CHAPTER 8

Contingent Capital: Economic Rationale and Design Features

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INTRODUCTION

The causes of the global financial crisis were multifaceted, but they revealed still unresolved weaknesses in national and international financial oversight and resolution frameworks. In particular, many governments in the crisis-hit countries had to provide unprecedented levels of support to contain the crisis and protect financial stability. These interventions have not only contributed to a significant increase in sovereign exposures but, in many countries, they have also risked weakening market discipline and worsening moral hazard.

To address moral hazard and the problem that institutions can become too important to fail, proposals for contingent capital are gaining ground.[2] Most recently, Switzerland has proposed a higher regulatory capital requirement (19 percent of risk-weighted assets) for its two largest banks, of which 9 percentage points may be held in the form of contingent-convertible debt. The Basel Committee on Banking Supervision (BCBS) has similarly proposed that all non-common equity regulatory capital of internationally active banks be convertible to equity or subject to permanent write-downs when it is determined that the bank is no longer viable. The Financial Stability Board (FSB) and the European Commission, in their efforts to address risks associated with systemically important financial institutions (SIFIs), are also examining mechanisms that convert debt into equity or the write-off of debt (including unsecured senior debt), based on (i) contractual agreements between banks and investors; or (ii) supervisors' statutory powers in the context of bank resolution.

[1]This chapter benefited from discussion and consultation with an MCM advisory panel, comprising Raghuram Rajan (University of Chicago), Lauren Anderson (Federal Deposit Insurance Corporation), Svein Andressen (Financial Stability Board), Patrick Bolton (Columbia University), Clive Briault (formerly of the U.K. Financial Supervisory Authority), Darrell Duffie (Stanford University), Wilson Ervin (Credit Suisse AG), Mark Flannery (University of Florida), Charles Goodhart (London School of Economics), Anil Kashyap (University of Chicago), Nick Le Pan (formerly of the Office of the Superintendent of Financial Institutions, Canada), and David Scharftstein (Harvard Business School). We are grateful for the valuable insights and comments provided by the panel, and by Jan Brockmeijer, Jonathan Fiechter, Nadege Jassaud, Fabiana Melo, Robert Sheehy, Christopher Towe, and José Viñals. An earlier version of this chapter appeared as an IMF Staff Discussion Note (SDN/11/01) on January 24, 2011.

[2]Throughout this chapter, contingent capital refers to bank contingent capital only.

Contingent convertible capital (CoCo) provides an automatic mechanism for increasing the equity capital and reducing the debt of a financial institution in times of stress. It enables the raising of capital at times when other options are impossible, either owing to unfavorable market conditions or because other options are unattractive to shareholders. Furthermore, automatic conversion by avoiding fire sales could help avoid contagion in times of systemic stress.

Concerns have been raised, however, about the operational aspects of CoCos and their implications for market dynamics. These instruments remain largely untested and could have unintended consequences, particularly in times of high market volatility and uncertainty. Their marketability, including whether there will be sufficient demand for them from traditional investors, is far from granted. The quality of their design features is key to ensuring their effectiveness and avoiding risks, including systemic ones. Others also warn that a conversion could have negative signaling effects, lead to contagion, and be subject to price manipulation (Sundaresan and Wang, 2010; Goodhart, 2010a). For example, some have cautioned against using triggers based on systemic risks or regulatory discretion, since these would make pricing these instruments difficult.

The rest of this chapter is organized as follows. The next section discusses the economic rationale for contingent capital instruments. The following section focuses on the operational aspects of contingent capital instruments, especially the pros and cons of various triggers and conversion rates and how they could influence the rating and pricing of these instruments. Next, the chapter discusses some recent contingent-capital proposals and the potential role of contingent capital in the framework of crisis prevention and crisis management. Appendix 8.1 presents a simple two-period model on how the expectation of a public bailout encourages excessive risk taking and how contingent-convertible bonds can mitigate such excesses. Appendix 8.2 details contingent-capital triggers and conversion options and conditions, and Appendix 8.3 compares contingent capital with hybrid and subordinated debt instruments.

ECONOMIC RATIONALE OF CONTINGENT CAPITAL

Contingent capital provides an automatic mechanism for increasing the capital and reducing the debt of a financial institution in times of stress. It enables the raising of capital at times when other options are impossible, either owing to unfavorable market conditions or because they are unattractive to shareholders (Duffie, 2010). This latter "recapitalization gridlock" reflects the unwillingness of shareholders to dilute their equity by share issuance or by "fire sales" in unfavorable market conditions (Brunnermeier, 2009; Adrian and Shin, 2010). Moreover, automatic conversion by avoiding fire sales could help avoid contagion in times of systemic stress.

Contingent capital instruments are expected to deal with the market failure associated with "too-important" or "too-connected" to fail. Depending on the choice of triggers and conversion rates, contingent capital instruments could be designed specifically to increase capital buffers, ensure prompt recapitalization, or increase loss absorbency before a bank-default event.

The credible threat of losses due to conversion and dilution could help reduce risk taking by managers, shareholders, and bondholders. The threat of heavy dilution should encourage shareholders to require more prudent corporate governance and risk-control procedures within a bank. Similarly, requiring bondholders to bear part of the cost of a future bank recapitalization would enhance their incentive to exercise greater market discipline. It also has been suggested that bank manager bonuses could be paid in the form of contingent convertible debt instruments to reduce their incentives for excessive risk taking. We developed a simple two-period model to illustrate the benefits of CoCos in promoting market discipline (Appendix 8.1). The model implies that the effect of CoCos on a bank's risk-taking behavior is equivalent to that of a risk-based, prefunded bank resolution fund.

From the banks' perspective, contingent capital may be preferred to equity for three reasons:

- It may *potentially* be cheaper (if the interest expense is tax deductible);
- Before conversion, it could be a nondilutive source of capital for existing shareholders, so that their issuance does not change corporate control; and
- It may be acceptable as Pillar 2 capital for supervisory stress tests.

Contingent capital instruments should be supplementary to common equity. Although they may be used to replace the existing hybrid capital that had poor loss absorption during the crisis, they should not compromise the objective of capital transparency and their use should be based on an enhanced capital structure under the Basel III framework. Common equity is no doubt higher quality capital in terms of loss absorption; however, an excessively high common equity requirement could lead to perverse risk seeking as bank managers struggle to maintain a return on equity demanded by investors.

Contingent capital differs from existing hybrid instruments in two important ways. First, contingent capital instruments are dated debt with debt/equity conversion or debt written-down contractual clauses, whereas the existing convertible hybrids are perpetual debt, which contractually offers the possibility to absorb losses primarily through the deferral of coupons (noncumulative) or extension of maturity. Second, the conversion of contingent capital instruments is automatic upon the activation of the predetermined conversion trigger, but the conversion of existing hybrids is largely at the discretion of banks, unless regulatory capital ratios are breached.

