EDITORIAL

I’m devoting this editorial to a subject that is taking up a lot of air time in the business media: the future of banking. It seems that intermediating between those who have cash and those who need cash will eventually be the preserve of anyone other than banks; such is the high profile of P2P, crowdfunding, fintech and the like. In The Times of 23 October 2015, the business editorial (written by Simon English) reduced the debate to a glorious intellectual tour de force with the words: “Banks suck.” He goes on to say that because banks sell us products that we have to have, such as current accounts and mortgages, they have us by the neck (his words, not mine) and so do not need to bother about delivering any acceptable level of customer service.

Leaving out whether one has to have a mortgage (one can always rent), these gross generalisations do Mr English’s readers, not to mention the UK taxpayer and also the profession of journalism, a grave disservice. Banks, like people, are not all alike. Some of them are poor and some of them are less poor. Some of them offer lax customer service and some of them a reasonably acceptable customer service. If this is how Mr English writes in the editorial pages of The Times newspaper, I’d hate to see the quality of discourse offered up by him in an internet blog post.

Perhaps he should step into a branch of Virgin Money? The customer service there seems, from what I observed at its Haymarket branch recently, really rather good. If he is after a current account, what about banks sell us products that we have to have, such as current accounts and mortgages, they have us by the neck (his words, not mine) and so do not need to bother about delivering any acceptable level of customer service.

My point is that there is some not too bad service undertaken, for millions of customers every day, by some banks. This does not mean the work of banks is done, far from it. There is much that needs improving by banks to restore their image and reputation, and to win back the trust of customers. And this is where I’d like to return to my opening theme of the future of banks.

Currently, banks are the only institutions that even purport to offer that essential ingredient of commerce: the universally available current account with on-demand overdraft. The oldest bank still in existence, Monte dei Paschi di Siena, dates from 1472. To secure the next 500 years, banks will have to combine the best of the traditional with the best of the current. The current is the easy part – it concerns technology and digital banking. Contrary to media belief, not all customers want to carry out their banking on their smartphone. The need is for banks to offer an omnichannel customer interface that embraces branch, phone, laptop, pad, mobile and video. This is not an intellectual challenge, it requires investment in time and technology know-how.

The other essential is an ability to understand customers with the same level of sophistication that is exhibited by the likes of Amazon, Google and Facebook. But banks need to achieve this level of understanding using human beings. This is because, despite what everyone says about banking being as commoditised as a tin of beans, there is a fundamental fallacy at work in that belief: a customer’s requirement for a can of beans does not change over his or her lifetime. One either wants to eat beans or not. The minute beans go off the menu, the product is dropped.

However, the relationship between a customer and his or her financial needs changes over time. At age 18 the need is simple – perhaps a current account and in due course a credit card. But later in life may be a need for a business start-up loan, a mortgage, a standby line of liquidity, foreign exchange remittances overseas … the list is long. And at some point the customer may wish to actually talk to a banker about his or her requirements.

That’s why I find it hard to accept that just because millennials like all their banking over the mobile today, they will always want to do it this way once they hit ages 40, 50 and 60. And to understand customers over time as their lives change requires more than just an algorithm. I hear a lot about the great customer service from Amazon and Facebook, but have you ever had any contact, by email or phone (remember face-to-face) with anyone at those companies? They understand us as computer code. Banks must learn to deliver exceptional customer service, but using that essential human element. This requires decentralisation so that local managers are empowered to authorise services to local customers, as demonstrated in recent years so successfully in the UK by Handelsbanken.

And that brings me to my last point. A quote on LinkedIn attributed to Richard Branson suggests: “Clients do not come first. Employees come first. If you take care of your employees, they will take care of the clients.” I wholeheartedly agree. Too many banks, irrespective of their size, have allowed themselves to turn into bureaucratic process-driven beasts where corporate automatons engage in oblique consultant-speak every day. Platitudes abound. Senior management meetings are characterised by a turgid atmosphere where trust is minimal and no one offers comment, let alone challenge. This corporate culture must share some of the blame for the worst excesses of the crash, and must be tackled.

Transforming the working environment at banks into an open, free speaking one will go a long way to restoring the culture of exceptional customer service that, along with an omnichannel interface and a savvy executive, will ensure the future still has a place for traditional banks.

