

# **After the Flood**

*How the Great Recession Changed  
Economic Thought*

EDWARD L. GLAESER, TANO SANTOS,  
AND E. GLEN WEYL

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FOR JOSÉ AND MICHELE

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# How to Implement Contingent Capital

Albert S. Kyle

## I Introduction

How can an economically efficient set of policies be designed to prevent financial institutions from receiving costly bailouts in the future? The scenario that ends in bailouts is familiar: As a result of looming loan losses, the financial condition of banks weakens. Banks delay raising capital and continue to pay dividends; the financial condition of the banking system weakens further. Government regulators do little to force banks to raise capital. Eventually, banks refuse to lend to one another, and uninsured creditors run by refusing to roll over their debt securities. To prevent imminent defaults, the government bails out bank creditors by providing collapsing banks with collateralized loans, loan guarantees, and equity injections. The bailout may even give value to otherwise worthless bank equity securities.

To prevent such a bailout scenario, two different sets of policies are typically proposed: i) more regulation and ii) more capital.

Proponents of more regulation believe that increased restrictions on banking activities, stronger reporting requirements, and more intrusive inspections will enable government regulators to avert bailouts by detecting undercapitalized banks and requiring them to raise more capital before they become too undercapitalized to do so. Proponents of more capital, such as Admati and Hellwig (2013), argue that dramatically

higher capital buffers will prevent banks from becoming so weak that they cannot raise new equity in stressed situations.

This paper shows how contingent capital securities, included in a bank's capital structure as a substitute for additional common stock, can amplify the effectiveness of both increased government regulation and higher capital requirements. Contingent capital is a hybrid security that has the risk characteristics of debt when a bank is healthy but converts to riskier common stock when a bank becomes undercapitalized. Conversion replaces a lengthy, messy bankruptcy process with a fast, clean conversion of the contingent capital securities into common stock. Since "bailing in" the contingent capital securities makes the bank dramatically better capitalized without threatening the value of more senior debtholders, contingent capital conversions reduce political pressure for government bailouts.

Contingent capital securities follow a template mandated by the banks' regulator. The market determines terms like maturity and coupon rate. The template defines trigger events, which set in motion a process that might lead to conversion of contingent capital securities into common stock. The most important trigger event is a choice by contingent capital holders not to roll over their securities when they mature; when owners of contingent capital securities try to run, they instead set in a motion a process that leads to conversion of their securities into equity. In addition, there may be regulatory triggers, such as failure to meet a target capital ratio, or market triggers, such as the market price of the bank's common stock falling below a given target fraction of its book value. Regulatory triggers and market triggers interact in a positive manner, making regulation supplemented by contingent capital more effective than increased regulation alone. When regulators are practicing forbearance by allowing banks to delay raising needed capital, market triggers can force conversion, thus keeping the regulators honest. When contingent capital holders and equity holders "collude" by pretending that a bank is healthier than they know it to be, regulatory triggers can call the market's bluff, thus keeping the market honest. This paper explains why both regulatory and market triggers are necessary to make contingent capital work effectively.

There are two distinct advantages of replacing some common stock with contingent capital in the capital structure of a bank. First, if the owners of the contingent capital do not collude with the owners of common stock, the arm's-length relationship between the contingent capital

owners and the equity owners incents the former to exert pressure on the bank to remain well capitalized. The potential benefits of market discipline resulting from monitoring by contingent capital holders is a central issue discussed in this proposal. Incentive problems associated with both debt overhang and managerial agency issues are mitigated if contingent capital securities are structured so that the owners of the contingent capital securities can force the bank to maintain healthy levels of capital while allowing reasonable levels of leverage. Furthermore, well-capitalized banks have less incentive to lobby regulators to practice forbearance with respect to requiring new equity issuance.

Second, the debt-like nature of contingent capital makes it less information sensitive than common stock, without “clogging up” the bank’s capital structure. Other securities with low information sensitivity, such as very junior debt or preferred stock, contain protective features that increase the costs of future issuance of more senior securities and dilute the common stockholders’ incentives to issue more common stock. As a result, issuance of such securities increases the fragility of the bank’s balance sheet; the path to recapitalization becomes so painful that banks avoid recapitalizing at all. Contingent capital does not clog up the capital structure in this way. In circumstances where additional issuance of information-insensitive securities is reasonable, contingent capital makes room in the capital structure by converting into equity first.

The effectiveness with which contingent capital securities can prevent bailouts depends on the details of how the securities are structured. These details include precise definitions of trigger events as well as provisions designed to force weak banks to conserve cash. The proposed structure for contingent capital securities describes examples of the types of triggers and other terms made necessary by the logic of contingent capital securities. The proposed structure converts contingent capital into 80% equity ownership. The other terms include limitations on dividend payments and requirements to pay high interest rates on contingent capital securities “in kind,” using shares of newly issued common stock, rather than in cash. The proposed structure avoids cash-settlement features, which use market prices to calculate the amount of dilution when conversion occurs.

This paper does not attempt to optimize the security structure by claiming that illustrative numerical values for various quantities are optimal. Instead, the specific numbers are designed to illustrate, using reasonable parameter choices, the trade-offs that optimized securities must deal with.



## 2 The Economic Policy Problem

### 2.1 *Too Big to Fail: A No-Bailout Policy Is Not Credible*

Government promises not to bail out failing banks have little credibility. Even when governments state a policy objective of no bailouts, markets do not believe the stated policy will be carried out, and markets are usually proven correct when the governments provide financial support to failing banks at taxpayer expense. Although this commitment problem is implicit in the cliché “too big to fail,” governments also have difficulty committing not to bail out small failing banks, especially in circumstances where failure of one or more small banks can lead to runs on many banks, large and small alike.

In the United States, the Federal Reserve bailed out bondholders of Bear Stearns by acquiring some of its risky assets at prices higher than the market was willing to pay. As the financial crisis unfolded with the collapse of Lehman Brothers in the fall of 2008, the U.S. government guaranteed the debts of AIG and guaranteed both existing and new debt issued by banks. Implicit guarantees to Fannie Mae and Freddie Mac became explicit as insolvency became clear. Although the FDIC did not insure the assets of money market mutual funds prior to the collapse of Lehman Brothers, these assets became insured shortly thereafter, when losses incurred by the Reserve Fund triggered an industry-wide run. The U.S. Treasury even bailed out equity owners of Citigroup and Bank of America. They did this by allowing shareholders to maintain ownership of a majority of outstanding shares, which were intrinsically worthless without government support. It then gave these shares value by providing financial support to both banks with ring-fenced loan losses, guaranteed debt issuance, and capital provided on generous terms relative to what was available in the market at the same time.

In the Eurozone, German taxpayers bailed out governments and banks of other countries, including Greece, Portugal, and Cyprus, contradicting the policies on which the euro was based. In the United Kingdom, the central bank stated a policy of not supporting Northern Rock as it failed; a few weeks later, it bailed out Northern Rock. In Ireland, the government tried to implement a policy of not bailing out its overextended banks at high cost to taxpayers; it subsequently imposed on Irish taxpayers substantial bailout costs.

Governments fail to keep their promises not to bail out failing banks for understandable reasons. If failing banks' creditors are not bailed out, governments fear the possibility of bank runs, severe credit squeezes, recession, and social unrest.

## *2.2 Adverse Selection, Moral Hazard, Good Governance, and Forbearance*

The lack of credibility of a no-bailout policy leads to a toxic interaction involving adverse selection, moral hazard, good governance, and regulatory forbearance.

Bankers believe that issuing new equity in stressed conditions is prohibitively expensive. High equity issuance costs result from an adverse selection problem. Since the true financial condition of banks depends on private information, which is difficult to share in a credible manner, a bank that attempts to issue new equity sends a bad signal to the market. When a large amount of equity is issued over a short period of time, the signal becomes worse, and "fire sale" prices may result. A rational undercapitalized bank with vigilant short-term depositors would be willing to incur high equity issuance costs in the short run if the alternative were even higher issuance costs in the long run. If the bank and its creditors instead expect that the bank will benefit from a taxpayer-funded bailout in disaster scenarios, then the bank has an incentive to delay issuing new equity when its financial condition first begins to weaken.

As banks become more undercapitalized by failing to raise capital, the moral hazard problem associated with risk shifting is magnified. When undercapitalized banks fail, the equity owners do not bear all the risks associated with failure. Some of the risks are shifted to debtholders or, if a bailout occurs, to taxpayers. The resulting option to default is valuable to equity owners. Equity owners have incentives to practice moral hazard by taking actions that increase the value of this option. In addition to avoiding issuing new equity, which dilutes the value of the option to default, such actions include paying higher dividends and increasing the riskiness of the bank's portfolio. These actions increase the probability of bailouts.

"Good governance," associated with the idea that banks operate in the interests of their shareholders, makes this moral hazard problem worse, not better. The expectation of valuable future bailouts increases the value of the bank's equity. Therefore, a well-governed bank not only has an

incentive to avoid expensive dilutive equity issuance when bailouts might otherwise be obtained, but also has an incentive to practice as much moral hazard, at the expense of taxpayers, as it can get away with.

To prevent moral hazard from making things worse, bank regulators should require undercapitalized banks to recapitalize promptly. In practice, “prompt corrective action” does not occur promptly enough. Instead, bank regulators practice forbearance. Responding to political pressure from banks that have a lot to lose, regulators allow undercapitalized banks to delay raising new capital. These delays often look reasonable ex post, because undercapitalized banks often become better capitalized by becoming profitable in the future. It is a fundamental fact about options that out-of-the money options tend to expire worthless; in other words, there is a substantial probability that the option to default will not be exercised, because the bank will become healthy again and not need a bailout.

How can government policy deal with this toxic interaction involving adverse selection, moral hazard, good governance, and regulatory forbearance?

Consider the problem of adverse selection. Although regulators might collect otherwise private information about the financial condition of banks and make such information public, it is unlikely that such policies will make the problem of adverse selection go away completely. The standard solution to intractable adverse selections, often applied to health care, is to subsidize the bad risks at the expense of the good risks. Applied to banks, this would have the dubious effect of using government policy to encourage capital to move to banks with track records of earning low returns in the past. It is doubtful that government policy can make the problem of adverse selection go away.

Now consider the problem of moral hazard. Moral hazard is not a traditional “market failure” based on public goods, externalities, or market power. Instead, it is a technological problem associated with the inability to observe or control actions associated with “bad behavior,” like draining capital from a bank or excessive risk taking. Compared with the private sector, the government has a particularly poor ability to deal with moral hazard problems.

Thus, to deal with the toxic mix, the public policy problem boils down to a trade-off between undermining good governance to make bad incentives weaker or to improve regulation by lessening the incentive for the private sector to pressure the regulators to practice forbearance.

