1 Hybrid Assets

1.1 INTRODUCTION

This chapter provides a general introduction to the different categories of hybrid debt and delivers the basic knowledge needed to move deeper into hybrid territory. Hybrid instruments are often misunderstood and hence mismanaged. They are not equity instruments with bond-like risk. Neither are they instruments with bond returns flavored with equity risk. Further, it is also difficult to come up with a standardization when it comes to categorizing hybrid debt. In this introductory chapter we cover the obvious and well-known instruments, such as preferreds and convertible bonds. These are the cornerstones of corporate hybrid debt. The chapter also contains a primer on bail-in capital, contingent convertibles, and financial hybrid debt such as Tier 1 and Tier 2 bonds.

1.2 HYBRID CAPITAL

Hybrid securities are located at the crossroads between debt and equity. This asset class combines properties of common equity and corporate debt. The most outspoken subcategories of hybrid securities are convertible bonds and preference shares (preferreds). Further, in the capital structure of banks and corporates, one can also find quite often hybrid instruments belonging to the category of subordinated debt. These are hybrid bonds and have an equity-like character because of their long (sometimes perpetual) maturity, deep subordination, loss absorption, and the possibility of a coupon deferral. These securities illustrate that the split between debt and equity is a continuum and far from crystal clear. Moody's, Standard & Poor's (S&P), and Fitch have each developed their own proprietary methodologies to determine the equity character to be attributed to a hybrid bond. Needless to say, the outcomes sometimes differ very much between these three rating agencies for one and the same bond.

Hybrids have never received the same amount of attention from investors, the financial press, or researchers as the two main stream asset classes – bonds and equity. Investment banks have typically structured their trading operations in fixed-income and equity departments. The first desk covers corporate debt and senior debt, while the second desk takes care of equity trading. Bond and equity trading also has a much larger scope than hybrids. Equity trading is indeed much broader than just buying or selling shares. The equity derivatives market for listed or exotic options is enormous, and has in turn been given a boost with the rise of the structured product market. The same holds for the fixed-income desks, where trading corporate bonds has received support from the advent of the credit default swap (CDS) market. Credit derivatives offer the owners of corporate debt the possibility to buy protection on these securities. According to ISDA,[1] the gross notional amount of all CDS contracts outstanding was $25.9 tn on December 31, 2011. The size of this CDS market is a multiple of the GDP of

[1] International Swaps and Derivatives Association.

Table 1.1 ALCOA: Structure of the liabilities on the balance sheet (Q4, 2011). The equity component consists of share capital, retained earnings, and minority interests

Liabilities (mn USD)	
Current	6 013
Loans	3 750
Bonds	12 587
Convertible Bonds	575
Preferred	55
Equity	17 140
TOTAL	**40 120**

Source: Bloomberg.

the United States, which was by contrast $15.6 tn. Hybrids do not have a similar firm link with a vast underlying derivatives market. From this perspective, the hybrid market stands more or less on its own feet.

Companies use a wide spectrum of instruments to finance their balance sheet. Here also, equity and standard corporate debt dwarfed the hybrid bonds. Hybrids remain, without doubt, the smallest component on the average corporate balance sheet. ALCOA, an aluminum producer in the United States, has, for example, a $40 bn balance sheet financed through $17 bn of equity, a $3.7 bn loan, and $12.6 bn in bonds. The hybrid component of the liabilities is rather limited and consists of a $55 mn preferred and a $575 mn convertible bond (Table 1.1).

In Figure 1.1, we show an example of a capital structure including a new kid on the block, namely, the contingent convertible or CoCo. This newcomer in the hybrid family is typically issued by a financial institution and contributes to the loss absorbency of the balance sheet. Indeed, in case the regulatory capital of a financial institution fails to meet a predetermined level, these contingent convertibles convert into shares or suffer a write-down. One can consider them as automated measures to swap debt into equity or write down the face value of debt, without causing default.

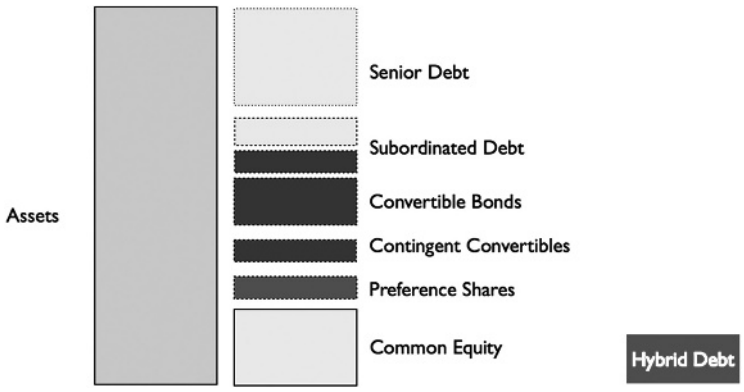


Figure 1.1 Sample balance sheet of a financial institution.

1.3 PREFERREDS

Preferreds are a straightforward mixture between debt and equity. These look at first sight like a combination between equity and bonds. Preferreds offer regular income payments, have no voting rights, and are senior to common stock since they have priority over common equity in dividends payouts. Are preferreds equity investments with bond-like characteristics or should we consider them as bonds with an equity-like behavior? We use the preferred share of ALCOA as a concrete example to develop a possible answer to this question. The ALCOA preferred pays a coupon of 3.75% on a face value of $100. This corresponds to a quarterly payment of $0.9375 every 3 months (January, April, July, and November). A summary of the instrument-specific features of the ALCOA preferred is given in the Table below.