And with that, I’ll take my leave of RoFM and bid you farewell. I hope you have all enjoyed the journal, or at least some of it! It’s been a pleasure working with the CISI and I’d like to take this opportunity to thank again Simon Culhane and the recently departed Richard Mitchell; without whom this journal wouldn’t have seen the light of day, and for that I think everyone at CISI should be grateful.

All the best.

Professor Moorad Choudhry FCSI, Editor, Chief Executive, Habib Bank AG Zurich, UK
ABSTRACT
This paper investigates what factors determine the optimal funding term of posted collateral. We show that it is different for the initial margin and variation margin. The funding term for the initial margin is determined by the liquidity and maturity of the derivative. For the variation margin, the funding term should be determined by the liquidity of the other assets on the balance sheet and the existing funding for these assets.

INTRODUCTION
Posting collateral is an excellent way to reduce credit risk in a derivatives transaction. However, it exposes the parties in a transaction to liquidity risk. Large movements in the mark-to-market (MtM) of transactions can lead to large liquidity outflows. Since MtM movements of derivatives are unpredictable and can be erratic, this poses a significant challenge to liquidity risk management.

In this paper, we consider over-the-counter (OTC) derivatives transactions that are out-of-the-money for which the bank has posted cash collateral. The collateral covers the variation margin and initial margin as prescribed by the Basel Committee on Banking Supervision (BIS) paper on margin requirements for non-centrally cleared derivatives [1]. The question we address is: what is the proper funding term for this collateral?

Since cash collateral earns the overnight (ON) rate, one might argue that it should be funded on an ON basis. However, for a 30-year swap that is far out-of-the-money, the collateral will very likely be needed to be posted for years. Therefore, even though the rate earned is ON, this is not the correct funding term.

Should the collateral then be term-funded, so that the bank is ensured to have funding for the posted collateral? This seems quite conservative for a 30-year swap. Indeed, we will show in this paper that this is not necessarily correct either.

However, here the truth does not lie somewhere in the middle, but rather somewhere else. We argue that the optimal funding term for collateral posted for variation margin is not determined by the term of the transaction, but rather by the liquidity of the other assets on the balance sheet. Only the optimal funding term for the initial margin is determined by the derivatives term and liquidity.

FUNDING TERM FOR POSTED COLLATERAL REQUIRED BY THE VARIATION MARGIN
Variation margin (VM) can have various features, such as minimal transfer amounts, thresholds, and collateral choice options. Here we assume the simplest case of cash collateral and daily margining without any complicating features. In particular, we assume that the variation margin equals the MtM of the derivative transaction at any time. Furthermore, this section considers only variation margin and assumes the absence of initial margin. We postpone the discussion of initial margin to a later section.

Consider the following stylised balance sheet:

\[
\begin{align*}
A &= 100 \\
L &= 80 \\
E &= 20
\end{align*}
\]

At this point, the bank enters into a swap with a counterparty. The swap turns out to be a bad investment, and the MtM of the swap decreases from 0 to -10. Therefore, the equity has reduced from 20 to 10. Also, the bank has posted 10 units of cash collateral and has issued extra debt to fund this collateral. The resulting balance sheet is:

\[
\begin{align*}
A &= 100 \\
L &= 80 \\
E &= 10 \\
\text{Posted collateral} &= 10 \\
\text{Swap} &= 10 \\
\text{Debt} &= 10
\end{align*}
\]

The question is: what is the right funding term for this extra debt issued to fund the collateral? Well, as may be seen from the balance sheet, an alternative (and better) interpretation is that the debt does not fund the collateral, but replaces the funding previously provided by equity.

The swap, which has turned into a liability, funds the collateral. The term of the swap and the posted collateral match exactly (under the assumptions mentioned above). In particular, when the swap matures, the posted collateral also disappears from the balance sheet. Although the issued debt provided the cash that was needed for the collateral, it replaces the funding provided by equity to the other assets. Therefore, its optimal term is determined by the other assets on the balance sheet. For example, if all the assets are ON deposits, then the issued debt should be ON as well; if these are long-dated illiquid loans, the issued debt should optimally fund these.

It may be useful to consider what happens with the above balance sheet if subsequently the MtM of the swap rises from -10 back to 0. Compared to the initial balance sheet, there is an additional 10 cash on the asset side, and on the liability side, an additional 10 debt.

\[
\begin{align*}
A &= 100 \\
L &= 80 \\
E &= 20 \\
\text{Posted collateral} &= 0 \\
\text{Swap} &= 0 \\
\text{Cash} &= 10 \\
\text{Debt} &= 10
\end{align*}
\]

The term of the debt is determined by the assets and will, therefore, be longer than the term of cash (ON). The cash can be returned to the equity holder (if capital requirements permit this), reinvested, or held as a liquid asset buffer. The debt funds 10 units of the assets and replaces the funding provided by equity before.

