Lessons from the Collapse in Hybrid Bank Capital Securities

Peiyi Yu[1] and Bac Van Luu[2]

[1] Corresponding Author. University of East London Business School, University Way, London E16 2RD, UK. Email: P.Yu@uel.ac.uk
[2] Russell Investments, 10 Regent Street, London SW1 4PE, UK. Email: VLuu@Russell.com

Abstract

This paper addresses the lessons that can be learned from the rise and fall of the market for hybrid bank capital securities during this decade's credit boom and bust. It is uncertain whether bank capital securities are going to survive as an asset class after the dramatic collapse in prices and the erosion of confidence among market participants. We examine the potential mis-pricing of the additional risks inherent in subordinated bank debt versus senior securities prior to the crisis. Using a cross-section of European banks, we ask whether there is a relationship between the issuance of hybrid bank capital securities and solvency risk, which became manifest in government bail-outs and the nationalisation of financial institutions. Finally, we argue that it could be beneficial to the stability of the financial sector if bank executives' compensation comprised a significant portion of subordinated debt.

Keywords: Hybrid Securities, Bank Capital Securities, Subordinated Debt, Tier 1 and Tier 2 capital, Executive Compensation, Credit Crisis

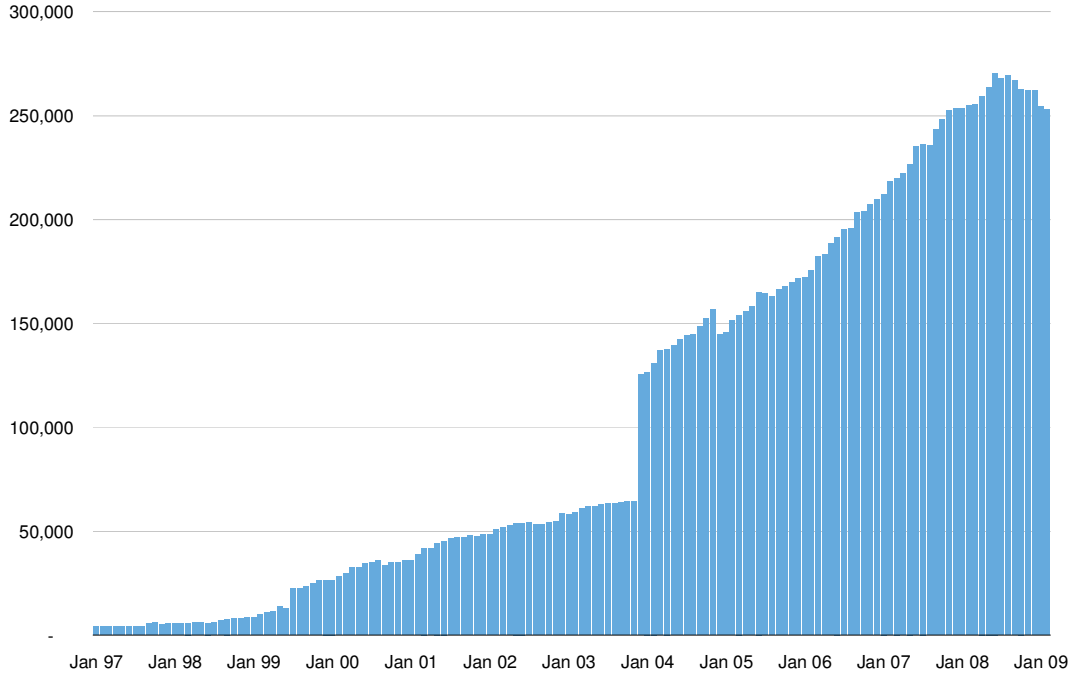
JEL classification: G01, G10, G22, G32

1. Introduction

The management of equity capital is essential to banks as financial services regulators have imposed stricter capital adequacy requirements. Issuing ordinary shares is one way of creating regulatory equity capital. Hybrid securities such as preferred shares and subordinated debt are other forms of capital admissible under the Basel accords. In the last decade, the issuance of such debt-like subordinated bank capital securities has soared, partly due to low spreads on fixed income instruments. A combination of regulatory change, strong bank asset growth and a favourable market environment has contributed to the evolution of the market of hybrid bank capital securities, especially in Europe. Bank capital securities were particularly popular with institutional fixed income investors, hedge fund and off-balance sheet Structured Investment Vehicles in the period of exceptionally low credit spreads before mid-2007, as subordinated securities offered a yield pickup (albeit a slim one at the time) over senior bonds.

However, the crisis in the US sub-prime mortgage markets and related asset classes that started in the summer of 2007 has forced global financial institutions to make large write-downs and loan loss provisions. As of the end of 2008, Bloomberg estimated that gross global financial institutions write-offs exceeded the $1,200 billion mark. As the credit crisis unfolded, spreads on bank capital securities started widening, but since the failure of Lehman Brothers in September 2008 the prices of these securities have completely collapsed and the amount outstanding started shrinking for the first time since the market emerged in Europe in the early 2000's (see Figure 1).

Figure 1: Euro Financial Sub-Debt Outstanding in € Million



Source: Merrill Lynch Global Index System, Authors' Calculations

Current investors in hybrid bank capital securities face considerable uncertainty with regard to the future value of their holdings. First, banks themselves have contributed to the nervousness by not calling so-called Tier 2 bonds at the first available opportunity, deciding not to return money to investors and instead extending the life of these securities[3]. Second, the prospect of nationalisation of banks has grown, but it is still unclear how authorities would treat subordinated bonds and other bank capital securities in the event of any further government involvement. The lack of consistency in the treatment of bondholders in previous government actions contributes to the confusion among investors In the nationalisation of Northern Rock, for example, some Tier 1 securities were wiped out, while others continued to receive coupon payments. In the case of Bradford & Bingley, all Tier 1 issues became worthless. Investors' appetite for these hybrid bank capital securities has dried up although banks are desperate for funding.

[3] In February 2009, Deutsche Bank decided not to call a Lower Tier 2 bond because it was not economical for the bank to do so. In the past, investors had expected that the reputational damage and the potential cost of higher future financing costs on subordinated debt would deter banks from not calling subordinated bank bonds.

We are interested in the lessons that can be learned from the extraordinary episode in the market for hybrid bank capital securities. In particular, we will focus on whether bank capital securities are going to survive after the dramatic collapse in prices and the erosion of confidence among market participants. We examine whether investors may have mis-priced the additional risks inherent in subordinated bank debt versus senior securities. Using a cross-section of European banks, we ask whether there is a relationship between the issuance of hybrid bank capital securities and subsequent solvency risk, which resulted in government bail-outs and even nationalisation of financial institutions. Finally, we argue that it could be beneficial to the stability of the financial sector if bank executives' compensation comprised a significant portion of subordinated debt. Unlike common equity and stock options, which are currently popular forms of incentive compensation for executives, hybrid debt-like securities would limit the upside from driving bank profits ever higher, but still expose bank managers to the downside risk of insolvency. It may contribute to a more prudent management of financial institutions in the future and to a revival of an asset class that is currently in the doldrums.