Consider first the possibility of undermining good governance, weakening the manner in which incentives operate in the private sector. The private sector aligns the incentives of top executives with shareholders by using bonuses, stock options, and stock ownership. Government policy could sharply curtail the use of incentive pay in executive compensation, instead requiring that top executives be paid fixed salaries. Since fixed salaries represent claims similar to debt, the incentives of top executives would become more aligned with those of the banks' debtholders than those of equity holders. This would reduce the moral hazard associated with risk shifting but lead to another moral hazard problem. Top executives on fixed salaries would have less incentive to work hard and less incentive to implement efficient decisions. They would be more likely to carry out the wishes of government regulators by making loans to non-credit-worthy borrowers which government regulators favor. The government could go further in this direction by appointing the top managers itself or by nationalizing the banking system. Ultimately, this approach is likely to lead to inefficient banks that either need bailing out anyway or pay inefficiently low interest rates on deposits, because their incentives to make profitable loans are undermined.

Consider next the possibility of reducing incentives for government regulators to practice forbearance. To the extent that forbearance results from political pressure by regulated banks who have significant value at stake, this approach should involve weakening the value banks believe they have at stake when regulators attempt to enforce capital requirements. If banks are financially healthy and there is freedom of entry, implicit promises to bail out failing banks are of limited value, because more capital will flow into banking, lower the returns to banking, and thus erode the value of the promised subsidies. Rent seeking generates private value to bankers only when they are already in trouble. Therefore, the regulatory problem is to design a regulatory mechanism that prevents banks from becoming unhealthy in the first place, even when the regulator itself has a tendency to practice forbearance at least some of the time.

This trade-off between good governance and forbearance resembles the trade-off between populism and corruption proposed by Glaeser (2012). In this context, "populism" is associated with a policy of undermining good governance. Populism implies giving the government a greater role in bank governance by subsidizing credit to politically favored customers of banks, such as subprime borrowers, even if this policy makes bank profits low. In this context, "corruption" means allowing private

sector incentives to drive bank policies, including policies that pressure regulators to practice forbearance.

### 2.3 *How Contingent Capital Addresses the Policy Problem*

Contingent capital lessens the pressure on regulators to practice forbearance by providing private sector incentives for banks not to become undercapitalized in the first place. At times when government regulators would be practicing forbearance by allowing modestly undercapitalized banks to delay raising capital properly designed contingent capital securities will be inducing banks to become better capitalized. Either the owners of the contingent capital securities will be threatening not to roll over their securities, or the terms of the securities themselves will make banks improve their financial healthy by, for example, reducing dividends.

It may be tempting to think of the policy problem as a mechanism design problem, where the regulator designs a game in which bank equity holders and contingent capital holders are the players and the regulator sets the rules of the games. Carefully crafted rules might lead to a game that, if played optimally by both equity holders and contingent capital holders, leads to an equilibrium in which banks remain well capitalized. This is not the best way to think about the problem. Even if optimal strategies could be calculated, equity holders might not play optimal strategies. Instead, they might “cheat” by avoiding capital raising in the short run, hoping instead to pressure regulators to change the rules of the game in the long run.

A better approach is to think of the policy problem as designing a game that keeps banks well capitalized even if the banks’ equity holders attempt to cheat by playing the game sub-optimally in the short run. A good contingent capital mechanism is a robust security design that keeps banks well capitalized even if the equity holders do not play optimally, thus providing weak incentives for the equity holders to pressure regulators to change the rules of the game by allowing forbearance. The approach taken in this chapter is not to solve for optimal strategies by equity holders but rather to show that even if equity holders follow suboptimal strategies by avoiding raising capital, banks do not become undercapitalized, and therefore incentives to change the rules of the game remain weak.

As discussed in the introduction to this chapter, contingent capital has two main advantages: i) contingent capital owners have an incentive to

monitor a bank's capital level and force capital raising even when the bank's regulator is practicing forbearance; and ii) contingent capital is a security with low information sensitivity, which does not clog up the bank's capital structure. Contingent capital securities incentivize capital raising while also making it less painful.

Contingent capital is not a panacea for the problem of low bank capitalization. A well-designed contingent capital security should deal with numerous additional incentive problems, including the following:

- Contingent capital owners and common stockholders may “collude” to shift risks to taxpayers, bondholders, or depositors.
- Market prices of common stock and contingent capital may not generate accurate signals of the value of a bank due to illiquidity, actual or perceived price manipulation, or the belief by common stockholders and contingent capital holders that government bailouts will occur.
- Bankers may delay taking write-offs of bad debts, making book values of assets a poor measure of the health of an undercapitalized bank.
- A bank nearing failure tends to hemorrhage cash as result of depositor withdrawals, excessive dividend payments, and excessive executive compensation.
- A bank with a very high level of capital and imperfect corporate governance may suffer from an agency problem associated with excessive executive compensation, perhaps enabled by hidden carry trades.

### **3 The Proposed Contingent Capital Structure**

#### *3.1 Summary of Features*

The main features that differentiate this proposed structure from the literature are the following:

- The threat by contingent capital holders not to roll over maturing securities is likely to be the binding constraint that induces banks to maintain healthy capital levels.
- A combination of regulatory triggers (based on measures of capital adequacy) and market triggers (based on common stock prices or credit default swap (CDS) spreads), forcing conversion when either trigger is pulled and not necessarily both, enhances the ability of a contingent capital regime to ensure that banks can raise new capital when they become undercapitalized.

- While the threat by regulators to force conversion due to missed regulatory targets is not likely to be binding most of the time, the possibility that it might be binding will lessen incentives for contingent capital holders and common stockholders to collude by delaying new common stock issuance to increase the ex ante value of potential bailouts.
- The proposed structure does not rely on cash settlement or “death spiral” features that are implicitly based on the assumption that market prices will be accurate at times when markets are most stressed.
- The proposed structure contains specific features—limits on cash interest to contingent capital holders and increased capital requirements when dividends or high cash executive compensation is paid—that encourage banks to retain cash equity when they become stressed.
- To deal with the incentives banks have to avoid writing down bad assets to pass regulatory tests, the proposed structure encourages mandatory write-downs when a bank’s common stock trades below book value for an extended time. In addition, the requirement that banks issue new common stock equal to the book value of interest paid to contingent capital holders in shares actually encourages banks to reduce book value by writing down bad assets.
- It is quite possible that contingent capital securities will have short maturities, structured like auction rate securities. If the securities do not roll over, suspension of convertibility may occur for a few months, during which the bank pays a penalty rate while it attempts to recapitalize or find other investors. If the securities are not redeemed at par after this period of suspended convertibility, a conversion event occurs. The penalty rate and the period of suspended convertibility are subject to negotiation between the bank and contingent capital investors. Note that short-term debt contracts, including auction rate securities, tend to make markets fragile by triggering messy bankruptcy processes when the debt cannot be rolled over. Since contingent capital securities are expressly structured to convert gracefully into common stock when they do not roll over, failure to roll over contingent capital securities makes market less fragile, because the capitalization of a bank is improved after conversion and there is no messy bankruptcy process.

The remainder of this paper discusses how the proposed contingent capital structure is designed to achieve its goal of preventing banks from failing as a result of not having appropriate incentives to recapitalize in times of stress.

### 3.2 Literature

The contingent capital structure proposed here incorporates various features that can be found in a growing literature on the subject.

A 20% capital level is consistent with other proposals favoring higher capital levels. For brevity, let “20+0” denote a 20% capital structure that is all common stock, while “15+5” denotes a capital structure consisting of 15% common stock and 5% contingent capital. Admati and Hellwig (2013) and Admati et al. (2013) propose dramatically higher capital levels, consistent with the a 20+0 capital structure. Calomiris and Herring (2012) also propose dramatically higher levels, including examples based on a 10+10 capital structure.

Kashyap et al. (2008) argue that too much equity in a bank’s capital structure exacerbates agency problems within a bank, because it insulates bank managers too much from the market discipline provided by bondholders. Consider, for example, a 20+0 bank in which the executives have captured control of the board, pay themselves lavish salaries at the expense of common stockholders, and pay common stockholders meager dividends. In this situation, market discipline does not work effectively through the market for corporate control. Debtholders, however, do exert market discipline. They can impose restrictive covenants or, even better, keep maturity of debt contracts short, refusing to roll over debt unless their demands are met. Since contingent capital holders are like debtholders, with interests diametrically opposed to bank’s management and common stockholders, more effective market discipline is provided by a 10+10 capital structure than a 20+0 structure.

Coffee (2011) and Calomiris and Herring (2012) emphasize this monitoring role of contingent capital holders or subordinated debtholders, who can discipline common stockholders (see also Calomiris 1999).

In contrast to the proposal here, Kashyap et al. (2008) propose that contingent capital not be funded with cash. Consistent with Bolton and Samama (2012) and Hart and Zingales (2011), the contingent capital structure proposed here is fully funded. It is likely to be purchased by long-term investors seeking to enhance yield in good times by risking losses in bad times.

Kashyap et al. (2008) also propose that contingent capital incorporate aggregate insurance not connected to specific bank losses. This aggregate insurance feature undermines the incentives for monitoring, which they



identify as the major problem making bank capital expensive. Aggregate insurance is not included in the structure proposed here.

Consistent with Sundaresan and Wang (2010), the contingent capital proposed here may sell at par.

Like Glasserman and Nouri (2012), regulatory capital ratios play an important role in the proposed contingent capital structure, and issuance of new equity may be a gradual process. In the proposal here, gradual issuance of common stock is incented by the threat of forced conversion and by paying dividends to contingent capital holders in shares.

The proposed contingent capital security avoids “death spiral” features, which result from trying to increase the number of shares into which contingent capital converts to achieve a market value target. In this respect, it is consistent with the spirit of Pennacchi et al. (2014) and differs from Flannery (2016).

Although regulatory triggers may refer to market prices, the proposed structure for contingent capital places minimal faith in the assumption that market prices are accurate indicators of the value of the bank. It is therefore robust to the possibility that asset prices may be overvalued due to short sale constraints and agreement to disagree, as in Scheinkman and Xiong (2003). In this respect, my proposed structure is different from Squam Lake Working Group (2010), Flannery (2016), Hart and Zingales (2011), and others.

The proposed contingent capital structure has multiple triggers. McDonald (2013) and Squam Lake Working Group (2010) propose dual microprudential and macroprudential triggers such that contingent capital converts when *both* bank-specific market triggers (low common stock price) and macroeconomic triggers (low index price for bank stocks) are simultaneously pulled. The proposed contingent capital has multiple microprudential triggers that fire when either one of multiple regulatory targets are missed *or* when the contingent capital holders force a conversion event. The purpose of these multiple triggers is to provide regulatory discipline when market discipline fails due to collusion between contingent capital holders and common stockholders or due to expectations of bailouts, which undermine market discipline. Although the proposed structure has no specific macroprudential triggers, such triggers could easily be incorporated into the proposed regulatory triggers.

Calomiris and Herring (2012) propose that contingent capital securities be required for large institutions with deep and liquid markets for common stock. In contrast, the proposal here is also compatible with

contingent capital being mandatory for smaller banks, even those that are not publicly traded.

### 3.3 *Higher Capital Levels*

Measuring capital for regulatory purposes is a potentially difficult exercise that involves translating conceptual financial risks into operational accounting rules. Such an exercise is not attempted here. To keep matters simple, let us think of capital levels as a percentage of “risk-weighted assets,” using informal intuition consistent with the spirit of the Basel I or Basel II frameworks. The Basel framework distinguishes between tier 1 and tier 2 capital. In what follows, common stock is tier 1 capital, and contingent capital is tier 2 capital.

