Stabilizing Large Financial Institutions with Contingent Capital Certificates

Mark J. Flannery

BankAmerica Professor of Finance
University of Florida

ABSTRACT

The financial crisis has clearly indicated that government regulators are reluctant to permit a large financial institution to fail. In order to minimize the transfer of future losses to taxpayers or to solvent banks, we need a system for assuring that large institutions always maintain sufficient capital. For a variety of reasons, supervisors find it difficult to require institutions to sell new shares after they have suffered losses. This paper describes and evaluates a new security, which converts from debt to equity automatically when the issuer's equity ratio falls too low. "Contingent capital certificates" can greatly reduce the probability that a large financial firm will suffer losses in excess of its common equity, and will provide market discipline by forcing shareholders to internalize more of their assets' poor outcomes.

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1. **Introduction**

Corporate limited liability tends to make firms under-value the possibility that their actions will have extremely bad outcomes. This distortion has been a particular focus for banking firms because their equity capital ratios are low and the government has an interest in assuring a stable financial system. The possibility that market counterparties will discipline financial firms’ risk-taking has been discussed most often in terms of debt-holders: if they perceive an increase in an issuer’s default risk, they will demand a higher promised debt payment in compensation for their higher expected default losses. Subordinated debentures have received particular attention in discussions of bank market discipline, because their loss distribution resembles that of the government’s deposit insurance fund.

However, a firm must pass through the bankruptcy process in order for debt holders to bear default losses, and that process destroys substantial value in a firm whose entire business model is based on credit-worthiness. Customers and creditors flee at the first signs of financial distress and their flight thereby causes further difficulties. The recent financial crisis clearly illustrates a strong official reluctance to let large financial firms fail. Such conjectured “TBTF” protection has always loomed over efforts to instill market discipline into the financial system. It is well known that a TBTF policy induces financial firms to take greater risks and to operate with lower equity cushions. Asset mispricing may also distort real-sector allocations.

With such strong *ex post* conjectural debt guarantees, shareholders need not pay higher interest rates to compensate bond holders fully for the expected costs of their default. So we need an alternative channel by which to induce large financial firms to pay more attention to the possible downside outcomes of their investment choices. In theory, this can be accomplished by enforcing appropriate, risk-related
capital standards on a continuing basis. But real-world supervision is ill-suited to this task. Regulatory powers have been expressed in terms of book accounting values because GAAP provides managers with considerable flexibility about when to recognize value impairments. Book equity values therefore tend to lag changes in a firm’s market value, and these lags are particularly severe when a firm is encountering financial difficulties. For example, many of the most troubled firms in 2007 – 2009 have been “well capitalized” according to Basel standards (Kuritzkes and Scott (2009)). Even while the government was investing TARP funds into many financial firms, supervisors found it difficult to stop dividend payments to common shareholders. In short, the present supervisory system does a poor job of enforcing meaningful capital requirements at large financial institutions.

Firms’ own reluctance to issue new equity after absorbing losses further impedes re-capitalization of weak banking firms. Increased leverage transfers value to shareholders from liability holders, whose promised payments become less likely to be fulfilled as the firm’s equity cushion falls. Accordingly, equity contributions to a highly levered firm transfers value to its liabilities. This “debt overhang” means that selling $1 of additional shares raises the firm’s market value by less than $1. Because new shareholders will demand fair value for their equity contributions, this transfer comes out of the value of the initial shareholders’ claims.

Uncertainty about asset values and volatilities makes it difficult for supervisors to demand prompt equity sales. Valuation uncertainty is intrinsic to financial markets: observers with different information or risk assessments will generally place different values on a portfolio. Private investors can differ among themselves, and supervisory staff might perceive more (or less) risk than a bank’s management. Even among supervisors, the riskiness of specific activities might appear different. In an environment with

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1 A bank’s equity capital ratio serves to divide risk exposures between shareholders and outside claimants such as bond holders or the government insurance agency. Pennacchi (1987) shows how the value of deposit insurance varies substantially with a bank’s ability to withdraw capital above the regulatory minimum and to continue operating with “inadequate” capital. Kane and Wilson (1998) argue that shareholders’ double liability at national banks prior to 1935 made them less keen to take risks.
legitimate differences of opinion, it becomes particularly difficult for a supervisor to force a bank to sell equity and (probably) to impose a visible dilution cost on that bank’s shareholders. Uncertainty leads a supervisor to delay (Brainard (1963)), which makes it more likely that further problems will tip the bank into dire circumstances.

Recent political discussions and official statements around the world indicate a desire to raise bank capital ratios going forward. But so long as “capital” is measured in book-valued (GAAP) terms we should not expect large firms to be reliably well-capitalized when trouble hits. Moreover, imposing high capital requirements increases private incentives to move some kinds of business outside the regulated entity, particularly when exuberant market expectations require little capital for banks.

This paper describes a novel security that large financial firms could issue in order to maintain their capital ratios above regulatory minima with a very high probability. “Contingent capital certificates” (CCC) would be issued as debt obligations, but would convert into common stock if the issuer’s capital ratio fell below some critical, pre-specified value. These bonds would add to the firm’s risk-bearing capacity in bad states of the world without burdening the firm with tax-inefficient equity financing in the good states. CCC would thus reduce the probability of failure, reduce the incentive to move safer activities off balance sheet, protect taxpayers and solvent banks from bearing the issuer’s losses, and still permit the issuers’ to lend profitably at relatively low rates of interest. I recommend that all systemically important banks be encouraged to issue these bonds, and that the bonds’ conversion should depend only on the issuer’s financial condition. Firms would not be required to issue CCC, but CCC could be used to reduce the amount of equity capital they are required to hold.