The paper is structured as follows. Section 2 outlines the characteristics of hybrid bank capital securities from the regulator's and from the investor's point of view. In Section 3, we discuss the factors that led to the explosive growth of the market and its subsequent demise during the credit crisis that is still ongoing. Section 4 contains our empirical analysis on the risk-return outcome for the asset class and the potential mis-pricing of risk by investors prior to the crisis. In section 5, we discuss the link between issuance of hybrid bank capital securities and solvency risk across a number of European banks. Finally, we conclude and put forward our proposal of including subordinated bank debt in executive's compensation packages.

2. Hybrid Bank Capital Securities from the Regulator's and Investor's View

Capital adequacy requirements oblige banks to maintain an appropriate ratio of equity capital to risk-weighted assets. Broadly speaking, a bank's equity capital is a limiting factor in its ability to lend money to companies and private households, in other words, its ability to expand the balance sheet. Banking capital provides a safety net to absorb a certain level of unexpected losses without negatively affecting depositor interests. Capital provides protection for depositors in two ways: i) in adverse situations for the bank, capital is capable of absorbing the losses, for example, by not paying dividends to shareholders or the deferral of coupons on hybrid instruments, and ii) if a financial institution is liquidated, depositors have precedence over holders of equity capital in claiming the remaining value of assets.

From the regulator's point of view, Tier 1 capital is the base measure of a bank's financial strength. A minimum of 8% of risk weighted assets must be met by Tier 1 plus Tier 2 capital and 4% of risk weighted assets must be Tier 1 capital. The structure of bank capital and the admissible components according to the Basel accords are shown in Table 1.

Hybrid capital securities are debt-like instruments that exhibit certain characteristics of shares, such as the possibility of interest deferral, deep subordination and very long maturities. From the investor's point of view, the different forms of bank capital securities exhibit distinct risk and reward characteristics. Broadly speaking, risks and reward rise the more equity-like the securities are. Figure 2 summarises these relationships. Holders of Upper Tier 2 securities bear similar risks to those inherent in Tier 1 paper. However, in contrast to Tier 1 securities, coupons are cumulative for upper tier 2 securities and deferred coupons have to be paid in the future. Lower Tier 2 securities are much more like senior bonds, insofar as the deferral or cancellation of coupon payments is ruled out. Moreover, lower Tier 2 securities are subordinated to senior bonds in the case of insolvency.

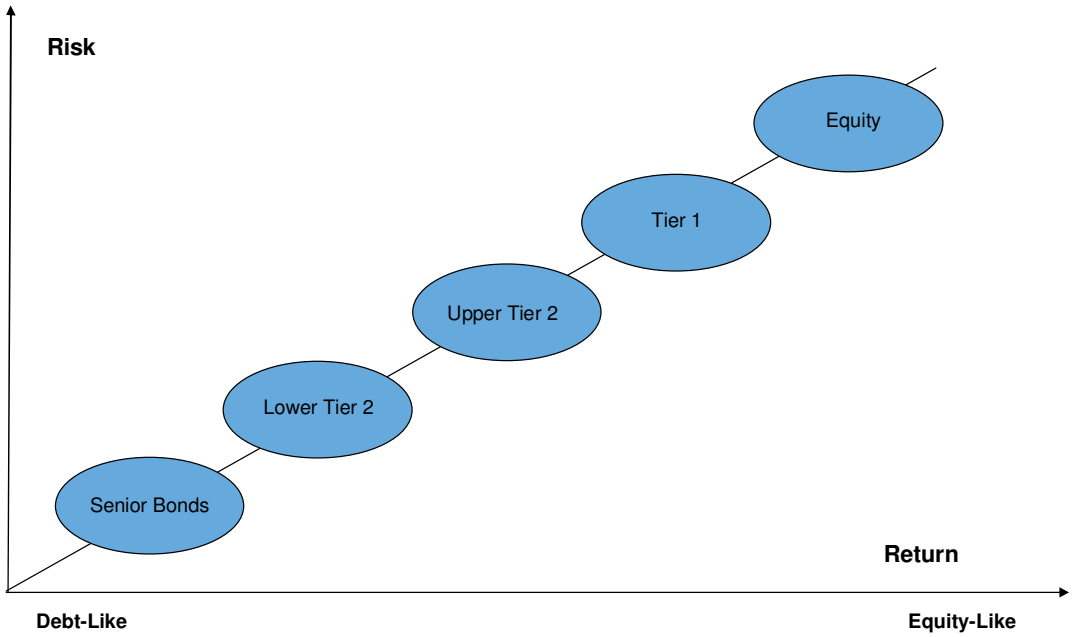
Table 1: Characteristics of Capital Classes

Main components	Characteristics for each capital class
Tier 1	
Ordinary shares	
Retailed profits	
Hybrid debt instruments (which may include perpetual non-cumulative preferred shares)	o No fixed costs: without a contract to pay interest or dividends. o Deferral is at the option of the issuer or the regulator, if the capital base is in jeopardy. o Non-cumulative coupons: the deferred coupons or dividends are not paid in the future. o Loss absorption prior the remainder of the creditors. o They are subordinate to all other kinds of debt, except ordinary shares. o Perpetual: they must be perpetual, an interest rate step-up.
Reserves originated by appropriation of retailed profits	
Minority interests	
Main components	Characteristics for each capital class
Upper Tier 2	
Hybrid debt instruments (for example: perpetual deferrable subordinate debt)	Perpetual, although in certain cases an issue with a maturity date may be admissible. Deferrable coupons: in this case coupons that are deferred must be paid in the future. Loss absorption: principal and interest can be written off if this allows the issuer to remain solvent. It is subordinate to all kinds of debt, except ordinary shares and Tier 1.
Reserves from revaluation of fixed assets (or investments in fixed assets)	
General provisions, up to a maximum of 1.25% of risk weighted assets	
Main components	Characteristics for each capital class
Lower Tier 2	
Subordinate debt with over five years to maturity	The capacity to absorb losses in only relevant in the event of insolvency, because no deferral is admissible for coupons, nor for cancellation of the principal and interest. To avoid a sudden fall in the level of capital these instruments are usually amortised on a linear schedule.
Any perpetual debt lacking the capacity to absorb losses, or a provision for interest deferral.	

Source: Delfiner and Pailhe (2007)

From the investor's point of view, the different forms of bank capital securities exhibit distinct risk and reward characteristics. Broadly speaking, risks and reward rise the more equity-like the securities are (see Figure 2). However, each capital class has its specific risk-reward profile, which we summarise in what follows:

Figure 2: Risk and Return of Capital Securities



Source: Authors

Investors in Tier 1 securities bear a number of risks, some of which are not present in senior bonds:

- A coupon payment may be cancelled or deferred.
- Risk of extension: if an issuer, whose credit quality deteriorates, decides not to call a security at the call date, the investor is subject to extension risk. Often, a step-up occurs at the call-date, which may not be sufficient to compensate investors for the deteriorating credit risks.
- The issuer is declared insolvent and the bank is liquidated, with the investor only having precedence over the shareholders.
- The spread volatility is significantly higher than for more senior bonds

Holders of Upper Tier 2 securities bear similar risks to those inherent in Tier 1 paper. In contrast to Tier 1 securities, however, coupons are cumulative for upper tier 2 securities, i.e. deferred coupons have to be paid out in the future.