In general, the debt issued to post VM collateral should have a term that optimally funds the assets, given existing funding (liabilities+equity).

This conclusion is not changed if we consider a netting set with many derivatives instead of a single swap. It does somewhat change if threshold amounts and minimal transfer amounts are introduced, but it still provides a useful limiting case.

To determine the optimal funding term of other assets and initial margin, we use the framework developed in [3], which we briefly recap in the next section.

LIQUIDITY RISK AND FUNDING
To find the optimal funding term of an asset, we need to consider funding costs and liquidity risk.

The main idea is that liquidity risk and funding costs are, so-to-say, two opposing forces: liquidity risk pushes to longer funding terms, funding cost pushes to shorter funding terms.

Liquidity risk generates an expected loss due to events that force the bank to sell assets at a discount. This expected loss not only depends
In case of securities, it may be possible to generate liquidity by repo transactions in an LSE. There could still be a loss due to an increased haircut of an off-market spread.

In [3], calculations are performed by assuming a lognormal distribution of the duration of LSEs. Also, a simple, piecewise linear dependence of the liquidation value of the asset on the duration of the LSE and funding term is assumed. Using these assumptions, the expected loss due to liquidity risk can be calculated analytically.

Figure 1: Funding and liquidity costs as a function of the funding term for a liquid and illiquid asset. The y-axis indicates the costs per annum. The x-axis indicates the funding term in months.

In Figure 1, examples are shown for expected loss of a liquid asset (with a minimal liquidation value of 90%) and an illiquid asset (with a minimal liquidation value of 0%). The line ‘LC’ denotes the expected loss (LC stands for liquidity cost). For the liquid asset, we see that the expected loss is eight basis points (8bp) for ON funding and decreases with the funding term to less than 1bp beyond one year. The expected loss for the illiquid asset is much larger at 68bp for ON funding and decreases to a few basis points at one year. In both figures a funding spread ‘FC’ is also included. The funding spread as a function of funding term is the same for both assets. It increases from 0bp for ON funding to 26bp at two years.

There is currently no consensus on exactly which funding curve to use. Discussion of this choice is beyond the scope of this paper. In [3], we discuss this issue in the context of valuation. The risk magazine article [2] discusses practices at different banks in the context of the funding valuation adjustment.

1. In case of securities, it may be possible to generate liquidity by repo transactions in an LSE. There could still be a loss due to an increased haircut of an off-market spread.

**Figure 1: Funding and liquidity costs as a function of the funding term for a liquid and illiquid asset. The y-axis indicates the costs per annum. The x-axis indicates the funding term in months.**

<table>
<thead>
<tr>
<th>Prob. LSE</th>
<th>Median duration</th>
<th>liquid</th>
<th>illiquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>5%</td>
<td>6m</td>
<td>ON</td>
<td>12m</td>
</tr>
<tr>
<td>5%</td>
<td>12m</td>
<td>ON</td>
<td>21m</td>
</tr>
<tr>
<td>5%</td>
<td>3m</td>
<td>4m</td>
<td>6m</td>
</tr>
<tr>
<td>10%</td>
<td>6m</td>
<td>8m</td>
<td>14m</td>
</tr>
<tr>
<td>10%</td>
<td>6m</td>
<td>ON</td>
<td>25m</td>
</tr>
<tr>
<td>10%</td>
<td>3m</td>
<td>5m</td>
<td>7m</td>
</tr>
</tbody>
</table>

Note that the optimal funding term of the illiquid asset is only mildly sensitive to the probability of an LSE, but quite sensitive to the median duration of the LSE. The liquid asset is sensitive to both parameters. The increase from ON to 8m when the probability of an LSE is increased from 5% to 10% is especially noticeable.

Because these parameters are uncertain and cannot be implied directly from market data, it may be prudent to choose a funding term that is somewhat conservative. For example, a bank’s best estimate of the median LSE duration is six months. However, the bank is uncertain about this estimate, and the median LSE duration might be as large as 12 months. In that case, the bank may be prudent and choose the largest of the optimal funding term for the range of median durations, which would imply in the above example a funding term of 25 months. In the following, we will use the optimal funding term directly: 12 months for illiquid assets and ON for liquid assets.