ALCOA 3.75% Preferred			
ISIN	US0138172004	SEDOL	2021786
ISSUE DATE	January 20, 1947	CALL PRICE	100.00
ISSUE SIZE	55 M	FACE VALUE	100
STOCK	ALCOA INC	MATURITY	PERPETUAL
COUPON	3.75%	FREQUENCY	QUARTERLY

The closing price of the ALCOA preferred on April 20, 2012 was $83.56. We apply a yield measure such as a current yield on the ALCOA bond to compare this preferred security against the bonds of the same issuer. The current yield (CY) is given by:

$$\text{Current Yield } (CY) = \frac{\text{Coupon}}{\text{Bond Price}} = \frac{0.0375}{83.56} = 4.49\% \tag{1.1}$$

The current yield indicates the annual income one earns on an investment in this preferred security if everything else remains unchanged. Under this assumption, the price of the preferred itself does not change. Through the current yield one looks at a preferred as a pure income instrument such as a bond. The theoretical price P of an instrument paying a perpetual cash flow C given an interest rate r is given by:

$$\begin{aligned} P &= \lim_{n\to\infty} \frac{C}{(1+r)} + \frac{C}{(1+r)^2} + \frac{C}{(1+r)^3} + \cdots + \frac{C}{(1+r)^n} \\ &= C \sum_{i=1}^{\infty} \frac{1}{(1+r)^i} = C \sum_{i=1}^{\infty} x^i \end{aligned}$$

Using the convergence of series $\sum_{i=0}^{\infty} x^i$ to $\frac{1}{1-x}$ we obtain:

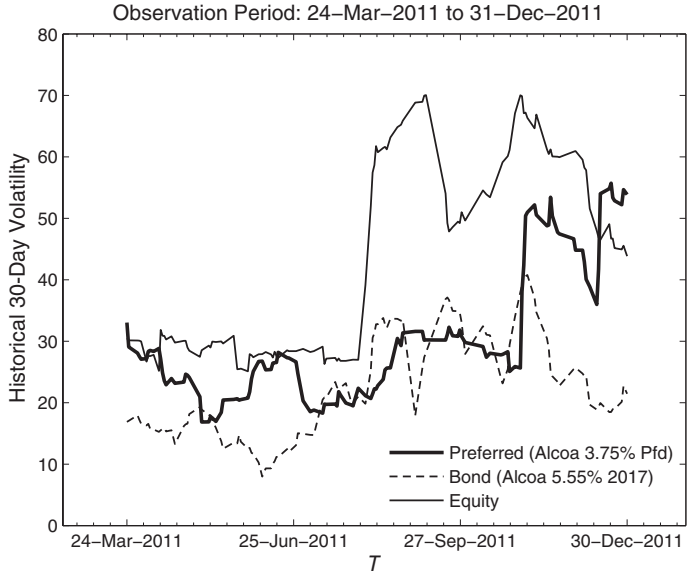
$$P = \frac{C}{r}$$

Given a 30-year US government bond rate of 3.12% on April 20, 2012, the theoretical price of the ALCOA preferred would hence be equal to $120.19 = ($3.75/0.0312). This value is considerably higher than the actual closing price of the preferred on that day. The difference is explained by the financial risk of the preferred. The income stream generated by a preferred is indeed not risk free. The dividend or coupon payments can be canceled by the issuer without

triggering an immediate default event as would be the case for a bond. For preferreds, a failure to pay the dividend does not invoke a default on the issuing company. As a result, investors demand a higher yield. The ALCOA preferred is yielding 137 bps more than a risk-free security such as a US government bond of a similar maturity. This yield difference is the compensation for the dividend-suspension risk of the ALCOA preferred.

Further, there is a cumulative dividend right attached to the ALCOA preferred. This implies that the unpaid accumulated preferred stock dividends must be paid before any dividends are paid out to the common stock holders. Hence, if there was a suspension in the dividend stream of the preferred security, the share holders would rank after the preferred bond holders. In such a situation, ALCOA would only be allowed to start paying out dividends to the share holders after the holders of this preferred stock had received all the dividends canceled earlier.

It is tempting to categorize an instrument such as a preferred, that distributes on a timely basis a fixed cash flow, as a bond. The fact that this instrument ranks just above common equity on the balance sheet, however, signals a different message. From that perspective one could indeed imagine that preferreds are shares in disguise and carry the same volatility as equity. In Figure 1.2, the historical 30-day volatility of the ALCOA preferred is plotted against the price volatility of the shares and a corporate bond issued by ALCOA. This graph illustrates how early 2011, the preferred demonstrated a volatility close to bond volatility, whereas in the final months of 2011, the opposite is true. The preferred then became as volatile as the listed shares of the same issuer. The graph in Figure 1.2 compares the volatility of preferreds, bonds, and equity using the annualized realized volatility over a 1-month period. This 1-month period is a rolling window for which a realized volatility number is calculated. A similar graph can be constructed for a different rolling window (3-month, 6-month, etc.). Doing this for a lot of different time periods allows us to construct a volatility cone as explained in [46]. To



Source: Bloomberg.

Figure 1.2 Historical 30-day volatility of some of the asset classes funding the ALCOA balance sheet: equity, bonds, and preferreds.

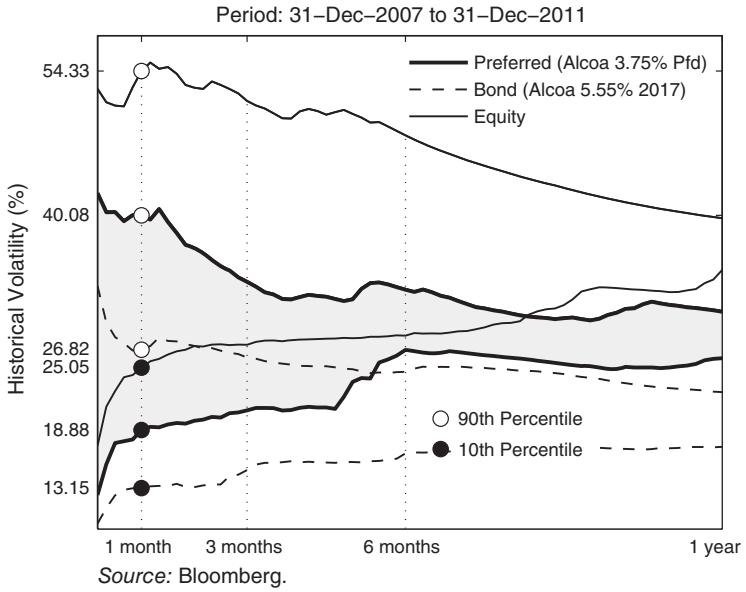


Figure 1.3 Volatility cone of a preferred, the equity, and a corporate bond issued by ALCOA. Period 2003–2013.

achieve this result, both the 90th and the 10th percentiles for each of these rolling windows are connected on a graph. The volatility cone for ALCOA for the period 2003–2013 can be found in Figure 1.3. A volatility cone is an interesting graphical snapshot view of the historical volatility of an asset.