Lower Tier 2 securities are much more like senior bonds, insofar as the deferral or cancellation of coupon payments is ruled out (and amounts to technical default). Lower tier 2 securities are subordinated to senior bonds in the case of insolvency and hence can be expected to be more volatile during their term to maturity.

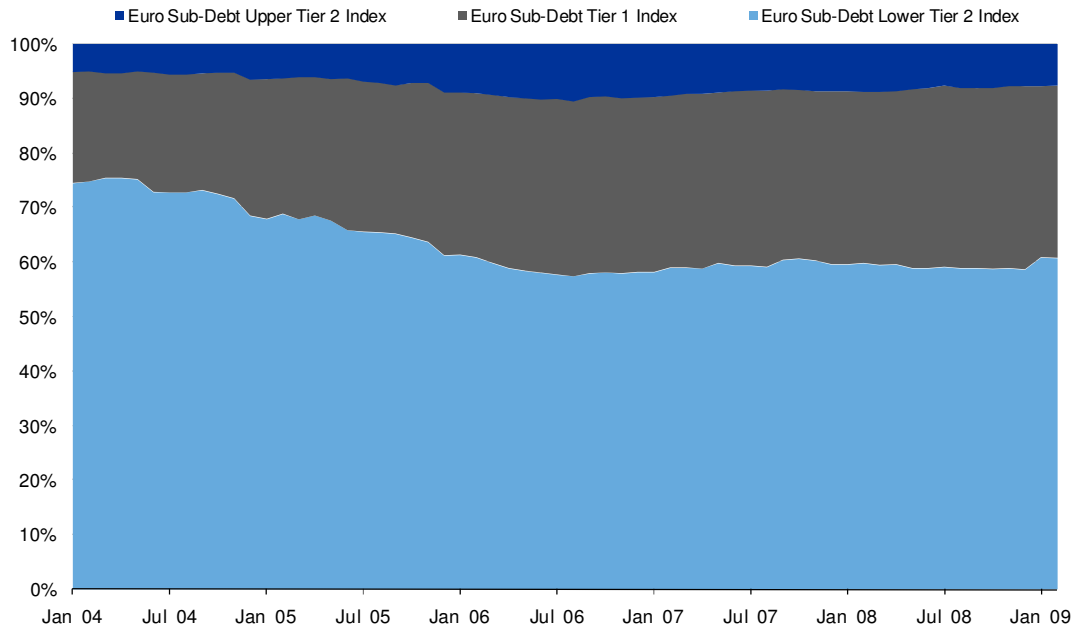
3. Drivers of Growth in the Market for Bank Capital Securities

Before the onset of the credit and banking crisis, and in particular in the period of exceptionally low credit spreads of 2005 to mid-2007, issuing hybrid banking capital securities had benefits over issuing common stock from the issuing institutuion's point of view. Firstly, these debt-like issues were often be more cost-efficient compared to shares, depending on market conditions. Secondly, hybrid instruments do not grant the traditional voting rights of shares, they do not dilute existing shareholders' influence. Thirdly, banks may be able to achieve a greater diversification of their capital structure and, as bonds are placed on the international fixed income market, expansion of their investor base. On the other hand, debt investors were increasingly moving down the capital structure, lured by attractive expected returns and perceived manageable risks.

Leveraged investors such as banks, hedge funds and collateralised debt obligations have been large investors in the market of bank capital securities. In this section, we analyse data on the volume and composition of the European bank hybrid capital securities market from the Merrill Lynch Global Index system. Due to data availability, our sample period spans the period between January 2000 and February 2009.

The demand by institutional investors such as Structured Investment Vehicles (SIVs) for more debt-like Lower Tier 2 securities and the regulatory limits on Tier 1 capital are responsible for the evolution and current composition of the subordinated universe by level of subordination (see Figure 3). Tier 2 hybrid debt has the greatest market share (and growing in recent years), while the upper Tier 2 has the smallest. More than 60% are Lower Tier 2 securities, with some 30% Tier 1 paper and the remainder made up of Upper Tier 2 bonds. While their debt-like nature made Lower Tier 2 securities popular with certain investors, the relative share of Tier 1 securities within the subordinated debt universe grew over the years, reflecting efforts by the large European financial institutions to raise Tier 1 capital amid rapid asset growth and the relatively low cost of doing so by issuing hybrid capital securities.

Figure 3: Composition of the Subordinated European Debt Universe by Level of Subordination



Source: Merrill Lynch Global Index System, Authors' Calculations

In addition to high demand by leveraged investors and SIVs for debt-like structures that offered an excess yield (however slim) over funding costs, three factors contributed to the rapid growth of the market for hybrid capital securities:

- Changes in the regulatory framework
- Easy-to-understand (although not necessarily more accurate) treatment of bank capital securities by ratings agencies
- The integration of capital markets within the European Monetary Union

We discuss these factors in turn and the turn to the impact of the credit crisis on the pricing and volumes in the hybrid bank capital market.

Regulatory Framework

In the original 1988 version of the Accord only two elements were eligible to make up core capital: equity capital and reserves. Supplementary capital could only be comprised of undisclosed reserves, revaluation of reserves, general provisions and hybrid debt/ capital instruments and subordinated term debt. As such, hybrid capital

instruments were foreseen as part of supplementary capital[4]. Committee foresaw the issuance of innovative capital requirements, with step-ups in the coupon rate and for the purpose of generating core regulatory capital at a lower cost. However, a cap of 15% was placed on tier 1 securities as core capital, because banks were expected to comply with the minimum capital requirements. Basel 2, the revised framework agreed on by the BCBS in 2004, made amendments to the capital adequacy rules for financial institutions, but the 15% limit for innovative Tier 1 securities was maintained[5].

Table 2: Hybrid Limits as a Proportion of Total Tier 1

	Supervisory Limit on innovative Tier 1	Supervisory limit on hybrids excluding non-cumulative preference shares	Limit on non-cumulative preference shares under National Company Law
Non-additive limits			
Austria	15%	30%	50%
Belgium	15%	33%	33%
Denmark	15%	15%	Not recognised
France	15%	25%	No issuance so far
Germany	15%	50%	Not recognised
Greece	15%	30%	No limit (Issuance Unusual)
Ireland	15%	50%	No limit
Italy	15%	15%	50%
Netherlands	15%	50%	50%
Norway	15%	15%	No issuance
Portugal	20%	20%	50%(Issuance Unusual)
Spain	15%	30%	30%
Sweden	15%	15%	No limit
UK	15%	15%	50%

Source: CEBS

Thus, banks began to issue non-innovative capital securities that had a call date and often included a switch from fixed rate to floating rate at that day, but did not involve a coupon step-up. The limits for non-innovative Tier 1 hybrids vary across different jurisdictions, with some regions allowing hybrid debt to form up to 50% of all Tier 1 capital, while other jurisdictions allow significantly less. Generally speaking, the Basel committee allowed individual governments to bend these rules over time through their own legislation. For example, banks in Australia can issue both innovative and non-innovative hybrid capital instruments totaling up to 25 percent of net Tier 1 capital from

[4] In the October 1988 "Instruments Eligible for Inclusion in tier 1 Capital" press release, the BCBS admitted the inclusion of hybrid instruments as part of core capital, provided that certain conditions are fulfilled.

