Bank Heal Thyself: Benefits of Adding CoCos to the Balance Sheet

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Introduction

CoCos, or simply cocos, are a promising form of hybrids first issued in 2009 by major West-European banks. They are contingent convertible debt securities that convert automatically into common equity when a regulatory capital ratio has fallen to its trigger level. For high-trigger cocos this level is reached when the book value of common equity tier 1 (CET1) has fallen to 7 percent of risk-weighted assets (RWA) as defined under the Basel III capital-requirements framework. At that point the bank is still a going concern and expected to recover. High-trigger cocos, which are the focus of this article, are dedicated to crisis preparedness and the recovery process.

What follows examines how cocos and their tax and regulatory treatment could be designed to promote greater in-house insurance of banks provided by their cocos holders. High-trigger cocos can be very effective in strengthening the financial system by helping banks weather a crisis that has decimated their equity capital. Conversion of their going-concern cocos helps rebuild capital initially through the cancellation of the cocos debt and subsequently through higher earnings on account of the interest payments no longer due. Cocos thus bring relief when equity capital is most needed but least available, and hence most expensive and dilutive, from other sources. While a fall in CET1 without cocos on the balance sheet increases leverage, if such a loss triggers cocos conversion, leverage decreases and the pressure to reduce assets is alleviated.

There are additional advantages. By automatically converting into a set number of newly issued shares of common stock when triggered long before the point-of-non-viability has been reached, high-trigger cocos can ward off discretionary regulatory measures. These could include bail-ins involving a partial or complete debt write-down ordered by regulators, and other possible interventions. Uncertainty about these interventions is bound to raise the cost of issuing instruments that could be subjected to them. High-trigger cocos would normally not be vulnerable in this regard. Being first to convert in a downturn when there is still much equity value left, they can credibly offer a substantial recovery rate in percent of the face value of cocos from the common stock issued when triggered.

A few definitions are needed. The conversion price per share set at the time of cocos issue, when divided into the face value of cocos to which it applies, yields the number of shares issued in conversion and hence the value that coco holders may expect to obtain, given their forecast of the share price conditional on conversion. The actual or conditionally expected recovery rate then reduces to the ratio of the corresponding post-conversion market price per share to the pre-set conversion price. That recovery rate for cocos may well be above the recovery percentage that holders of non-contingent subordinated debt could expect to realize from bankruptcy resolution. In addition, cocos holders would find their claim being converted into a highly liquid asset, shares of common stock, instead of being locked into an illiquid subordinated debt instrument that may eventually be bailed in by regulators to facilitate resolution.

The terms set on cocos can control the apportionment of expected gains and losses between their holders and pre-existing shareholders in a manner most conducive to generating optimal management incentives. If cocos holders were to lose everything upon conversion, like with write-down-only cocos that, in spite of their name, do not convert into anything of value at all, existing shareholders would profit unduly from cocos conversion. This could encourage substitution in favour of high-risk assets and stimulate the transfer of value from the bank's bondholders to its shareholders. On the other hand, if the credibly targeted recovery rate were set too close to 1 or to 100 percent, cocos holders would

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have nothing to fear from conversion and insufficient reason to incur monitoring costs even if their interests should be represented on the bank's board. Existing shareholders would benefit directly from conversion to the extent that the recovery rate for cocos holders (ρ) is less than 1. However, any small benefit from cocos conversion obtained by pre-existing shareholders when ρ is, say, 0.8 would be dwarfed by the prior stock-price decline that would accompany the fall in the CET1/RWA capital ratio to the trigger point.

If cocos are issued as a substitute for equity, they add to risky debt that can contribute to the debt overhang effect discouraging new equity issues and otherwise profitable investments. However, this effect is countered by the automaticity of conversion because the cocos debt must be cancelled and replaced by equity should a serious risk event triggering conversion have occurred. If cocos were issued as substitutes for non-contingent subordinated debt instead, they would raise the contingent equity content of the bank's financing and lower the yield required on equity and on any remaining non-cocos debt. Conversion would then reduce the debt overhang, rather than merely restoring the *status quo ante.* Mehran and Thakor (2014) and Bundesministerium der Finanzen (2014) have offered additional reasons why supervising leverage and introducing contingent debt are important to help privatise the too-big-to-fail (TBTF) banks' safety net and to ensure that their risk-taking is adequate, not underpriced and socially excessive.