Irrespective of specific choices, the section shows how a funding term can be estimated from choosing the optimum of the combined funding costs and expected liquidation losses.

**OPTIMAL FUNDING TERM OF COLLATERAL**

We use the example of the previous section to estimate the optimal funding term for collateral posted for a five-year out-of-the-money OTC swap. We assume the swap is the only transaction in the netting set.

The swap is illiquid, and since it is a five-year swap, the volatility in the initial margin may be limited. Therefore, the funding term for the initial margin would be that of an illiquid asset, which in the previous example was 12 months.
The funding term for the collateral posted for the variation margin is determined by the liquidity of the other assets. For a typical bank, most assets are illiquid, although the bank should also hold a buffer of liquid assets. If we assume that only part of the illiquid assets are term-funded or optimally funded, then the optimal funding for the variation margin is determined by the illiquid assets and is 12 months as well.

Consider as a second example a short position in a one-month option, which we consider to be the only transaction in the netting set. In this case, the optimal funding for the variation margin is 12 months, but for the initial margin one month, clearly showing the different drivers of the funding term for initial and variation margin.

As a final example, if the optimal funding term for initial and variation margin differs, consider a liquid derivatives transaction. In that case, the optimal funding for the initial margin is ON; for the variation margin it is, as before, 12 months.

SUMMARY

The funding term for initial margin and variation margin can differ significantly. In a netting set with a single transaction, the liquidity and term of that transaction determine the optimal funding term for the initial margin posted. The posted collateral for variation margin requirements is funded by the derivative itself. Therefore, the optimal term of the debt issued to meet collateral requirements depends on the liquidity and term of the other assets on the balance sheet. More specifically, its optimal term should optimise the value of the assets, given the term of liabilities already present.

The optimal funding term of an asset minimises the sum of funding costs and expected losses from liquidity risk. Examples for a liquid and illiquid asset illustrate the optimisation of the funding term.

Note that in case of multiple transactions in a netting set, the conclusion regarding the variation margin does not change (as long as cash collateral is posted that matches the MtM of the netting set). The initial margin funding term is more complicated to determine in that case, as it will depend on liquidity and term of all transactions in the netting set. A possible way to estimate this is to allocate the initial margin to the different transactions and optimise per transaction, but this requires further research.

ACKNOWLEDGEMENTS

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REFERENCES


INTRODUCTION

Readers will be familiar with the basics of bond market instruments. An oft-used but commonly misunderstood technique in bond analysis is the asset swap spread (ASW). In this article we consider the use of asset swaps and ASW spreads to determine relative value in a credit-risky bond. Such analysis is a key part of the security selection decision. ASW spreads have been long in use in the market because the interest rate swap (IRS) is an important reference for the bond market and is used to hedge the IR risk of bonds. This type of derivative contract typically exchanges a fixed rate interest payment to the floating one, and represents a fundamental tool in terms of hedging, speculation and managing risk. The spread between swap and bonds can be used to determine the relative value of the bond, but can be measured in several ways. It is therefore important to know which method is being used and quoted. Once known, the spread is taken to indicate the richness or cheapness of bonds with different features.

ASSET SWAP SPREAD

The asset swap is an agreement that allows investors to exchange or swap future cash flows generated by an asset, usually fixed rates to floating rates. It is essentially a combination of a fixed coupon bond and an IRS. We define it thus:

An asset swap is a synthetically created structure combining a fixed coupon bond with a fixed-floating IRS, which then transforms the bond's swap fixed rate payments to floating rate. The investor retains the original credit exposure to the fixed rate bond. The pricing of asset swaps is therefore driven by the credit quality of the bond issuer and the size of any potential loss following issuer default.

A bond's swap spread is a measure of the credit risk of a bond relative to the interest rate swap market. Because the swap is traded by banks, or interbank market, the credit risk of the bond over the interest rate swap is given by its spread over the IRS. In essence then, the IRS represents the credit risk of the interbank market. If an issuer has a credit rating superior to that of the interbank market, the spread will be below the IRS level rather than above it.