[5] Non-innovative capital instruments are the capital instruments with no step-ups in the coupon rate.

July 2007[6]. An overview of regulatory limits on innovative and non-innovative securities within Tier 1 is given in Table 2.

The regulatory capital adequacy requirements, as laid out in the Basel Accord of 1988 (Basel 1) is one of the main drivers of the increased issuance of hybrid capital securities by financial institutions. The market for hybrid securities expanded rapidly because they were perceived to be a timely solution to the demands of both issuing institutions and investors. While after banks filled their 15% allocations of innovative bank capital securities, banks may begin searching for structures that would still appeal to institutional investors such as non-innovative bank capital securities. These instruments do not have to be classed as innovative Tier 1 capital by their respective regulators.

Rating Agencies

The treatment of hybrid bank capital securities by rating agencies is of great importance to issuing banks as it influences the bank's cost of refinancing. The investors buying bank capital securities relied on the ratings agencies, as the investors lacked the competency to monitor credit performance and estimate expected cash flows. In recognition of the deeper subordination of capital securities, the rating agencies apply a downgrade in the credit rating relative to senior bonds. Except in case of weaker banks where rating committees may apply wider notching, ratings on hybrid bank capital will generally follow a convention such as subordinated debt and equivalent hybrid capital instruments obtain one notch lower than deposits and other senior obligations (see Moodys, 2007, and Standard & Poor's, 2006). The credit agencies may not distinguish between hybrid bank capital securities that are cumulative versus those are non-cumulative, since there is little reason to suppose recovery prospects of the two are materially different.

However, the failure of major credit rating agencies to anticipate the recent collapse in the prices of subordinated securities or even warn against the rise in risks that pertain to

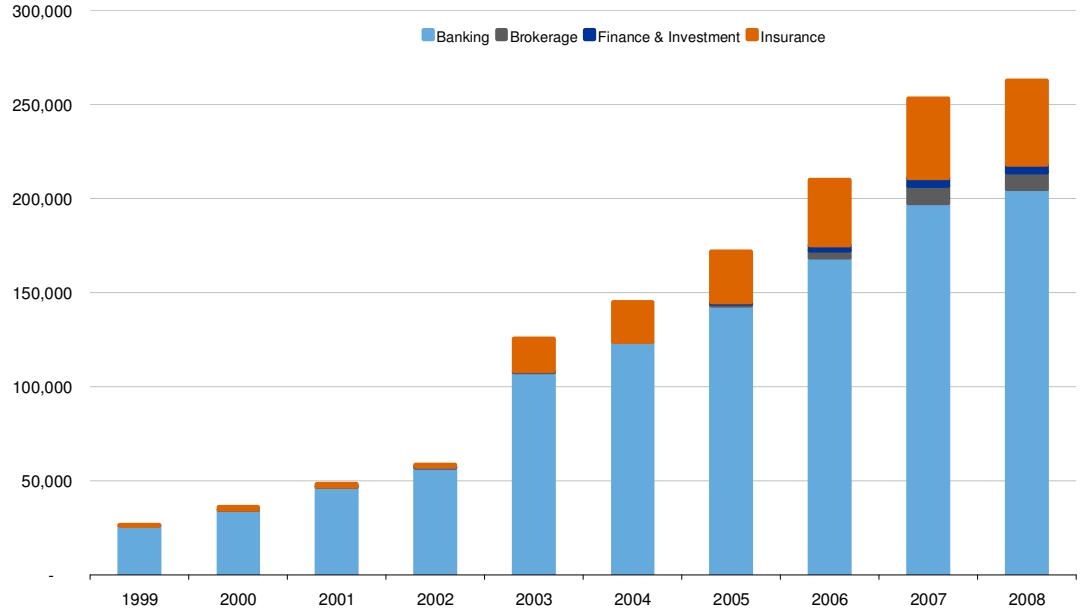
[6] Of this, innovative hybrid securities are limited to 15 percent. Therefore, banks in Australia need to issue 10 percent of their hybrid capacity in the form of non-innovative securities if banks want to maximise the hybrid component of the capital mix.

hybrid capital securities, but not to senior bonds, has undermined confidence in the validity of the process used to assign credit ratings.

The European Monetary Union

In Europe, the introduction of the Euro has also been one of the main drivers of the increased issuance of hybrid capital securities by financial institutions. The market for subordinated debt issued by financial services institutions has grown by tenfold since the introduction of the Euro as shown in Figure 5. Measured by the Merrill Lynch Financials Sub-Debt index, the nominal value of the bonds outstanding was around € 260 billion at the end of 2008. Around € 205 billion of that had been issued by banks, with some of € 44 billion coming from insurance companies. As for the quality of outstanding bonds, more than 90% were rated AA or A. The issuance is dominated by large European banks.

Figure 4: Merrill Lynch Euro Financial Sub-Debt by Sectors € million (Face Value)



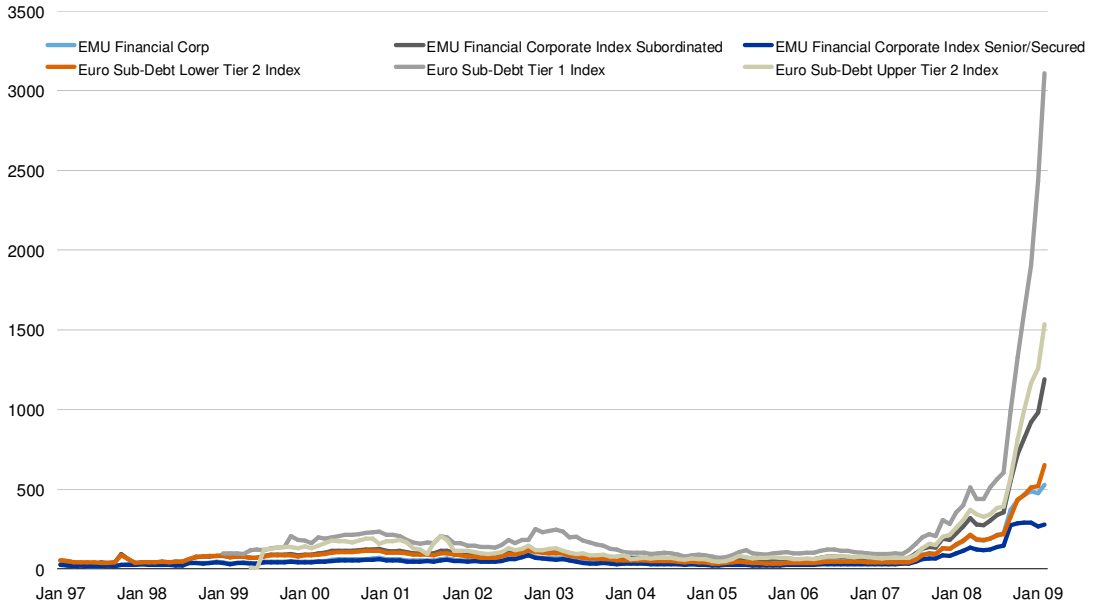
Source: Merrill Lynch Global Index System, Authors Calculations