Sufficient reasons may already have been given to favour high-trigger 'recovery' cocos, with a 7 percent or more CET1/RWA trigger, over low-trigger (5 percent or less) 'resolution' cocos and over debt that can be bailed in. One might thus suppose that adding high-trigger cocos to banks' balance sheet in good times to help preserve going-concern value in a crisis would merit encouragement from national bank regulators and tax authorities. This, however, has not always been forthcoming, least of all in the United States and, until recently, in Germany. Accounting definitions and national conventions for distinguishing debt from equity for tax purposes and for meeting regulatory capital requirements have gotten in the way.

Internalising and minimising TBTF-bank rescue costs

Internalising the bailout costs of keeping TBTF banks from failing is a principal policy objective of financial reform. Coupled with political aversion to nationalisation or extended government control, having TBTF status also means that private equity in TBTF banks tends to be preserved, being poised for recovery after the crisis. Recently there have been fresh studies on the size of the funding subsidies for such systemically important banks. The value of this subsidy has been measured in basis points (bps) saved on bonds issued by TBTF compared with other, carefully selected, banks not covered individually by the government's implicit guarantee of their survival. Thus one recent study (Santos 2014) estimated a funding advantage of 31 bps (0.31 percent) for TBTF over smaller banks on the basis of the bond spread differential for issues rated single-A by S&P. Related studies (see especially Gara, Santos and Traina 2014) have tended to confirm that large banks in fact do enjoy economies of scale in addition to TBTF subsidies and use their competitive advantage to grow larger and to increase risk-taking after assurances of greater government support.

Implicit subsidies rise with the probability of distress in financial institutions, both individually and collectively, and with the willingness and ability of the relevant government agencies to bail them out. For instance, the IMF (2014) has estimated that in Europe the subsidy dropped during the initial phase of its financial crisis, but rose again and reached 90 basis points after bailouts under the European Stability Mechanism had been authorised in 2012.

Attempts to keep surviving TBTF banks from getting bigger after the last crisis, and generate credibility for official denials that they will be rescued in the next crisis have failed. Hence, taking the availability of TBTF emergency aid as given, the government's objective is to reduce both the private uncompensated benefit and the government's net costs of such contingent aid first by lowering the frequency and severity of financial crises and then by cutting the subsidy component. This means that government should pay for less, and private shareholders and long-term creditors for more of the TBTF coverage, and that its costs to the insurer should be prepaid through the equivalent of higher insurance premiums. Higher capital requirements for Global Systemically Important Banks (G-SIBs) to be met by CET1, such as 2 percent of RWA extra by January 2019 imposed on the Deutsche Bank, contractually agreed bail-in of long-term debt under prespecified conditions, and availability and contingent conversion of high-trigger cocos are all part of the strategy to reduce the unfunded government costs of

TBTF guarantees. The EU's Single Resolution Mechanism and Single Resolution Fund make use of some of these instrument requirements and reserve-accumulation approaches.

Regulatory capital requirements with cocos

By the start of 2019, with the end of the transition period, most Basel III regulatory capital requirements will have to be fully implemented, i.e., *fully loaded*, including the definition of RWA. For information purposes, most major banks started comparing their actual capital ratios with those required under Basel III fully loaded several years ago. On this basis, the basic minimum CET1 requirement, in effect already from 2015 on, is equal to 4.5 percent of RWA. CET1 consist principally of the proceeds from stock issuance and retained earnings. To this a 2.5 percent Capital Conservation Buffer (CCB) is added that must also be met by CET1, but in full only by 2019. This raises the CET1 requirement, fully loaded, to 7 percent of RWA, which explains why this level has often been chosen as the trigger point for going-concern cocos.