Risk weights are based on rules designed to make risks comparable across assets of different riskiness. The numeraire capital level appropriate for a bank asset of “typical” risk is 8%. We think of this typical debt instrument as being on the boundary between investment grade and junk, perhaps with a risk equivalent to a bond rating of BBB-.<sup>1</sup>

If a bank’s capital level is substantially above 8% of risk-weighted assets in the Basel framework, then the bank’s capital level is considered healthy; if it is far below 8%, the bank is considered to be undercapitalized and should be required to take steps to improve its capitalization. Although Basel I can be interpreted as usually calculating risk-weighted assets based on book values, the regulator can mandate calculations based on book values, market values, or a combination of both. In the simplified discussion below, the terms “risk-weighted assets” and “book value” are used interchangeably. The discussion below does not depend on whether the regulator uses market values or book values. It does not depend on whether the regulator uses Basel I, Basel II, Basel III, or a different regulatory mechanism.<sup>2</sup>

Neither the Basel I process nor the Basel II process prevented massive bank failures during the financial crisis. This suggests that target capital levels should be far higher than the 8% numeraire level. The obvious regulatory policy to reduce costs associated with bailing out failing banks is higher capital requirements.

For the sake of discussion, assume that the regulator structures capital requirements so that a bank is incentivized to have a target capital level of 20% of risk-weighted assets, 2.5 times the 8% numeraire level of Basel I. A 20% capital level can be implemented either with all common stock

or with a mixture of common stock and contingent capital. The following discussion focuses on a “10 + 10” capital structure (half common stock and half contingent capital).

The 10 + 10 capital level is to be interpreted as an equilibrium target, not a minimum. As the discussion below makes clear, contingent capital may not be forced to convert into common stock until a lower minimum level is hit, here assumed to be 7 + 7.

Multiple tiers of contingent capital might be useful. For example, a 10 + 10 + 10 capital structure would consist of 10% common stock, 10% contingent capital, and 10% backup contingent capital. When contingent capital converts into common stock, backup contingent capital converts into contingent capital. To recapitalize after conversion, a bank needs to issue backup contingent capital, not contingent capital. Backup contingent capital may be a useful feature of a contingent capital proposal, because backup contingent capital is even less information sensitive than contingent capital. To keep the discussion in this paper simple, backup contingent capital is not part of the proposed contingent capital structure.

### *3.4 Proposed Structure in Detail*

The structure for contingent capital securities proposed here has several features, including multiple “either-or” conversion triggers and forced common stock issuance, all designed to deal with the incentive problems. The proposed security features, to be mandated by the bank’s regulator, has the following characteristics:

- The only types of equity securities allowed in a bank’s capital structure are common stock and contingent capital.
- Contingent capital is structured as reverse convertible preferred stock. The term “reverse convertible” means that, when a conversion event occurs, the bank—not the contingent capital investors—has the option to determine whether the contingent capital is paid off at par or converted into common stock with severe dilution to existing shareholders; either way, there is no potentially disorderly bankruptcy process.
- When a conversion event occurs, the bank has a fixed window of time, assumed for simplicity to be 60 days, during which it can redeem at par some or all of the contingent capital, either with the cash proceeds of new common stock issuance (e.g., with a rights offering after the conversion event, presumably priced above

the conversion rate) or with some fraction of cash proceeds of new common stock issuance in the recent past. For the sake of discussion, the fraction of cash proceeds from recent new common stock issuance that can be used to redeem contingent capital is assumed to be reduced by 5% for each month that has passed since the common stock was sold, falling to zero after 20 months. For example, if a bank issued new equity for cash three months before the conversion event, then 85% of the cash proceeds of this equity issuance can be used to redeem contingent capital at par after a conversion event. Unredeemed contingent capital converts to common stock at the end of the fixed window of time; the conversion process cannot be reversed at the end of the window, even if the bank's financial situation has improved dramatically. During the 60-day conversion window, corporate governance should be subjected to some oversight by the regulator or contingent capital investors; for example, dividends and bonuses should not be allowed.

- Conversion is based on a highly dilutive fixed ownership percentage of the outstanding common stock, assumed for the sake of discussion to be 80% ownership of the common stock. Regardless of the book value or market value of the contingent capital and common stock, this 80 – 20 conversion rule implies that if none of the contingent capital is redeemed, then all contingent capital converts into common stock representing 80% ownership of the bank, with all issues of contingent capital converting proportionally based on their par value. For example, if 25% of the contingent capital is redeemed at par after the conversion event, the remaining 75% of the contingent capital converts into 60% ownership of the common stock.
- Contingent capital shares have equal seniority. If one share is affected by a conversion event, then all shares are affected.
- If a bank fails to replace maturing contingent capital with new contingent capital or defaults on an interest payment to contingent capital holders, then a conversion event occurs. The bank does not undergo a potentially destabilizing liquidation, bankruptcy, or other resolution process.
- The regulator may declare a conversion event when a bank is deemed undercapitalized for any of a variety of reasons, such as i) low book capital, ii) failing grades on a stress test, iii) persistently low common stock prices, iv) persistently high CDS spreads, v) ratings downgrades, vi) accounting irregularities, or vii) persistently high levels of borrowing from the central bank. These are “either-or” tests, implying that failing only one test triggers a conversion event. These tests may interact with other regulatory tools, such as mandatory common stock issuance, limits on dividends and executive compensation (discussed further below), immediate forced conversion of contingent capital (without

a 60-day window), replacing management, or placing a bank directly in a resolution process. For example, it would be reasonable for the regulator to replace management and liquidate a bank after discovering massive fraud that makes it unlikely the bank will have value, even after conversion of all contingent capital. To ensure that market prices are not affected by private information about regulator's behavior, the automatic triggers should be based on rules and not on regulatory discretion.

- After a conversion event, the bank must promptly replace the converted contingent capital with new contingent capital. If it does not do so after a reasonable period of time—say, 90 days after the end of the 60-day conversion period—the central bank or other bank resolution authority either forces the bank into a resolution process or automatically purchases new contingent capital securities, holds the proceeds of the securities as cash, puts restrictions on the bank's activities, and charges a very high interest rate in shares (assumed for the sake of discussion to be 3% per month) until either nationalization automatically occurs or the bank has replaced all of the government-provided contingent capital with new market-contingent capital.
- Cash interest on contingent capital is capped at a rate assumed for the sake of discussion to be 200 basis points over Treasury rates.
- Contingent capital is also allowed to be paid interest in shares of common stock, but such shares must result from recent new issuance of common shares that raise cash equity equal to a multiple of the book value of the shares issued to contingent capital holders in lieu of cash interest. For the sake of discussion, the multiple is set at 2. For example, assume contingent capital holders holding \$400 par value of contingent capital receive one share of common stock as annual interest paid in kind; assume the market value of a share is \$10, implying a 250-basis-point yield to contingent capital investors; assume the book value of a share is \$25; then the bank must issue new equity with cash proceeds of \$50 by issuing some number of new shares of common stock; presumably, the number of shares issued to give contingent capital investors one share worth \$10 is, in this example, more than two shares worth \$20 (due to the multiple of 2) and perhaps about five shares worth \$50 (since the book value of the stock is 2.5 times its market value).
- Maturities of contingent capital securities should be limited. For example, such securities might have a maximum five-year maturity; alternatively, contingent capital securities should be both put-able and callable at par (with modest penalties), given a reasonable notice period (say, two years). Contingent capital securities are not allowed to have incentive payments or delayed interest

payments, such as cumulative preferred stock. The par value of the securities must be equal to the capital raised.

In addition to these provisions, the proposed structure also includes other features of bank regulation that are not, strictly speaking, intrinsic to the contingent capital securities themselves:

- The bank regulator may require a bank to write down the book value of assets when the market value of its equity is low. For example, if the market value of common stock during a quarter is less than 10% of the value of risk-weighted assets during the quarter, the regulator may require the bank to write down the book value by some percentage of the difference between market value and book value, say, 10% each quarter.
- When a bank pays cash dividends to common stockholders (or buys back common stock for cash) or pays high cash executive compensation, its forward-looking capital requirement is raised by a multiple of the amount paid for a given period of time. For the sake of discussion, we assume a multiple of 3 (half common stock and half contingent capital), a forward-looking period of four years, and an unrestricted executive compensation limit of \$1 million for any employee. For example, if a bank has two employees with cash compensation in excess of \$1 million, one with cash compensation of \$1.5 million and one with cash compensation of \$3 million, the high cash executive compensation amount is \$2.5 million, calculated as  $(1.5 - 1.0) + (3.0 - 1.0) = 2.5$ . Compensation in shares is not restricted.

To illustrate how the forward-looking capital requirement works, suppose that  $10 + 10$  is the target capital structure, but the regulator does not declare a conversion event until the level falls below  $7 + 7$  for a bank that has paid no dividends and no high cash executive compensation for the past four years. Now consider a bank in a steady state where risk-weighted assets are constant, common stock is 10% of risk-weighted assets, and contingent capital is 10% of risk-weighted assets. Suppose that the bank has been paying cash dividends and high cash executive compensation equal to 5% of the book value of its common stock per year (0.5% of risk-weighted assets); then its steady state capital requirement is raised by 6% of risk-weighted assets, calculated as  $5\% \times 0.10 \times 3 \times 4 = 6\%$ . Since half of the 6% is required to be common stock and half contingent capital, the bank's required capital level is raised from  $7 + 7$  to  $10 + 10$ . This is the sense in which  $10 + 10$  is the steady state for this bank; it is a function of the steady state dividend yield and steady state level of high cash

executive compensation. Note that this regulatory principle creates a procyclical capital level, which allows the  $10 + 10$  steady state capital structure to fall to  $7 + 7$  gradually over four years if the bank pays no dividends and no high cash executive compensation; it rises above  $10 + 10$  if the bank pays higher dividends or higher cash executive compensation.

- Institutions that own bank common stock or contingent capital securities cannot count the value of such securities as bank capital for regulatory purposes. This provision effectively prevents circular cross-holdings of contingent capital securities.
- Cash interest on contingent capital securities should be tax deductible as long as interest is not also being paid in common stock. If interest is also being paid in common stock, both the cash interest and the interest paid as common stock are taxed like payments to equity.

This structure for contingent capital is designed to balance incentives in such a manner that the bank has a reasonable level of high-quality common stock in its capital structure; the regulator can credibly threaten forced contingent capital conversion to induce the bank to recapitalize without a disorderly resolution process; the regulatory threat and the contingent capital holders' threat to force conversion interact in a positive manner; the bank has an incentive to conserve cash and issue common stock when it becomes undercapitalized; and the low information sensitivity of contingent capital lessens the cost of recapitalizing a bank with new issuance of contingent capital after a forced conversion. All these features are designed to avoid situations in which governments bail out failing banks to avoid disorderly bank failures.

#### **4 Contingent Capital as Reverse Convertible Preferred Stock**

At its simplest, the purpose of contingent capital is to ensure that a bank that needs to raise additional capital can, with very high probability, do so by converting its outstanding contingent capital into common stock and then replacing the contingent capital by issuing more of it. Since the conversion does not involve a potentially disorderly bankruptcy process, it is painful only for the bank's common stockholders, not for the bank's debtholders or for the rest of the economy. To avoid the severe dilution of forced conversion, the common stockholders have an incentive to keep the bank well capitalized in the first place. In principle, contingent capital

can be structured in many ways: as put options with a striking price well below market, as deeply subordinated debt that can be washed out or “bailed in,” or as preferred stock with a reverse conversion feature.