2 Appendix B lists some papers that have considered various types of contingent capital.

3 Others would trigger conversion only if a supervisor declared that a systemic risk event was underway (e.g. Squam Lake (2009), Kashyap et al. (2008), Hancock and Passmore (2009)). My own view is that systemically important firms should not be permitted to operate with inadequate capital, lest their problems induce a systemic event.
The paper is organized as follows. Section 2 describes the CCC debt instrument and explains how it re-arranges loss risk exposures between shareholders and fixed claimants. Large banks presently finance themselves with sufficient long-term debt that substantial risk-bearing capacity could be added without changing the maturity structure of issuing firms’ outstanding debt. A specific capital proposal is presented in Section 3, as a basis for further discussion and refinements. The proposal’s trigger and capital restoration ratios are intended purely for illustrative purposes. Section 4 discusses some questions about how CCC bonds can be implemented for large financial firms. I argue that the conversion trigger must be expressed in terms of equity’s contemporaneous market value. Some have argued that this reliance on market valuations might permit some market manipulation if an issuer’s equity ratio falls close to the trigger. I am not confident about the importance of this potential, although it must be taken seriously. I discuss the potential for market manipulation in Section 5. The final section summarizes and concludes. The paper includes two Appendices. Appendix A presents a slightly more sophisticated example than the one presented in section 2, and Appendix B lists prior papers that have considered various forms of contingent-capital.

2. What are Contingent Capital Certificates?

A firm becomes bankrupt when the value of its promised liability payments exceed the value of its assets – or, equivalently, when the value of its equity goes to zero. Common equity is the most effective means for a private firm to absorb losses. If public policy aims to minimize the extent to which a private firm’s losses must be absorbed by public funds, supervisors should assure that systemically important firms always maintain an adequate equity cushion between their asset and liability values. One approach to this problem would be to require that large financial firms always maintain very high ratios of common equity to their risky assets. Because equity is tax disadvantaged, however, this saddles the firm with a high cost of capital, which means that lenders must pay higher interest rates on their loans.
Competition tends to drive banking firms to finance themselves with less equity and more debt (up to a point), because more leverage tends to lower the firm’s overall cost of capital. Even if a firm starts out with a high equity ratio, losses can dissipate that equity and supervisors must assure that the lost equity be replaced.

CCC provide loss-absorption capacity if things turn out poorly for the firm, without requiring that it maintain a high volume of tax-disadvantaged equity financing. CCC originate as debt, and should be treated as debt for tax purposes because they have no “upside” if the firm’s condition improves. This makes the “carrying cost” of risk-bearing capacity quite low for the issuing firm. Yet if the firm suffers losses, a CCC covenant specifies that some of the CCC convert to common equity to replace lost equity value. No new funds enter the firm. Rather, its leverage is reduced by replacing some of its outstanding debt with (converted) common stock. The CCC conversion occurs promptly, automatically, and transparently. The contract covenants simply specify that the nature of the claim changes if the issuer’s equity capital ratio falls below a specified (positive) trigger value.

A. Example of CCC Conversion into Equity

A simplified example illustrates how CCC protect a financial firm’s solvency and its fixed claimholders. Table 1 presents a sequence of balance sheets in which the reported numbers are assumed to represent market values. This example ignores the effect of leverage changes on the value of shareholders’ and debt holders’ claims, but Appendix A shows why this omission does not distort the basic economic features of CCC.

Starting off at $t = 0$, the firm has a 5% capital ratio, which exceeds the (assumed) minimum required ratio of 4%. With ten shares of stock outstanding ($N = 10$) and an equity value of $5$, each share is worth $0.50$. Between $t=0$ and $t=1/2$, the loans’ value falls by three dollars, reducing the firm’s capital ratio to 2.06%. Once equity falls below its trigger value, a covenant in the CCC bonds requires that enough bonds be converted to restore the capital ratio above 4% of assets. Assume that the target equity
ratio after a conversion is set to 5%, or $4.85. This generates the indicated balance sheet at t=1: outstanding CCC fall by $2.85 and the equity account rises by the same amount. The bank’s capitalization is again adequate, which is the supervisor’s primary concern.

The initial shareholders and converting bond investors will be concerned with how the firm’s ex post ownership is distributed. After the bank’s loan portfolio has fallen in value, its share price stands at $0.20. This market price should determine how many shares the CCC investors receive in return for their contribution of $2.85 in new equity funds. That is, the CCC investors receive 14.25 new shares of stock, giving them more than 60% of the re-capitalized firm’s ownership. The initial shareholders are thus forced to sell shares at a fair market value in order to restore their capital ratio to the supervisor’s assessment of adequacy. The converted bond holders have suffered no loss of capital, and should be able to sell their shares for $0.20 in the open market. After conversion, the firm has a smaller amount of outstanding CCC (only 2.22% of total assets), which supervisors would presumably want to have augmented in short order.

CCC investors resemble debt investors in that they can lose if the bank’s assets fall in value but they have no upside. It thus seems that CCC should be considered debt by the IRS, and periodic payments to CCC investors would be tax deductible to the issuing firm.

B. Policy Benefits from Contingent Capital Certificates

If large financial firms financed themselves partly with CCC, there would be a mechanism for re-capitalizing firms promptly after they suffered losses. No new money needs to come into the firm, as the re-capitalization takes place via a debt-for-equity swap.\footnote{CCC in this way resemble a pre-packaged bankruptcy or Zingales’ (2008) suggestion that a temporary change in bankruptcy laws force weak financial firms’ debt holders to take equity in place of some debt claims. Unlike a pre-packaged bankruptcy, however, the CCC’s re-capitalization occurs relatively far from the firm’s bankruptcy point.} Because liabilities thereby fall relative to the firm’s assets, its default probability (PD) and loss given default (LGD) both decline following the re-capitalization. If the conversion trigger (in the example above, this is equity equal to 4% of assets) is
evaluated frequently (e.g. daily), the likelihood that a firm will fail before debt can be converted is quite small. Although CCC cannot completely protect a firm against bankruptcy, they can severely reduce its probability of failure independent of supervisory actions (which tend to occur slowly in uncertain financial times). This reduction in default probability comes at the expense of shareholders, who would become unable to continue operating their firms with inadequate capital. In other words, shareholders bear more of the downside outcomes resulting from their investment decisions.