From the sample volatility cone of ALCOA, we learn that the cone and therefore the risk of the preferred share is at an intermediate level between the cone of the shares and the volatility cone of a corporate bond. For the 1-month time horizon, the 90th percentile of the realized volatility is 54.33% for shares, 26.82% for bonds, and 40.08% for preferred shares. This illustrates the higher risk of the preferred compared with a standard corporate bond from the same issuer. With the help of the volatility cone, one can look under the hood of this bond-like instrument and discover a higher level of embedded risk.

1.4 CONVERTIBLE BONDS

Another instrument within the hybrid family is the convertible bond. The total amount of outstanding convertible bonds at the writing of this book equals $469 bn spread across 1960 different issues.[2] Basically, these instruments can be regarded as corporate bonds where the investor has the right to convert the bond into shares. This conversion right is restricted to the investor only. It is not an obligation and hence remains at the discretion of the investor. Therefore, conversion is labeled as optional. The number of shares received upon conversion is typically outlined in the prospectus and is called the conversion ratio (C_r). After conversion, the investor forgoes the remaining coupons (c) and the final cash redemption of the face value

[2] *Source:* UBS.

(N) of the convertible bond. The conversion price (C_P) is the embedded purchase price of the shares obtained through conversion:

$$C_P = \frac{N}{C_r} \tag{1.2}$$

ALCOA 5.25% March 15, 2014			
ISIN	US013817AT86	SEDOL	B65YPD6
ISSUE DATE	March 24, 2009	ISSUE PRICE	100%
ISSUE SIZE	575 mn	FACE VALUE	1000
STOCK	ALCOA INC	MATURITY	March 15, 2014
CONVERSION RATIO	155.4908	FREQUENCY	SEMI-ANNUAL
REDEMPTION	100.00%	RANKING	SENIOR UNSECURED
COUPON	5.25%		

In March 2009 ALCOA issued a $575 mn convertible bond distributing a semi-annual 5.25% coupon. A summary of the structure of this convertible can be found in the Table above. The bond expires on March 15, 2014. The owner of the bond has an opportunity up till this final maturity date to convert the bond into shares. If the investor skips this conversion, the final payout will be $1000 plus the final coupon of $26.25. By contrast, if the investor opts for the conversion, he receives 155.4908 shares of ALCOA with value S_T. A rational investor maximizes his final payout P_T at the expiration date T:

$$P_T = \max(C_r \times S_T, \$1026.25) \tag{1.3}$$

Similar to preferreds, this asset class blends bonds and equity into one structure. The extent to which a convertible bond behaves like a bond depends on the level of the share price. A low share price at time $t < T$ makes conversion unlikely; the investor is better off receiving coupons instead of converting the bond in cheap shares. The convertible bond has in such a case the price dynamics of a corporate bond and is sensitive to changes in interest rate and credit spread levels. The value of the convertible P_t is said "to trade close to the bond floor" (B_F). The bond floor is the corporate bond component of the convertible. It is calculated as the present value of all the cash flows embedded in the convertible bond while neglecting any possible conversion into shares. This is also often called the investment value of the convertible.

High prices of the underlying share lead to high conversion probabilities and the value of the convertible is then close to parity (P_a). Under such circumstances, the value of a convertible is definitively more a share than a bond:

$$P_t \approx P_a = \frac{C_r S_t}{N} \tag{1.4}$$

The parity or conversion value of a convertible represents the value of the amount of underlying shares received upon conversion per bond.

The convertible bond market is far from standardized. Bond structures are quite different across issues. They differ not only in basic features such as coupon structure, conversion ratio, or maturity. There is more, since each convertible bond comes with additional features

impacting its price and properties. In Chapter 2, features such as calls, puts, refixes, dividend protection, etc. will be discussed in detail.

1.5 CONTINGENT CONVERTIBLES

Contingent convertibles, contingent capital, CoCos, buffer convertible capital securities, enhanced capital notes, etc. are all different names for the same kind of capital instrument issued by a financial institution. Having different names for one and the same instrument clearly adds to the confusion surrounding this new asset class. The contingent convertible market is in its infancy and lacks standardization. There is no such thing as a typical CoCo structure. In a nutshell, a contingent convertible comes down to a standard corporate bond issued by a bank that can absorb losses without triggering a default for the issuing bank. The loss absorbency is obtained by writing down a predetermined fraction of the face value of the bond or by converting the bond into shares of the underlying bank.

The market for contingent convertibles kicked off in December 2009 when the Lloyds Banking Group launched its $13.7 bn issue of enhanced capital notes. This issue was spread over a number of bonds with maturities ranging from 10 to 22 years. This first CoCo issue was set up as an exchange for existing hybrid securities issued by Lloyds. Next in line was Rabobank, which made its first entry in the market for contingent debt with a €1.25 bn issue early 2010. After this, things turned quiet until February 2011, when Credit Suisse launched its so-called buffer capital notes. This issue ($2 bn) turned out to be quite popular and was more than 12 times oversubscribed. Yield-hungry investors were lining themselves up to include this new asset class in their portfolios. The Credit Suisse issue took place against the background of the new regulatory regime in Switzerland that requires large banks to hold loss-absorbing capital up to 19% of their risk-weighted assets [58]. This capital has to consist of at least 10% in common equity and up to 9% in contingent capital.

The start of this new asset class was met with significant skepticism from market practitioners, regulators, and scholars, involving heated debates. However, the CoCo issuance in the first quarter of 2012 equaled $3.7 bn, which corresponded more or less to 30% of the convertible bond issuance over the same period. The dust is clearly settling and regulatory initiatives throughout the financial world have helped CoCo bonds to earn an accepted position in the capital structure of banks. In Europe, during the period 2009–2013, approximately $40 bn was issued of this new category of debt. In Chapter 3, the concept of contingent convertibles, their valuation, and market risks will be covered in detail.