#### *4.1 Permanent Capital*

Regardless of whether it is structured like a put option, like subordinated debt, or like preferred stock, contingent capital should be thought of as permanent capital. This implies that the maturing contingent capital securities must be converted into common stock if new securities are not immediately issued to replace maturing securities. If the contingent capital is structured as put options, the bank must be required to exercise the put options at expiration if new put options have not been issued to replace the expiring ones. Similarly, if the securities are structured as preferred stock or subordinated debt, these securities must be converted into common stock if new preferred stock or subordinated debt is not issued to replace maturing securities.

After a conversion of contingent capital securities into common stock, the bank should be required promptly to issue new contingent capital securities. Since the old contingent capital securities have just been converted into common stock, the bank presumably should have a solid cushion of common stock in its capital structure, making issuance of new contingent capital easier. Clearly, issuance of new contingent capital should be easier than issuance of more new common stock, because the contingent capital securities are senior to common stock and therefore less information sensitive.

#### *4.2 Disadvantage of Put Options*

Structuring contingent capital as a put option has one obvious disadvantage. The seller of the put option can only be assured of honoring its obligation to buy the shares issued as a result of put option exercise if the seller itself is solvent. The put options are likely to be exercised at times when a banking crisis is in progress and there is a credit crunch. Ensuring the solvency of the option sellers in such circumstances is a more difficult a regulatory problem than the problem of inducing banks to be adequately capitalized in the first place. Structuring contingent capital as put options therefore does not solve the problem of ensuring that banks can issue more common stock if needed. It merely passes the problem



along to different institutions: those which issue put options. It therefore obviously makes sense to structure contingent capital as a security that is fully funded in advance, either as subordinated debt or as preferred stock.

### *4.3 Advantages of Preferred Stock*

Given a choice between subordinated debt and preferred stock, there are multiple reasons to structure contingent capital as preferred stock and not as subordinated debt.

First, it is more difficult politically to force losses on debtholders than on equity holders. Calling the securities equity rather than debt therefore makes it easier to force losses on the contingent capital holders.

Second, default on contingent capital securities that are structured as subordinated debt might trigger a messy bankruptcy process. One of the purposes of contingent capital is to avoid the threat of such a process. Bank resolution tends to be more disorderly and complicated when a bank holding company is involved. Discussing whether contingent capital securities are issued by a bank holding company or its subsidiaries is a topic beyond the scope of this proposal.

Third, contingent capital can play a useful monitoring role if the contingent capital holders have interests different from common stockholders. To enforce their interests, the contingent capital holders may ask for some rights that usually belong to equity holders, especially for small banks that are privately held. Such rights might include the ability to attend board meetings or to examine the bank's books on a regular basis. To the extent that contingent capital holders demand rights usually not associated with debtholders, these securities look more like equity than like debt.

### *4.4 Taxation of Contingent Capital Interest*

One disadvantage of structuring the securities as equity is that coupon payments may be taxed like dividends and not like interest. The proposed structure recommends restructuring tax laws so that cash interest paid on contingent capital is tax deductible like debt, as long as no interest is being paid in shares. Since the proposed maximum cash interest rate allowed is 200 basis points over Treasuries, the contingent capital securities must be very safe, debt-like securities to qualify for tax deductibility. If the interest rate is higher than 200 basis points over Treasuries, the additional interest

is required to be paid in shares financed with new common stock issuance and all the interest—whether paid in cash or paid in common stock—is taxed like payments to equity, not debt. This required structure gives the common stockholders and contingent capital holders an incentive to keep the bank well enough capitalized so that the contingent capital securities are perceived as being safe. It thus mitigates the perverse incentives that otherwise occur with debt overhang. This feature emphasizes the hybrid nature of contingent capital securities, which are like debt when safe and like equity when risky.

#### *4.5 Comparison with Convertible Preferred Stock Used in Venture Capital Transactions*

If thought of as an equity security, contingent capital is a form of reverse-convertible preferred stock. As such, it shares similarities and differences with “straight” preferred stock and regular convertible preferred stock like that typical of venture capital transactions. It is similar to straight preferred stock in that the cash flow rights resemble bond payments. If the bank does well, neither contingent capital nor straight preferred stock participate in the bank’s upside, except to the extent that they receive promised coupon and principle payments. The convertible preferred stock used in venture capital transactions, in contrast, converts into common stock when the firm does well. It has a potentially huge upside.

In effect, the convertible preferred stock used in venture capital transactions has an embedded call option that is exercised by the convertible preferred shareholder, while the reverse-convertible contingent capital securities have an embedded put option exercised by the common stockholders. The embedded call option gives the convertible preferred stock used in venture capital transactions a convex payoff structure when the firm does well, as a result of which the convertible preferred shareholders are more tolerant of risk taking by the firm. The embedded put option in contingent capital gives the security a concave payoff structure, as a result of which the contingent capital shareholders want the bank to limit risk taking.

Although contingent capital does not participate in upside gains like the convertible preferred stock used in venture capital transactions, what happens when the venture-capital-backed firm or contingent-capital-backed bank does poorly can be remarkably similar, given the differences between startup firms and banks.

The convertible preferred stock used in venture capital transactions typically has coupon payments that accumulate if they are not paid in a timely manner. If, after some number of years, the venture-capital-backed startup firm has not done well, either by being acquired at a premium valuation or by having a successful initial public offering, the owners of the convertible preferred shares have the right to redeem their shares for cash. If the firm is not able to satisfy the redemption request on the redemption date, the convertible preferred shares often are entitled to receive a very high interest rate, paid in shares, which over a period of a few years transfers control of the firm to the convertible shareholders. In effect these payments are like a reverse conversion in which the common stockholders allow their equity stake to be diluted to meet the conditions defined by the structure of the convertible preferred stock. Thus, when either the startup firm or bank does poorly, both the convertible preferred stock used in venture capital transactions and the contingent capital structure proposed in this paper have “reverse conversion” features that give the securities a concave structure and thus give the preferred stockholders an incentive to lower risk in bad states.

Although both the convertible preferred stock used in venture capital transactions and the reverse-convertible contingent capital securities have similar concave claims on cash flows in bad states, the securities themselves serve quite different purposes. In a typical venture capital situation, the startup firm has little or no debt; if it is efficient to liquidate the firm, reverse conversion allows a venture-capital-backed startup firm to be liquidated in an orderly manner, in a situation where there are typically few assets to liquidate. If it is not efficient to liquidate the firm, it gives the convertible preferred shareholders a strong bargaining position: they can threaten to liquidate the firm and fire its employees. The employees also have a strong bargaining position, to the extent that most of the value of the firm is their human capital and thus the threat to fire them has little credibility. The powerful control rights given to convertible preferred shareholders in bad states compensate them for the fact they otherwise would have little bargaining power with a firm whose assets are mostly in the heads of its employees.

#### *4.6 Why Banks Are Different*

If the firm is a bank, the situation is entirely different from that of a startup firm. The bank holds numerous assets and liabilities, is highly leveraged, and typically many of its assets are opaque and therefore difficult to

liquidate. The purpose of the contingent capital securities is to allow the bank to continue operating in a well-capitalized manner, not to be liquidated quickly. Since contingent capital owners control 80% of the bank's shares after conversion, they can threaten to replace the bank's management, a market discipline feature emphasized by Calomiris and Herring (2012).

While the contingent capital holders have an incentive to avoid a lengthy period during which debt overhang distorts the incentives of the common stockholders, both contingent capital holders and common stockholders have a common incentive to avoid a conversion that requires new contingent capital to be issued if they believe risks can be shifted to depositors, bondholders, or taxpayers. In contrast, the bank's regulator has strong incentives, both microprudential and macroprudential, to ensure a prompt recapitalization of a weak bank. In addition to the microprudential motive of preventing exactly such risk shifting, the regulator also has an incentive to ensure that banks throughout the economy have enough capital to support new lending and do not have incentives to strengthen their own capital position by squeezing their customers too hard.

For microprudential reasons, the regulator wants cash injected into a failing bank sooner rather than later. Forcing fast conversion of large amounts of contingent capital into common stock makes it easier for banks otherwise in distress to raise new contingent capital securities, by doing it sooner rather than later. The alternative of allowing a weak bank to delay raising new contingent capital encourages a distressed bank to buy time by selling off its good assets, by failing to make good loans to good customers, by exaggerating its financial position, and by allowing too much cash to leave the bank in the form of dividends, executive compensation, and new loans to borrowers headed toward default. These short-term strategies destroy the bank's value while allowing the distressed institution to bet on good luck or a bailout in the future. They also make bailouts more costly.

For macroprudential reasons, the regulator wants a well-capitalized banking system able to support lending to worthy customers. In recessions or financial crises, financial distress tends to be correlated across banks. Recessions are prolonged and exacerbated if many banks are allowed to persist in undercapitalized states year after year. Forcing banks to have high levels of capital makes it easier for banks to raise new capital in times of stress, since high levels of capital reduce the information asymmetries that make raising new capital expensive for the issuer.

While conversion of contingent capital into common stock results in immediate recapitalization, contingent capital holders and common stockholders may actually bargain for a slower-than-optimal recapitalization involving gradually paying interest to contingent capital holders in the form of common stock. Such delayed recapitalization may be motivated by a desire to benefit from potential bailouts if the bank's position deteriorates sharply in the future. The proposed contingent capital structure addresses this incentive problem by taking tax deductibility of cash interest payments away from the contingent capital holders when they are receiving interest in common stock and, more importantly, by requiring the bank to issue new common stock with a book value equal to a multiple of 2 of the interest paid in shares. Contingent capital holders are likely to demand interest payments in stock based on the market value of the common stock. To the extent that the market value of the common stock is below its book value, many shares of common stock will have to be issued, and this will speed up the bank's recapitalization process. For example, if the bank's shares are trading at 25% of book value, each dollar's worth of interest payments to contingent capital holders in shares must be accompanied by \$8 of new common stock issuance.

The bank can reduce the amount of common stock it must issue by writing down the value of bad assets. For example, if the bank writes the book value of its assets down by 5%, then the common stock will trade at 50% of book value, and only \$4 of new common stock needs to be issued to pay \$1 in-kind interest. This incentive to write down bad assets is beneficial, since a bank otherwise has an incentive to overstate its capitalization to appear healthy to its regulator.

## **5 Market Discipline from the 80-20 Conversion Rule**

The proposed structure converts contingent capital into 80% ownership of the common stock of the bank, regardless of the book value or market value of the bank's contingent capital and common stock.

The market discipline that results from the highly dilutive 80-20 conversion rule depends strongly on whether contingent capital holders collude or do not collude with bankers representing common stock owners. Contingent capital tends to provide effective market discipline only when the contingent capital owners do not collude or cooperate with common stockholders. When they do collude, the result is the same as a 20+0

capital structure with no contingent capital. The bank is protected from failure by higher capital requirements (20% instead of, say, 10%) but not by the market discipline exerted by contingent capital owners.

