions. The result of these measurement and incentive problems is that supervisory action is often delayed until losses can be proven beyond any reasonable doubt rather than when they actually occur.

Accounting loss recognition lags were substantial during the recent crisis. For example, according to regulatory accounting, Citibank, a systemically important financial institution (Sifi) that received a significant government bailout, maintained a Tier I capital ratio that never fell below 7% during the course of the financial crisis and was 11.8% at what the market regarded as its weakest moment in December 2008, when its stock market capitalisation fell to around 1% of its total accounting assets. Indeed, all of the banks that required bailouts in the crisis reported higher-than-average levels of regulatory capital in the period just prior to their bailouts.

One could argue that making initial book equity capital requirements much higher would solve some of the incentive problems that distort risk measurement and risk management, even without properly incentivising the timely replacement of capital. But 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.

Equity is costlier to raise than debt for fundamental reasons associated with asymmetric information, managerial agency costs and tax savings from debt. The literature on bank capital crunches documents that shocks to bank equity capital have large contractionary effects on the supply of lending precisely because lost equity is costly to replace. Whether tax benefits of debt (the deductibility of interest in corporate taxation) should be included when measuring the relative long-run costs of equity finance has been hotly debated. But even if tax savings only matter from a transitional perspective, it is beyond doubt that if banks were permitted to raise capital in part through

CoCos, they would likely choose to issue capital faster, and thus to restrict loan growth less, during the transition to higher capital. Given the desirability of improving access to credit as one of the means of promoting economic recovery, transitional issues are far from trivial.

Furthermore, given the problem of lagging recognition of lost capital, setting a high initial book equity requirement does not guarantee that capital will be kept high.

We conclude that a significant increase in capital requirements is necessary, but accomplishing that objective purely with a higher equity requirement has high costs and does not reliably solve the problem of inadequate capital. A properly designed CoCos requirement can provide unique incentives that will motivate Sifis to implement strong systems of risk governance to measure and manage risk, and raise additional capital or sell assets in a timely fashion, when necessary, to minimise the chance of violating minimum capital adequacy standards.

### **CoCos - a brief guide**

The essential idea of a CoCo has been widely discussed by many people. Despite numerous differences in design and specific intent, virtually all versions of CoCos have the common goal of establishing a contractual structure that results in an increase in bank capital in adverse states of the world. This can occur, either directly through contractual convertibility, or indirectly through incentives to voluntarily raise new equity capital. Recapitalisation restores the bank to a viable position of capital adequacy and thereby avoids regulatory resolution.

Proposals vary with regard to three critical features: first, the amount of CoCos required to be issued; second, the trigger for conversion from bonds to equity; and third, the conversion rate - or the amount of equity to be issued when the CoCos are converted.

The differences across proposals with respect to these three key design aspects reflect differences in the weights that the various CoCo proposals attach to the following objectives: first, providing a contingent cushion of common equity that results from the conversion of debt when the CoCo is triggered - which we label the 'bail-in' objective; second, providing a credible signal of default risk in the form of the observed yield spread on convertible debt prior to any conversion - which we label the 'signalling' objective; and third, incentivising the voluntary, pre-emptive, and timely issuance of equity into the market as a means of avoiding highly dilutive CoCo conversion - which we label the 'equity-issuance and risk management' objective.

### **Four criteria**

For CoCos to be most effective, four criteria must be met. First, a large amount of CoCos (relative to common equity) should be required. Second, CoCo conversion should be based on a market-value trigger, defined using a moving average of a 'quasi-market value of equity ratio', or QMVER. Third, all CoCos should convert if conversion is triggered. Lastly, the conversion ratio should be dilutive of preexisting equity holders.