The spread of the floating coupon over the bond's market price, that is, the asset swap value is the difference between the bond's market price and par. The package of the asset swap is structured in two phases:

- at issue, the investor pays the asset (cash bond) at par
- at the same time, the investor enters in the swap contract, paying fixed cash flows equal to the coupon payment and receiving a fixed spread over the interbank rate, that is, the asset swap spread. Figure 1 shows the asset swap mechanism.
The zero-coupon curve is used in the asset swap analysis, in which the curve is derived from the swap curve. Then, the ASW spread is the spread that allows us to receive the equivalence between the present value of cash flows and the current market price of the bond.

In an asset swap contract, the investor assumes the credit risk of the bond. In the case that the bond defaults, the investor will continue to pay the swap, without receiving the coupons and the redemption value at maturity. Therefore, the buyer of the bond takes the default exposure of the bonds. Figure 2 illustrates the bond’s yield decomposition.

Figure 2: Bond’s yield decomposition and relative ASW spread.

SWAP SPREAD FOR RICHNESS AND CHEAPNESS ANALYSIS

Making comparisons between bonds could be difficult, and several aspects must be considered. One of these is the bond’s maturity. For instance, we know that yield for a bond that matures in ten years is not the same as one that matures in 30 years. Therefore, it is important to have a reference yield curve and smooth that for comparison purposes. However, there are other features that affect the bond’s comparison, such as coupon size and structure, liquidity, embedded options and others. These other features increase the curve fitting and the bond’s comparison analysis. In this case, the swap curve represents an objective tool to understand the richness and cheapness in the bond market. According to O’Kane (2005), the asset swap spread is calculated as the difference between the bond’s value on the par swap curve and the bond’s market value, divided by the sensitivity of 1bp over the par swap.

where:

- \( \text{Pinterbank rate} \) : bond’s value discounted at interbank rate
- \( P\text{Full} \) : market price of the bond
- \( PV01 \) : sensitivity of 1bp on the coupon payment.

Let us now consider the following example of bonds issued by two companies operating in different industries. The first one is Hera SpA, an Italian company operating in the utility industry that issued the bond HERIM 3¼% 2021 (hereinafter HERIM); the second one is Telekom Finanzmanagement GmbH, a German company operating in the telecommunications industry that issued the bond TKAAV 3¼% 2021 (hereinafter TKAAV). Therefore, both companies issued two bonds with similar features:

- the same time to maturity (eight years)
- similar issue date (4 October 2013 for HERIM and 3 December 2013 for TKAAV)
- similar maturity date (4 October 2021 for HERIM and 3 December 2021 for TKAAV)
- the same creditworthiness with a Bloomberg composite rating of BBB
- the same currency (EUR)
- the same coupon payment (3.250% for HERIM and 3.125% for TKAAV, annual frequency payment)
- the same bond structure (bullet as maturity type, no embedded options).

Figures 4 and 5 show the Bloomberg screen for ASW analysis. To calculate the ASW spread, we use the bond’s price, which is equal to 115.138 for HERIM and 114.592 for TKAAV. The swap structuring has been performed as follows:

- the same frequency payment as well as the bond’s coupon structure, in this case annual
- the same day count convention, in this case actual/actual
- Euro swap curve as reference interbank curve, coherent with the bond’s currency (EUR).

Depending on the reference yield curve selected and its currency denomination, the ASW spread changes. Figure 3 shows the ASW spread for different reference yield curves for TKAAV.

Figure 3: Relative value of TKAAV 3¼% 2021, on ASW screen. © Bloomberg LP 2014. Used with permission.
As shown in Figures 4 and 5, with this swap structuring, the ASW spread for HERIM is 39.5 bp and for TKA AV is 39.1 bp. These represent the spreads that will be received if each bond is purchased as an asset swap package. In other words, the ASW spread provides a measure of the difference between the market price of the bond and the value of the cash flows evaluated using zero-coupon rates.

However, a critical issue on this spread measure is how the asset swap has been structured. ASW measure works very well when bond prices trade at or near to par. Most corporate bonds trade with price away from the par (as in this case), thus making the ASW an inaccurate spread measure. If the bond trades at premium, the ASW spread will overestimate the level of credit risk; conversely, if the bond trades at discount, the ASW spread will underestimate the level of credit risk. Therefore, in the case of HERIM and TKA AV, the ASW spread overestimates the credit risk associated with the bonds, because both trade significantly at premium.

Z-SPREAD MEASURE

Z-spread is an alternative spread measure to the ASW spread. This type of spread uses the zero-coupon yield curve to calculate the spread, which in this case is assimilated to the interest rate swap curve. Z-spread represents the spread needed in order to obtain the equivalence between the present value of the bond’s cash flows and its current market price. However, conversely to the ASW spread, the Z-spread is a constant measure.