### *5.1 No Collusion between Contingent Capital Owners and Common Stockholders*

To illustrate the mechanics of conversion of contingent capital into common stock, consider the following simple example based on three assumptions:

- The contingent capital owners do not collude with common stockholders. Instead, they aggressively threaten to force conversion, so that the value of their holdings does not fall below a par value of 10% of the book value of assets.
- The bank reports book capital of 10% of assets, and the outstanding par value of contingent capital represents another 10% of assets.
- The combined value of the common stock and contingent capital does not change as a result of conversion of the contingent capital into common stock (i.e., the value of expected bailouts is zero).

As contingent capital owners contemplate whether to roll over their maturing contingent capital, they will be keeping an eye on the market value of the bank's common stock. If the market does not trust the bank's book value numbers, the bank's common stock will trade at a steep discount to its book value.

Assume an 80-20 conversion ratio and assume outstanding contingent capital is 10% of risk-weighted assets and trades at par. This implies that common stockholders are indifferent between allowing contingent capital to convert and allowing it to roll over when the common stock is trading at a value equal to 2.5% of risk-weighted assets. To see this, note that the combined market value of the common stock and contingent capital is 12.5% of assets. If the value of the bank does not change post-conversion, then the post-conversion new common stock will be worth 12.5% of assets. The holdings of the former contingent capital owners will represent 80% of this value, or 10% of the book value of assets, and the holdings of the legacy common stock holders will represent 20% of this value, or 2.5% of assets.

Now assume also that the book value of common stock is 10% of risk-weighted assets. This indifference point now corresponds to the common

stock trading at 25% of book value. After conversion, the common stock trades at 62.5% of the new combined book value of 20% of assets represented by common stock and converted contingent capital.

The contingent capital owners have an incentive not to lose money on conversion. They are therefore likely to threaten a conversion event by not rolling over the securities when the market value of the common stock is substantially greater than 25% of its book value. The common stockholders have little incentive to resist the threat of conversion when the combined market value of the contingent capital and common stock is less than 62.5% of its book value. By offering very high interest rates to encourage rolling over when the value of the common stock and contingent capital is less than 62.5% of its book value, the common stockholders might induce rollover, but the present value of their common stock would be less than what they would obtain with conversion, even after dilution. If contingent capital holders threaten conversion when the common stock is trading at, say, 30% of its book value, common stockholders are likely to attempt a rights offering to raise enough new common stock to induce the contingent capital to roll over. The rights offering is likely to be priced somewhat above 25% of the book value of common stock, because the common stockholders have nothing to gain over an 80-20 forced conversion from a successful rights offering priced at 25% of book value.

When choosing a conversion ratio, such as 80 to 20, the regulator will want to align incentives of the common stockholders and the contingent capital holders, so that neither common stockholders nor contingent capital holders have an incentive to resist conversion at the point when the regulator believe it is microprudentially reasonable for the bank to recapitalize. The above analysis is therefore consistent with the interpretation that the regulator will want a bank to increase its common stock dramatically when the market value of its common stock and contingent capital fall to 12.5% of the bank's risk-weighted assets. A ratio with more dilution, such as 90 to 10, will induce the common stockholders to delay conversion. There will be a potentially greater incentive problem between contingent capital holders and common stockholders due to debt overhang (with contingent capital playing the role of debt). A ratio with less dilution, such as 70 to 30, will induce contingent capital holders to force conversion earlier, at a point when bad incentives related to debt overhang are less of a problem.

The 80-20 conversion rate proposed is for the purposes of discussion. It is chosen to illustrate the effects of a substantial degree of dilution.

## 5.2 *Conversion Incentives of Common Stockholders*

As the market value of common stock falls toward 2.5% of the book value of assets, the common stockholders can attempt to forestall conversion of contingent capital using three mechanisms: i) increase the interest rate paid on the contingent capital; ii) issue new common stock, perhaps through a rights offering; or iii) “deleverage” by selling off risky assets, refusing to make new loans, and refusing to roll over maturing loans.

It is likely that the bank will first increase the interest rate paid on contingent capital to its maximum rate of 200 basis points over Treasuries.

A question of practical importance is whether common stockholders will voluntarily attempt to forestall conversion of the contingent capital by issuing new common stock before conversion is forced by contingent capital holders refusing to roll over their securities. When a conversion event occurs, the proposed contingent capital structure allows the bank to use a portion of the cash received from recent common stock issuance to redeem contingent capital at par. Without this feature, conversion would dilute the common stock to a 20% ownership stake regardless of the amount of new common stock recently issued; this would strongly discourage new common stock issuance by a weak bank anticipating contingent capital conversion in the not-too-distant future. With this feature, the proposed capital structure essentially gives the common stockholders a valuable option either to use the cash proceeds of the common stock issuance to redeem contingent capital or to allow it to migrate gradually into the bank’s permanent capital structure.

The proposed migration rate of 5% per month represents a trade-off. A low rate encourages the bank to issue common stock sooner, since more of the proceeds can be used to redeem contingent capital at future conversion events. A high rate improves the bank’s permanent capital structure more quickly. If the regulator exercises prompt diligence in forcing banks to issue capital when needed, a low rate would be appropriate. Since, however, regulators around the world have a proven track record of not mandating common stock issuance in a timely manner, the rate needs to be high enough to migrate the new common stock into the permanent capital structure reasonably quickly.

If the pressure to issue new common stock comes from contingent capital holders (not colluding with common stockholders) or from the bank’s regulator (when collusion is occurring), the ability to use a portion of cash raised from common stock issuance to redeem converting contingent



capital should make the bank less resistant to the demands of the contingent capital holders or regulator. It thus helps align incentives.

After conversion of contingent capital to common stock, a bank that has more than 10% common stock may consider itself overcapitalized and may therefore want to increase dividends or engage in stock buy-backs. Temporarily higher capital requirements for higher cash dividend yields should induce a bank to pay dividends gradually rather than as a lump sum.

### 5.3 *Monitoring by Arm's-Length Contingent Capital Holders*

One way in which unaccountable bank managers justify lavish salaries is by engaging in hidden carry trades, paying out the profits from such trades in good times as generous performance-based bonuses. Loosely speaking, we can think of a carry trade as financing a long position in a risky debt instrument at safe low interest rates. Such speculative positions conceptually incorporate short positions in out-of-the-money embedded put options. By choosing to invest in risky debt in a typical carry trade, the bank sells an out-of-the-money option to default, which gives the risky borrower the option to put assets (collateral) to the bank by defaulting. The positions are profitable when the embedded put options expire out of the money. Of course, carry trades have a tendency to blow up occasionally (i.e., they give rise to a “peso problem” associated with large losses when the embedded put options expire in the money).

When carry trades blow up in a highly leveraged bank, there is a risk that stockholders will be wiped out and bondholders will suffer losses too. Even if corporate governance does not allow common stockholders to deal with this agency problem effectively, bondholders can deal with the problem by insisting on fully collateralized loans with short maturities. In the limit, this becomes overnight repo financing with haircuts commensurate with the risk of the assets being financed. To the extent that shareholders realize that they cannot effectively limit the risk taking in hidden carry trades, they can motivate bondholders to limit risks for them by deliberately increasing the amount of debt in the bank's capital structure. Using this logic, Kashyap et al. (2008) point out that low capital levels can address a fundamental agency problem arising in banks.

Contingent capital is a useful device for generating both the benefits of reduced risk taking coming from monitoring by debtholders and reduced bankruptcy costs from having contingent capital conversions replace bank

failures. Contingent capital holders may not be able to limit risk taking as efficiently as repo lenders, because they are not fully collateralized on a daily basis, but they can limit risk taking more effectively than common stockholders can by keeping maturities short and threatening a conversion event when the bank appears to be engaging in excessive risk taking associated with extensive carry trades. To make sure that carry trades are not hidden, contingent capital investors might demand more transparency than do common stockholders. Alternatively, if the bank finances risky positions in the repo market, the contingent capital investors might demand that the bank keep some assets in unleveraged trust accounts that the contingent capital investors can observe; this will allow contingent capital investors to limit the amount of capital tied up in repo haircuts.

To the extent that high leverage addresses the agency problem associated with carry trades, contingent capital owners and a bank have an incentive to negotiate terms in which contingent capital is paid a very high interest rate in exchange for tolerating very low levels of capital in the bank. In other words, the solution to the agency problem may make the bank vulnerable to a costly failure, which in the absence of a bailout threatens to impose on the rest of the financial system costs not internalized by the contingent capital holders and the bank in their negotiations. To deal with these external costs, the proposed contingent capital structure requires a banks that pays interest rates higher than 200 basis points over Treasuries also to issue common stock at the same time. This feature frustrates the bank's and contingent capital investors' joint incentive to seek higher leverage.

It might be argued that an alternative way to limit bank risk taking is to prohibit it directly. For example, the Dodd-Frank Act includes the Volcker rule, which limits speculative proprietary trading by large banks. Effective implementation of the Volcker rule is likely to push more speculative trading out of banks and into hedge funds. The hedge fund model is a good example of high leverage being used to control agency costs, consistent with Kashyap et al. (2008). The investors in hedge funds are often unable to monitor the hedge fund's risk taking on a daily basis. They often cannot directly observe the hedge fund's positions and therefore cannot determine whether a hedge fund's profits are influenced by hidden carry trades. The investors in hedge funds deal with this problem by allowing the hedge fund to use leverage and by delegating to the hedge fund's prime brokers the task of limiting the hedge fund's leverage and risk taking. Of course, the prime brokers are the same banks that

formerly would have engaged in proprietary trading on their own account. Ironically, prime brokerage itself has elements of a risky carry trade. A prime broker that gives its hedge fund customers more favorable terms (e.g., lower haircuts and higher leverage) may be able to charge higher fees. The high fees are like premiums on out-of-the-money put options. When these hidden options expire in the money, the catastrophic result may resemble the collapse of the highly leveraged hedge fund Long-Term Capital Management in 1998. It remains to be seen to what extent implementation of the Volcker rule will result in banks hiding risks in opaque prime brokerage arrangements with hedge fund customers.

#### *5.4 Collusion between Contingent Capital Holders and Common Stockholders*

The logic implying that contingent capital holders will enforce market discipline by threatening conversion when a bank becomes undercapitalized is based on the assumption that contingent capital holders represent a different group of investors from common stockholders. The proposed structure therefore works best if contingent capital owners do not collude with common stockholders and instead enforce market discipline. As a practical matter, this might not be true. For example, the holders of contingent capital might be pension funds with long holding horizons. If such pension funds also invest in common stock issued by banks, the pension funds have an incentive to maximize the combined value of the common stock and contingent capital, not the value of the contingent capital alone.

A more difficult problem also occurs when the bank is closely held and the contingent capital holdings are also highly concentrated. This is likely to be an important issue for small banks. Even large publicly traded banks with liquid market sometimes have large sophisticated investors—like Warren Buffett's Berkshire Hathaway or sovereign wealth funds—in the more senior part of their complex equity structure. Even if contingent capital securities are only issued by large banks with deep liquid markets for their common stock, it is possible that their contingent capital securities will be held by concentrated investors like insurance companies (both life and casualty), large public and private pension funds, and sovereign wealth funds. It will be easy for such sophisticated investors to communicate with bank management; indeed, they already have a long history of doing so. Concentrated holdings make it easier for the common stockholders to collude by making side deals unobserved by the regulator.