Higher regulatory capital requirements are set for capital and leverage ratios that include non-common additional tier 1 (AT1) along with CET1 in the numerator. AT1 capital, such as non-cumulative perpetual preferred stock with interest/dividends that may be cancelled at the discretion of both management and by regulators, is judged to be highly loss-absorbing and thus part of T1 capital along with CET1. However, the contribution of AT1 that may be 'credited' to the T1/RWA requirement of 6 percent may not exceed 1.5 percent of RWA. Tier 1 (T1) capital is also the numerator of the leverage ratio whose denominator, *leverage exposure* (LE), is much greater than RWA. Being less assuredly loss-absorbing than T1, tier 2 (T2) cocos may contribute no more than 2 percent of RWA to meeting the minimum of the total capital ratio (T1 + T2)/RWA. This minimum is scheduled to rise from 8 percent in 2015 to 10.5 percent of RWA by 2019 as the CCB of 2.5 percent is being phased in.

The takeaway is that qualifying cocos that may be credited toward regulatory capital requirements could account for as much as 3.5 percent of RWA, or one third of the total minimum capital requirement plus CCB equal to 10.5 percent of RWA fully loaded if all the non-common parts of these requirements were met by cocos. AT1 cocos could then be accounting for 1.5 percent and T2 cocos for 2 percent, while CET1/RWA is 7 percent. Almost all of the countries participating in global finance accept this extent of cocos' participation in meeting T1 and T2 capital requirements. The United States has chosen not to accord AT1 credit to cocos, citing national accounting rules, and to leave the tax status of the interest paid on cocos unclear, thereby discouraging the issuance of cocos. In the meantime, major banks in a growing list of European countries beyond the pioneers from Britain, Switzerland and the Netherlands have issued AT1 and/or T2 cocos. So have other large banks in countries such as Canada and Singapore.

Obstacles to issuing cocos in the United States

The issuance of cocos is encouraged when these instruments are treated as debt for tax purposes, but as equity for satisfying regulatory-capital, rating, and accounting-classification requirements. The United States has so far failed to provide legal certainty that interest paid on cocos is tax deductible, so that the issue would not normally have to be determined administratively on a case-by-case basis. As discussed further in von Furstenberg (2014), US regulatory agencies have categorically denied AT1 credit for cocos as long as cocos are classified as a liability and thus considered debt under US-GAAP. It appears therefore that US federal bank regulators do not view cocos as sufficiently equity-like to be reliably loss absorbing. At the same time the US Internal Revenue Service (IRS) may still regard cocos as too much like the common equity into which, when triggered, they would convert. Thus there are two strikes against cocos issuance in the United States: no assured tax deductibility for the interest paid on them and no credit as AT1 for meeting the T1 capital requirement or the impending leverage ratio requirement that features T1 capital in its numerator.

Until recently, cocos also had one strike against them in Germany. As reported in BDB (2014), Germany's Federal Finance Ministry published an administrative regulation on 10 April 2014 settling the tax treatment of capital instruments, like AT1 capital. This ruling adopted the tax conditions already prevailing in most other European countries, which allow interest paid on cocos to be fully deductible as a rule. Thus only US (and Australian) regulators are still denying assured deductibility of interest paid on cocos to issuers under their jurisdiction.

Distinguishing the equity from debt content in cocos

For high-trigger cocos there are only two possible outcomes: either they are serviced punctually and paid off at maturity, or their capital ratio declines to the high-trigger level specified in their covenant before their term is up. In that case their conversion into common stock is mandatory. The conversion price may have been set outright, or as a minimum, at the time of cocos issue. The minimum would bind if it topped the result of an unwise price-setting method designed to deliver 100 percent recovery for cocos holders *ex post* by setting the conversion price equal to whatever the market price then turns out to be.

The most critical variables for pricing the conversion risk premium in cocos are (i) the annual probability of conversion (π) of the surviving cocos and (ii) the recovery rate (ρ) obtained from the market value of the common stock received at conversion in relation to the face value of the cocos cancelled at that time. If π is reinterpreted as the annual probability of default on straight bonds in an alternative application, the recovery rate would be the fraction of the face value of the debt that is recovered in bankruptcy proceedings. To simplify the exposition, both π and ρ are taken to be constant over the entire term, or up to the first-call date, of the straight bond or coco whose face value is normalized at 1. This principal amount is repaid with accrued interest if the coco has not been converted into common stock by its maturity date after T years. The probability of the debt surviving to maturity is $(1 - \pi)^T$.