### **An argument from design**

Turn now to the first of our criteria - that a large amount of CoCos relative to common equity should be required. Why so? Our recommendations regarding the amount, trigger, and conversion terms of CoCos all reflect our view that the central objective should be to incentivise the prompt voluntary issuance of equity into the market in response to significant losses in the economic value of equity by a Sifi. Rather than focusing on facilitating a more orderly liquidation of assets, as supporters of the 'bail-in' objective advocate, or on creating a convertible debt instrument that would credibly suffer substantial default risk via conversion, and therefore, provide useful market signals about forward-looking perceptions of default, we focus on providing institutions with a strong incentive to take remedial measures to raise equity long before they face the risk of insolvency.

The incentive to issue equity pre-emptively is strengthened when the size of CoCos is large. To be concrete, and to ensure adequate incentives for timely equity offerings while the bank still has access to the equity

market, we propose the following combination of CoCo design features: commensurate with the Basel III book equity requirement for Sifis - which envisions as much as a 9.5% Tier I equity requirement relative to risk-weighted assets - we propose that the amount of CoCos be set at 10% of book assets.

With respect to the second of the four criteria - the appropriate trigger for conversion - we propose that CoCo conversion should be based on a marketvalue trigger. When a trigger is credibly and observably based on market value at a high ratio of equity-to-assets (long before concerns about insolvency arise), and when the conversion ratio is dilutive of existing common shareholders, this will create a powerful incentive to avoid a mandatory conversion of CoCos into equity by preemptively issuing equity into the market. Under those conditions, a Sifi experiencing significant loss and approaching the neighborhood in which dilutive conversion would be triggered, would choose to issue significant equity into the market, possibly combined with asset sales that would raise the market value of its outstanding equity relative to assets, thereby avoiding the conversion trigger. The trigger should, therefore, be defined as stated under the second of the four criteria: using a moving average of a QMVER. We suggest an 8% QMVER trigger for CoCo conversion based on a 90-day moving average (which we explain further below). The third criterion, that all CoCos should convert if conversion is triggered, offers a further incentive to issue equity early.

Turning to the fourth criterion, we propose that the conversion rate should increase the dilution to incumbent equity holders by exchanging CoCos for equity at a conversion ratio below the price of equity. A dilutive CoCo conversion means that the holders of CoCos will have more value in new equity than the principal of the bonds they surrender. This would remove any doubt that a preemptive issue of equity will be less dilutive than the mandatory conversion of CoCos. To ensure adequate dilution risk to shareholders, we propose that all CoCos convert upon hitting the trigger with a conversion ratio that is 5% dilutive of equity holders (relative to face value).

Given the strong incentives to promote timely equity offerings, we believe our CoCos would almost never actually convert into equity. They would play little role in bail-ins or in signalling CoCo holders' losses (which, in equilibrium, should be expected to be nearly zero). If a bank experienced a sudden and complete loss of market confidence (say, as the result of accounting fraud à la Enron), then the Sifi likely would be unable to avoid conversion through a preemptive equity offering. Although we value the ability of CoCos to absorb losses under such circumstances, our main interest is in creating very strong incentives for managers to take corrective action while they still have multiple options to do so.

Not only would the corrective action of a pre-emptive stock issue or asset sale preserve high ratios of equity to assets in the wake of significant shocks ex-post, but the knowledge of the existence of CoCos and the anticipation of the possibility of facing dilutive CoCo conversion would create strong incentives for management to maintain high ratios of capital, accurate measures of risk, and effective controls on risk at Sifis. CoCo conversion would be a chief executive's nightmare: not only would existing stockholders who are diluted by the conversion be calling for his head, but he would also face an onslaught of sophisticated new block holders of stock (institutional investors who formerly were CoCo holders) who are likely to be eager to sack senior management for their demonstrated incompetence.

### **Setting an appropriate trigger, and related questions**

Why a QMVER? To begin with, it is worth noting the attributes that an appropriate trigger must possess. An appropriate trigger must be accurate, timely and comprehensive in its valuation of the issuing firm. And the trigger should be defined so that it can be implemented in a predictable way, so that CoCo holders can price the risks inherent in the instrument at the time of its offering. This latter point has been emphasised by the rating agencies that refuse to rate CoCos in which the conversion is contingent upon the decision of a regulator or bank management.