### 5.5 *Expectations of Bailouts*

The logic implying that common stockholders of a bank with a 10 + 10 capital structure have little incentive to resist conversion when the market value of the common stock falls to 25% of book value is based on the assumption that the combined value of the bank to common stockholders and contingent capital holders is not affected by the conversion itself. This assumption is likely to be violated if the market expects government bailouts of common stockholders, contingent capital holders, bond holders, or depositors. If bailouts are expected, they give the bank more value than implied by the value of the bank's assets alone. This extra value will be impounded in the prices of the bank's common stock, contingent capital, and debt. Since the value of expected bailouts is higher the more poorly the bank is capitalized, common stockholders and contingent capital holders have an incentive to collude to delay conversion of contingent capital even when the bank is unhealthy. Such collusion implies that the monitoring function of contingent capital is lost.

The lack of monitoring is quite severe when market participants expect bailouts. Conceptually, there are two debt overhang problems. First, there is the debt overhang problem between common stockholders and contingent capital holders, where we think of contingent capital as debt. This problem is addressed by the contingent capital holders' threat of forcing a conversion event, which can be made frequent if maturities are kept short enough. It is also addressed if contingent capital holders collude with common stockholders, because they then have an incentive to make efficient common investment decisions.

Second, there is the debt overhang problem between common stockholders plus contingent capital holders (viewed together as "equity") and bondholders, depositors, plus resolution authorities (viewed together as "debt"). When contingent capital holders aggressively protect their interests relative to common stockholders, the bondholders, depositors, and resolution authorities receive an external benefit as a result of their more senior position in the capital structure. When common stockholders collude with contingent capital holders, these benefits are lost, and this second debt overhang becomes a moral hazard or risk-shifting problem. Furthermore, the usual debt overhang problem is exacerbated to the extent that colluding common stockholders and contingent capital holders believe they may benefit from bailouts.

To remedy the perverse incentives resulting from collusion when bailouts are expected, it is important that contingent capital has automatic

conversion triggers in addition to the conversion that occurs when contingent capital owners threaten not to roll over. For contingent capital to work properly when common stockholders and contingent capital holders collude, these triggers must be implemented in a credible enough manner to ensure that banks remain well capitalized. This point is discussed in more detail next.

## 6 Need for Both Regulatory and Market Triggers

What kinds of additional triggers should be built into the required structure of contingent capital securities? When common stock owners collude with contingent capital owners, the bank effectively has a  $20 + 0$  capital structure (i.e., the incentive structure is the same as if the bank's equity consisted only of common stock). To the extent that discipline is not provided by the market (contingent capital), it must be provided by its regulator.

The regulator's main objective is to ensure that banks do not rely on government-financed bailouts to prevent them from failing. This regulatory objective is achieved when banks can raise significant new equity capital, even after bad news has lowered the value of their assets.

For contingent capital to work effectively when common stockholders collude with contingent capital owners, there must be at least two kinds of triggers, which can be called regulatory triggers and market triggers. To see why, let us examine what happens when only one type of trigger exists.

### *6.1 Why Market Triggers Alone Do Not Work*

To illustrate why a regulatory trigger is needed, suppose there is only a market trigger. For example, McDonald (2013) proposes conversion if the bank's common stock trades in the market below a trigger price while an index of financial stocks also trades below a trigger level. Calomiris and Herring (2012) propose conversion if the 90-day moving average value of the bank's common stock is less than 8% of assets. Hart and Zingales (2011) propose conversion when CDS spreads on the bank's debt or contingent capital stay above a trigger level for some period of time. For example, a conversion event might be triggered if CDS spreads average more than 200 basis points over Treasuries for six months.

There are two problems with relying on these kinds of market-based triggers alone. First, the market may believe creditors or equity owners of failing banks will be bailed out. Since the common stock and contingent capital prices impound the present value of the anticipated bailouts, the stock price can remain high, or the CDS spread can remain low, even as a bank's inherent strength deteriorates. When it becomes apparent that a bank is undercapitalized and the conversion triggers are being hit, the bank may already be effectively insolvent and unable to raise new capital, even after conversion of contingent capital to common stock. This situation makes a bailout more likely to occur.

Second, if the common stockholders and the contingent capital holders collude, they may manipulate common stock prices or CDS spreads to give a misleading indication of the financial health of the bank. This is a more severe problem when the common stock and contingent capital are closely held, in which case there can effectively be a squeeze in the supply of common stock and contingent capital. As a result of a squeeze, both the common stock and the contingent capital can trade in the market at artificially high prices. If prices are artificially high due to a squeeze, the common stock or contingent capital securities may be hard to borrow. Furthermore, CDS spreads may be squeezed as well, under the assumption that an auction to establish a value for contingent capital securities after a conversion event effectively or actually requires delivery of squeezed securities. The regulators may have little incentive to see through the artificial prices until it is too late.

As a practical matter, these two problems interact in a confusing, complicated, and ambiguous manner. For example, suppose that market participants do not believe that the debt of banks will be bailed out, and market participants do not know that the prices of the banks' assets are being squeezed to artificially high prices. Then the high prices for bank common stock and the low CDS spreads send a misleading signal of financial health, which the market can easily misinterpret. When it becomes apparent that the banks are not financially healthy, it is too late to avoid a bailout.

If the market expects bank bailouts but the regulator surprises the market by requiring that banks raise substantial new capital, the market will immediately subtract the reduced present value of previously expected bailouts from debt and equity prices, resulting in a collapse in the price of both. The banks may be unable to raise new equity, they will fail to have adequate capital to support economic growth, and the government may wind up owning them.

To avoid these problems, the regulator must implement triggers for conversion events not based solely on market signals. As a practical matter, some regulatory measure of capital adequacy will be required.

Short sale restrictions have been proposed as a device to make market prices more accurate, thus perhaps making capital adequacy measures less important. In fact, short sale restrictions are likely to undermine the effectiveness of market triggers. As Scheinkman and Xiong (2003) discuss, short sale restrictions lead to an upward bias in prices if investors agree to disagree about the value of a firm. Such disagreement is particularly likely when ambiguity about the probability of bailouts exists. The upward bias can induce confusion and lead market participants to believe that financially unhealthy banks are healthy.

Calomiris and Herring (2012) worry about conversions that occur as a result of artificially low market prices. They therefore propose disallowing short sales of common stock by contingent capital holders. Disallowing short sales by contingent capital holders makes collusion between contingent capital holders and common stockholders somewhat easier. If, for example, some contingent capital holders collude with common stockholders and some do not, those who do not collude will not be able to punctuate their lack of collusion with short sales. Sundaresan and Wang (2010) argue that expectations of a severely dilutive forced conversion based on a market trigger can lead to a multiple equilibrium problem in which a healthy bank suffers forced dilutive conversions. Calomiris and Herring (2012) correctly point out that if the market trigger is based on the ratio of the market value of the common stock to the risk-weighted value of assets (not the book value of the common stock), such dilutive forced conversions can be avoided if the bank increases its market capitalization by issuing more common stock, even if the common stock is issued at a discount. For example, a rights offering at a deeply discounted price will prevent the multiple equilibrium suggested by Sundaresan and Wang (2010).

A better way to look at this short sale issue is from the perspective of the contingent capital holders seeking to force conversion, not from the perspective of the common stockholders seeking to prevent it. If contingent capital holders want to force additional capital raising by the bank, they do not need to go through the costly and risky process of shorting the bank's common stock in an effort to force a market trigger. Instead, they can follow the simpler strategy of keeping the maturity of the contingent capital short, then threatening not to roll it over when it matures. To deal

with this threat, the bank must either find new contingent capital holders or issue more common stock.

Contingent capital holders may also want to hedge their exposure by shorting the bank's common stock, similar to the manner in which convertible arbitrage strategies might short a company's stock. Such short hedge positions tend to keep contingent capital owners at arm's length from the bank whose common stock they are shorting. In this way, allowing contingent capital owners to short the stock of the banks they invest in tend has the beneficial effect of limiting collusion.

## *6.2 Why Triggers Based on Regulatory Capital Alone Do Not Work*

To illustrate why a market trigger is needed, suppose there is only a regulatory trigger, such as a capital adequacy ratio.

Even if market signals are known to ignore important information or to incorporate information into prices in a biased manner and the regulator's calculations are known to incorporate information into valuations accurately, it is nevertheless a mistake for the regulator to rely exclusively on its own calculations and ignore market signals.

Consider the following hypothetical example. Suppose that BBB tranches of assets backed by subprime mortgages trade in the marketplace at 60% of par, but the bank's regulator has accurately calculated that a valuation of 90% of par reflects expected defaults and also incorporates an adequate risk premium. In other words, the regulator is 100% certain that market prices are incorrect based on available information and is 100% certain its own valuations are correct. Suppose further that the regulator is also correct in its assessments. Should a regulator force a bank that owns such subprime assets to write them down to 60 cents on the dollar or allow the bank to value the assets at 90 cents on the dollar?

Suppose that a 60-cent valuation will require the bank to raise new equity capital now, while a 90-cent valuation will not. If the regulator does not require the bank to raise new capital now, it is setting the stage for a costly future disaster. It is possible that information changes in such a way that the regulator's valuations, although accurate at the time they were made, subsequently deteriorate due the arrival of new bad information. It is possible that this could make the regulator's accurate valuation fall to 60, while the market's more irrational and more pessimistic valuation falls to, say, 20. If the regulator at this point were to ask the bank to raise more capital, the market price of 20 for a significant portion of the bank's



assets might be so low that the bank could not raise new equity from the market at any price. As a result, the bank becomes insolvent and invites government ownership.

Since it is the regulator's plan for the market ultimately to buy the bank's equity to keep it well capitalized, the regulator must respect market valuations, even if the regulator believes them to be irrational.

Therefore, at best, the idea that a regulator's accurate hold-to-maturity valuation should trump a market valuation should apply only to assets known by the regulator to be extremely safe if held to maturity, even when the market appears to be building substantial default premiums and risk premiums into valuations. To justify ignoring market prices, the regulator must not only know that its valuations are accurate based on the information at the time the valuations are made, but the regulator must also know that its valuations are not going to change much if new adverse information arrives in the future.

If a bank holds assets known by the regulator to be safe with probability one (or perhaps close to one), then there is a strong case to be made that the central bank should be willing to buy such assets at a discount to their known-to-be-safe hold-to-maturity value. Similarly, the central bank should be willing to finance portfolios of risky assets with a repo haircut large enough to cover hold-to-maturity losses under very pessimistic scenarios. Such purchases will force the market prices of such assets to reasonable levels and therefore help defeat a credit squeeze.

Contingent capital does not directly address the problem of bank liquidity. It does address the issue indirectly by making more capital available in the bank's capital structure; this capital can be used for haircuts associated with collateralized lending. Thus, stronger capital levels will enable a central bank lending facility to safely make larger amounts of low-default-risk collateralized loans to banks facing liquidity problems.