The 'riskless' rate (r*) that functions as the discount rate is deemed to be free of credit risk, but not free of illiquidity premiums and monitoring costs. Hence the best representation of the riskless rate for 10-year USD issues of cocos could be Moody's AAA rate on seasoned bonds, which have an effective maturity of around 10 years. The annual rate of return required on cocos (R) here does not include a premium to compensate for risk aversion, but only for losses expected in the event of conversion. R is the dependent variable being solved with the values of ρ, π, and r* assigned in the first 3 columns of Table 1. These same three parameters plus T determine the equity content (EC), which is the percentage of the value of cocos that is expected to be contributed by the common stock received if mandatory conversion should be triggered.

If $\rho = 0$, as on write-down-only bonds, $R = r^* + \pi$. At the other extreme $R = r^*$. This result applies both when $\pi=0$ and when $\rho=1$. Within the range of parameter values shown in Table 1, the risk-neutral actuarial conversion risk premium, $R - r^*$, varies from 40 to 240 bps, with the highest values obtained with the lowest value of ρ and the greatest value of π.

Estimates of EC in the last column of Table 1 range from 6 percent to 32 percent. Higher values of ρ, π, and T raise, and of r* lower, EC. Its size could be relevant for the tax treatment of interest paid on cocos. For instance, one of the factors considered by the IRS in its debt/equity determination "looks directly to the future form of the security, taking into account the possibility that a firm with a convertible bond has, in essence, a potential share of common stock outstanding" (Ceryak 1990, 280). Hence the higher the equity content of a hybrid, the greater the chance that the IRS would deny interest deductibility. The IRS may also apply the non-contingent bond method, fully described in my earlier article (von Furstenberg 2012), under which only that part of the interest would be

Table 1

Estimated rates of return required on cocos and their equity content

Row number	Recovery rate (ρ)	Probability of conversion (π)	Riskless interest rate (r*)	Term years (T)	Required rate of return (R)	Equity content (EC %)
1)	0.4	0.02	0.02	10	0.032	6.59
2)	0.4	0.02	0.04	10	0.052	5.97
3)	0.4	0.04	0.02	10	0.044	12.12
4)	0.4	0.04	0.04	10	0.064	11.02
5)	0.8	0.02	0.04	10	0.044	11.95
6)	0.8	0.02	0.04	20	0.044	18.54
7)	0.8	0.04	0.04	10	0.048	22.03
8)	0.8	0.04	0.04	20	0.048	31.93

Notes: $R = r^* + (1-\rho)\pi$; and $EC = \pi\rho(1 - [(1-\pi)/(1+r^*)]^T)/(r^* + \pi)$.

Source: von Furstenberg (2014).

deductible that would be paid on an otherwise comparable bond without the conversion feature.

Conversion risk and illiquidity do not necessarily raise the interest rate on cocos above that on otherwise comparable straight bonds. Unlike cocos, straight junior subordinated bonds are subject to default risk and a recovery rate which, while set at a default level of 40 percent in CDS pricing models for corporate bonds, in fact is only about half as large (see Moody's 2011). If high-trigger cocos conversion happens when the bank is still a good distance from default, a recovery rate of up to 80 percent may very well be realised: the only requirement for this to be achieved is to ground the conversion price specified for the cocos issue in realistic expectations of the low stock price to be expected when capital ratios have declined to the trigger point and cocos are being converted. On the other hand, since high-trigger cocos conversion must come well before default, and be more frequent than default to the extent conversion succeeds in averting it, the probability of cocos conversion, π, will always be higher than the default probability on otherwise comparable non-cocos bonds.