Some proposals for contingent capital assume that book values of the institution's equity relative to its assets would be the appropriate conversion trigger for CoCos. But book value is an accounting concept, subject to manipulation and, inevitably a lagging indicator of deterioration in a bank's balance sheet. The problem of using book value as the trigger is not just one of managerial manipulation. As we have argued above, regulators and supervisors have shown time and again that they are hesitant to opine negatively about Sifis in a way that will

become public. Such forbearance leads to protracted delays in recognising problems. Thus, a central purpose of employing non-equity capital is to reinforce official supervision with market discipline.

What market-based measures could be employed as the trigger? The two obvious candidates are CDS spreads and stock price movements. CDS markets seem less desirable for the purpose of deriving triggers for two reasons. First, the markets are relatively shallow, and thus may be more susceptible to manipulation. Second, the pricing of risk is not constant over time; an observed spread at one point in the business cycle, under one set of market conditions, can be indicative of a higher level of risk than that same spread observed at another time under a different set of business conditions.

Equity values, if used properly, would provide the best source of information to design a trigger. Indeed, some of the best-known cases of the failures of large firms that surprised rating agencies and regulators were signalled long in advance by a severe and persistent decline in the aggregate market value of their equity. KMV's rating of Enron's debt was the only rating that correctly predicted a severe probability of default. The reason for its success was that the KMV model was based on the Black-Scholes approach to measuring default risk as a function of leverage (measured using market values) and asset risk (also derived from observed stock returns volatility). Similarly, market value information about Lehman provided an early warning of its problems. The market value of Lehman's equity as a percentage of the derived market value of assets was slipping over time during the spring and summer of 2008 so that it was actually negative on several occasions in July and August of 2008. If Lehman had been required to issue CoCos with a trigger based on its market value of equity, this substantial and protracted market decline in the equity value of Lehman would have produced conversion of debt into equity long before insolvency.

As we have noted, the existence of a properly designed CoCo requirement would also incentivise all financial firms to voluntarily raise equity capital in large amounts before hitting the CoCo trigger. Managers who are maximising the value of shareholders' claims in the firm will always have a strong incentive to prevent the triggering of the conversion of CoCos by strengthening the governance of risk and, if necessary, preemptively issuing equity into the market or selling assets, so long as the dilution effect of the CoCo conversion is sufficiently large. Even managers that are not maximising shareholder value, per se, will want to avoid the potential corporate governance consequences of a massive CoCo conversion, which would almost assuredly lead to a shareholder revolt to oust them, which would be facilitated by the presence of newly converted and concentrated holdings of shares held by sophisticated institutional investors.

We suggest employing a 90-day moving average of the ratio of the market value of equity relative to the sum of the market value of equity plus the face value of debt to smooth fluctuations in share prices and reduce the noise in market value signals. We define this ratio as the QMVER. A trigger based on the QMVER would be desirable based on the criteria of predictability, timeliness, comprehensiveness and accuracy.

### **The right incentives**

A proper CoCo requirement can provide strong incentives for the prompt recapitalisation of banks after significant losses of equity, or for the proactive raising of equity capital when risk increases. Consequently, it can also provide strong incentives for effective risk governance by regulated banks, and can reduce forbearance (supervisory reluctance to recognize losses).

Judging as best we can from the experience of the recent crisis, our proposed requirement would have been very effective in encouraging the timely replacement of lost capital early in the crisis.

*This article is an abridged version of [Why and How to Design a Contingent Convertible Debt Requirement](http://fic.wharton.upenn.edu/fic/papers/11/11-41.pdf), which is available at <http://fic.wharton.upenn.edu/fic/papers/11/11-41.pdf>. For helpful comments, the authors wish to thank, without implicating, Wilson Ervin, Mark Flannery, Charles Goodhart, Andrew Haldane, Tom Huertas, George Pennacchi, Matthew Willison, and Peter Zimmerman.*