During the recent crisis, most hybrid capital instruments did not absorb losses the way they were designed to do. This was partly due to banks' reluctance to send negative signals to the markets and partly due to regulatory forbearance, overestimated capital ratios, and/or capital injections from governments which prevented the breach of regulatory ratios. (See Appendix 8.3 for a more detailed discussion on precrisis hybrids.) The crisis has exposed the weaknesses in capital structure and measurement, especially how Tier 1 capital ratios masked the underlying capital position of banks. Since then, the Basel III framework has raised the minimum common equity ratio from 2 percent to 7 percent (of

which 2.5 percent is a conservation buffer) and substantially enhanced the quality of capital (Chapters 3 and 4 provide more details). It will be critical to build on past experience to avoid CoCos repeating the same failure as hybrids, including marring once again capital's loss-absorbency availability and transparency.

OPERATIONAL ASPECTS OF CONTINGENT CAPITAL

The design of trigger and conversion rates will be crucial to ensure the effectiveness of contingent capital in achieving the intended objectives (Box 8.1). In this section, the pros and cons of various trigger conditions and conversion rates are discussed, including their impact on the pricing and marketability of these instruments and on market dynamics.

Triggers of contingent capital instruments determine the probabilities of conversion or conversion risks. To the extent that the conversion itself is not a default event, the idea is to impose losses upon creditors, who would otherwise be affected only by default. The trigger could be linked to system-wide conditions or bank-specific conditions, or to a combination of both (Appendix 8.2, Table 8.1).

Systemic triggers would be based on the condition of the whole financial system (e.g., liquidity conditions, a market volatility index, or supervisory declaration of a systemic crisis). Such instruments may be more efficient at addressing systemic risks, since they increase capital across the banking system at the same time. However, using systemic triggers would mean forgoing any benefits from the market-discipline effect, since there would be limited additional incentive for banks to improve their individual risk management. Moreover, given the difficulty of predicting systemic events and the discretionary element in calling such circumstances, the rating and pricing of these instruments would be complex.

Bank-specific triggers would be based on the state of an individual institution. These could include a bank's capital ratio, share price or CDS price, or an assessment of nonviability by the supervisor. Instruments with market- or capital-ratio-based triggers are likely to be easier to rate and price compared with those whose triggers are based on supervisory discretion. Reported capital ratios seem to align better with a regulatory capital framework and objectives, but tend to be lagging indicators of a bank's financial condition and, thus, may not trigger conversion sufficiently early. A concern with market-based triggers is that they can be more easily subject to market manipulation, although this problem may be overcome to some extent, for example by basing the conversion trigger on the moving average of a market price (Flannery, 2009).

Instruments with high-level triggers (i.e., set at capital levels well above distress thresholds) could be a useful tool for crisis prevention. They could help mitigate systemic risks by ensuring recapitalization well before a bank faces serious difficulties and a potential loss of broader market access. They would also provide strong encouragement to shareholders and bondholders to exercise market discipline,

BOX 8.1

A Schematic Exposition of the Use of Contingent Capital Instruments

Crisis Prevention: Several tools work to limit the prospect of systemic crisis: (i) better management incentives to lower the risk appetite; (ii) higher capital buffers (e.g., Basel III) and additional loss-absorbing capital instruments that could include contingent convertible capital (CoCos); (iii) revamped disclosure to inform markets of the true and fair view of the capital position of financial institutions; (iv) more intrusive supervision—impose restrictions on dividends and mandate capital plans earlier; and (v) promotion of preemptive restructuring by virtue of effective resolution and recovery planning (e.g., sale of nonstrategic subsidiaries).

Crisis management (going concern): Revamped and more diligent prevention efforts serve to lower contagion by a distressed SIFI. They allow management and authorities to undertake progressively more aggressive restructuring measures to stave off insolvency as capital levels deteriorate (see below table) and prevent systemic crisis. Central bank emergency liquidity assistance could be made available under the conditions that equity solvency is sustained and borrowing is properly collateralized.

Orderly resolution (gone concern): Once all restructuring measures are exhausted, countries will require a framework that provides a menu of resolution-transaction options. Resolution-transaction options should include: (i) a transaction for the purchase of viable assets and assumption of certain liabilities by an existing institution; (ii) temporary creation of government-owned bridge financial institution (both necessary for SIFIs); and (iii) liquidation of assets with deposit transfer/payout supported by depositor guarantee schemes (available for smaller nonsystemic institutions).

	Triggers	Objective	Degree of Stress	Debt Instruments	Approach
↓ ↓ ↓ ↓ Restructuring measures as capital declines ↓ ↓ ↓ ↓	Examples of high triggers: – Common equity ratio 7 percent of risk-weighted assets (Swiss proposal) – 7 percent above plus any countercyclical buffer requirements	Recapitalization to stabilize the situation and build market confidence	Deteriorating financial situation (going concern)	High-trigger CoCos convert to equity	Conversion through ex ante contractual agreement between issuers and investors
	Examples of low triggers: – Common equity 5 percent of risk-weighted assets, or ratio of equity to non-risk-weighted assets	Provide additional recapitalization to prevent receivership	Threat of failure (going concern)	Low-trigger CoCos convert to equity	Conversion through ex ante contractual agreement between issuers and investors
	– Point of nonviability or other resolution triggers	Compulsory restructuring to prevent insolvency resolution	Threat of insolvency (going/gone concern)	In order of claim priority, subordinated debt and, ultimately, unsecured senior debt could be subject to debt-to-equity conversion	Contractual possible, but most likely would require statutory powers

since they act earlier to reduce risk taking and improve management and align governance with the long-term sustainability of the bank.[3]

Instruments with low-level triggers could be useful tools for orderly resolution. In their case, the trigger would be set at the point of nonviability[4] as a way to ensure private sector involvement in the bank restructuring process, as was done in the case of Lloyds Banking Group.[5] There is a possibility that market confidence in a bank's financial condition could weaken and create liquidity pressures as bank capital approaches the conversion trigger. This argues for the careful integration of their use with emergency liquidity facilities and supervisory intervention techniques to ensure that they increase, rather than decrease, the bank's chance of survival and that they do not trigger a broader loss of confidence.

An important consideration would be the conversion rate, which determines the burden sharing between shareholders and bondholders. The impact on the incentives to monitor bank management would depend on which party loses most in a conversion: with a high rate of dilution, those who lose are the ex ante shareholders; with little dilution, those who lose are the holders of contingent debt. Possible options include the following (also see Appendix 8.2, Table 8.2):

- Conversion into a predetermined number of shares based on the par value of an instrument divided by the issuing bank's share price *at the time of issuance*. Upon conversion, the dilution to the shareholders is limited to lower share prices, but bondholders would suffer losses as if they were shareholders.
- Conversion into an ex post determined number of shares, based on the par value of the instrument divided by the share price *at the time of conversion*. Upon conversion, the holders of CoCos would receive the notional amount in shares and would not suffer losses if they could sell the shares, but would absorb future losses as new shareholders. The ex ante shareholders, however, would suffer a much stronger dilution than in the previous case. Such instruments may give rise to an "infinite dilution" or "death spirals" when share prices are falling close to zero. Hence, they may be more prone to market manipulation. In this context, some restrictions (circuit breakers) on conversion rates may be justified if such risk is not reflected in prices (De Martino and others, 2010).