1.6 OTHER TYPES OF HYBRID DEBT

1.6.1 Hybrid Bank Capital

Innovative Tier 1

The financial industry is quite unique as it has to adhere to restrictions and regulations when it comes to capital structure. Corporates in other sectors of the economy are free to decide to what extent they want to use leverage. When such a company over-extends its debt and runs an unhealthy balance between the amount of equity and debt, it becomes vulnerable to economic shocks. An over-leveraged company may not be able to deal with disappointing

earnings following a slow-down in its business. This could possibly lead to a bankruptcy and could create some ripples within the economy if the company is large enough.

A failure of a bank, on the other hand, may easily send a real shock wave through the economic system, thereby bringing other financial institutions to the brink of collapse. The Basel Committee of the Bank of International Settlements (BIS) develops guidelines and supervisory standards in banking supervision. This committee has a clear focus on banking stability. In July 1988, the committee published its first work "international convergence of capital measurement and capital standard" [17], subsequently better known as Basel I or the Basel Capital Accord. Basel I came with two novelties: it defined the two basic building blocks of banking or regulatory capital and it laid out a minimum requirement for these components.

Regulatory capital can be decomposed conceptually into Tier 1 capital and Tier 2 capital.[3] Tier 1 capital should reflect high-quality capital that is able to absorb bank losses in a going-concern context, whereas Tier 2 capital was originally supposed to absorb losses only in a gone-concern context. The concept of regulatory capital has disappointed during the credit crisis of 2008, as its quality, consistency, and transparency showed fundamental flaws [144]. The large bank losses that materialized during the crisis highlighted the important economic differences between the Tier 1 and Tier 2 components of regulatory capital. Because Tier 2 capital (such as subordinated debt) was only loss absorbing after a bank had been declared bankrupt, banks needed to raise new equity to remain solvent notwithstanding their non-negligible stock of Tier 2 capital. Furthermore, banks disposed of surprisingly little capital that was effectively loss absorbing, despite very high reported Tier 1 capital ratios. In the end, so-called Common Equity Tier 1 (CET1) capital, a subcomponent of Tier 1 and solely composed of retained earnings and common equity, turned out to be the only loss-absorbing building block of the capital structure. Equity indeed never has to be paid back and the company has full discretion on how to reward the share holders through the distribution of dividends.

In a speech given at the American Economic Association in 2001, Andrew G. Haldane, Executive Director of the Bank of England, elaborated on the amount of Tier 1 capital and the ability of a bank to withstand a shock on the assets side of its balance sheet. It was shown how, for a group of major financial institutions which in the fall of 2008 either failed or required government support, the Tier 1 ratio[4] was increasing as the credit crunch was about to start. The signaling power of these improving Tier 1 ratios wrong-footed the market as far as these particular banks were concerned [114].

The Tier 1 bucket has never been designed to be filled with hybrid instruments only. However, because interest rate payments are tax deductible while dividend payments are not, financial engineering pushed banks to create innovative Tier 1 instruments. In fact, banks have been relying heavily over the period 1995–2008 on innovative Tier 1. These instruments are quite different from convertible bonds and contingent convertibles. The latter securities have an outspoken hybrid nature because the probability of a conversion into shares is part of the instrument setup. At expiration, the investor in these instruments will either end up with shares or with the face value of the bond. This is not the case for innovative Tier 1 instruments. These typically do not convert into shares but earn their hybrid status from the fact that the nature of these instruments is equity like: permanent character and coupon deferrability being part of these "equity" properties. To illustrate the hybrid nature of the innovative or additional Tier 1 bonds compared with more traditional forms of debt, one can take a look at two particular

[3] The Tier 3 category disappears in Basel III.

[4] The Tier 1 ratio relates the total amount of Tier 1 capital a bank has at its disposal to the value of the risk-weighted assets.

Table 1.2 Characteristics of a hybrid and senior bond issued by Société Générale

	Société Générale	
Bond Type	Tier 1	Senior Unsecured
Issue Date	January 26, 2005	April 20, 2011
S&P Rating	BBB	A
Maturity	Perpetual	April 20, 2016
Coupon (%)	4.196	4
Coupon Frequency	Annual	Annual
Possibile Coupon Deferral	Yes	No
Par Amount	1000	100 000
ISIN	FR0010136382	XS0618909807
Call Date	January 26, 2015	
Call Price	100%	
Step-Up Coupon	3M EURIBOR + 153 bps	
Price (%)	67.500	103.675

Source: Bloomberg. Date: April 27, 2012.

examples. In Table 1.2, there is a short description of a hybrid Tier 1 bond and a senior bond, both denominated in euros and issued by Société Générale, a French bank:

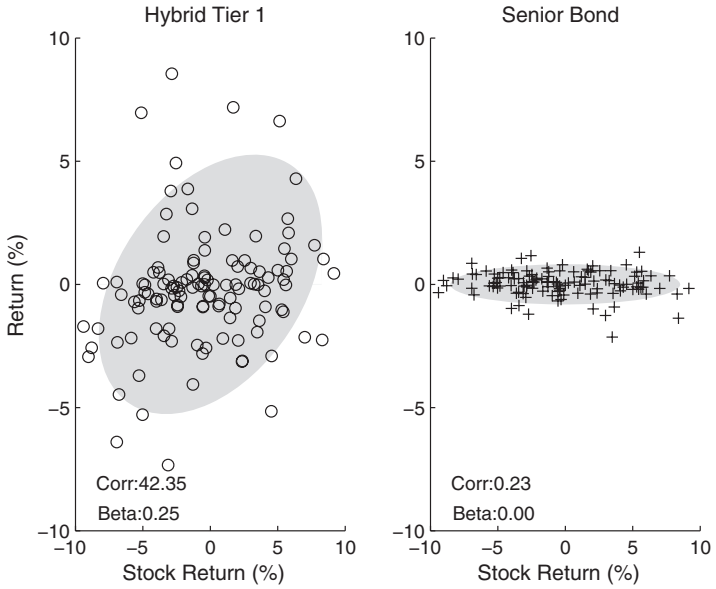
- **Senior bond**
  The senior bond received an A rating from Standard & Poor's, has a 4% annual coupon, and has a remaining maturity of almost 4 years. The coupons have to be paid by the issuer to the bond holder. Failure to do so would trigger a default of this bank.
- **Hybrid Tier 1**
  The Tier 1 bond is perpetual but comes with a first call date 10 years after the issue date. If Société Générale skips the call, the coupon structure changes and the bond turns into a floating rate note where the bank is paying 153 bps over Euribor. The hybrid carries a possibility that in case of unsatisfactory capital ratios, the interest on this debt might not be paid. Such an event does not push the issuing bank into default, however.