The Bloomberg ASW screen shows the Z-spread. It is 46.1 for HERIM and 45.9 for TKA AV. The Z-spread hence provides a better measure of spread, although giving a similar result in terms of an investor’s decision. However, being a constant measure, it does not consider the timing of default. In fact, each cash flow has a different level of credit risk. To overcome this limitation, the Z-spread could be adjusted by introducing a probability of default for each cash flow. This other spread is referred to as adjusted Z-spread or C-spread.

THE CREDIT DEFAULT SWAP BASIS AND TRADING ISSUES

A credit default swap (CDS) price provides fundamental credit risk information of a specific reference entity or asset. As explained before, asset swaps are used to transform the cash flows of a corporate bond for interest rate hedging purposes. Since the asset swaps are priced at a spread over the interbank rate, the ASW spread is the credit risk of the same one. However, market evidence shows that CDSs trade at a different level to asset swaps, due to technical and market factors. Although the CDSs and ASW spreads measure the credit risk of the reference name and they are driven by specific market factors, we assume that the comparison between them represents the reference credit risk. The difference between the CDS and the ASW spread is called the basis and is given by:

\[ \text{Basis} = \text{CDS spread} - \text{ASW spread} \]

If this difference is positive we have a positive basis, and it happens when credit derivatives trade at higher prices than asset swaps. Otherwise, if the difference is negative we have a negative basis. Consider the following example of a positive basis trade for HERIM and TKA AV. For both bonds we calculate the CDS spread, which is equal to 86.3 for HERIM and 88.6 for TKA AV. The CDS basis over the ASW spread determined before is equal to 46.8 for HERIM and equal to 49.5 for TKA AV. However, the basis illustrated in Figure 6 is different because credit relative value (CRVD) measures it relative to the Z-spread, which is 50.7 for HERIM and 48 for TKA AV. The basis relative to the Z-spread is equal to 35.6 for HERIM and 40.6 for TKA AV. So, we note that either the ASW spread or the Z-spread can be used as the basis performance, giving a similar result and positive basis in both cases.

An important consequence of positive basis is that the trading strategy will be by selling the underlying asset (cash bond) and selling the CDS contract on the same name, with the goal to profit by higher CDS prices and a low spread of the bond. As explained before, the CDS basis above the spread depends on technical and market factors. Among technical factors we list the following:

- **CDS premiums are above zero** – as we know, the CDS price represents a premium paid by the protection buyer to the protection seller. The protection seller, or the bank, will expect a premium, that is, a positive CDS basis over the interbank curve
- **Default protection** – the CDS size will be affected on the default event. The protection seller considers this risk on the CDS premium, increasing the basis:

1. Note, these Z-spreads have been calculated with a different yield curve than the one used in Figures 4 and 5.
ANALYSIS USING MARKET OBSERVATION

We perform an analysis in which we compare bonds with similar characteristics within the same industry. This is a common analysis undertaken by bond portfolio managers looking to invest in a particular industry.

We selected five bonds rated BBB, similar maturity (around six years at maturity), trading in the European bond market. The bonds were issued by companies operating in the utility industry. The bonds are:

- SPPEUS 3¾% 2020, issued by SPP Infrastructure Financing BV
- RWE 17/8% 2020, issued by RWE Finance BV
- ENEASA 3¼% 2020, issued by Energa Finance AB
- IBESM 27/8% 2020, issued by Iberdrola International BV
- SRGIM 3¾% 2021, issued by Snam SpA.

Figure 7 illustrates the historical trend of the ASW spread for each bond selected. Although the bonds are issued by companies operating in the same industry and have similar ratings, they each have a different ASW spread. For instance, we can see that the ASW spread for SPPEUS 3¾% 2020 is around 170 basis, while the ASW spread for RWE 17/8% 2020 is around 20 basis.

From Figure 7 we conclude that, if we assume the credit risk is virtually identical (from a rating agency perspective and tenor perspective), the bond with the highest ASW spread will be the one we select.

However, it is worthwhile considering the CDS basis first, as that also gives an indication of richness or cheapness.