With both π and ρ higher for cocos, and with π raising and ρ lowering R, it is not possible to state categorically which way the spread between them and otherwise comparable non-cocos junior subordinated bonds should go. An example may help explain that the values assigned to ρ and π for each of the two types of subordinated bonds are critical to the outcome. If the share price expected to prevail, should it come to conversion, is only 40 percent of what it was at the time of cocos issue, setting the conversion price equal to 50 percent of that share price at cocos issue would yield an expected ρ of 80 percent (i.e., 0.40/0.50). So if r* is 4.63 percent, ρ = 80 percent and $\pi_{conversion}$ = 8 percent for cocos, and r* = 4.63 percent, ρ = 20 percent, and $\pi_{default}$ = 2 percent for a bank's straight subordinated bonds, R = 6.23 percent for both types of instruments. However, the balance of required rates of return could easily tip either way. For instance, if the values of both ρ and π were cut in half on the cocos, their R would rise to 7.03 percent while remaining at 6.23 percent on the non-cocos debt. In theory, the IRS could then apply the non-contingent bond method and disallow the deduction of 80 bps of the interest paid by cocos issuers.

In actuality, the R required for cocos may be lower than suggested above. A selection of recent European USD cocos issues in my book (von Furstenberg 2014) shows that 7 out of 10 had an investment-grade rating of BBB- or higher from S&P and an average yield (R) in November 2013 of 5.64 percent. For that month, our chosen riskless rate (r*) averaged 4.63 percent, leaving a cocos-over-straight-AAA-bonds spread of 1.01 percent.

Benefits of issuing cocos as substitutes for other subordinated debt

Applying elementary accounting discipline is helpful to lay out the possible balance-sheet effects of cocos (C) issuance and convergence. The starting identity (1) below does not yet contain cocos, so that C_1 equals zero initially. However there are senior debt (S), non-cocos junior subordinated debt (J), and equity (E) on the liability side whose sum is equal to that of assets (A).

$$(1) \qquad S_1 + J_1 + E_1 = A_1$$

The changed amount of any particular liability or asset from its initial level is shown in parentheses in subsequent equations. Cocos in the amount C_1 are now introduced into the original pre-crisis balance-sheet equation (1) in two ways. They can be either a substitute for equity, say through a stock buyback, as in equation (2), or a substitute for some of the junior debt that is repaid, as is equation (3).

$$(2) \qquad S_1 + J_1 + C_1 + (E_1 - C_1) = A_1$$

$$(3) \qquad S_1 + (J_1 - C_1) + C_1 + E_1 = A_1$$

A financial crisis (subscript 2) then causes losses (L_2) to equity and equally to the book value of assets, which falls from A_1 to $A_2 = A_1 - L_2$ in both cases. In the second case, however, increasing debt J by the amount L_2 reverses the asset shrinkage, so that A_2 is restored to A_1 in equation (5). Indeed, increased borrowing rather than asset contraction may be indicated when the crisis is expected to be short-lived.

$$(4) \qquad S_1 + J_1 + C_1 + (E_1 - C_1 - L_2) = (A_1 - L_2)$$

$$(5) \qquad S_1 + (J_1 - C_1 + L_2) + C_1 + (E_1 - L_2) = A_1$$

If the operating losses are such as to drive the relevant capital ratios below their trigger level in both cases, no cocos are left on either balance sheet, but the effects of

cocos issuance and conversion remain visible in equation (7) that is based on equation (5).

$$(6) \qquad S_1 + J_1 + (E_1 - L_2) = A_1 - L_2$$

$$(7) \qquad S_1 + (J_1 - C_1 + L_2) + (E_1 - L_2 + C_1) = A_1$$

Equation (6) shows that if cocos were originally issued as a substitute for equity, a bank that subsequently encounters a loss of equity capital triggering conversion would find itself in the same position as if cocos had never been issued. Had the bank issued cocos as a substitute for non-cocos junior subordinated debt instead, its position after conversion would have been stronger as equation (7) shows more equity and less debt than (6). If the face amount of cocos issued happened to be equal to the size of the subsequent loss that caused them to be converted, so that $C_1 = L_2$, equation (7) would reduce to the pre-crisis equation (1): cocos would have proved perfectly loss absorbing.