### 6.3 *Multiple Triggers*

These arguments imply that effective implementation of contingent capital should, at a minimum, incorporate both market signals and calculations conducted by the bank's regulator. Furthermore, these triggers should operate in an either-or manner, not a both-and manner. For example, it is reasonable for the regulator to value a bank's assets in a conservative manner, based on the lowest of several different methodologies: i) book value, ii) the regulator's conservative estimate of correct values,

iii) the market prices for the assets, and iv) a value backed out of the market price of the bank's common stock and contingent capital securities.

These triggers might also include information from outside experts, such as accountants or ratings agencies. For example, the regulator might require a bank's senior debt to be rated A or better, or require that contingent capital securities be rated BBB or better. A satisfactory audit or a satisfactory bond rating should not be a sufficient condition for a bank to avoid raising new capital, but a sufficiently unsatisfactory audit result or a sufficiently unsatisfactory bond rating might well be sufficient to trigger a conversion event or other forced capital raising. For multiple triggers to prevent a bank from getting into a position where it cannot issue new equity, the multiple triggers should consider the probability that the bank becomes undercapitalized in the future.

Using an analogy with option pricing, the triggers should keep the option to default (by not being able to raise capital) far enough out of the money that the bank does not face significant risk of failing. This requires addressing both the "money-ness" of the option and the bank's volatility. Market triggers address both money-ness and volatility by using triggers based on both common stock prices (money-ness) and CDS spreads, contingent capital yields, or bond yields (volatility). Regulatory triggers address both money-ness and volatility by measuring capital adequacy using risk-weighted assets (money-ness) and stress tests (volatility). When regulatory capital is high and common stock prices are high, both the market and the regulator agree that the bank is currently well capitalized. When a bank's CDS spreads are low and the bank passes a regulatory stress test, both the market and the regulator agree that the bank is expected to remain well capitalized in the future with high probability.

## **7 Additional Considerations**

### *7.1 Incentives to Conserve Cash*

As a weak bank heads toward failure, it tends to lose cash in two ways. First, a weak bank tends to lose cash that can be used as capital by paying out high cash interest rates on debt or contingent capital securities (as a result of market perceptions that it is weak), by paying excessive dividends or executive compensation (as a result of moral hazard), and by forgoing opportunities to issue new equity (as a result of expecting bailouts or shifting risks to bondholders).

Second, a weak bank tends to become illiquid as a result of losing short-term financing, as maturing unsecured debt is not rolled over, secured (repo) borrowing is not rolled over, and depositors flee to other institutions. Higher haircuts on repo borrowing also make a weak bank less liquid.

The proposed contingent capital structure addresses the first problem directly and addresses the second problem indirectly by addressing the first problem. It addresses the first of these problems in three ways:

- By requiring the bank to issue new common stock as a multiple of 2 of book value when shares are used to pay interest on contingent capital, the proposed structure prevents capital from leaving the bank when the market prices the contingent capital in a risky manner. Indeed, it requires the bank to raise new capital.
- By raising capital requirements by a multiple of 3, of cash dividend payments and cash executive compensation payments over \$1 million for a period of four years, the proposed structure limits excessive dividends and executive compensation when the bank's capital is inadequate.
- By allowing the bank to repurchase contingent capital in the event of a conversion event, with a portion of cash raised from recent common stock issuance, the proposed structure incentivizes the bank to issue new common stock even when there is a substantial possibility of a highly dilutive forced conversion of contingent capital into common stock.

All three of these features interact in a positive manner. Suppose that a weak bank delays writing down bad assets so that it can report to its regulator high enough capital levels to allow large bonuses and high dividends. If the market believes that bank is weak, contingent capital owners will demand high interest rates on contingent capital. To the extent that these rates exceed 200 basis points over Treasuries, the bank will be forced to issue new common stock to pay the extra interest. Since the amount of new common stock to be issued is proportional to the book value and not to the market value of the common stock, the bank will be severely punished for not writing down the value of its common stock. Since a portion of newly issued common stock can be used to redeem contingent capital in the event of conversion, this reduces the cost of issuing new common stock. Since the portion that can be used to redeem contingent capital declines over time, this incents a weak bank that is issuing common stock to allow conversion sooner rather than later.

To discuss how these features might work in practice, suppose that a bank is required to maintain levels of 7% common stock and 7% contingent capital if the bank has paid no dividends and no executive compensation in excess of \$1 million for at least four years. Suppose further that the bank's book value has been constant for more than four years, and the bank has been paying out dividends and cash executive compensation in excess of \$1 million at a rate equal to 5% of book value for more than four years. Taking into account the bank's dividend and executive compensation history, the bank's capital requirement will be common stock equal to 10% of the book value of assets and contingent capital equal to 10% of the book value of equity, for a total of 20%, calculated as  $7\% \times 2 + 5\% \times 0.10 \times 3 \times 4 = 20\%$ .

Now suppose that the quality of the bank's assets deteriorates, and the bank begins to write down the value of some of its assets. By canceling cash dividends and reducing cash executive compensation, the bank can reduce its capital requirement from 10 + 10 to 7 + 7 over a period of four years. This gives the bank substantial flexibility to take write-downs without having to issue new common stock. It also gives the bank flexibility to allow some contingent capital to mature without being rolled over.

Let us suppose that after four years of no dividends and low executive compensation, the capital structure is 7 + 7. Suppose that this occurs as a result of writing down bad assets and by allowing contingent capital to mature without being rolled over. Now suppose that the contingent capital holders threaten to force conversion into common stock by not rolling over their securities. The bank may respond to this threat either by issuing new common stock or by raising the interest rate it offers on new contingent capital.

Suppose that the bank follows the path of paying a higher interest rate on the contingent capital, with contingent capital owners receiving the Treasury rate plus 200 basis points in cash interest (the maximum allowed) plus common stock worth an additional 250 basis points per year. Suppose that the common stock is trading at 50% of book value (i.e., at 3.5% of risk-weighted assets). In terms of book value of shares and par value of contingent capital, the cost of the extra interest paid in shares is 500 basis points, not 250 basis points. Applying the multiplier of 2 based on book value, the bank must issue enough common stock to raise the book value of its outstanding common stock, before the extra 250 basis points of interest paid in shares, by 0.70% of risk-weighted assets per year, calculated as  $7\% \times 0.0500 \times 2 = 0.70\%$ . After the interest is paid to the

contingent capital holders in shares,  $3/4$  of this amount,  $0.525\%$  of risk-weighted assets per year, is left over to improve capital adequacy. The remaining  $1/4$  of this amount is paid to contingent capital holders, who receive the interest of 250 basis points on shares representing  $7\%$  of risk-weighted assets. This costs the bank  $0.175\%$  of risk-weighted assets per year, calculated as  $7\% \times 0.0250 = 0.175\%$ .

Thus, as a result of the combination of paying high interest rates to contingent capital holders and issuing required new common stock, the book value of common stock rises from  $7.00\%$  of assets to  $7.525\%$  of assets after one year, and the market value of common stock rises from  $3.75\%$  of assets to slightly less than  $4.275\%$  of assets (assuming  $\$1$  of common stock issuance raises common stock prices by slightly less than  $\$1$ ). This will have the effect of substantially recapitalizing the bank and eventually driving down the interest rate on contingent capital.

If the bank had not written down the values of bad assets, so that its book value of common stock remained at, say,  $10\%$ , then it would have to issue even more common stock to pay high interest rates to contingent capital holders. This would make the bank recapitalize even faster. This example is consistent with the interpretation that  $7 + 7$  is the rock-bottom minimum capital structure tolerated by the regulator, and the bank has already minimized the short-run amount of new common stock it is required to issue by writing down assets as much as possible and by allowing contingent capital to mature and roll over.

## 7.2 *The Bank's Cost of Capital*

Bankers are likely to argue that significant contingent capital requirements raise their cost of capital and therefore increase the equilibrium interest rate on loans to customers. Many such arguments are bogus. Typical bogus arguments contradict the Modigliani-Miller principle that relates high expected returns on common stock to high leverage. Other arguments confuse accounting with economics. It is not the purpose here to review all of these arguments in detail.

The relationship between taxpayer-financed bailouts and a bank's cost of capital is particularly confusing. If the market anticipates that the bank's debt will be bailed out by taxpayers with some probability, it is likely that the present value of the anticipated bailouts will be passed along to the bank's common stockholders. Debt that is in fact risky will pay an interest rate appropriate for safer debt, and this interest cost

savings will show up as cash flow to common stockholders. The extra cash flows will increase the value of the bank's common stock and in this sense will lower the bank's cost of equity capital. If contingent capital requirements shift the costs of bailouts from taxpayers to contingent capital investors, then the bank's common stockholders will lose the value of the bailouts, because they will either have to pay an interest rate to the contingent capital holders high enough to cover losses given default, or they will have to issue more common stock to make the debt safer. Since the newly issued common stock does not benefit from the subsidies implicit in bailouts, the cost of this equity capital is higher than it would be if bailouts were anticipated. Contingent capital requirements may indeed raise banks' cost of capital, by removing the present value of subsidies expected to be received at taxpayer expense.

Since the value of the subsidies depends on how well capitalized the bank is, if the regulator forces the bank to convert contingent capital unexpectedly, the unexpected decline in the value of the subsidies will disappear from the bank's value. The value of its shares may well plummet. Thus, a plummeting share value on imposition of a contingent capital regime or on unexpected forced conversion of contingent capital may not be a sign that the bank's intrinsic cost of capital has increased but rather a sign that the bank was expecting its cost of capital to be subsidized by bailouts.

It has also been argued that high equity requirements increase the adverse selection costs of issuing equity. For example, Calomiris and Herring (2012) suggest that the higher capital requirements proposed by Admati et al. (2013) incorporate significant incremental adverse selection costs. In fact, contrary to Calomiris and Herring (2012), higher equity requirements probably reduce adverse selection costs, because the Modigliani-Miller principle applies to adverse selection in a manner similar to the way it applies to risk premia.

If the Modigliani-Miller principle is respected and bailouts do not occur because they are unnecessary, then the total value of the securities a bank issues will be a function of the risk structure of the bank's assets. How this value is divided among the various security owners will depend on the rules governing the structure of the various securities.

Suppose that contingent capital holders are occasionally expected to be able to "steal" the bank from the common stock holders at a time of market crisis by forcing an artificial, highly dilutive conversion not justified by the underlying forces of supply and demand. If so, then the

occasional windfall expected by contingent capital holders should be priced into the contingent capital securities and show up as a below-market interest rate in normal times. The interest rate will be particularly low to the extent that dollars in crisis states are more valuable than dollars in good states of the economy. Conversion events that benefit existing contingent capital holders at the expense of existing common stockholders do not affect the cost of capital for a bank; they merely redistribute these costs between equity and contingent capital in a manner that the market prices into the various securities, without having any effect on the bank's overall cost of capital.

### 7.3 *No Cash Settlement*

Although the proposed structure does use market signals to trigger conversion events, the proposed conversion rule for contingent capital does not have a variable conversion price or variable number of common shares into which contingent capital converts. In this sense, the proposed conversion rule lacks cash settlement features (i.e., features that rely on market prices to determine the cash flows on the securities themselves).