Because the interest on CCC bonds should be tax-deductible for the issuing firm, their risk-absorption capacity has limited effect on the issuing firm’s cost of capital. Unlike a straightforward increase in equity capital requirements, CCC will not raise break-even loan rates substantially, and hence will not impede borrowers’ growth or profitability. Indeed, CCC should permit regulatory authorities to require substantial more “downside risk” protection at a modest cost to the issuing banks. CCC conversions also tend to mitigate capital standards’ pro-cyclical effects by providing new equity capital if loan losses are exceptionally high.

Using a market value trigger to generate CCC conversions raises some new questions about capital regulation, which I discuss in Section 5 below.

**C. How Much Added Risk Capacity?**

The Squam Lake Working Group (2009) point out that a firm’s capital structure is designed to reflect the information and incentive problems it confronts between managers or bond holders and shareholders. Therefore, supervisors should be reluctant to interfere with a financial firm’s liability structure, which is endogenously designed to provide governance and discipline that enhance the firm’s

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5 Pyle (1986) points out how shortening the interval between examinations (solvency assessments) reduces the value of deposit insurance. CCC constitute a mechanism by which deficient capital positions are remedied promptly. The expected default losses borne by “uninsured” debt claimants or the insurance agency is thus much smaller than it would be if shareholders were permitted to continue operating with a low equity ratio.

6 In more technical language: prompt re-capitalization reduces the maturity of shareholders’ call option on the bank’s assets.
total value (see, among others, Flannery (1994)). It is therefore worth examining financial firms’ actual liability structures, to assess whether substantial CCC issuances would distort bank capital structures. Figure 1 plots the ratio of various debt aggregates to risk-weighted assets for the nineteen financial holding companies subjected to the Treasury stress test in the spring of 2009.7 (Note that the first five firms on the left are not “traditional” bank holding companies.) The Figure plots three overlapping categories of total long-term debt, gathered from the issuers’ Annual Reports:

- total long-term debt
- long-term debt that is not explicitly identified as secured, and
- subordinated debentures.

Not all firms differentiate clearly between secured and unsecured long-term debt. For example, many financial companies have borrowed extensively via secured FHLB advances, but these were not explicitly identified by all firms. Accordingly, the “Long-Term Debt (not known to be secured)” category almost surely overstates the volume of debt that could readily be replaced by CCC.

With this caveat, Figure 1 suggests that most of the 19 SCAP institutions could issue a substantial amount of CCC without affecting their existing capital structure. Companies can most readily issue CCC to replace their unsecured long-term debt, including the traditional subordinated debt included in Tier 2 or (through trust-preferred structures) in Tier 1. Among the 14 traditional BHCs, for example, subordinated debentures financed an average (median) of 4.89% (4.87%) of the traditional BHCs’ risk assets. Potentially unsecured long-term debt (including subordinated debentures) averaged 12.2% of risk-weighted assets. (median = 12.1%) Figure 2 scales these firms’ debt issuances by Tier 1 regulatory

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7 Data sources: Tier 1 capital and risk-weighted assets are obtained from the FR Y-9C forms for March 31, 2009. Two components of subordinated debentures are reported in the Y-9c: those bonds sold to the public (in line 19.a of Schedule HC) and those sold to off-balance sheet trusts established by the issuer (line 19.b). Long-term debt is collected from consolidated financial statements in the holding companies’ 2008 Annual Reports. For each institution, I separately recorded bonds that were identified as secured. Some institutions provided no such identification, leading me to label those bonds as “not known to be secured” in the Figures.
capital net of trust-preferred debentures. In 2009, subordinated debentures constituted an average (median) of 53% (51%) of non-trust preferred, Tier 1 equity. Not-explicitly-secured, long-term debt was an average (median) 137% (123%). In short, replacing subordinated debt with CCC would raise the average traditional BHC’s pre-failure risk absorption capacity by more than one-half, and replacing all of the (not known to be secured) long-term debt with CCC would more than double the average firm’s pre-bankruptcy risk-bearing capacity without changing its usage of long term debt. Nor did the special financial conditions of 2008-9 prominently affect the BHCs’ long-term debt proportions. Figure 3 illustrates that, at the end of 2004, subordinated debt and (not known to be secured) long-term debt also constituted large proportions of Tier 1 equity capital: 40% and 180% respectively.

3. A Specific Proposal for Contingent Capital

Further discussion of contingent capital’s policy value may be abetted by offering a specific proposal for incorporating contingent capital into financial firms’ capital structures. The following description’s specific parameter values are meant only to illustrate the basic idea. This proposal applies to systemically important firms.

a. A large financial firm must maintain enough common equity that its default is very unlikely. This common equity can satisfy either of two requirements:

   o Common equity with a market value exceeding 6% of some asset or risk aggregate. For simplicity, I’ll discuss the aggregate as the book value of on-book assets.

   o Common equity with a market value exceeding 4% of total assets, provided it also has outstanding subordinated (CCC) debt that converts into shares if the firm’s equity market value falls below 4% of total assets. The subordinated debt must be at least 4% of total assets.⁸

b. The CCC will convert on the day after the issuer’s common shares’ market value falls below 4% of total assets.

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⁸ Note that the proposal increases the amount of downside risk protection if CCC are issued.
c. Enough CCC will convert to return the issuers’ common equity market value to 5% of its on-book total assets.

d. The face value of converted debt will purchase a number of common shares implied by the market price of common equity on the day of the conversion.

e. Converted CCC must be replaced in the capital structure promptly.

This proposal includes two crucial, new elements. First, it defines required capital in terms of equity’s market value. Second, it provides for automatic and prompt replacement of lost equity when the equity ratio falls below a specific value.