First we compare the basis between the CDS and ASW spread (or Z-spread). In Figure 8 we can see that higher Z-spread pushes down the basis. For instance, SPPEUS 3¾% 2020 is the bond with the highest Z-spread compared to other bonds, but with negative basis. The negative basis is conventionally temporary, but it represents a good opportunity for arbitrageurs who can trade across cash and synthetic markets, reverting the current trend. In this case there is a relatively lower spread in CDS market and higher spread for bond market, that is, the bond is cheap. Conversely, RWE 17/8% 2020 is the bond with the lowest Z-spread.

Moreover, we can see from Figure 7 that the ASW spreads have low fluctuations, while the CDS spread changes over time due to the credit market sentiment. For a worsening credit environment and deteriorating economic outlook, the basis can become positive quickly. Therefore the basis will fluctuate in line with that.

However, most investors do not enter into CDS basis trades to arbitrage, they simply wish to select a cash bond. From this analysis we see that the bond we would have selected first because of its value (to us) given by high ASW also looks to be trading at the ‘right’ level to the CDS – that is, it is not ‘expensive’. The two bonds with a positive basis would appear to be ‘expensive’ and so we would not, all else being equal, purchase them over the other securities.
APPENDIX 1: THE PAR ASSET SWAP SPREAD

We assume we have constructed a market curve of LIBOR discount factors where $D(t)$ is the price today of $1$ to be paid at time $t$. From the perspective of the asset swap seller, it sells the bond for par plus accrued interest. The net upfront payment has a value $100 - P$, where $P$ is the market price of the bond. If we assume both parties to the swap are interbank credit quality, we can price the cash flows off the LIBOR curve.

For the calculation, we cancel out the principal payments of par at maturity. We assume that cash flows are annual and take place on the same coupon dates. The breakeven ASW spread $A$ is calculated by setting the present value of all cash flows equal to zero. From the perspective of the asset swap seller the present value is:

$$100 - P + C \sum_{i=1} Df(t_i) - \sum_{i=1}^n D_i (L_i + A) Df(t_i) = 0$$

(1.1)

There is a $100 - P$ upfront payment to purchase the asset in return for par. For the interest rate swap we have:

$$C \sum_{i=1} Df(t_i)$$

(1.2)

for the fixed payments and

$$\sum_{i=1}^n D_i (L_i + A) Df(t_i)$$

(1.3)

for the floating payments, where $C$ equals the bond annual coupon, $L_i$ is the LIBOR rate set at time $t_i$ and paid at time $t_i$, and $D$ is the accrual factor in the corresponding basis (day-count adjustment). We then solve for the ASW spread $A$.

SELECTED BIBLIOGRAPHY AND REFERENCES


INTRODUCTION

A healthy and stable banking system as a key player and main engine is the conditio sine qua non for sustainable economic growth. Efforts to reform banking sector regulation began shortly after 2009. The global financial crisis highlighted the importance of risk and asset liability management, which is able to withstand adverse financial events. The crisis made global policymakers aware of the weaknesses of banking supervision and regulation on the one side, and the irrational behaviour and hubristic motives of bankers on the other. Scholars and practitioners around the world actively started to find a best solution which would ensure greater financial soundness. A number of initiatives were taken by the Financial Stability Board (FSB), and the Basel Committee on Banking Supervision (BCBS) focused on developing counter-cyclical policies. As a consequence, the BCBS issued the Basel III framework, and established a basis for improving and increasing liquidity. In its statement to the press, the BCBS said that it had issued “final elements of the reforms to raise the quality of regulatory capital”. The reforms should strengthen bank-level, or microprudential, regulation, which will help raise the resilience of individual banking institutions to periods of stress. At the same time, the reforms also have a macroprudential dimension in addressing the system-wide risks that can build up across the banking sector, as well as the procyclical amplification of these risks over time (BCBS, 2010a).

From a practical point of view, banks created excessive leverage, primarily because of excessive and inadequate securitisation and usage of toxic derivative instruments. Also, they eroded the quality and stability of bank capital. Initially, the focus of Basel III was on increasing the capital base by introducing bank capital requirements which should accomplish different operating and strategic objectives. Basel III is changing the banking paradigm about risk and liquidity management. However, the new framework is becoming very complex, and policymakers had better cut some of the dead wood out of the earlier versions of the Basel accords for the sake of clarity. Indeed, it will not be wrong if we write that the forest of Basel III has too many trees“(Lannoo, 2011).