Studying the price returns of both bonds of Table 1.2 in the second half of 2011 reveals the equity nature of Tier 1 debt. There is no direct relationship between the Tier 1 bond and the underlying shares according to the prospectus. Nevertheless, the perpetual nature of the bond and its deep subordination make it sensitive to share price movements. In Figure 1.4, the daily log returns[5] of Société Générale's share prices are plotted against the daily log returns in the senior and Tier 1 bond. The beta[6] of the Tier 1 returns versus the share price returns is 0.25. Every percentage move on the stock therefore, on average, implies a 25 bps move on the bond. The correlation between the two time series is 42%. By contrast, the senior bond's price changes are clearly not correlated to share price changes. This example illustrates the equity character of innovative Tier 1 structures and hence also their hybrid nature.

Similar to preferreds, the coupon payments on these innovative instruments can sometimes be deferred in times of financial distress. This will act as a loss-absorbing buffer. Similar to our Société Générale example, Tier 1 hybrids often come with a call option and a corresponding

[5] A log return or logarithmic return of a variable X between two different dates t_0 and t_1 is given by $\log(X_{t_1}) - \log(X_{t_0})$ with $t_0 < t_1$.

[6] The beta (β) of a bond, stock, or portfolio is a number describing the volatility of this asset in relation to the volatility of a reference asset. Beta measures the sensitivity of the returns of the asset with respect to changes in the price of the reference asset.



Source: Bloomberg.

Figure 1.4 Daily log returns of the share price of Société Générale versus the return of a Tier 1 hybrid and a senior unsecured bond. Observation period: June 30, 2011 to December 30, 2011.

step-up clause. If the bank does not buy back the bond on the call date, the coupon is increased with a predetermined step up. This step-up penalty would indeed create an incentive for the bank to redeem this hybrid Tier 1 on the call date. This early redemption possibility, however, is against the nature of Tier 1 instruments which should have a perpetual character. On top of this, such bonds failed to absorb losses in the 2008–2009 credit crisis. It is, therefore, no surprise that similar Tier 1 instruments with a step-up coupon have been outlawed in Basel III and lose their top-notch capital status. This has prompted financial institutions in 2012 to start buying back these hybrids and replacing them with new Basel III-compliant regulatory capital. The phasing out of this kind of hybrid debt by Basel III is going to take place gradually up to the full implementation of these new capital adequacy rules on January 1, 2019.

Tier 2

Tier 2 bonds rank above equity and Tier 1 bonds. These bonds are subordinated to senior debt and are loss absorbing on a gone-concern basis. Tier 2 has also been impacted by the August 2010 proposal of the Basel Committee regarding the loss absorbency of regulatory capital [26]. All non-common Tier 1 and Tier 2 instruments at internationally active banks must have a clause in their terms and conditions that requires them to be written off or converted into shares on the occurrence of a non-viability event. This non-viability event is the earlier of (1) the decision to make a public-sector injection of capital, without which the bank would become non-viable and (2) a decision of the national regulator to write off the debt, without which the firm would become non-viable.

A hybrid Tier 1 – such as the one we used as an example in Figure 1.4 – creates for the investor an undesired loss-absorption risk. The interest payments can indeed be canceled by

Table 1.3 Characteristics of a callable Tier 2 bond issued by Deutsche Bank

Deutsche Bank	
Bond Type	Tier 2
Issue Date	January 16, 2004
S&P Rating	BBB+
Maturity	January 16, 2014
Initial Coupon (%)	3.875
Coupon Frequency	Quarterly
Possible Coupon Deferral	No
Par Amount	1000
ISIN	DE0003933511
First Call Date	January 16, 2009
Call Price	100%
Call Notice	30 Days
Step-Up Coupon	3M EURIBOR + 88 bps
Price (%)	97.90

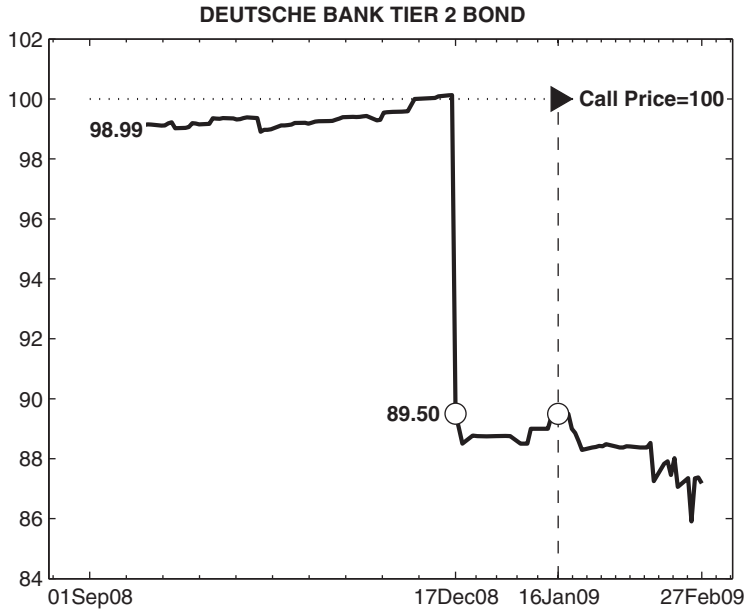
Source: Bloomberg. Date: April 25, 2012.

the issuer. This is a **deferral risk**. There is another type of risk that will be explained in this book: **extension risk**. This is the risk that the company will not call back the bond on the first call date. Because of this, the life of the bond is extended at least till the next call date (if any). This would push the repayment of the redemption amount further into the future. A Tier 2 bond issued by Deutsche Bank will be taken as a case study to illustrate the risks of buying such a callable bond while ignoring its hybrid nature. The characteristics of the bond have been defined in Table 1.3. The total issue size of the bond is €1 bn.