Policymakers need not specify all of the CCC debt’s contractual features. Regulators care that equity is promptly replaced in the firm, but should care little about how the firm’s ownership claims are distributed ex post. Market forces should be able to produce a well-designed instrument. While permitting an issuing bank to specify its CCC contract’s terms, supervisors should require that a qualifying CCC incorporate the following “Essential CCC Features”.

a. The supervisor defines the minimum trigger point and the target capital amount to be established by CCC conversion, based on whatever criteria the supervisor finds to be relevant.

b. The minimum capital ratio is specified in terms of the common stock’s market value.

c. Conversion occurs rapidly, once the trigger is tripped.

d. The CCC conversion occurs whenever an issuer violates the minimum trigger capital ratio, regardless of whether other firms are also converting and regardless of whether there is a (declared or undeclared) financial crisis.

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9 If CCC are implemented as proposed, it seems that all capital measures for large firms must be expressed in market value terms.

10 Supervisors will be concerned with the ex post ownership structure only to the extent that it might give current shareholders (management) incentives to take counter-productive steps to avoid (or to encourage) conversion.

11 Even if supervisors could initially specify the best security design, changing market conditions could alter the best contract and one suspects that market forces will respond to such changes more quickly than a supervisory apparatus.
The CCC debt converts automatically – no option. If the firm is insolvent when conversion is triggered (e.g. because of a jump in asset values), the debt covenants must specify a conversion price that wipes out the previous shareholders.¹²

Converted debt must be replaced within a specific time frame.

CCC cannot be owned by systemically important firms for their own account.

By specifying the functions CCC should perform, rather than the instrument’s specific features, supervisors can involve market forces in designing an efficient security, thus minimizing any financial burden on issuing firms.¹³

4. CCC Implementation Questions

A. The Conversion Trigger

Some proponents of contingent capital would specify accounting-based triggers (e.g. Tier 1 capital in Squam Lake (2009, page 4)). I strongly prefer to specify the CCC conversion trigger in terms of the contemporaneous market value of outstanding common shares. Market values are forward-looking and quickly reflect changes in a firm’s condition, including off-book items, which GAAP equity measures might omit. In contrast, GAAP accounting emphasizes historical costs and provides managers with many options about when and how to recognize value changes.¹⁴ These options are manipulated most aggressively when the firm has problems – exactly when rapid re-capitalization is required to ameliorate those problems. A trigger based on GAAP equity value thus guarantees that the trigger will be tripped long after a financial firm enters distress, and perhaps long after it has become

¹² We generally think that the market value of equity must be positive. However, if current asset value is below current liability value and new capital must be sold immediately, the market value of old capital can be zero.

¹³ This process is similar to the supervisors’ current need to determine whether a new security design qualifies as regulatory capital.

¹⁴ There may be legitimate differences of opinion about asset values or risks, but the managers’ opinion is only one of many. To the extent that managers can convince market investors that their assessments are correct, equity market value will reflect insiders’ opinions and prevent the trigger from being tripped.
insolvent. (Recall how many troubled banks and holding companies during 2008 were “well capitalized” or “adequately capitalized” according to Basel’s book-valued calculations.) A trigger based on GAAP equity value thus guarantees that the trigger will be tripped long after a financial firm enters distress, and perhaps long after it has become insolvent. (Note how many troubled banks and holding companies during 2008 were “well capitalized” or “adequately capitalized” according to Basel’s book-valued calculations.)

I also propose that CCC conversions depend only on a firm’s own condition, not the state of the financial system. Large, systemically important firms cannot be permitted to fail, and CCC provide an alternative to government absorption of private losses. Some have argued that CCC conversions may permit weak managers to retain control of their firms, thus interfering with the efficient deployment of banking resources. However, managerial entrenchment is a general corporate governance problem. If shareholders will not fire bad managers, at least we can protect taxpayers from their poor results by providing a mechanism for re-capitalizing without bankruptcy.

The Squam Lake proposal for contingent capital specifies a two-part trigger: supervisors must declare a systemic crisis, and the issuing bank must fall below a specified capital ratio. Hancock and Passmore (2009) suggest a systemic trigger to force conversions regardless of a bank’s individual condition. In both these cases, the systemic risk trigger means that individual firms would not be stabilized by CCC conversions. Nor would the first “systemically important” firm to encounter difficulties be stabilized by such conversions. Yet the definition of systemic importance seems to imply that one such firm’s failure will engender a systemic crisis. (Why wait for the second problem to emerge?) Perhaps more importantly, these proposals rely on supervisory initiatives to trigger re-capitalizations. Given the uncertainties associated with asset valuations in difficult times and the reluctance of existing shareholders to convert (on account of the debt overhang), this mechanism seems likely to delay re-capitalization. (Political considerations could add further impetus for delay.) And we
know from past experience that delaying the treatment of struggling financial firms increases the government’s expected resolution costs.

**B. Conversion Price for Shares**

Policy makers should not directly care about the conversion price for shares. Their concern is primarily that the firm’s equity capital be increased by a minimum number of dollars; the share price used in conversion only distributes value between the old and new shareholders. Nevertheless, some decision must be made about allocating post-conversion firm ownership, and we must take care that the conversion process not influence managers to behave in a counter-productive way.

My proposal in Section 3 would convert CCC face value into shares at a rate implied by the contemporaneous share price. With a contemporaneous-market conversion price, CCC bonds have very low default risk. With a sufficiently high trigger value, the CCC investors will almost surely be fully repaid either in cash or in an equivalent value of shares. Relatively safe CCC bonds whose payoffs are divorced from share price fluctuations should trade at low coupon rates in liquid markets.

The Squam Lake Working Group expresses reservations about this security design feature, noting that “Conversions based on market values, however, can create opportunities for manipulation.” (Squam Lake (2009), page 4). Once specific scenario has speculators purchasing a firm’s CCC and shorting its shares. If the share price is reduced by short sales, a speculator might force conversion of his CCC at an advantageous (temporarily low) price, yielding a capital gain on the converted shares when the short sales are reversed. (I return to this issue in Section 5 below.) While calling for further study of the conversion price question, the Squam Lake Working Group seem to prefer a fixed, pre-specified conversion price. Hancock and Passmore (2009) likewise propose a pre-specified conversion price.