If contingent capital converts into a fixed dollar value of shares based on the market price of the stock at the time of conversion, contingent capital owners may hedge this equity exposure by selling the shares they receive on exercise. This potentially places very large price pressure on the price of the common stock, exactly at a time when information asymmetries are great. To the extent that markets become confused about how much trading is due to hedging as opposed to information asymmetries, this may make the stock price highly sensitive to information asymmetries. If, furthermore, the contingent capital holders dynamically hedge their exposure, they will sell more shares as the value of the shares falls. The result is a potentially unstable stock price whose value is not easily defined. The proposal by Flannery (2016) has such destabilizing cash settlement features.

### 7.4 *Who Would Own Contingent Capital?*

Contingent capital securities are likely to be demanded by longer-term bond investors with a tolerance for bearing some degree of risk. This includes life insurance companies; pension funds; endowments; or, more generally, any investors with long horizons and low leverage who are

seeking to increase returns by reaching for yield. They would fit well into mutual funds that balance holdings between stocks and bonds. They would be highly appropriate for life-cycle index funds attempting to hold the market portfolio with varying degrees of leverage. Assuming the interest payments are taxable, the securities are, like bonds in general, appropriate for tax-free investors like retirement accounts and foundations.

The ownership structure of contingent capital securities is likely to create tension between two types of investors: i) sophisticated, concentrated investors with the ability to monitor the capitalization and riskiness of the banks they invest in and ii) less sophisticated investors reaching for yield in diversified portfolios that balance risk and expected returns. Some life insurance companies may have the ability to monitor directly the banks that issue the contingent capital securities they invest in. Pension funds and endowments are likely to invest through skilled asset managers with specialized monitoring capabilities.

If contingent capital securities become widely mandated, it is possible that specialized institutional asset managers will structure funds to invest specifically in such securities on behalf of sophisticated institutional clients like pension funds and endowments. If the asset managers are compensated on the basis of the performance of the funds, this will tend to create a separation between the owners of the common stock of banks and the managers of the funds specializing in contingent capital securities. Such structures will tend to prevent collusion between banks and contingent capital owners. Note that the asset manager structure will tend to prevent collusion, even if the institutional investor clients themselves hold a diversified portfolio of contingent capital securities managed by asset manager's specializing in contingent capital securities and bank common stocks managed by a different arms'-length asset manager. Institutional investors, by owning bank common stock through one asset manager and contingent capital through another, can hedge themselves against random redistributions of bank value that occur as a result of unpredictability in the frequency and outcome of conversion events.

Contingent capital securities are not likely to be safe enough to be a reasonable investment for money market funds. Regulators should probably prohibit such securities from being owned by money market funds at all. Indeed, the recent financial crisis was probably exacerbated by the fact that money market funds inappropriately chased yield by buying securities too junior in the capital structure of the banks whose



paper they purchased. As a general regulatory principle, money market funds are like highly leverage banks; thus, contingent capital investments by such institutions should have a risk weight of 1,250%; this would prevent money market funds from investing in contingent capital securities.

### 7.5 *What Contingent Capital Might Look Like*

The proposed structure does not dictate terms like maturity and interest rate. It is tempting to think of contingent capital as a substitute for “permanent” capital, which therefore should have a long maturity. This thinking is erroneous, because contingent capital securities cannot be paid off unless new contingent capital is issued. In other words, the contingent capital structure proposed here automatically provides “permanent” capital, even if the securities themselves have a maturity of one day. A bank permanently retires its contingent capital by reducing the size of the bank, winding down its operations, and returning capital to investors.

Given that the threat not to roll over contingent capital is likely to be the binding threat that disciplines a bank, it is likely that implementation of the proposed structure would result in contingent capital that has a relatively short maturity, with perhaps many issues outstanding with multiple staggered maturity dates. When outstanding securities are reaching maturity on a frequent basis, relatively frequent monitoring by contingent capital holders takes place and the market can observe the outcomes. Note that this benefits all contingent capital security investors, because all securities have equal seniority when a conversion event takes place.

One likely possibility is that contingent capital could be structured like commercial paper or auction rate securities, with short maturities and floating interest rates. Short-term financing backed by thin capital requires a well-defined mechanism for suspending convertibility and converting debt into common stock. Suspension of convertibility is different from a conversion event. In the event the holders do not want to roll over maturing securities, suspension of convertibility may take place if the securities contain provisions allowing the bank to delay paying of the securities at par by instead paying a high, escalating interest rate for a prespecified time. This prespecified time is the outcome of negotiations between the bank and its contingent capital investors when the securities are issued; for the sake of discussion, it might be three to six months. During this period, there is no conversion event; instead, the

interest rate may escalate based on negotiated contractual provisions. For example, the rate may be 200 basis points over Treasuries before the suspension of convertibility and then may rise by 100 basis points per month during the period of suspended convertibility. Since high interest rates greater than 200 basis points over Treasuries are required to be paid in newly issued securities that issue new common stock, this mechanism will automatically result in gradual common stock issuance, which recapitalizes the bank, thus making its contingent capital securities attractive at low interest rates again. Alternatively, if the penalty interest rate for securities that do not want to roll over is very high, the bank may issue large amounts of new common stock quickly in order to induce the contingent capital securities to roll over at lower interest rates. If, at the end of the three-to-six-month period of suspension of convertibility, the bank does not pay off the contingent capital securities, a conversion event takes place. This gives the bank an additional window of time, during which it can issue common stock to redeem the securities.

It is also reasonable to expect staggered maturities. For example, Calomiris and Herring (2012) suggest a rolling window of five-year maturities, with  $1/5$  of the contingent capital maturing each year. As a practical matter, banks will probably issue somewhat more contingent capital than the bare minimum its regulator requires, in order to have a cushion that buys time for rolling over the securities in an orderly manner. For example, a bank might issue contingent capital equal to 12% of assets instead of 10%. To make calculations simple, suppose these securities have six-year maturities, with  $1/72$  of the securities maturing each month. If contingent capital holders demand high rates to roll over securities, the bank can pay off maturing securities each month for one year, allowing the stock of outstanding securities to decline from 12% of assets to 10% of assets. At the end of one year, the maturing securities may have a suspension-of-convertibility feature, allowing the bank to buy three to six months of more time. If a conversion event occurs at the end of this period, the bank still has 60 days in which to issue new common stock.

These considerations suggest that conversions of contingent capital into common stock that result from direct negotiation between contingent capital investors and banks—and not from automatic regulatory or market triggers—are likely to be a relatively slow and orderly processes, generating numerous market signals that the regulator observes as a bank's attempt to recapitalize. These market signals include declining levels of "excess" contingent capital, penalty interest rates during periods

of suspension of convertibility, and issuance of bank common stock at depressed prices.

The regulator will want to watch carefully for signs that the bank is colluding with contingent capital owners. Such signs would include, for example, equity kickers associated with new contingent capital offerings. Since an equity kicker is like a payment of interest greater than the maximum rate of 200 basis points over Treasuries, such kickers should either be prohibited or alternatively require a multiple of 2 of additional common stock issuance based on the book value of the bank's assets. Hidden equity kickers should be prohibited. Indeed, a clean approach to deterring collusion is to require all equity issuance to result from rights offerings to common stockholders.

## 8 Macroeconomic Considerations

Although the proposed contingent capital structure is microprudential in nature, it has numerous features that can promote macroeconomic stability:

- When bank equity values collapse as a result of panic, massive conversions of contingent capital and massive issuance of new contingent capital to replace converted contingent capital will have a tendency to strengthen quickly the capital structure of banks throughout the economy, thus bringing an end to the panic.
- The requirement to increase capital for four years after payments of cash dividends or large cash compensation creates procyclical capital and also encourages banks to conserve cash during periods of financial stress.
- The required conversion of all contingent capital rather than just part of it tends to create a large capital buffer during periods of financial stress.
- To the extent that the value of a bank's equity securities fall dramatically as a result of conversion of contingent capital, the bank's regulator receives a useful signal concerning the extent to which the market was pricing private benefits of expected bailouts into the value of the bank's securities.
- A speedy conversion process should shorten the time during which banks try to deleverage their portfolios. This should have some stabilizing effect due to less contraction in credit supply.

Although the proposed structure does not include explicit macroprudential triggers—such as market-wide indices of CDS spreads or

market-wide indices of bank stock prices—macroprudential triggers could easily be incorporated.

It might be a useful policy for the regulator to force conversion of healthy banks from time to time. Suppose that the regulator implements a policy of declaring a contingent capital conversion event for at least one bank in the top 100 per year. For example, the chosen bank might be the one with the lowest score on a stress test, even if all 100 banks achieve an otherwise acceptable score. If the chosen bank is actually quite healthy, it should be able to execute a successful rights offering at a price much higher than the dilutive 80-20 conversion rate, then use the proceeds of the rights offering to replace the converted contingent capital. To the extent that bankers perceive such forced conversions as costly, the bankers have an incentive to keep healthy enough capital levels so that they are not the bank chosen for conversion.

## 9 Conclusion

The purpose of contingent capital is to incentivize banks to maintain healthy balance sheets, which reduces the expected value of taxpayer bailouts and therefore reduces the inefficiencies that expected bailouts lead to.

To achieve this objective, contingent capital should be structured as a robust security, designed to make banks less fragile. It should work both when contingent capital holders collude with common stockholders and when they do not. It should work when markets agree with regulators and when markets do not agree with regulators. The structure for contingent capital securities proposed in this paper is robust in all these ways.

## Notes

This chapter was inspired by comments Robert H. Smith made at a lunch with Smith School faculty in the fall of 2009, where he exhorted the faculty to conduct research that would help prevent another financial crisis. The author thanks Anna Obizhaeva for helpful comments.

1. Assets safer or riskier than typical assets have risk weights that convert them to the numeraire scale based on 8%. A safer asset might have a 50% risk weight, which converts an actual capital level of 4% to the numeraire level of 8%; a riskier asset might have a risk weight of 250%, which converts an actual capital level of 20% into the numeraire level of 8% as well. A typical asset has a risk weight of 100%. The most risky assets, such as defaulted debt with

little prospect for recovery, have the maximum risk weight of 1,250%; since they have a required capital level of 100%, writing such assets off does not affect a bank's capital adequacy. For example, a bank that holds \$10 billion in assets with a risk weight of 100%, \$5 billion in assets with a risk weight of 50%, \$2 billion in assets with a risk weight of 250%, and \$1 billion face value in defaulted debt with a risk weight of 1,250% has risk-weighted assets of \$30 billion, calculated as  $10 \times 1.00 + 5 \times 0.50 + 2 \times 2.50 + 1 \times 12.50 = 30$ . If the bank has \$2.4 billion in capital, its capital level is equal to 8% of risk-weighted assets. If the bank writes off the defaulted debt, its risk-weighted assets fall to \$17.5 billion, and its capital falls to \$1.4 billion; its capital level remains 8% of risk-weighted assets.

2. The Basel II framework is designed to allow a sophisticated bank to use its own internal risk management process to measure the riskiness of its assets. Although Basel II can potentially deal with new or complex assets not dealt with adequately in Basel I, it also gives a bank incentives to have internal risk management processes that understate risks. The Basel III framework is intended to address the flaws of Basel I and Basel II.

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