4. The Risk-Return Outcome for Investors: Was the Market Underestimating Risks before the Crisis?

As we know, the benign period of market growth and falling yields did not last. The prices of hybrid bank capital securities started weakening in the summer of 2007, but market conditions deteriorated significantly after the failure of Lehman Brothers in September 2008. It became clear that the credit crisis was sufficiently severe to put the solvency of large and systemically important financial institutions at risk and governments in advanced economies stepped in to inject equity capital, and in some cases, become majority owners of banks. The junior status of hybrid capital securities within the capital structure and the inconsistent treatment of the nationalised banks' hybrid securities by governments did not bode well for the market. In this section, we re-examine the rationale for investing in hybrid capital securities and ask whether the market was seriously underestimating the risks, not only those pertaining generally to financial institutions, but those specific to subordinated debt instruments.

The main benefit of hybrid capital securities compared to senior bonds is the higher yield they pay to investors. Both senior bonds and hybrid capital securities are subject to the risk of the issuer defaulting, but hybrid securities are subject to a number of additional risks. For example, investors in Tier 1 securities could see their coupon payment cancelled or deferred, which is called deferral risk. Investors are also subject to extension risk, the possibility that an issuer decides not to call a security at the call date, usually when that institution's credit quality has deteriorated. Often, a step-up occurs at the call-date, which may not be sufficient to compensate investors for the deteriorating credit risks. Extension risk affects both Tier 1 and Tier 2 issues. In the case of the insolvency and liquidation of a bank, hybrid capital securities investors have precedence over the shareholders, but will be paid only after the senior bondholders. The recovery rate for subordinated bonds in the bankruptcy case is therefore lower than for senior bonds. Due to these additional risks, the spread volatility of hybrid securities should be expected to be higher than for senior debt.

Figure 5: Option adjusted spread over government bonds of EMU Corporate from 1997 January to 2009 February



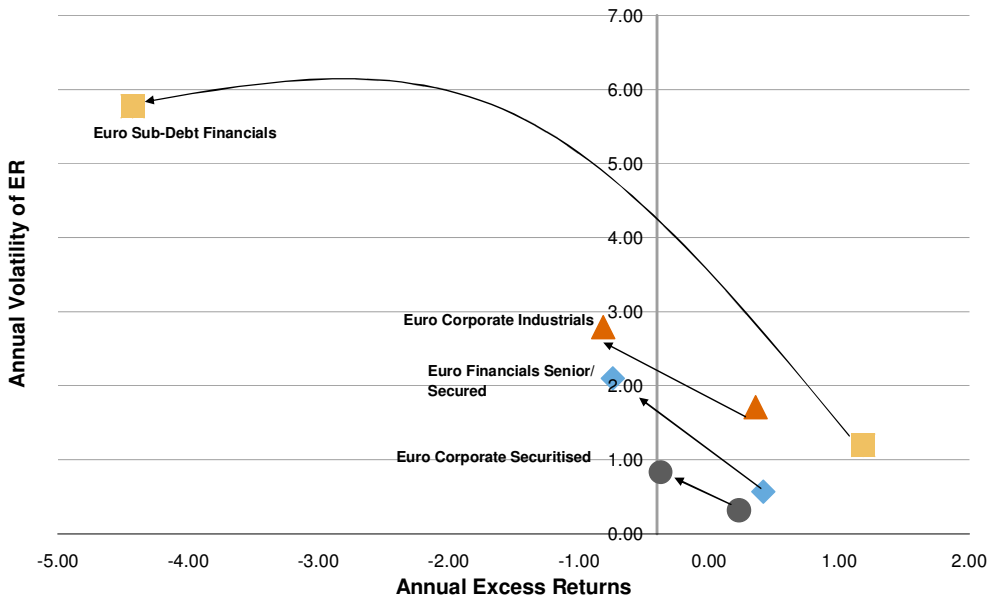
Source: Merrill Lynch Global Index System, Authors' Calculations

Figure 5 shows that these additional risks of hybrid capital securities were perceived to be small prior to the crisis, but that spreads have skyrocketed since the summer of 2007. The yield difference (on a duration-matched basis) between subordinated (that is Tier 1, Upper and Lower Tier 2) financial bonds and senior securities traded between 25 and 50 basis points for most of the credit boom years of 2003 to mid-2007 and since then has widened out to more than 900 basis points at the end of February 2009. As can be seen from the Figure, Tier 1 financial bonds offered a yield in excess of 3,000 basis points over duration-matched government bonds. What is striking is that subordinated financial debt appeared to offer a kind of "free lunch" in terms of its risk-return characteristics prior to the crisis. We illustrate this point in Figure 6, which shows various Merrill Lynch Euro corporate bond indices in excess return/risk[7] space.

For each index, we have plotted two points. One is based on data between January 2000 and May 2007, i.e. shows excess returns and volatilities of the credit asset class before the credit crunch started in the summer of last year. The other uses the entire sample period until the end of February 2008 and thus includes the period of the broad credit sell-off.

[7] Excess return is the return of the credit index over a equal-duration government bond index. Risk is measured as the annual standard deviation of excess returns.

Figure 6: Impact of 2007/2008 Credit market sell-off on excess return and risk



Source: Merrill Lynch Global Index System, Authors' Calculations

The arrows indicate how return-to-risk tradeoffs deteriorated during the last twenty months of data. It is apparent that the subordinated financial debt index (yellow square) suffered the most in excess return terms compared to the other indices, after having been the star performers before the credit crunch started. Excluding the sell-off, subordinated debt outperformed duration-matched government bonds by about 1.2% with a volatility of excess returns of 1.2%. This represented a far better return-to risk trade-off than for the other credit indexes.

Since May 2007, however, that advantage has spectacularly reversed. As of the end of February 2009, subordinated debt returned 4.4% p.a. less than equal-duration government bonds over the entire sample period, and the volatility of excess returns has jumped to 6%. Corporate industrials and senior/secured financials produced an annual excess return of around 0.4% prior to the credit crisis and have since also dropped into negative territory for the entire sample period, but the deterioration was not nearly as dramatic as for subordinated debt. The "free lunch" that seemed to exist for hybrid bond investors has proved to be a mirage for those that held on to the securities. It may also be an indication that investors have significantly underestimated and mis-priced the

risks that are specific to subordinated securities versus senior bonds, such as subordination, deferral and extension risk. Unfortunately, no established pricing models exist that take into account all the features that are peculiar to hybrid bank capital securities although new research by Mjøs and Persson (2007) is aiming to fill that gap. An alternative approach is to try to break up the spread of a hybrid capital security into its risk components, based on observed spread differences between senior, Lower Tier 2 and Tier 1 securities and empirical default and recovery probabilities.