15 As noted above, GAAP accounting procedures also present opportunities for manipulation.
CCC bonds with a market-valued trigger and a fixed conversion price could effectively re-capitalize over-leveraged firms. However, the fixed conversion price adds an element of equity risk and uncertainty to the CCC returns. A high conversion price might give shareholders an incentive to induce conversion as a means of selling equity cheaply. A low conversion price would make bondholders eager to bid down share prices (if possible) to trigger conversion. Such strategic considerations are unrelated to the firm’s credit condition and add nothing to the regulatory goal of stabilizing under-capitalized financial firms. Occam’s razor thus supports the separation of equity risk from credit risk in CCC, further abetting transparent solutions for troubled banks.

**C. CCC Risk Features**

CCC would have lower default risk than today’s subordinated debentures. With a sufficiently high equity trigger ratio and continuous asset value fluctuations, a firm could issue effectively riskless CCC: CCC bonds would be repaid either in cash or in a similar value of newly-issued common shares. Even after some CCC convert, new ones generally could be issued at reasonable interest rates because they would have a substantial amount of equity capital protecting them from loss. The key to this protection is the assumption that continuous price fluctuations very rarely cause large asset value changes, particularly when re-capitalizations will be forthcoming automatically based on daily market capital ratios.

However, asset returns could also include a jump process. A sufficiently large downward value jump would impose default losses on CCC, equivalent to those that would be suffered by ordinary subordinated debentures. If asset values fell below the promised payments on outstanding debt and new equity must immediately be issued, the share price would go to zero. CCC would convert, but debt holders would not receive their full principal in share value. Rather, the converting CCC investors would

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16 Even if asset returns do not jump, irregular (“lumpy”) information releases may cause jumps in equity value.
first absorb the bank’s “negative capital” position, leaving them with a credit loss. In this situation, the firm’s old shares would have no market value; there would be no equity price with which to determine the number of shares converting CCC should receive. This situation could be easily covered by a clause in the bond indenture specifying an arbitrary price for the newly-recapitalized firm’s shares.

Even with continuous asset returns, CCC investors could suffer losses if the conversion process were somehow flawed, so that the new shares could not be liquidated at the conversion price.

CCC yields could provide market information about the adequacy of the bank’s minimum equity ratio. If assets became more volatile, CCC yields would rise to compensate for possible default losses. CCC yields could thus validate whether (in the market’s opinion) a firm’s minimum debt ratio was sufficiently high.

**D. Which CCC Convert?**

Most conversions will involve only a subset of the outstanding CCC. How would the converting bonds be selected? I have thought of three possibilities, some of which are mutually inconsistent.

a) Convert the shortest-remaining maturity bonds first.

b) Sell CCC with various “seniorities”, so that some bonds must convert fully before others can begin to convert. This might aid the sale of replacement CCC, since new bonds could be afforded last place in possible future conversions.

c) Select the converting bonds randomly, perhaps within common-maturity or common-seniority tranches.

A related question concerns whether the CCC would convert according to their market or book values. If the conversion amount were the CCC debt’s book value and riskless interest rates rose (fell), debt holders would gain (lose) by forcing conversion. If the conversion amount were the CCC debt’s current market value, we would need to rely on (potentially) thinly-traded prices which would add uncertainty to both bond and shareholders.

Mechanically, we would want to assure that CCC conversion was not interpreted as an event of default for any of the issuing firm’s other outstanding obligations. We would also need the issuing firm
to have authorized issuance of a sufficient number of new shares, so that the conversion could occur in a timely manner.

**E. Share Pricing Errors**

Even if market equity prices are efficient, they do not always reflect the “true” value of a firm’s residual claims perfectly. CCC conversion might be accelerated or delayed, and the conversion price might be either higher or lower than “fundamentals”. The potential for equity pricing errors does not necessarily render market-valued triggers inferior designs. Rather, we must compare the errors caused by market prices with the alternatives. Book (GAAP) equity valuations are also unlikely to be perfect, with a distressed firm’s equity value likely to be overstated. In contrast, market pricing errors should be random. The possible distortions associated with random pricing errors seem far preferable to those based on book values.

**F. Policy parameters**

The “Essential CCC Features” listed in Section 3 require supervisors to select some important policy parameters.

1) What level of common equity should trigger conversion? What should be the relevant deflator? Minimum capital ratios should reflect the needs of both firm solvency and systemic stability.

2) When conversion occurs, what should be the target capital ratio? Requiring only that the ratio be restored to its minimum acceptable value makes it likely that conversions will be small, but relatively frequent events. Alternatively, we might specify a post-conversion

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17 The incidence of pricing errors could be reduced if the market value of equity were averaged over multiple days’ closing prices, although this would delay re-capitalization.

18 Current data availability requires that the trigger denominator be some accounting measure, or perhaps a book value adjusted by the difference between equity’s book and market values. The delay in this information may need to be accommodated in the form of (perhaps) a higher trigger ratio.

19 Dwight Jaffee has pointed out that theory suggests a firm will take less asset risk with an x% equity cushion than with (x/2)% of equity and (x/2)% of CCC. This tendency should influence the required trigger ratio and the substitutability between CCC and common equity in a systemically important firm’s capital structure.
cushion (e.g. 1% above the required minimum in my specific proposal) that makes conversions larger, but less frequent.\textsuperscript{20}

3) How quickly must converted CCC be replaced in the firm’s capital structure?

4) What maturity should the CCC bonds have, at issue? Should policy require that the outstanding CCC have some minimum (or average) maturity remaining?

5) Can systemically important firms purchase CCC bonds for a customer’s?

6) Does it matter whether CCC are fixed or floating rate instruments?