The call notice for the bond was 1 month. This implies that the company had 30 days to let the investors know whether or not it was going to call. Deutsche Bank had as issuer of this bond up till December 16, 2008 to make up its mind, given the fact that the first call date of the bond was January 16, 2009. The market was clearly expecting Deutsche Bank to call the bond and pay back €1 bn. The price of the bond was indeed smoothly converging to the call price and seemed to be immune to the turmoil in the financial markets in the fall of 2008. This is illustrated in Figure 1.5. Deutsche Bank's decision not to call back the bond generated a 10% loss for the investors holding this particular bond in their portfolio at the moment Deutsche Bank decided not to call. Investors had been valuing the bond on the basis that the first call date would indeed be the maturity date of the bond when they would receive the full par amount. Their assumption was based on the belief that Deutsche Bank would be facing a step up in the interest payments if they skipped the call. In case of such a call, the initial coupon of 3.875% would be replaced by a quarterly floating Euribor rate with a spread of 88 bps.

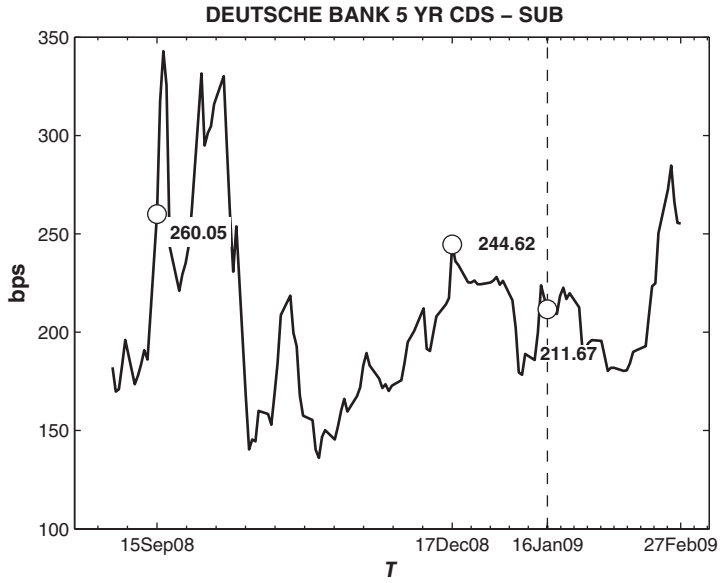
Rationally, Deutsche Bank did the right thing not calling the bond. As a financial institution it was, like other banks, witnessing a flight to quality during the 2008 credit crisis. Investors preferred government bonds above bank debt. The share price of Deutsche Bank suffered and the CDS spreads increased (see Figure 1.6). Therefore, it became more expensive for an investor to buy insurance on the CDS market against a default on bonds issued by Deutsche Bank. On December 17, 2008 the CDS spread was 244.62 bps.[7] If Deutsche Bank had to call

[7] A basis point on a credit default swap protecting €10 mn of debt from default for a period of 5 years is equivalent to €1000 per year.



Source: Bloomberg.

Figure 1.5 Price of Deutsche Bank's Tier 2 bond and the impact of skipping the first call date.



Source: Bloomberg.

Figure 1.6 5-Year CDS rate for Deutsche Bank's subordinated debt.

back the issue and refinance the total amount of €1 bn, it would pay much more than the extra cost of facing the step up in the coupon.

1.6.2 Hybrid Corporate Capital

A corporate hybrid is a long-dated, deeply subordinated debt instrument with cancelable coupons issued by a non-financial institution. Sometimes this debt instrument has one or more embedded issuer calls. If the issuer forgoes the call and keeps the bond alive, the post-call-date coupon structure changes. For the issuer, there is an interest rate charge increase with a predefined step up. During the month of January 2013 there was a record $14 bn issuance of corporate hybrids. One hybrid issued by EDF, a major French utility, had an issue size of $4 bn. Corporate issuers seek, through hybrids, benefits for the funding of their balance sheets. Corporates typically protect the rating of senior notes through the issuance of lower-rated hybrid instruments in order to obtain "cheap equity" [135]. A credit analyst will welcome the fact that a new source of funding has been used which is deeply subordinated to senior debt. A wide variety can be observed in the corporate hybrids that have been issued so far. The differences between these corporate hybrid bonds can be organized along three different axes: coupon payments, permanence, and subordination.

- **Coupon payments**
  Most hybrids come with a coupon, the payment of which can be skipped at the discretion of the management of the company (**optional deferral**). A **mandatory deferral** corresponds to a case where a breach of a financial ratio would trigger the non-payment of the coupon. The deferrals on the coupon payments can be **cumulative** or **non-cumulative**. In the first case, the issuer has to deal with the coupon payments that were deferred in the past before any new coupons or dividends can be paid out. There is also a connection between the payment of the dividends on the common stock and the coupon payments on hybrid debt. A **dividend or coupon pusher** would force hybrid coupon payments if a dividend payment on common stock had taken place. In some cases a **lookback period** is combined with a coupon pusher. Coupon payments are pushed to the holder of the hybrid if the issuing company has rewarded its equity investors with a dividend payment during this lookback horizon. The opposite case is that of a **dividend stopper**, where the deferral of a coupon payment on a hybrid bond eliminates any dividend payment on common stock.
- **Permanence**
  The equity nature of a hybrid bond increases with the maturity of the bond. A rating agency will typically view the absence of a specific maturity date, such as in the case of a perpetual bond, as a factor to give more equity credit to a hybrid bond [164]. The existence of a call date with a step-up coupon would weaken the equity profile as this could force the issuer to redeem the structure prematurely in order to walk away from the higher interest charge on the bond. For the investor, the mere existence of an issuer call introduces uncertainty regarding the final maturity date of the bond. This uncertainty is labeled "extension risk." An example of this kind of risk was illustrated in Figure 1.5 when we covered an unexpected extension of a hybrid bond issued by Deutsche Bank. In the space of corporate hybrids we find a similar example in Nufarm, an Australian company specializing in the development and marketing of crop-development products. In November 2011 it decided not to call back its hybrid bond on the first call date. What was originally a 5-year security immediately shifted into a perpetual bond with a semi-annual call. The company accepted to pay the step-up percentage of 2%.

Table 1.4 Characteristics of a hybrid bond issued by Bayer

	Bayer
Bond Type	Hybrid
Issue Date	July 29, 2005
S&P Rating	BBB−
Maturity	July 29, 2105
Initial Coupon (%)	5.00
Coupon Frequency	Annual
Optional Coupon Deferral	Yes
Mandatory Coupon Deferral	Yes
Par Amount	1000
ISIN	XS0225369403
First Call Date	July 29, 2015
Call Price	100%
Step-Up Coupon	3M EURIBOR + 280 bps
Price (%)	99.71

Source: Bloomberg. Date: April 30, 2012.