How two G-SIBs have managed capital requirements and the introduction of cocos

According to Deutsche Bank's Annual Report for 2013 (DB 2014), its total assets were 1,611 billion euros, leverage exposure (LE) was 1,445 billion euros, equal to 90 percent of total assets, and risk-weighted assets (RWA) were a mere 350 billion euros, or 22 percent of total assets. By the end of 2013, DB's CET1 ratio had risen to 9.7 percent of RWA, but that ratio fell back to 9.5 percent by the end of Q1 2014. DB's goal of raising CET1/RWA to 10 percent within one year is modest when compared with the goals set by other G-SIBs in the area. UBS, for instance, met its goal of 13 percent for that capital ratio as early as Q1 2014, a goal which included a capital buffer equal to 3 percent of RWA above the required level. This buffer was to be sufficient to cope with a crisis stipulated in its stress test without suffering restrictions on the payment of dividends and stock buybacks.

The ECB is about to conduct its own stress test with new standards for capital adequacy and crisis preparedness. In preparation for that test, DB announced on 19 May 2014, that it was raising 8.5 billion euros from the sale of new shares to a private party and through rights issued to existing shareholders to boost its CET1 ratio from 9.5 percent to 11.8 percent. Assuming that the closing price of DB shares of 29.71 euros on 4 June 2014 in Frankfurt correctly valued the shareholdings just prior to the opening of the subscription period (6-24 June), the theoretical ex-rights price (TERP) is 28.14 euros by my reckoning. Hence existing shareholders could suffer a loss in value from the rights issue if the share price after the end of the subscription period would settle below the TERP and do so on account of the adverse signaling effects of the rights issue. The 26.77 euro closing price of DB on 25 June 2014 on the 'Börse Frankfurt' suggests that investors initially did not view the rights issue as value enhancing.

Cocos may offer a better way to raise regulatory capital ratios and buffers. If DB had issued AT1 cocos equal to 1.5 percent of its end-2013 RWA of 350 billion euros and T2 cocos equal to 2 percent of that RWA, it would now have 12.25 billion euro cocos outstanding. For comparison, UBS already placed four issues of write-down only cocos amounting to 5.3 billion euros, or 2.88 percent of its RWA, over two years ending February 2014. That same percentage of DB's RWA would amount to 10.1 billion euros. Having a total of 10 billion euro worth of cocos outstanding by the end of 2015 could help lift DB to being adequately buffered rather than comparatively thinly capitalized. In view of the 1.5 billion euro T2 issue already placed in 2013 and the 3.5 billion euros of AT1 write-down with optional write-up notes placed in May 2014, half of the 10 billion euro cocos would remain to be issued. The cocos issue would have to be even larger if it were also to provide for replacement on DB's books of the 11.3 billion euros of existing hybrid capital securities whose eligibility for AT1 or T2 is being phased out.

Conclusions

Cocos started to be issued in 2009 within a few years after first having been proposed by Flannery (see 2014). Since then some serious errors have crept into their design: for instance, by trying to fix recovery rates at either zero or 100 percent and by letting distressed banks sell cocos to agencies of their own government. Thus second thoughts about sustainability – the ability to replace cocos with new issues soon after they have been converted – and about the spillback of large losses into the banking system have begun to dog write-down-only cocos and have created renewed interest in cocos with a high expected recovery rate.

While cocos remain a work-in-progress in several respects, high-trigger cocos that convert into common

shares well before approaching the point of non-viability were found to have much to recommend them. Judicious choice of the conversion price per share translates into a large measure of control over ρ and hence the required spread of cocos over non-contingent subordinate debt. This spread may not be large and may not even be positive. Letting high-trigger cocos replace non-contingent subordinated debt could therefore be an excellent business decision requiring no regulatory mandates. It would only require that bank regulators and tax authorities give these cocos due credit for inclusion in AT1, and not only T2, and grant tax deductibility of the interest paid on them. Exposure to regulatory failure would be minimised.

Regulators, auditors, trial lawyers and prosecutors are, of course, still needed for oversight to limit the extent to which the capital ratio that serves as a cocos trigger and the leverage ratio that serves as a back-up can be gamed. Otherwise, these crucial ratios may be creatively inflated or otherwise misstated, thwarting prompt and automatic corrective action in which high-trigger cocos conversion should take the leading part.

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