**G. Dysfunctional Managerial Actions?**

Regulators must understand the incentives conveyed to management by the issuance of CCC bonds. If managers wish to avoid (or to encourage) conversion, how might their reactions affect the issuing firm’s financial condition? Some troubling actions – e.g. re-purchasing the bonds as equity value approaches the conversion trigger – will be ineffective or even counterproductive, because the trigger is based on equity’s total market value (not, e.g., the price per share). Eliminating the CCC liabilities will immediately increase the firm’s required common equity (from 4% to 6% in my proposal). Issuing firms should be unable to retire their CCC without advance regulatory permission. Managers might seek to raise equity market values by increasing portfolio riskiness. While theoretically possible, this effect is most important at very high leverage levels. With the moderate leverage permitted under capital adequacy standards, the costs of adjusting portfolio risk could outweigh the value benefits of risk-shifting. In addition, an increase in CCC yields would signal this activity in a way that might induce supervisors to increase required capital.

Managerial aversion to CCC conversion could also produce some positive actions, such as shrinking the balance sheet or augmenting transparency to protect shareholders from conversions based on inappropriately low equity prices.

\textsuperscript{20} This might be a feature best left for market participants to design.
5. Share Price Effects of Pending Conversion

Two key features of my proposal can be considered and designed separately. First, we need to specify a trigger that causes conversion. Second, we need to specify how the conversion price per share will be determined. Regulators are primarily interested in designing a trigger mechanism that confines potential losses to a financial firm’s existing shareholders. Although shareholders are also concerned with this trigger’s design, they probably care even more about the price at which new shares are sold to converting CCC investors. This price determines the extent to which their claims are diluted. Regulators needn’t be greatly concerned with this distribution of ownership claims, unless the conversion somehow elicits counter-productive managerial actions to prevent the conversion.

A. Share Dilution Effects

Except under special circumstances, selling more shares will reduce the price per share. The anticipation that additional shares will be sold thus generally causes a fall in share prices. If CCC convert at the current share price, a price decline leads to further share issuances (upon a CCC conversion). Some analysts have suggested that pending conversion will induce a downward price spiral. For example, French and Roll (1986) describe how an initial price decline leads other traders to infer some (unobserved) bad news event. The uninformed traders therefore trade the price down further. For a CCC conversion, however, investors should be able to work out the price implications of a conversion, reducing the probability of an irrational spiral.

B. Death Spirals?

A market-valued trigger might attract market manipulation. A speculator could purchase some CCC, short the stock, and receive under-valued shares when the conversion trigger was tripped. If short sales could force a solvent firm’s share price to zero, CCC might destabilize financial firms rather than
The proposition that issuing CCC could cause a firm’s demise is considered in a paper on “Death Spiral Convertibles.” Hillion and Vermaelen (2004) examine 261 firms that undertook 467 convertible debt or preferred stock issues between December 1994 and August 1998. The issued security converted (at the investor’s option) into shares at some fraction of the current market price. In the year following the convertible’s issuance, the average issuer’s equity market value fell 34%, despite a sharp upward trend in the overall market during that period. (85% of issuing firms’ share prices declined.) In evaluating these firms’ share prices, Hillion and Vermaelen found support for two hypotheses. First, the security was poorly designed: the extent of a firm’s share price decline increased with the discount at which the security could be converted into shares. Second, their “last resort financing hypothesis” specifies that the issuers were under-performing firms with good growth options but low cash. They had “no option other than a floating-rate convertible issuance to avoid immediate bankruptcy.” (page 391). The authors concluded (page 384) that “Many of the firms that failed would have failed earlier without death spiral financing.”

We should note generalize the experience described by Hillion and Vermaelen (HV) to large financial firms’ CCC. First, HV’s sample included “small, young and risky” firms (page 383) with an average (median) equity value of $67.5 million ($39.2 million). Large financial firms’ equity prices should be substantially less susceptible to manipulation. Second, if the short-seller is trying to force a conversion, other investors also would be cognizant of the potential conversion. (Unlike HV’s securities, where converted at the option of the individual investors.) Investors (including the issuing firm’s present

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21 The allegations that short sellers were driving share prices artificially low in October 2008 lead the SEC to ban “naked” short selling.

22 Both the issued debt and preferred shares had the feature that a share price decline increased the number of shares obtained upon conversion. Adding to the impression that these securities were poorly designed was the common inclusion of a look-back option, which permitted the converting investor to convert at a past price (or average of past prices), and the fact that many of the conversions occurred at a discount to the common’s market price.

23 “More than 50% of the firms went public after 1992.” (Hillion and Vermaelen (2004), page 392)
shareholders) could benefit by purchasing shares once the short seller had initially depressed share value below “fundamentals”. Third, there would be no serious question about the issuing firm’s viability because conversion (if it occurred) would occur while the firm still had (say) 4% common equity capital. Without the threat of impending failure, such as we had in October 2008, it seems that short-sellers’ ability to depress share price would be more limited. Fourth, CCC issuers could design their securities to minimize the effectiveness of this short-selling play. For example:

a) Make the trigger depend on an average of 5 or 10 consecutive days’ share prices – so short sellers would have to maintain their positions (and the associated price effects) for a longer period of time.

b) Select which CCC to convert by lottery – so a short-seller could not be sure that s/he owned bonds that would actually convert.

c) Change the law to forbid firms with an interest in the CCC from selling the underlying common stock short.

The feasibility of counter-productive stock price manipulation deserves serious further study. Indeed, one important justification for letting issuers design their own CCC features is that the market may produce good solutions to this potential problem.

C. Whose Problem Is It?

In closing, however, note that policymakers have no particular duty to protect shareholders from these sorts of risks. CCC are meant to re-assign risks away from taxpayers and toward shareholders. It is thus not a question of creating or destroying new risks, but rather of apportioning risks to various claimants – the shareholders or the government. If the risks of banking are re-defined to include conversion manipulation risk, that should be a risk borne by bank shareholders.24

6. Summary and Conclusions

24 Adding a new sort of risk to shareholders’ returns will raise required equity returns, but only if the risk is systematic (as opposed to diversifiable). The benefits to shareholders of issuing tax-deductible CCC instead of holding common equity should be large enough to minimize this effect on the bank’s cost of loanable funds.
Past and present supervisory arrangements have proven inadequate to protect taxpayers and solvent banks from bearing the losses in “systemically important” financial institutions’ portfolios. Supervisors have feared that imposing any losses on these firm’s bondholders might destabilize the entire financial system. Because such losses can only be imposed if the firm becomes bankrupt, these fears are well-founded. Even if a bankruptcy were processed within a single country, claimants become highly uncertain about the eventual payments they will receive. In an effort to avoid become entangled in a risky bankruptcy proceeding, counterparties will curtail their involvement with troubled financial firms even before bankruptcy has become probable. These decisions diminish the financial firm’s charter value and can thus substantially raise the costs imposed on creditors.