Contingent capital instruments with debt write-off features would be more suitable for (but not limited to) cooperative and mutual banks that are prevented

[3]Since bank managers may prefer to reduce their risk rather than reach the trigger point, this may lead to deleveraging. Large-scale asset sales by a systemic bank in a crisis could put significant downward pressure on asset prices, with a negative impact on the balance sheets of other institutions. The "fire sale" externality has been a significant factor of contagion in the recent crisis (see Brunnermeier, 2009; Adrian and Shin, 2010).

[4]Nonviability as defined by the Basel Committee (see page 169) or the level when a resolution process starts.

[5]In this case, existing Tier 1 and Tier 2 instrument holders were made the offer to exchange their securities against the new CoCos (ECN—Enhanced Capital Note) after the bank had been intervened. The exchange was effective in reducing existing liabilities and providing extra loss-absorbing capital for times of future stress.

by their legal structure from issuing shares. Such instruments could be designed to impose a significant haircut on bondholders upon the trigger event. The Rabobank Senior Contingent Notes provide an illustration whereby the notes' original principal amount can be written off, but not written back up, by 75 percent if the bank's common equity ratio falls below 7 percent. Instruments with large haircuts would provide a powerful incentive for bondholders to monitor the bank's performance and resilience closely. However, the stringency of the losses that would be imposed might mean the cost of these instruments could be steep and, thus, likely to be limited to issuance by strong banks, that is, banks with a very low probability of failure.

The pricing of and the demand for contingent capital instruments will depend on conversion triggers, types of conversion, and conversion rates. The level of the trigger determines the conversion risk; therefore, for a given conversion rate, issuing an instrument with a low trigger should be cheaper than issuing one with a high trigger. Conservative and traditional real-money investors, whose investment horizon is longer term, are more likely to be drawn to instruments with a lower probability of conversion and loss sharing. More dynamic/speculative investors, who have higher risk-return investment strategies, should be more willing to consider high-level trigger CoCos with their greater loss risk.

Like the hybrid market in the late 1990s, the contingent capital market would need some preconditions to become a deeper asset class. It took close to five years after its inception in 1997 for the European hybrid market to reach critical mass and become a mainstream asset class (Figure 8.1). Likewise, contingent capital may need several years before investors become more familiar and comfortable with the instruments. The main barriers that would also need to be overcome relate to (i) obtaining ratings; (ii) lifting the mandate restrictions of certain investors to hold equity-like products;[6] and (iii) obtaining the inclusion of CoCos in benchmark indices.

The tax and regulatory treatment of CoCos would be important in developing this instrument. The tax deductibility of interest would help lower the cost of contingent capital. After the crisis, two European banks issued tax-deductible contingent capital instruments, but with different regulatory capital status—lower Tier 2 instrument by Lloyds and noncapital senior debt by Rabobank (as discussed earlier). However, there has been no further issuance of CoCos since then, possibly due to the regulatory uncertainty regarding the treatment of contingent capital instruments (Appendix 8.3). Most existing hybrid securities will no longer qualify as regulatory capital under Basel III after January 2013 and will be phased out over time by 2023.[7] The regulatory landscape, which will be shaped by the policy initiatives of the Basel Committee and the

[6]To accommodate fixed-income investors who are not allowed to hold equity as part of their mandate, financial structures are being formulated that would allow common equity to be held in trust or in other vehicles on behalf of CoCo holders or to facilitate the disposals of such equity for cash.

[7]Under Basel III, Tier 1 capital ratio will incorporate up to 25 percent of "other qualifying" noncommon equity instruments, but based on stricter criteria.

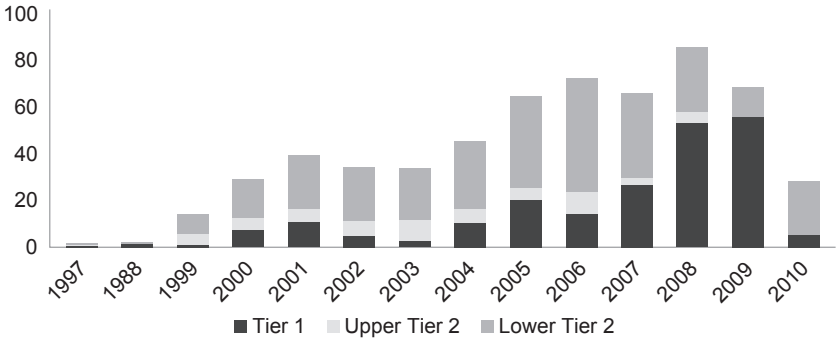

Figure 8.1 Issuance of Tier 1, Tier 2, and Lower Tier Capital in Europe, 1997–2010 (in billions of euros)

FSB (discussed below), will be an important factor in the development of a market for contingent capital instruments.

A proper sequencing could help expand the CoCo market over time. Investors differentiate between strong and weak banks, and having strong banks issuing at first would generate confidence in the new instruments and market stability until investors were comfortable enough to increase exposure to "second tier" (riskier) issuers. The investor base could initially include a small pool of buyers, such as hedge funds, sovereign wealth funds, and high-yield or equity investors. Over time, traditional credit investors, real money, asset managers, and insurers could step in and provide depth to the market.

The depth of existing subordinated debt and equity markets (Figure 8.2) provides an indication of the pool of potential investors. If contingent capital is to target fixed-income investors, the outstanding Tier 1 and Tier 2 debt markets in Europe and the United States indicate that the current institutional market capacity is about $260 billion for the United States and €580 billion for Europe. The European and U.S. equity markets for bank stocks, combined, amount to

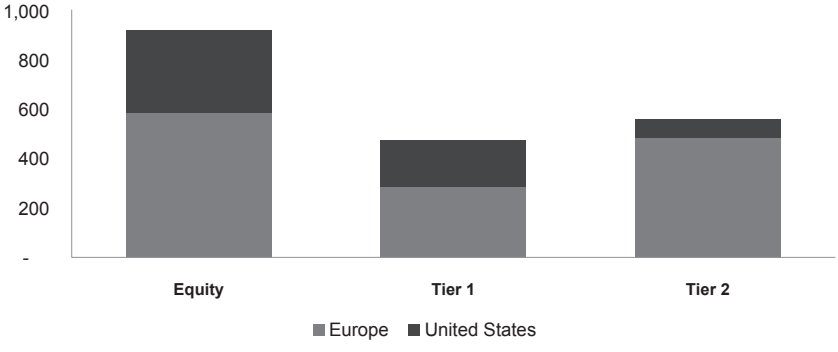

Figure 8.2 Outstanding Bank Debt and Equity in Europe and the United States, 2010 (in billions of U.S. dollars)

about $923 billion. An important issue to consider is the potential "crowding out" risk if equity investors were to prefer CoCos to equity—this may lead to higher costs of issuing common equity.