Default Risk

A good starting point for the valuation of subordinated debt is to first "price" the default risk of senior debt of the same issuer. The approach to assessing that default risk and deriving a risk-neutral market price for it is to calculate the spread required to compensate for the probability of cash flow impairments during the lifetime of a bond.

In Table 3, we report this "default-risk compensation spread" for the investment grade rating categories, using the following assumptions:

1. an average recovery rate of 47% and
2. the average empirical default probabilities between 1970 and 2007, as published by Moody's.

Table 3: Spread Required To Compensate for Default Risk (47% Recovery Assumption), in basis points

Years	Aaa	Aa	A	Baa	IG
1	0	0	1	9	4
2	0	0	3	13	5
3	0	1	4	16	7
4	0	1	5	19	8
5	1	2	5	20	9
6	1	2	5	21	10
7	2	3	6	22	10
8	2	3	6	22	10
9	2	3	7	23	11
10	3	3	7	24	11
11	3	3	7	25	11
12	3	3	8	25	12
13	3	3	8	26	12
14	3	4	8	27	12
15	3	4	8	28	13
16	3	4	9	28	13
17	4	4	9	28	13
18	3	4	10	29	14
19	3	4	10	29	14
20	3	5	10	29	14

Source: Moody's, Deutsche Bank

The recovery rate assumption is consistent with the historical experience of senior bonds, hence it appears that the option-adjusted spread of 313 basis points (as of 12 March 2008) on the Merrill Lynch senior financial index with an average Aa2 rating comfortably overcompensates for the pure default risk based on historical averages. In fact, it would even more than compensate for default risk if senior financials were rated Baa instead of Aa.

The spread between the hybrid instrument and the more senior instrument is sometimes referred to as a "subordination premium", which includes not only a value for the lower claim in the case of bankruptcy, but also for the broader bundle of options.

Hybrid securities generally rank as either junior subordinated debt securities or preferred shares. This means that hybrid banking capital securities have lower status of claim in bankruptcy and recovery. The recovery rate assumption for this sample period is consistent with the historical experience of senior bonds. The spread between the hybrid instrument and the more senior instrument is referred to as a "subordination premium", which including not only a value for the lower claim in the case of bankruptcy, but also for the broader bundle of options.

Using the methodology applied in Table 3, it is possible to derive an estimate of "the additional spread" required to compensate for the lower recovery rates of capital securities compared to senior bonds. While using 47% recovery rate for senior securities, we make the conservative assumption of a 0% recovery rate for Tier 1 capital (while we still maintain identical cumulative default probabilities).

We interpret the difference between the two spreads as the "pure subordination" premium, the differences between Table 3 and Table 6. It becomes apparent that the differential recovery prospects can only account for a very small part of the current spread between "Tier 1" and "senior securities within the Merrill Lynch Euro Financials index. This finding maybe one of the supporting evidence that the current wider spreads should cover deferral risk and extension risk.

Table 4: "Pure Subordination Premium" - Difference of Default Risk Compensation Spreads with 0% Recovery vs. 47% Recovery

Years	Aaa	Aa	A	Baa
1	0	1	1	9
2	0	1	2	12
3	0	0	3	14
4	1	2	4	16
5	1	2	5	18
6	2	2	5	19
7	1	2	5	19
8	2	2	6	20
9	3	2	6	20
10	2	2	6	21
11	3	2	7	21
12	3	3	6	23
13	3	3	7	24
14	3	3	7	24
15	3	3	8	24
16	4	3	8	25
17	3	4	8	26

Source: Moody's, Deutsche Bank, and authors

Extension Risk

Extension risk can be defined as investors need to take into consideration the probability of the call not being exercised. Generally, hybrid securities either have long maturity or are perpetual instruments. Most issues are also typically structured with an issuer call option effective after a number of years. Frequently these call dates are combined with a step-up in coupon that occurs at the call date[8]. Even if the bond is not called at the first opportunity, the issuer often has the option to call the bonds at regular intervals thereafter. Before the recent credit crisis, bank issuers with high credit ratings have called hybrid securities at the first available opportunity. This is because the issuing banks want to avoid the risk to their reputations that a step-up in the coupon rate would imply (Eichert, 2005). Failure to buy back bank capital securities might impair a bank's ability to issue cheaply in the future as well as being seen as a sign of weakness. Investors generally prefer to have the certainty that the bank capital securities will be called.

However, developments in the financial sector in last year have significantly reduced both the regulatory and economic incentives to retire Lower Tier 2 bonds. Although the

[8] The mechanics of the step-ups are as follows: if the bond is not called, the coupon changes from a fixed to a floating rate and also "steps up" versus the spread to swaps at the time of issuance.

overwhelming majority of bank capital securities are called at the first possible date, there are a few examples of extensions within the hybrid market after the credit crunch starting a year ago. In December 2008, Deutsche Bank was the first major bank not to call a Lower Tier 2 issue at the first opportunity. This particular bond, a € 1 billion issue, was issued as a 10 year deal, but with a call date after 5 years at the bank's option in January 2009. If these Lower tier 2 issues do not be call back after 5 years, then the coupon steps up and theoretically makes it more expensive funding for the bank. In this instance, the coupon moves from 3.875%, to 3 month Euro money market rate (Euribor) plus 88bps. This currently equates to just over 4%. Deutsche Bank's decided to skip this opportunity to redeem €1-billion of subordinated bonds at the first scheduled call date because replacing them would be more expensive. However, Deutsche bank's move has transformed pricing within the subordinated debt market. Since the move has implications for the wider subordinated debt market and investors also fear that other banks will follow. Banco Sabadell SA in Spain in February 2009 also skipped the chance to repay their Lower Tier 2 notes at their first call date because it would be also more expensive to refinance the debt.

The extension risk premium may be modelled in the following two ways. The first method of modelling the extension premium is proposed by Lehman Brothers(Poper and Varma, 2006). They showed that to isolate and address the extension risk component by constructing a long/short trade where they buy the step-up security of a bank issuer and go short the same time using subordinated credit default swaps (CDS) (i.e. buying protection). The subordinated credit default swaps (CDS) can protect against credit, deferral and subordination risk, but not extension risk. Going long the cash bond and buying protection would involve earning the spread on the bond and paying away the CDS premium. The other alternative of modelling the extension premium is to compare the asset swap spread of non-callable Lower Tier 2 (LT2) securities with callable bonds of the same issuer. For example, as of 13 March 2009, a non-callable LT2 issued by Barclays PLC with maturity 2011 was trading at an ASW spread of around 491 basic points, while a callable security of the same issuer with a first call date in 2010, but a final maturity of in 2049 had a spread of more than 5000 basis points. Before the crisis, investors expected banks to repay callable notes at the first opportunity and these banking capital securities were valued on that basis. It seems

to be clear from the Barclays example that many issuers' callable Lower Tier 2 bonds are now effectively assessed on a yield to maturity basis rather than on yield to call.