When the potential bankruptcy involves multiple national jurisdictions, these costs and incentives become exponentially greater.

The cost of a large financial firm’s financial distress would be more limited if the firm promptly issued new equity to replace asset value losses. But this does not occur to a sufficient extent. First, a risky firm’s shareholders are subject to a debt overhang problem that makes them reluctant to issue new shares. Second, formal supervisory pressure to raise new equity must be based on inadequate book capital ratios, which can vastly overstate a troubled firm’s true equity value. Finally, both bank managers and supervisors find it difficult to force costly action on shareholders (the sale of new stock) when there is a great deal of uncertainty about true asset values and hence the true need for stock issuances. Amidst confusing financial markets, the temptation to await further developments generally proves irresistible. Because conjectured government guarantees permit under-capitalized firms to continue borrowing (operating) for a while, new equity issues are postponed. Yet these are precisely the times when additional capital is the most important factor in keeping financial firms stable.

If capital problems cannot reliably be addressed as they occur, we should make advance arrangements to deal with possible capital deficiencies at large, important financial firms. Contingent
capital certificates (CCC) – debt issues that automatically convert to equity when the issuer’s capital ratio falls too low – provide a solution to this problem. Automatic conversion based on a market-valued trigger circumvents the natural incentive to defer corrective measures. Indeed, a vital conceptual feature of these securities is that they drastically shorten the maturity of options underlying bank debt and equity contracts. With capital adequacy evaluated daily in the equity markets, the probability of a large equity loss is much more limited than under current institutional arrangements. This effect depends requires a *market-valued* equity trigger to effect conversion.

The interest payments on CCC debt should be tax deductible to issuing firms, and most holding companies currently have sufficient long-term debt outstanding that risk absorption could be greatly enhanced by simply substituting CCC for traditional forms of outstanding (non-deposit) debt. The likely effects on shareholders’ overall cost of loanable funds should therefore be small.

Designing a new financial instrument is laden with the danger of unintended consequences. For CCC, supervisors should define a set of basic features that qualifying convertible debt should have, and then permit market participants to design the specifics. Market participants can better judge how contract features will affect pricing and liquidity, and the optimal contract design may change over time.

Going forward, sound policy for both individual firms’ safety and soundness and the financial sector’s stability must include advance arrangements to re-capitalize financial institutions in an orderly way. Offering financial firms the opportunity to issue contingent capital certificates will contribute greatly to this goal of orderly re-capitalization.
REFERENCES


Kuritzkes, Andrew and Hal Scott, “Markets are the best judge of bank capita,” Financial Times (September 23, 2009).


Figure 1: Debt (from 3/31/09 Annual Reports) to Risk-Weighted Assets (from 12/31/08 Y-9C reports)

19 SCAP Institutions

Debt to Risk-Weighted Assets Ratios, 2009
Figure 2: Long-term Debt (not known to be secured), from 3/31/09 Annual Reports to (Tier 1 – Trust Preferred Debentures), from 12/31/08 Y-9C reports (14 “traditional” BHCs among the 19 SCAP firms)
Figure 3: Long-term Debt (not known to be secured), from 12/31/04 Annual Reports to (Tier 1 – Trust Preferred Debentures), from 12/31/04 Y-9C reports (14 “traditional” BHCs among the 19 SCAP firms)
Table 1: CCC Example Ignoring (Incipient) Debt Overhang at $t = 1/2$

$t = 0$

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>$100 Loans</td>
<td>$90 “Deposits”</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>$5 CCC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$5 Equity (5%)</td>
</tr>
</tbody>
</table>

$N = 10 \Rightarrow P(\text{stock}) = $0.50$

$t = 1/2$

<table>
<thead>
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<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>$97 “Loans”</td>
<td>$90 “Deposits”</td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>$5 CCC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$2 Equity (2.06%)</td>
</tr>
</tbody>
</table>

$N = 10 \Rightarrow P(\text{stock}) = $0.20$

$t = 1$

<table>
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<th>Liabilities</th>
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<tr>
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<td></td>
</tr>
<tr>
<td>$2.15 CCC</td>
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</tr>
<tr>
<td></td>
<td>$4.85 Equity (5%)</td>
</tr>
</tbody>
</table>

$P(\text{stock}) = $0.20 \Rightarrow N = 24.25$
Table 2: CCC Example Ignoring (Incipient) Debt Overhang at t = ½

<table>
<thead>
<tr>
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<th>Assets</th>
<th>Liabilities</th>
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<tbody>
<tr>
<td>Assets</td>
<td>$100 Loans</td>
<td>$90 “Deposits”</td>
</tr>
<tr>
<td>Liabilities</td>
<td>$5 CCC</td>
<td>$5 Equity (5%)</td>
</tr>
</tbody>
</table>

N = 10  \rightarrow  P(stock) = $0.50

<table>
<thead>
<tr>
<th>t = 1/2</th>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
<td>$97 “Loans”</td>
<td>$90 “Deposits”</td>
</tr>
<tr>
<td>Liabilities</td>
<td>$4.50 CCC</td>
<td>$2.50 Equity (2.58%)</td>
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</tbody>
</table>

N = 10  \rightarrow  P(stock) = $0.25 (?)