There may be a case for imposing certain restrictions on holders of convertible instruments. In particular, if the investors are other leveraged financial institutions of systemic importance, the potential write-off could have contagion effects. One of the reasons regulators did not enforce hybrid coupon deferrals and maturity extensions was to avoid penalizing insurance companies, who were large holders of those instruments and would have been forced to sell in such an event. The same political economy concerns could also apply to contingent capital. Regulators would also need to ensure that, after conversion, the new equity holders would be "fit and proper" owners of a bank. However, it is unclear whether it would be necessary for regulators to impose limits on SIFIs' cross-holding of CoCo instruments, since the proposed liquidity requirements under Basel III, which are more onerous, are likely to limit cross-holdings in general.

CONTINGENT CAPITAL PROPOSALS

This section discusses the contingent capital proposals recently made at both international and national levels, as well as the potential role of contingent capital in a framework of crisis management.

Basel Committee "Point of Nonviability" Proposal

The Basel Committee issued minimum requirements on January 13, 2011, to ensure that all classes of capital instruments fully absorb losses at the point of nonviability before taxpayers are exposed to loss (BIS, 2011; BCBS, 2010e). More specifically, it proposed that all noncommon equity Tier 1 and all Tier 2 instruments must have a provision in their terms and conditions that requires them to be written off or converted into common equity upon the occurrence of the trigger event. The trigger event is the first decision by the relevant authority, either

- that the firm would become nonviable without a debt write-off; or
- that the firm would become nonviable without a public sector injection of capital or equivalent support.

The relevant authority in determining the trigger event is the authority where the capital is being given recognition for regulatory purpose. In the case of conversion, these capital instruments must be converted into the common stock of the issuing bank or of the parent company of the consolidated group, including any successor in resolution.

This proposal can be considered as a low-level-trigger contingent capital instrument similar to a resolution tool, as discussed earlier. It remains to be seen how the discretionary element may affect the pricing and marketability of these capital instruments. Regulators may be allowed to intervene before capital deteriorates to the point at which a capital-ratio-based, low-trigger CoCo would

have been converted. Thus, the proposed trigger that is linked to the decision of public support would ensure that private creditors take losses before government intervention. It is important to note that the BCBS report also emphasizes that its proposal for contingent capital should not diminish the need to reform national insolvency and bank-resolution schemes to create stronger incentives for private sector solutions for failing SIFIs.

Contingent Capital as Additional Loss-Absorbing Capital Buffer for SIFIs

Various proposals have been made to use contingent capital to meet part of the requirements for additional loss-absorbing capital. The countercyclical capital buffer is expected to be built up rarely (at times of bubbles); however, the additional loss-absorbing capital requirements for SIFIs may represent a substantial amount. The calibration of additional capital requirements for SIFIs, which has been under discussion, may be defined as a Pillar 2 add-on, calibrated by the systemic risk contribution of each bank. If CoCo bonds were to be used to meet part of the additional capital requirements for SIFIs, for illustrative purposes 25 global SIFIs[8] would need to issue $300 billion of CoCo bonds to meet additional loss-absorbing capital requirements of 2 percent of risk-weighted assets. Should those same SIFIs use CoCos to meet the countercyclical buffer in bad times, they may need to issue another $400 billion.

The contingent capital proposal by the Swiss regulators represents the first national initiative (Box 8.2).[9] The high-trigger CoCos are designed to meet a bank's recapitalization needs when its capital situation is deteriorating, thus contributing to the stabilization of the bank before restructuring actions become necessary. The low-trigger CoCos are expected to generate capital to prevent the bank from being put into receivership and to ensure an orderly resolution that is funded first by private creditors, which should minimize the need for possible government support.

However, CoCos have been excluded from the list of instruments eligible to meet the proposed additional capital requirements for global systemically important banks (G-SIBs). In a meeting in late June 2011, the Group of Governors and Heads of Supervision, the oversight body of the BCBS, agreed on a bucketing approach for additional capital requirements tied to the extent of systemic importance, with an undisclosed number of buckets ranging from 1 percent to 2.5 percent and an additional "empty" bucket of 3.5 percent that is intended to discourage banks from increasing their systemic importance. It was also agreed that the G-SIB surcharge will be fully met with common equity. Contingent capital instruments may be applied at national discretion but only as an add-on to the G-SIB surcharge, consistent with the IMF view that the surcharge should be predominantly common equity until its effectiveness can be better assessed (see also Chapter 7).

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[8]The list of SIFIs worked on at the FSB has not been disclosed. The sample used in this report is based on the list published in the *Financial Times* on November 1, 2010 ("Regulators Outline Banking Blueprint").

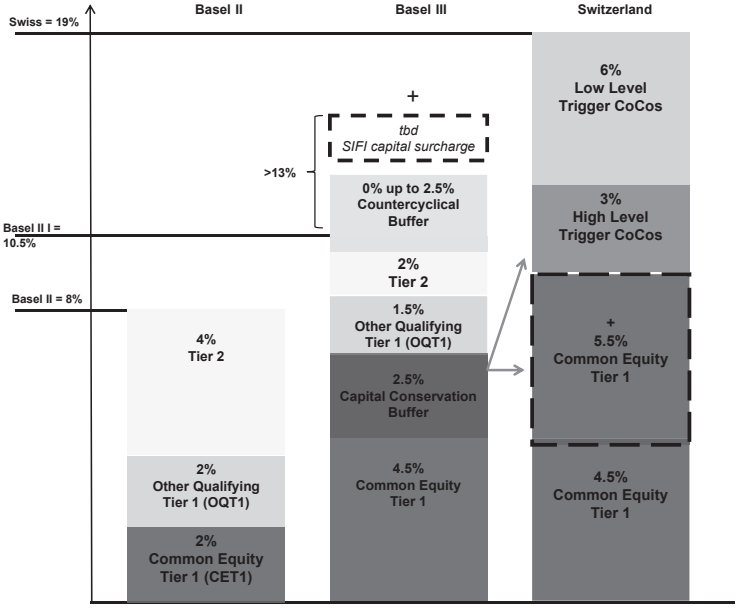
[9]The U.K. authorities may be considering a similar approach (Bank of England, 2010).

BOX 8.2

The Swiss Contingent Capital Proposal

The Swiss Commission of Experts released on October 4, 2010, a comprehensive framework to address risks associated with SIFIs, which should be adopted into law by early 2012. Part of the framework is to raise total capital ratio to 19 percent: 10 percent in common equity Tier 1 (CET1) and 9 percent in contingent-convertible bonds (CoCos), including 3 percent with a "high level trigger" of 7 percent of CET1 to meet the enhanced "additional capital conservation buffer," and 6 percent with a "low level trigger" of 5 percent of CET1 as a SIFI additional loss-absorbing capital requirement or "progressive component."

Comparison of Basel II, Basel III, and Swiss CoCo Proposals



Main features of Swiss contingent capital:

- The triggers would be "contractually predefined" and based on common equity ratios in line with the Basel III framework.
- The equity conversion prices would not be predefined and could be set either at the time of conversion or at the time of issuance. Write-down could be an alternative. Preconversion, these contingent capital instruments would be classified as dated subordinated debt with nondeferrable coupons, also known as (ex-lower) Tier 2 debt.