Deferral Risk

Tier 1 securities generally include a feature for deferral of coupon payments. Deferral may be optional, allowing issuers to defer coupons at their discretion. However, there are multiple disincentives for issuers to act on this capability. First, deferral restricts the ability to pay dividends on common equity or to undertake share repurchases. Second, particularly in the case of frequent financers such as banking institutions, the residual fallout in terms of broadly higher funding costs from a deferral may overwhelm the short-term value of exercising a deferral option. Thus, while deferral options have been exercised, in a number of situations issuers have continued to pay even when financial flexibility has been stretched. In some instances, deferral may become compulsory. This is usually the case when a predetermined and specified credit metric is breached. The issuer is then barred from paying a coupon until the metric is restored. The feature is designed to give rating agencies assurance that interest will be deferred when required, heightening the level of "equity credit" assigned to a given security. Quite often, regulatory requirements may constrain issuers in making payments on hybrids if certain credit metrics are breached.

While it is true that Tier 1 may have a slightly higher extension risk and less favourable recovery prospects in the case of insolvency, we would argue that the possibility of deferral is the most important distinguishing risk factor between Tier 1 and Lower Tier 2 securities. Most of the spread difference between these different levels of the bank capital structure may thus be attributed to the risk of coupon deferral. As of the end of February 2009, the difference between the asset-swap spreads on the Merrill Lynch Tier 1 and Tier 2 Subordinated Debt Indices was an astounding 1,115 basis points compared with an average of 71 basis points during the 2002 to mid-2007 period. Current spread differences are indicating a very high implied risk of deferrals on Tier 1 securities. Investors should compare the market-implied probabilities of deferrals with their own assessment and thereby gauge the relative attractiveness of securities in different parts of the capital structure. The very low spread differences between Tier 1 and Tier 2

securities seems to suggest that market participants were somewhat complacent to the deferral risks in the more deeply subordinated securities.

This impression of complacency is corroborated by observations of investor behaviour during the last two years. Luu and Madura (2008) report that even sophisticated institutional investors largely relied on publicly available ratings and did not make an effort to separately assess subordination, extension and deferral risks.

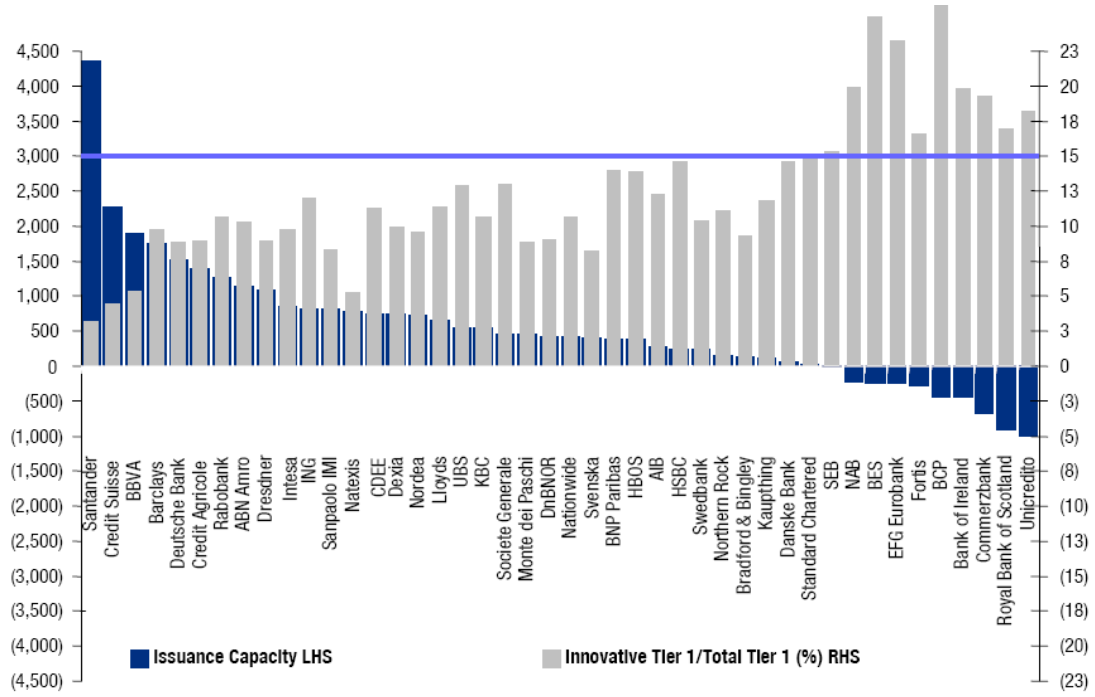
5. Hybrid Capital Issuance and Solvency Risk

While the holders of hybrid bank capital securities have suffered heavy losses, government bailouts of financial institutions are placing burdens on all taxpayers. Bank regulation that can help to prevent insolvency of systemically important "too big to fail" institutions presumably would raise the welfare of an economy. In this section, we suggest very tentatively that there may be a correlation between issuance of hybrid capital securities by financial institutions and the subsequent need for a government bailout. Our conjecture is that aggressive sales of Tier 1 capital securities in particular are indicative of an expansion of the balance sheet. Some contributions in the literature have examined the potential motivations for issuing hybrid capital securities. Benston, Irvine, Rosenfeld, and Sinkey (2003) analyse 105 issues of hybrid capital by US bank holding companies in the years 1995-1997 and study the characteristics of issuers vs. non-issuers. They find that issuers tend to be larger, have higher tax-rates, more uninsured funding and lower equity ratios. Their event studies also find significant abnormal returns on the common stock of issuers who filed after the Federal Reserve's new favourable tax-treatment of hybrid capital was announcement on 21 October 1996. The latter is taken as a evidence that issuers of hybrid securities were looking to (and succeeding in) enhancing shareholder value.

A similar motivation could be behind the rapid growth in European hybrid capital securities issuance in the early 2000's. The expansion of bank assets and the corresponding issuance of hybrid capital securities led to a number of banks reaching

their 15% limit on innovative Tier 1 securities to total Tier 1 capital. Figure 7 shows the remaining capacity to issue innovative Tier 1 for a cross-section of large European banks as of the beginning of 2008, i.e. after the credit crisis started but before it escalated following the bankruptcy of Lehman Brothers. From left to right, the percentages of "innovative Tier 1 to total capital and issuance capacity" are decreasing. Santander is the bank who has the most leeway to issue the innovative Tier 1. On the other hand, Royal Bank of Scotland, Bank of Ireland, Fortis are the banks, who all subsequently applied or are applying for governments' bailout schemes, have exceeded their regulatory capacity of issuing innovative Tier 1 capital securities.

Figure 7: Ratio of Innovative Tier 1 to Total Capital and Issuance Capacity



Source: Lorenzen et al (2008)

Our observation is anecdotal and certainly requires more rigorous confirmatory analysis, but relationship between the capacity to issue more innovative Tier 1 capital securities (an indicator of how much use the banks has made in the past of its allowance of these securities to form part of Tier 1 capital) is striking nonetheless, as reported in Table 7. Institutions that had almost used up their allowance of innovative Tier 1 securities issuance (and thus had little leeway to issue new securities) were more likely to require a government bailout. Lloyds TSB, UBS, HBOS, Northern Rock and Bradford and Bingley are prominent examples. Banks that had ample capacity, such as

Spain's Santander and Credit Suisse, have so far refrained from participating in any government-led equity capital injections. Their more cautious stance in raising Tier 1 capital through the hybrid security route may be a sign of a more conservative asset and capital management . It may have simply left them more options to raise private capital when other institutions found that government funds were the only available capital once the crisis escalated.