- **Subordination**
  The subordination is another factor when it comes to categorizing the equity nature of a hybrid security. Deeply subordinated debt will receive more equity credit.

An example of a hybrid bond issued by a corporate is the 100-year €1.3 bn bond issued by Bayer in 2005 (see Table 1.4). This bond is callable after 10 years with a step-up feature. The bond carries a deferral risk on the coupon payments. This interest payment deferral is both optional and mandatory:

- Optional deferral. At the discretion of Bayer, the issuing company, the coupon payments can be omitted. This deferral is cumulative.
- Mandatory deferral. On a so-called cash flow event, the issuing company is not allowed to distribute the coupon payments on this bond. The issuer can then voluntarily decide to make up such unpaid interest within 1 year following the suspension of the coupon payment. The cash flow event would occur if the consolidated cash flow of the issuer is less than 7% of the revenues of the company.

There is no standardization at all in corporate hybrids. There is an extreme range of structuring possibilities when it comes to designing the optimal bond structure. This results in a wide variety of issued hybrids. There is a continuum that ranges from the very bond-like structures with a fixed maturity to the more equity-like perpetual structures with non-deferrable coupons.

1.6.3 Toggle Bonds

A toggle bond is a debt instrument where the failure to pay a coupon will be compensated by increasing the size of the future coupons. This hybrid instrument has a very high junk-bond status and contains compensation for the investor that can take place in two different ways.

- **Cash**
  The coupon will be increased when the upcoming coupon payment cannot be made in time. This is where toggle bonds deserve their junk-bond status. A company is literally allowed to fill up a hole while digging a bigger one.

- **Payment in kind (PIK)**
  The PIK bond gives the issuer the flexibility to allocate more bonds to the investor in case the debt schedule cannot be made. The deferred coupon payment is added to the balance of the bond. The default rate of this kind of debt was very high during the 2008 subprime crisis. The post-2008 deals carry outspoken limits that specify to what event new debt can be issued to make up for the missed coupon payments.

1.7 REGULATION

National regulators have been implementing new regulations after the credit crunch, much of this under the leadership of international bodies such as the Basel Committee or the FSB. As explained in Section 1.5, CoCos are an example of an offspring of these new laws and rules that came into being after 2009. Central banks all over the world had to bail out banks using tax-payers' money. Since then, regulators have been under ongoing pressure from the public to make sure this never happens again. Two options were available to the policy makers [105]. First of all they could impose measures to make the bankruptcy of a bank less likely. A second measure would focus on making the impact of such a default on the financial system as small as possible. The failure of Lehman Brothers in September 2008 triggered an avalanche of financial distress throughout the world. This is the contagion risk that regulators need to deal with going forward.

1.7.1 Making Failures Less Likely

The failure of a bank can be made less likely by reducing the likelihood that the bank will incur large losses on its operations. An investment bank running a complex portfolio of structured products likely runs a higher risk than a retail bank following a traditional banking model where it produces moderate but stable returns. The Volcker rule is a specific section of the Dodd–Frank act named after Paul Volcker, a former chairman of the Fed, that deals with this specific risk. This rule restricts banks in their proprietary operations and prevents them from owning large stakes in hedge or private equity funds. A similar initiative has been taken in the UK following the publication of the report of the Independent Commission on Banking (ICB), chaired by Sir John Vickers. This so-called Vickers report [123] proposes ring-fencing, a clear separation and segregation between the retail business of a bank and its trading operations.

The Basel Committee on Banking Supervision has made, in its Basel III proposal, a push for a higher minimum regulatory capital. Not only the minimum capital for banks was to be increased, but also the quality of the required capital had to be higher. The Basel Committee made it clear that a capital instrument could only be considered as regulatory capital if it was truly loss absorbing [26]. All of the Basel III initiatives aim to make government-led bail-outs less likely.

1.7.2 Making Failures Less Disruptive

In March 2008, investors were watching very closely the difficult situation in which Bear Stearns, a US investment bank, had landed itself. The questionable liquidity of the assets on the balance sheet of Bear Stearns fed rumors that the Bear had cash problems. Meanwhile the share price had been sliding down for over a year, going from $164.06 on February 1, 2007 to $57 on March 13, 2008 – the day before its earnings announcement. When the share price of Bear Stearns lost another 50% after this announcement, the Federal Reserve Bank of New

York stepped in. Their actions led to the take over of the ailing investment bank by JP Morgan Chase. On March 17, 2008 JP Morgan Chase had offered to acquire Bear Stearns at a price of $2 per share, a fraction of its value a month earlier. The bid was subsequently increased to $10 per share and the acquisition was concluded on April 8, 2008. To make the deal attractive to Jamie Dimon, the CEO of JP Morgan Chase, the Federal Reserve (the "Fed") had agreed to take $30 bn of the losses on the worst assets of Bear Stearns [178]. The Bear Stearns tragedy was absorbed very well by the market and the financial system seemed resilient enough when it came to absorbing losses. Only 6 months later, the market turned out to be less able to deal with the failure of a big international player. The bankruptcy of Lehman Brothers sent shock waves throughout the financial system. The aftermath of the default of Lehman Brothers extended beyond the United States. In fact, it was the administration process in Europe which proved to be most difficult. The US part of the Lehman business had been acquired by Barclays, while the administrators of the European business of Lehman Brothers, with its headquarters in London, had a most difficult time sorting things out [128]. The administrators had to understand the business and operational workflow first, before they were able to make decisions. This was an almost impossible task given the complex structure of the bank, the complexity of the assets on its portfolio, and primarily because most ex-Lehman staff were landing jobs at other financial institutions. Those who knew and could help were not around any more . . . Cleaning up the Lehman debris took a very long time. Major banks are now working with their regulators to produce so-called "living wills" [56]. These are road-maps to explain how to orderly wind down the bank in case of a bankruptcy. As such, a living will also explains the different relationships within the same banking group.