For the implementation of the Swiss requirements, the same timeframe will apply as in the case of Basel III, by 2019. The accumulation of capital in the various categories will be overseen by the Swiss Financial Market Supervisory Authority and the Swiss National Bank as part of capital planning.

Contingent capital is not designed to deal with liquidity problems. The conversion would stop the interest payments on convertible bonds but would otherwise not generate additional liquidity for banks. However, if perceived negatively by the market, the conversion could actually generate a liquidity squeeze for the institution. To avoid the negative impact on market dynamics, triggers would need to be set off long before liquidity pressures started, in order to forestall a self-fulfilling presumption of a liquidity crisis (Duffie, 2010). However, forestalling a liquidity crisis with convertible debt would require large amounts of such debt and might require extending the coverage of debt-equity conversion to unsecured senior debt under the bail-in schemes (Box 8.3). In practice, the use of contingent capital instruments may require precommitted liquidity support from the central bank or from a consortium of private banks.

BOX 8.3

Bail-In Proposals: A Statutory Approach to Debt Restructuring

Bail-in proposals mainly represent a statutory approach to debt write-downs or debt-equity conversion. This approach would likely require endowing regulators with statutory powers to cancel, write down, or convert existing claims on debt holders or override preemption rights.

- Unlike regulatory contingent capital, bail-in schemes deal directly with the resolution of SIFIs. They provide supervisors with discretionary power to recapitalize an insolvent SIFI more quickly (a few days) than under the existing bankruptcy rules (a few months or longer), thus gaining a crucial time period to assess the viability of the bank and, when necessary, proceed with an orderly and rapid liquidation. Because the recapitalization will be based on the conversion of private debt into equity rather than a bailout, moral hazard will be reduced.
- Bail-in is better suited than contingent capital for dealing with larger shocks/tail risks, because financial institutions would ordinarily maintain a substantially large amount of unsecured debt that could be eligible under bail-in schemes for conversion into equity.

Bail-in could face tough legal challenges and strong political opposition. A clear and convincing legal procedure would be essential to its effectiveness. Regulators would need statutory power to write down existing claims of equity and debt holders, override preemption rights, and change management. Upon the occurrence of the trigger event, creditors would be forced to give up full legal claims, presumably in exchange for overall value maximization and so that business operations could continue normally. This would interfere with laws that guarantee property rights. Therefore, bail-in schemes would require changes in current legislation to legitimize the interference. The problem is further complicated by the lack of consensus on whether all unsecured debt should be subjected to the statutory power, although the general agreement is that collateralized debt or any other secured claims should be excluded.

There will also be challenges associated with cross-border implementation. Regulators in a home country with the bail-in statutory power might not be able to write down the debt that is booked in a foreign country or is governed by a foreign law. In this case, the effectiveness of the bail-in could be reduced significantly, unless states were willing to adopt laws recognizing the statutory power of the resolution authorities in other jurisdictions.

CONCLUDING REMARKS

Contingent capital instruments should be considered as part of a comprehensive and consistent crisis prevention and management framework. Although these instruments could be useful additions to the crisis management toolkit, they are not intended to be standalone tools. Instead they should be implemented within a comprehensive framework that includes strengthened supervision, an enhanced capital base, improved disclosure, and an effective resolution regime. Their design should also avoid adding more procyclicality during crisis times.

The design of the conversion trigger and the conversion rate will be crucial to ensure effectiveness. As each objective (e.g., prevention, resolution, and market discipline) entails a different design, it will be important to identify the design priorities. In particular, to avoid adverse unintended consequences and enhance market acceptance, several considerations should be at the fore.

Triggers based on the capital ratios of individual institutions are preferable, since they are less prone to market manipulation and market contagion and since both shareholders and bondholders will have an incentive to avoid letting capital fall near the trigger point. As a tool for crisis prevention, conversion triggers should be set high enough, relative to the point of insolvency, to ensure conversion for individual institutions well ahead of the emergence of distress. As a tool for an orderly resolution of a failing bank, conversion triggers may be set at a low level, that is, to convert close to the point of an institution's insolvency, thereby providing a broader private sector investor base for sharing the burden for bank failures with the public sector.

Ensuring consistency, transparency, and standardization will be important to avoid complex structures and to support the G-20 objective of higher capital transparency. Some standardization might be necessary to avoid complex structures. Regulators, issuers, and investors need to establish transparent criteria to ensure proper marketability of contingent capital instruments and allow sufficient depth and liquidity for their successful use. Despite their potential use in addressing moral hazard, contingent capital instruments are untested. Therefore, supervisors will need to be vigilant in monitoring (i) the design and issuance of contingent capital instruments; (ii) the implied transfer of risks within the financial system; and (iii) potential buildup of systemic risks, including liquidity risk.

APPENDIX 8.1. MODELS OF BAILOUT AND BANK RISK TAKING

The Basic Model

Consider a bank that starts at period 1 with an asset consisting of its own cash capital of M and an investment of I (i.e., loans), which is financed with outside equity (NP) and debt (D):

$$I - M = N \times P + D$$

where P is the price of each share and N is the number of issued shares.

At period 2, the repayment on debt is $(1 + r)D$, where r is the interest rate on debt. For simplicity we assume that the risk-free interest rate is equal to zero. The gross payoff on the investment I is stochastic R.

i) If $R < (1 + r)D$, the bank defaults on its debt. Assuming default is costless, creditors (bond investors) receive R while shareholders receive 0.

ii) If $R > (1 + r)D$, the bank pays off debt, and each share gives right to residual $[R - (1 + r)D]$.

In the equilibrium, the interest r on debt is determined by:

$$D = E\{\min[(1 + r)D, R]\}$$

The value of each share is given by

$$\max \frac{[R - (1 + r)D]^+}{N}$$

where $[R - (1 - r)D]^+$ is a notation for max $[R - (1 + r)D, 0]$. The total expected value of shares is therefore given by

$$V = N \times E\left\{\frac{[R - (1 + r)D]^+}{N}\right\} = E\{[R - (1 + r)D]^+\}$$

$$V = E\{R - \min\{[R, (1 + r)D]\} = E(R) - E\{\min[R, (1 + r)D]\}\}$$

$$= E(R) - D = E(R) - I + M = \text{NP}$$

And the gross return on the bank's own capital M is

$$\frac{V}{M} = 1 + \frac{E(R) - I}{M}$$

Result 1. *For a given expected profit, the gross return increases when M decreases. Therefore, the bank's incentive is to leverage as much as possible (and thus increase its default probability), so that potentially high profits from its investment will be spread over a common equity base.*

The Model with Government Bailout

How does a government bailout encourage excessive risk taking by a bank? The simple intuition is that the bank now expects that when $R < (1 + r)D$, it could receive a transfer T from the government to prevent it from default on its debt: $T = (1 + r)D - R$. The bank therefore has one more reason to take excess risks: to maximize T.