Table 7: The relationship between bailout plan and the capacity of issuing more Tier 1 capital securities

Bank name	Capacity to issue additional innovative Tier 1 (in % of Total Tier 1)	Participation in respective governments' bailout plan
Santander	23%	No
Credit Suisse	12%	No
Lloyds	4%	Yes
UBS	3.2%	Yes
HBOS	2.9%	Yes
Northern Rock	1.2%	Yes
Bradford & Bingley	1%	Yes
Fortis	-2%	Yes
Bank of Ireland	-2.9%	Yes
Royal Bank of Scotland	-4.8%	Yes

Source: Citigroup, Company Accounts, Bloomberg, Authors' Calculations.

6. Hybrid Capital Securities and Executive Compensation

In reaction to the ongoing banking crisis, financial institutions have started to overhaul the bonus structure for their staff. In November 2008, the Swiss bank UBS has set out a new bonus system for its top executives. For example, senior bankers of UBS are forced to repay part of their bonuses if they under-perform in years of losses. In the UK, Lloyds agreed to pay 2008 bonuses over three years starting from 2010 in its subordinated debt or loan notes[9]. We believe that the route taken by Lloyds could be a blueprint for other banks as well, even those that are in full private ownership.

[9] The UK government has agreed to the Lloyds bank's staff, including low-level workers, receiving about £80 million in 2008 bonuses.

We suggest that banks should change their remuneration systems by paying incentive compensation partly in subordinated debt. Since the maturities of bank capital securities are usually longer than five years, the new bonus system would see rewards for those who deliver good results over several years without assuming unnecessarily high risk. As the payoff from holding subordinated securities is limited by the face value plus coupons, it could help to avoid the problem caused by paying common equity and equity options to managers. The emphasis on the share price has arguably led some bank executives to take greater risks than they otherwise would have to achieve a higher reported return on equity, which the market usually has rewarded by pushing bank shares higher.

Furthemore, paying compensation in the form of subordinated debt may help banks in regaining their reputation for prudence after years of aggressive risk-taking. We propose that banks should publish the purchases and sales of an institutions' own subordinated debt by senior executives, as is already the case with equity purchases and sales by company directors. The signal that executives send by buying their own institutions' subordinated debt could help investors and other stakeholders gain greater confidence in the solvency of a bank. Unusual sales of hybrid capital securities by executives may have the opposite effect, but would also provide useful information and help market participants to distinguish deteriorating financial institutions from the sound.

Finally, banks are desperately seeking to raise capital in order to bolster balance sheets damaged by the ongoing credit crisis. Tapping their own senior and other employees with large incentive compensation packages may be a viable additional source of capital that is politically acceptable in times of large-scale bailouts of the financial sector and economically wise as it aligns the interests of the executives with the need for a stable financial system.

7. Conclusion

Due to their cost-effectiveness as a source of regulatory capital in times of low credit spreads and their appeal to fixed income investors, bank capital securities have rapidly

become an important asset class within the European fixed income universe. As is often the case, the apparent "free lunch" of higher returns and lower volatility compared to non-financial bonds quickly disappeared in the vicious sell-off that hit subordinated financials hard and has yet to show any signs of abating. The lack of clear guidance from governments with regard to the treatment of nationalised banks' subordinated debt has added to the perceived risk of the securities from the investors' point of view. It is far from certain whether the market will recover from the blows that it has been dealt in the last couple of years.

However, we believe that hybrid capital securities can and should be revived to give financial institutions more flexibility in the management of their capital structure. However, regulators should be mindful of the distorting effects that excessively cheap capital can have on large banks' corporate strategy and consequently financial stability. There can be "too much of a good thing". Financial institutions made use of the low yields on debt and the seemingly insatiable appetite for debt instruments by issuing debt-like securities that were at the same time recognised as regulatory capital. Some investors appeared to completely ignore the equity components of hybrid capital securities that gave rise to subordination, extension and deferral risks. While some underestimation or even mis-pricing of these risks seems apparent from the low spreads before the crisis and their explosion from mid-2007 onwards, it seems unlikely that market participants return to the complacency shown in the 2002-2007 period. On the contrary, risk premia for subordinated debt have risen to such a degree that one may wonder whether risks are now not being over-priced.

Furthermore, we suggest that a correlation exists between the issuance of hybrid capital securities by a financial institution and the subsequent need for a government bailout. This result should be tested against a broader cross-section of financial institutions and further factors should be controlled for, but the relationship appears to be plausible. As previous research by DeYoung et al (2001) based on 1990's US data suggests, issuance of hybrid capital securities is mainly conducted by larger banks with lower capital ratios and greater emphasis on their stock price performance. This could be the case with the large and complex European financial institutions of the 2000's, where aggressive pursuit of shareholder value may have been detrimental to solvency in a volatile market environment, but further confirmatory analysis is needed.

Finally, we believe that the asymmetric payoff of the securities to the holder makes them particularly suitable as part of executive compensation packages. If bonuses were paid partly as hybrid capital securities of a bank instead of cash, equity and options (as is currently the industry practice) bank executives may have an incentive to take a longer-term view, emphasise solvency instead of shareholder value and provide useful signals to market participants about the health of financial institutions by publishing their purchases and sales of subordinated debt.

References

Delfiner, Miguel and Cristina Pailhé (2007): "Hybrid bank capitalization instruments", Central Bank of Argentina Working Paper

DeYoung, Robert; Mark J. Flannery, William W. Lang, Sorin M. Sorescu (2001): "The Information Content of Bank Exam Ratings and Subordinated Debt Prices", Journal of Money, Credit and Banking, Vol. 33, No. 4 (Nov., 2001), pp. 900-925

Eichert, Florian (2005): "Kapitalmärkte – Hybride Financials", Landesbank Baden-Württemberg Credit Research, 27 September 2005

Lorenzen, Hans P.; Peter A. Groves; Mikhail Foux; Matt King (2008): Supply Outlook 2008. Citigroup European Quantitative Credit Strategy and Analysis, 8 January 2008

Mjøs, Axel and Svein-Arne Persson (2007): Bundled Financial Claims - A Model of Hybrid Capital, Department of Finance and Management Science, The Norwegian School of Economics and Business Administration Working Paper, 11 May 2007

Moody's (2007): "Incorporation of Joint-Default Analysis into Moody's Bank Ratings: A Refined Methodology", Moody's Rating Methodology, March 2007

Standard and Poor's (2006): "Criteria: Assigning Ratings To Hybrid Capital Issues", S&P Viewpoint, 8 May 2006, accessed online in April 2008: http://www2.standardandpoors.com/portal/site/sp/en/us/page.article/3,1,1,0,1145718364711.html