1.8 BAIL-IN CAPITAL

When a bank is bailed out with tax-payers' money, external funds are used to recapitalize the bank or to cover its losses. This rescue operation can take place by relying on an external resolution fund (RF) or a deposit guarantee scheme (DGS). In both cases this is a form of state aid. A deposit guarantee reimburses a limited amount of the deposits to depositors whose bank has failed. In the member states of the European Union the cap on a DGS payout is €100 000. The safety of the deposits is guaranteed by a national agency in the home country of the bank. Examples of such institutions are the Federal Deposit Insurance Corporation (FDIC) in the USA and the Financial Services Compensation Scheme (FSCS) in the UK. One could argue that a country using a DGS introduces a moral hazard in its banking system. Banks know that whatever the outcome of their actions, the deposits will be guaranteed by the government. The existence of such a bail-out mechanism could stimulate them to take excessive financial risks in order to achieve higher returns. Without a DGS, in contrast, investors would only open a deposit with the safest banks of their country.

Bail-in capital is a different solution since it will force bond holders to take their burden of the bank's losses. A bail-in bond can be written down or converted into shares immediately before the financial institution reaches a state of bankruptcy. This is a more extreme construction than a contingent convertible, where the haircut or conversion only takes place when the bank is still a going concern. CoCos recapitalize the bank when its capital ratios are considered too weak, not when the bank is on the brink of collapse.

Bail-in bonds would impose the burden on the bond holders not on the tax payers. At the same time that the bonds are bailed in, the regulators can take other forceful measures: the existing equity of the bank can be wiped out and the management of the failing bank can be

Table 1.5 Bail-in losses in Ireland

Bank	Date	Amount (EUR mn)	Loss (%)
Anglo Irish	20-Oct-10	$1600	80–95
Bank of Ireland	8-Jun-11	$2600	80–90
Allied Irish	11-May-11	$2600	77.5–90

Source: Barclays.

replaced. The regulator might even force the bank to sell some of its assets. Such a bail-in mechanism would allow the bank to continue to operate, thereby avoiding any disruption to the financial system. Bailing in bonds is a harsh but swift solution. A customer of a bailed-in bank is not supposed to notice a difference on a Monday morning when the bail-in mechanism was applied during the weekend. Paul Calello, the former head of the investment banking business of Credit Suisse, and Wilson Ervin, its former chief risk officer, examined how a bail-in might have been applied in the case of Lehman [47]. They came to the conclusion that Lehman might have been saved if its subordinated bonds had been bailed in and converted into shares together with a smaller haircut imposed on the senior bonds.

Anybody taking a first glance at the bail-in solution will advocate that bond holders are forced to take their share of responsibility whereas a bail-out solution would keep the same bond holders alive thanks to tax payers' money. Is the use of bail-in bonds therefore a big plus? There are strings attached to the bail-in solution. Some tax payers will still be picking up part of the bill when a bail-in is used to save a bank. These individuals will find out, for example, that they have nevertheless been hit by the bail-in because their pension fund had some of its assets invested in bail-in bonds. Tax payers' money might not have been used directly but the bottom line remains the same.

An example of a bail-in can be found in some Irish banks, where this punitive solution was imposed on some of the bonds of Allied Irish, Bank of Ireland, and Anglo Irish during the Irish banking crisis in the period 2010–2011. The losses ranged from 80% for Lower Tier 2 (LT2) bonds to 95% of the principal for the Tier 1 (T1) bond of Anglo Irish Bank (see [148]). Senior debt was, in this bail-in exercise, left out of the burden sharing. A summary can be found in Table 1.5.

1.9 RISK AND RATING

1.9.1 Risk

The source of the market risk inherent in the category of hybrid instruments is directly linked to their ranking within the balance sheet. Hybrid capital instruments rank just above equity. The recent turmoil in the financial markets has been a very good example to illustrate the risk profile of this kind of debt. The year 2008, and especially the last 3 months of that year, was a period where the credit crunch left a scar on multiple portfolios. In the spring of 2011, a new crisis erupted. This second crisis, a sovereign debt meltdown, started in Europe with Greece and soon spread out all over Italy, Spain, and Portugal. In the bear market years (2008 and 2011), hybrids were doing particularly badly. Their deep subordination and high equity content pushed their returns clearly close to where the equity markets were performing in those periods. In Table 1.6, one can find an overview of the returns of four categories of hybrid

Table 1.6 TIER 1: Markit Iboxx Tier 1 Index, TIER 2: Markit Iboxx Lower Tier 2 Index, SENIOR: Markit Senior Bank Index, PREFERRED: S&P US Preferred Index, CONVERTIBLE: BofA Merill Lynch Global Convertible Index, MSCI: MSCI World Index

	FINANCIALS		**GENERAL**			
Year	TIER 1	TIER 2	SENIOR	PREFERRED	CONVERTIBLE	MSCI
2008	−36.39%	−4.97%	4.83%	−29.61%	−29.35%	−40.11%
2009	40.54%	17.15%	12.73%	25.64%	36.34%	22.82%
2010	10.86%	2.89%	3.31%	5.72%	11.73%	7.83%
2011	−12.63%	−6.71%	2.13%	−8.20%	−5.66%	−7.56%
2012	29.76%	31.01%	13.67%	11.23%	13.44%	13.07%

Source: Markit Partners, Bloomberg, and MSCI.

instruments compared with the performance of the equity markets (MSCI Index) and senior financial bonds in particular. Within the financial hybrids, the Tier 2 bonds outranked the Tier 1 securities in the two crisis years of 2008 and 2011. In 2008, for example, an investor would have lost 4.97% on Tier 2 bonds whereas investments in Tier 1 securities would have yielded on average 7 times more losses (−36.39%).

1.9.2 Rating

Because of the higher investment risk associated with hybrid securities, these bonds receive a lower rating compared with senior debt issued by the same entity. Rating agencies typically lower hybrid debt a couple of notches below this senior issue. S&P, for example, lowers a hybrid security one notch for subordination and one to two notches more depending on the specifications of the coupon deferral [135].

1.10 CONCLUSION

The following chapters provide a deeper analysis of each of the different categories of hybrid capital introduced in this first part of the book. The very few examples covered in this introductory chapter have already illustrated the complete lack of standardization in the hybrid space. No two instruments are the same, making comparison not straightforward.