We now introduce a risk measure in investment in the basic model to illustrate how bailout could lead to more risky behavior. For simplicity, we assume the bank holds only loans in its assets; hence, cash M is equal to 0. Assume $R = R^* + \sigma\varepsilon$, where σ is

a measure of risk in investment and ε represents a shock to return. $E(\varepsilon) = 0$, $\varepsilon \sim f(\varepsilon)$ in $[\varepsilon^l, \varepsilon^h]$. σ $[\sigma^l, \sigma^h]$, σ^l is the minimum risk and σ^h is the maximum risk.

Assuming that there is a default cost d, if the bank defaults the creditors now will only receive $R - d$, while shareholders receive nothing. The bank defaults when $R^* + \sigma\varepsilon < (1 + r)D$ or $\varepsilon < -[R^* - (1 + r)D]/\sigma$.

The equilibrium interest rate r on debt is determined by:

$$D = \int_{-[R^*-(1+r)D]/\sigma}^{\varepsilon^h} (1 + r)Df(\varepsilon)d\varepsilon + \int_{\varepsilon^l}^{-[R^*-(1+r)D]/\sigma} (R^* + \sigma\varepsilon - d)f(\varepsilon)d\varepsilon$$

and the value of capital is given by

$$V = \int_{-[R^* - (1 + r)D]/\sigma}^{\varepsilon^h} [R^* + \sigma\varepsilon - (1 + r)D]\, f(\varepsilon)d\varepsilon$$

Therefore the total value of the bank is

$$D + V = E(R) - d \int_{\varepsilon^l}^{-[R^* - (1 + r)D]/\sigma} f(\varepsilon)d\varepsilon$$

Result 2. *To maximize its value, it is optimal for the bank to take the minimum risk because of default cost* d.

However, if the interest rate does not respond to risks because of a bailout guarantee that prevents the default of the bank ex post, then

$$\frac{\partial V}{\partial \sigma} = \int_{\varepsilon^l}^{-[R^* - (1 + r)D]/\sigma} \varepsilon f(\varepsilon)d\varepsilon > 0$$

Result 3. *With the expectation of bailout, the bank will take maximum risk as long as the probability of default is greater than* 0.

The Model with a Bailout Insurance Fund

Assume that the government imposes a bailout premium ex ante on the bank for the expected value of bailout. How would this change the bank's risk-taking behavior? A practical example would be the bank resolution fund that has been set up in several advanced countries. With the bailout insurance, the bank will receive a transfer $T = [(1 + r)\, D - R]^+$ in period 2—but it all goes to repay the creditors. In period 1, the bank must pay a premium that is equal to the expected value of the transfer, which depends on risk σ

$$E(T) = \int_{\varepsilon^l}^{-(R^*-1+r)D]/\sigma} [(1 + r)D - R^* + \sigma\varepsilon)f(\varepsilon)d\varepsilon$$

Hence, a bank perceived as riskier would pay a higher insurance premium.

The value of capital net of the insurance premium is given by

$$V = \int_{-[R^*-(1+r)D]/\sigma}^{\varepsilon^h} [R^* + \sigma\varepsilon - D] f(\varepsilon)\, d\varepsilon - \int_{\varepsilon^l}^{-[R^*-(1+r)D]/\sigma} [D - R^* + \sigma\varepsilon] f(\varepsilon) d\varepsilon$$
$$= E(R) - D$$

which is not increasing with risk σ.

Result 4. *A bailout insurance fund reduces the incentives for banks to take excessive risk.*

A Model with Contingent Convertible Bonds

In this section, we will show that CoCos can be equivalent to optimal capital insurance. Following the basic model, now the bank issues convertible debt (D^c) in period 1, in addition to regular debt (D), so that

$$I = NP + D^c + D$$

Consider three possible cases:

i) If $R < (1 + r)D$: the bank defaults (as before). The creditors of regular debt will receive $R - d$, while shareholders and CoCo investors receive nothing.

ii) If $(1 + r)D < R < (1 + r)D + (1 + r^c)D^c$, CoCos are converted and CoCo investors receive a share (φ) of total capital (φ = 1 implies total dilution to the original shareholders). $\varphi = N'/(N + N')$, where N' is the number of new shares.

iii) If $R > (1 + r)D + (1 + r^c)D^c$, there is no default and no CoCo conversion.

We first assume that a default does not trigger a bailout and, in this case, the interest rates are determined by:

$$D = \int_{-[R^*-(1+r)D]/\sigma}^{\varepsilon^h} (1 + \mathrm{r})D\, f(\varepsilon)\, d\varepsilon + \int_{\varepsilon^l}^{-[R^*-(1+r)D]\sigma} (R^* + \sigma\varepsilon - d)\, f(\varepsilon) d\varepsilon$$

$$D^c = \int_{-[R^*-(1+r)D]/\sigma}^{-[R^*-(1+r)D-(1+r^c)D^c]/\sigma} \varphi[R^* + \sigma\varepsilon - (1 + r)D]\, f(\varepsilon)\, d\varepsilon +$$

$$\int_{-[R^*-(1+r)D-(1+r^c)D^c}^{\varepsilon^h} (1 + r^c)D^c f(\varepsilon) d\varepsilon$$

One can show that the interest rate is higher for convertible debt than for plain vanilla debt.

The value of capital is

$$V = E(R) - D - D^c - d \int_{\varepsilon^l}^{-[R^*-(1+r)D]/\sigma} f(\varepsilon)\, d\varepsilon$$

Result 5. *The value of capital is maximized by the bank taking minimum risk. In this case, contingent convertible bonds reduce the bank's incentives to take excessive risks by eliminating the bailout or reducing the probability of default.*

APPENDIX 8.2. SUMMARY OF CONTINGENT CAPITAL TRIGGER CONDITIONS

TABLE 8.1

Contingent Capital Trigger Conditions

Type	Description	Advantages	Disadvantages	Example
Bank-specific triggers	Institution-specific factors	✓ Clear incentives for shareholders and managers ✓ More targeted and focused on distressed institutions only	✓ May be insufficiently responsive to systemic risks (e.g., to the need to recap entire banking system simultaneously)	
	1. Financial soundness indicators (e.g., capital ratios)	✓ Easy to price ✓ Intuitive and simple to understand and implement ✓ Disclosed	✓ Low publication periodicity means indicators likely to lag actual financial conditions ✓ Back-tested poorly against crisis; hard to determine a trigger level that is informative of financial distress ex ante	✓ Conversion occurs if a bank's capital ratio (e.g., Tier 1 or common equity over risk-weighted asset, RWA) falls below a predetermined threshold ✓ Lloyds exchange: trigger set at "5% of published core Tier 1 capital to total RWA"
	2. Market indicators (e.g., share price, credit default spread, CDS)	✓ Forward-looking (assuming reasonably efficient markets) ✓ Better early warning indicator of distress than regulatory ratios	✓ Markets can be distorted, especially during times of stress, and therefore fail to provide the right signals ✓ Higher chance of false positives, i.e., premature conversions, which lead to higher funding cost ✓ Price manipulation (via short-selling) and the self-fulfilling threat of equity dilution could inflict a confidence-induced downward spiral that eventually triggers conversion	✓ Conversion occurs if firm's stock price drops below some level or the CDS exceeds some level
	3. Supervisors' discretion to trigger conversion when financial stress is deemed sufficiently high (e.g., stress test results)	✓ Addresses the lag problem with capital ratios and other accounting/regulatory measures ✓ Uncertainty of outcome limits market manipulation and over-engineering of contingent capital with predetermined conversion criteria	✓ Not automatic, which increases negative signaling problem ✓ Strong reliance on regulatory judgment and supervisory discretion might be counterproductive if negative signaling effect encourages forbearance ✓ Lower marketability: increases funding costs since investor may charge a premium for the uncertainty associated with the outcome of the stress test	✓ Conversion can also occur if bank "fails" a regulatory stress test (like U.S. SCAP or the European CEBS stress tests)