<table>
<thead>
<tr>
<th>t = 1</th>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
<td>$97 Loans</td>
<td>$90 “Deposits”</td>
</tr>
<tr>
<td>Liabilities</td>
<td>$2.15 CCC</td>
<td>$4.85 Equity (5%)</td>
</tr>
</tbody>
</table>

P(stock) = $0.20  \rightarrow  N = 24.25
Appendix A: CCC Conversion Example, Including an Incipient Debt Overhang

The text presents an example of CCC conversion (section 3, Table 1) that apparently omits any potential effect of higher bank leverage on the value of outstanding CCC or deposits. This simplification permits the example to illustrate the mechanics of CCC conversion. However, the assumption of unchanging debt value is much more robust than that simplification makes it appear. The key to this insight is understanding the speed with which CCC force under-capitalized firms to re-capitalize: by using a contemporaneous, market-value trigger, CCC shorten the maturity of all the options embedded in the issuing firm’s debt and equity.

What is a “debt overhang?” When a firm’s asset value falls, it becomes less likely that fixed claimants will be paid off in full. Under the usual circumstances evaluated in corporate finance theory, shareholders need not re-capitalize promptly and hence the debt’s market value declines on account of higher expected credit losses. Because value is transferred from debt holders to shareholders by operating at higher leverage, shareholders are reluctant to replace lost equity value. Myers (1977) first pointed out this “debt overhang” problem: when a firm has risky debt outstanding, part of any new equity contribution will increase the value of outstanding deposits. Hence selling (e.g.) $100 worth of shares will raise the firm’s total equity value by (e.g.) only $99 because the larger capital account raises the market value of promised debt repayments.

The effect of a debt overhang with CCC is illustrated in Table 2, which starts out (at t=0) the same as in Table 1. The firm holds 5% capital and the assumed regulatory minimum is 4%. When the loans’ market value falls at t=1/2, however, Table 2 shows an incipient impact of higher leverage on the value of the banks’ CCC debt claims. If the bank were expected to continue operating with its capital level at t=1/2, the market value of CCC debt would fall by $0.50.25 (I assume temporarily that the

25 Equivalently, the CCCs’ yield to maturity rises.
probability of depositor credit losses is vanishingly small, but relax this assumption below.) Because 
some wealth is extracted from debt holders, the initial shareholders’ equity would be worth $2.50 if they 
were permitted to continue operating with their current capital ratio. However, CCC are designed to limit 
this sort of wealth transfer. Instead of permitting the firm to continue operating with 2.58% equity (= 
$2.50 / $97), CCC conversion promptly restores a 5% equity ratio. This conversion averts the wealth 
decline that would be suffered by fixed claimants in the absence of conversion. If we think of a risky 
bond as containing an implicit (default) put option, the maturity of that put generally coincides with the 
bond’s maturity. In this case, CCC make the maturity of that put option very short (e.g. one day), and 
hence virtually worthless.

Once some CCC have converted, the remaining CCC will be protected again by 5% equity and 
hence their market value will return to par, as it was at t=0. Knowing at t=½ that conversion will occur, 
the price of CCC never falls in the way suggested by Table 2. 26 In other words, the balance sheet shown 
in Table 2 for t=½ never applies to a firm with outstanding CCC. Instead, the full decline in loan value 
passes directly into the firm’s equity value: when the loan value falls from $100 to $97, equity’s value 
falls from $5 to $2. Share price is thus $0.20.

With an asset value of $97 and equity worth $2 (as at t = ½ in Table 2), we must convert 
$2.85 (= 4.85 – 2.00) of CCC to equity. Applying the share’s market price to the converted CCC balance 
indicates that the CCC investors will acquire 14.25 shares, compared to the initial shareholders’ 10 shares. 
Forcing a prompt re-capitalization prevents the transfer of value away from fixed claimants or their 
insurer. This explains why shareholders might resist the initial issuance of CCC, and why CCC are 
consistent with a policy that imposes realized losses on a firm’s shareholders instead of taxpayers.

What about the value of deposits? The t=1 balance sheet in Table 2 is misleading in the sense 
that the deposits only enjoy $7 ( = $2.15 + $4.85) of junior claims, compared to $10 ( = $5 + $5) at t=0. 

26 In referring to “par”, I am assuming either no change in market interest rates, or that the CCC carry floating rates.
One might anticipate, therefore, that the depositors at \( t=1 \) will have lost value on account of higher credit risk exposure. However, if the converted CCC must be promptly replaced, the firm’s balance sheet will soon have $9.70 ( = 10% of $97) of claims junior to the depositors, making them as riskless as they were at \( t=0 \).

In both of my examples (Tables 1, 2) asset values do not fall by enough to exhaust the initial shareholders’ equity contributions. This assumption makes the CCC riskless: a bond holder is repaid either $1,000 in cash or $1,000 in shares. However, the bonds become risky under either of two circumstances: the bank’s minimum or restoration-target capital ratio is too low, or the asset values can jump (rather than moving continuously). With a very short interval between trigger evaluations, the jump possibility seems more relevant. If asset values can jump down discretely, even a bank above its minimum required equity ratio might lose enough asset value to impose losses on CCC investors. For example, consider the following balance sheet:

\[
\begin{array}{c|c}
\text{Assets} & \text{Liabilities} \\
\hline
$99 \text{ Loans} & $90 \text{ “Deposits”} \\
$5.00 \text{ CCC} & \\
$4.00 \text{ Equity (4%)} & \\
\hline
\end{array}
\]

A downward jump of asset value from 99 to 94 would wipe out the firm’s equity and impose a $1 loss on the CCC investors, just as if they were “normal” subordinated debt. However, the firm would not “fail” and there would be no bankruptcy disruption to its business:
At this point, the firm is under-capitalized, and supervisors would have to take explicit actions to force the firm to shrink or to issue new shares.

This example indicates how CCC can be used to provide market disciplinary signals, in addition to avoiding bankruptcy costs. If the firm’s equity is considered insufficient to protect the bondholders from default, the bonds would be priced to yield more than the riskless rate. So long as the bonds’ yield was not abnormally high, the market would be indicating that the firm had sufficient equity.
APPENDIX B: Contingent Capital Papers

I list here papers that have previously considered various types of contingent capital investments.