Type	Description	Advantages	Disadvantages	Example
Systemic triggers	Based on "systemic"/ broad market factors	✓ Increases capital across the banking system at the same time, and thus may be most efficient at addressing and reducing systemic risk	✓ Virtually no incentive for bank management to take specific actions as trigger conditions are removed from *direct* control ✓ Might be too broad and costly ex ante unless trigger conditions are set sufficiently low	
	1. Predetermined general conditions of financial sector (loss rates, capitalization, cash capital ratio)	✓ Intuitively attractive: increases banking system capitalization in response to systemic credit losses ✓ Automatic: not reliant on regulatory judgment and supervisory discretion (and does not breed entitlement for intervention)	✓ Lack of differentiation among banks may have unintended consequences ✓ Lack of supervisory interference removes judgment in situations with little or no precedent ✓ Possibility that trigger is too narrow, i.e., systemic risk is caused by something unrelated to credit losses (and recapitalization addresses only symptom not cause)	✓ Credit loss trigger: conversion occurs if, say, residential or commercial mortgage delinquencies nationwide rise above a certain level
	2. Supervisory discretion or supervisory declaration of a systemic crisis	✓ Broad-based recapitalization of the banking system when regulators want/need it	✓ Lack of differentiation among firms may have unintended consequences and make recapitalization inefficient ✓ Strong reliance on regulatory judgment and supervisory discretion might be counterproductive if negative signaling effect encourages forbearance ✓ Large-scale consequences might delay supervisory action ✓ Lower marketability: increases funding costs since investor may charge a premium for the uncertainty associated with trigger conditions	
Dual triggers (bank specific + systemic)	Declaration of a systemic crisis and the realization of a *single* idiosyncratic trigger	✓ Broad-based recapitalization of the banking system while allowing for differentiation among banks	✓ Prone to produce mixed signals: pits regulatory judgment against market-perceived severity of systemic distress ✓ Risks combining the worst characteristics of triggers: strong reliance on supervisory discretion and lagging indicator subject to national variations	✓ Declaration by regulators that the financial system is suffering from a systemic crisis (see French and others, 2010)

TABLE 8.2

Summary Table of Contingent Capital Conversion Options
(Advantages/disadvantages to shareholders [E] and holders of contingent capital [D])

Type	Description	Advantages	Disadvantages	Example
Relative to contingent capital holders *(Conversion into fixed value of equity)* (e.g., "reverse convertibles")	Converts upon trigger breach into a *variable* number of shares based on the share price at the time of the trigger breach	✓ Clarity for holders of contingent capital (valuation certainty) ✓ Cost-effective issuance cost of contingent capital	✓ Possibility that conversion will be ineffective due to insufficient capital buffer ✓ Likely to increase the cost of and decrease access to new equity unless share amount is limited	
1. Conversion *at par value*		✓ Benefit to owners of contingent capital securities from a negative shock to the share price (if it also increases the likelihood of conversion) (D) ✓ Lower issuance cost of contingent capital (D)	✓ Incentives created for market manipulation (e.g., short-selling of stock), which could be mitigated by using some historical market-based trigger for conversion (e.g., the average stock price over a longer period) (D) ✓ High (and unknown) dilution to shareholders likely to create strong incentives to avoid trigger breach to a point when conversion might be too late ✓ Potentially large dilution risk, since contingent capital is likely to trade at a discount for any reasonable trigger point (E) ✓ Higher cost of equity capital, due to potential dilution and dilution uncertainty, depending on trigger conditions relative to trading price of contingent capital (E) ✓ Higher cost of equity but lower issuance cost (E/D)	
2. Conversion *below* par value		✓ Higher firm value due to reduced liabilities lowers the possibility of a lucrative speculative attack (E)	✓ Existing shareholders have incentive to trigger conversion prematurely (especially in combination with market-based triggers) in order to reduce dilution risk (especially if debt does not trade at a discount) (E) ✓ Smaller dilution risk (than in the case of conversion at par) could fail to deter ex ante risk taking by managers ✓ Lower cost of equity but higher issuance cost (E/D)	

Type	Description	Advantages	Disadvantages	Example
3. Conversion at/above/below trading price of contingent capital at time of conversion		✓ Lower dilution risk, since conversion rate is pegged to a trading price that is likely to be discounted to principal (E)	✓ Higher overall cost of capital, due to higher uncertainty for both holders of contingent capital and shareholders ✓ Incentives created for market manipulation (e.g., short-selling of stock) to reduce debt payments when bank operates close to the default barrier, debt-equity correlation is high, and dilution risk is low (E) ✓ High issuance cost of contingent capital (D)	
4. No conversion but principal write-down		✓ Most cost-efficient form of contingent capital (D) ✓ No dilution risk (E)	✓ Incentives created for market manipulation (e.g., short-selling of stock) to reduce debt payments	
Relative to shareholders *(Conversion into a fixed number of shares)* ("mandatory convertibles")	Converts upon trigger breach or a certain date (if earlier) into a finite number of shares based on the share price at the time of original issuance	✓ No incentive for manipulation: prespecified, fixed amount of dilution for shareholders; managers consider conversion only if the degree of dilution is smaller than the debt payments to holders of contingent capital (E) ✓ Encourages both parties to avoid trigger breach; conversion optimal only if share price is sufficiently low when bank operates close to its default barrier (as long as trigger conditions are idiosyncratic and not completely insulated from changes in the share price) (E/D)	✓ Cost of funding will increase proportionately to the chance of the bank facing difficult circumstances	✓ Lloyds exchange: The conversion rate (as a number of shares) is determined by dividing the par value of the securities by the share price at the time of issuance
Relative to issuer's capital needs	Converts upon trigger breach into a variable number of shares based on the share price and the capital shortfall at the time of the trigger breach	✓ No clarity for holders of contingent capital (valuation uncertainty) (D) ✓ Conversion effectiveness, i.e., sufficient capital buffer created upon conversion (assuming timely trigger and conversion formulation) ✓ Greater incentive compatibility	✓ Higher overall cost of capital due to higher uncertainty for both holders of contingent capital and shareholders ✓ High issuance cost of contingent capital (D)	✓ Conversion rate determined by book value multiple/risk-weighted asset multiple

APPENDIX 8.3. HOW DOES CONTINGENT CAPITAL COMPARE WITH HYBRID AND SUBORDINATED DEBT INSTRUMENTS?[10]

Similar to other hybrid capital instruments, contingent capital entails both equity and debt-like features. Bank regulators may allow these instruments to be treated as part of capital due to their loss-absorbing characteristics. They may be cheaper for issuers (because of tax deductibility), and shareholder dilution only occurs if conversion is triggered. Fixed-income investors may be attracted by the higher yields of these instruments.

The hybrid capital instruments did not provide meaningful loss absorption during the recent crisis. Although they contractually entailed loss-absorbing clauses, primarily through the deferral of coupons and/or extension of maturity, this remained at the discretion of banks, unless regulatory capital ratios were breached. In most cases, governments' rescue of banks meant that liquidation was averted and, thus, subordinated debt holders did not suffer liquidation-related losses either. At least in the initial stages of the financial crisis, the deferral of coupons/maturity extension was not the preferred route for issuers and regulators alike, since they feared negative signaling effects. However, as the crisis amplified, some regulators became more forceful in imposing some losses on subordinated creditors, and the European Commission introduced the concept of "burden sharing" among taxpayers, shareholders, and bondholders through the imposed suspension of dividends and coupons to preserve cash and capital in distressed banks.

However, by buying back bonds at heavy discounts to par, issuers managed to reduce their debt-servicing obligations and created capital gains that augmented their core capital. Although this was beneficial for issuers, it changed the traditional priority of claims, since bondholders had to take permanent losses ahead of shareholders.

In response to the crisis, the BCBS strengthened the standards by increasing the quality, consistency, and transparency of the capital base. Higher minimum capital requirements were established for common equity (from 2 percent to 4.5 percent) and Tier 1 (from 4 percent to 6 percent), while maintaining the capital ratio at 8 percent. In addition, the BCBS introduced additional capital buffers. All new Tier 1 and Tier 2 instruments will have to be loss-absorbing to be eligible as regulatory capital.

Accordingly, most existing hybrid and subordinated debt instruments will not qualify as capital after January 1, 2013. Innovative capital, such as instruments with an incentive to redeem like a step-up at the call date, will no longer be included in the calculation of Tier 1 capital. Other instruments that do not meet the new criteria for inclusion in Tier 1 and Tier 2 capital will be phased out by 2022.

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[10]Prepared by Vanessa Le Leslé. All data comes from publicly available sources, such as Bloomberg, LP Dealogic, and individual bank reports.

TABLE 8.3

Comparison of Characteristics of Contingent Capital and Basel III Tier 1 and Tier 2 Loss-Absorbing Instruments

	Hybrid Tier 1 With Conversion or Write-Down	Tier 2 With Conversion or Write-Down	High-Level Trigger Contingent Capital (>7%)	Low-Level Trigger Contingent Capital (5%)
Rank as	Tier 1	Tier 2	Possibly Tier 2 (preconversion)	Possibly Tier 2 (preconversion)
Maturity	Perpetual	Dated	Dated	Dated
Coupon deferability	Yes	No	No	No
Status of missed coupons	Noncumulative (cancelled)	Not applicable	Not applicable	Not applicable
Loss absorption in gone concern[1]	Yes	Yes	No	No
Permanent write-down of principal				
Conversion into equity				
Loss absorption in going concern	Yes	No	Yes if Core	Yes if Core
Write-down of principal	*Temporary*		Tier 1 below a predetermined level (e.g., 7%)	Tier 1 below a predetermined level (e.g., 5%)
Conversion into equity	No		Same	Same
Mandatory cancellation of coupons			No	No

[1] Gone concern at the point of nonviability.

Tier 1, Tier 2, and contingent capital will have to entail equity conversion clauses or permanent write-offs (Table 8.3). The order of loss absorption for these instruments is not yet clear (e.g., whether conversion of contingent capital should occur prior to or after the deferral of hybrid Tier 1 coupons and hybrid Tier 1 conversion into equity). Regulatory clarification will be necessary to facilitate the pricing of these different instruments under the new Basel III capital regime.

The investor base for contingent capital may be different from the traditional fixed-income investor base. Traditionally, the natural investor base for hybrid Tier 1 and Tier 2 securities was fixed-income investors. Going forward, the conversion into equity or permanent write-down features of contingent capital and other Basel III capital instruments may deter those investors. A new investor base may gradually emerge for CoCos, starting with hedge funds, high yields, or equity investors. Mapping investors' yield targets and future Basel III instruments to expected yields highlights the possible shift that could happen in the investor base (Figure 8.3).

If a sample of 25 global SIFIs were to issue CoCo bonds to cover up to 2.5 percent of risk-weighted assets (RWA) for the countercyclical buffer, this would represent $392 billion. If the SIFI additional loss-absorbing capital requirements (which remain to be defined) were to be established at 2 percent of RWA, for instance, the same sample could use CoCo (or equity, of course) to the

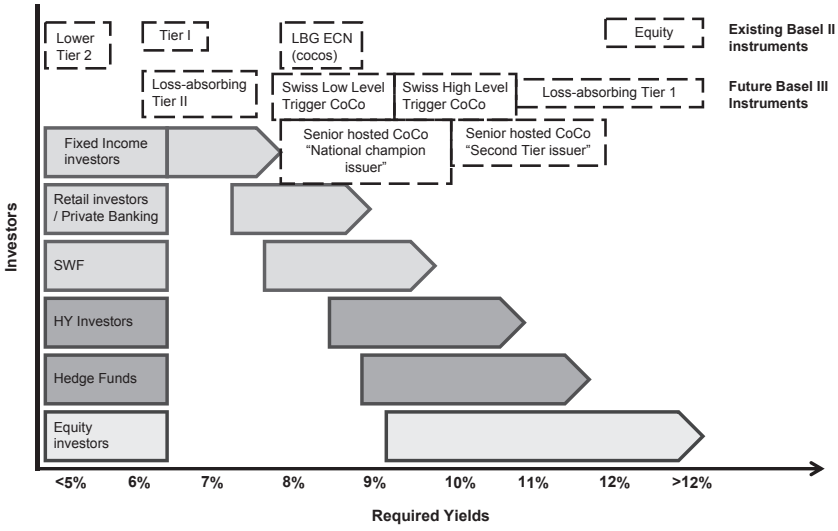

Figure 8.3 Indicative Investors' Yield Targets and Select Capital Instruments Yields in Europe

extent of $314 billion. In addition, banks will have to replace the existing Tier 1 and Tier 2 instruments that will be gradually phased out under Basel III, and this will reduce their available nonequity Tier 1 and Tier 2 capital and increase their need to tap capital markets with loss-absorbing instruments. With over $1 trillion of outstanding subordinated and hybrid debt that will be phased out by 2022, banks may have to issue loss-absorbing instruments of this magnitude in coming years.