The foundation of Basel III was laid on top of the three pillars from Basel II (minimum capital requirements, supervisory review, and market discipline) (BCBS, 2004), which are strengthened with a new regulatory capital framework. In general, Basel III includes two quantitative metrics: Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR), which will undoubtedly generate higher costs (including complaints costs). Establishing a globally harmonised framework for managing system-wide risks that can build up across the banking sector, as well as the procyclical amplification of these risks over time (BCBS, 2010a).
of liquidity risk, especially the calibration of quantitative metrics, is challenging, given the differences in banking landscape (Gomes and Khan, 2011). The counter-arguments against Basel III emphasise that the higher capital requirements caused by raising banks’ marginal cost of funding lead to higher lending rates. More specifically, large banks would, on average, need to increase their equity-to-asset ratio by 1.3 percentage points under the Basel III framework. Authors have found that generalised method of moments (GMM) estimations indicate that this would lead large banks to increase their lending rates by 16 basis points, causing loan growth to decline by 1.3% in the long run (Cosimano and Hakura, 2011).

To this end, the aim of this article is to discuss many academic articles about banking regulation and the results of Basel III. More precisely, our scientific efforts are concentrated on the critical observation of Basel III and the need for adopting new standards for banking. We will focus on the most important reforms that made a radical shift in global banking regulation, and at the same time we will make a critical review of Basel III in order to provide a good theoretical base for further scientific efforts.

THE THORNY PATH FROM BASEL I TO BASEL III

Banks, as financial intermediaries, are constantly exposed to different types of risk, such as credit risk, liquidity risk, operational risk or market risk. In other words, taking risks has become the business of banking. An important question regarding the business of risk taking is the extent to which banks are willing to go in that process. (Un)fortunately, banks cannot answer this, as they do not make the ultimate decision, but the answer is short and simple: regulation. The banking industry is more regulated than any other industry in the world – even more so than nuclear power stations. If we take into consideration how harmful the effects from systemic banking crises may be, the statement mentioned above is both logical and justified. Recently, bank failures have significantly hampered economic activity and had a great impact on economic development. When people hear the words ‘banks’ and ‘regulation’ used together, they think of Basel – the rules set by the Bank for International Settlements (BIS) and its BCBS.

The new regulatory initiatives have attempted to internalise the negative externalities of liquidity risk to some extent, by shifting the costs of liquidity insurance to the private sector. This should also help to reduce the moral hazard of banks counting on the government and central bank for a bailout (too big to fail) (van den End, 2012). But, financial regulation is a complex thicket of highly technical policy challenges, with the interrelated policies often complicated further by mutually incomprehensible jargon. The devil is generally in the details, and elegant quantitative modeling of policy trade-offs is rarely available. Particularly, analytical frameworks tend to be similarly fragmented across different academic silos, including economics, financial research, accounting, political science, and sociology (Véron, 2012).

The first set of rules, Basel I, was published in 1988 with the primary focus on minimum capital requirements (BCBS, 1988). The standard defined the Tier 1 and Tier 2 capital as additive elements of the total capital. It also introduced the concept of risk-weighted assets, by classifying assets into five categories according to credit risk, that are assigned weights varying from 0% to 100%. By requesting minimum capital adequacy ratio of 8%, the aim of Basel I at first was to strengthen the soundness and stability of the international banking system. Moreover, higher transparency and comparability in international terms were also part of the goals set by the BIS. Later, having in mind the increased banks’ involvement in activities with securities and financial derivatives, their exposure to market risks combined with credit risk exposure has also become part of the capital adequacy calculation.

A significant change in the rules was made with the publishing of a new set of rules, known as Basel II, in 2004 (BCBS, 2004, 2005, 2006). In the new standard, the BCBS decided to expand its influence area by providing additional discipline on banks’ risk taking behaviour. Besides the existence of a pillar on minimum capital requirements, two additional pillars were established: on supervisory review and market discipline. A novelty within the first pillar was the new method of calculating regulatory capital, covering three components of risk that banks face: credit risk, operational risk and market risk. Additionally, the framework also suggested different ways in which each of the risk components can be calculated, that is: standardised approach, foundation internal ratings-based (IRB) approach, advanced IRB and general IB2 restriction for credit risk; basic indicator approach (BIA), standardised approach (TSA) and advancement measurement approach (AMA) for operational risk; and Value-at-Risk (VaR) for market risk. The second pillar, representing supervision, was introduced with the aim of strengthening co-operation between banks and supervisory agents, such as central banks. Finally, the goal of introducing market discipline as a third pillar was the requirement for disclosure of information regarding the calculation of bank capital positions and risk management processes.

Yet not fully completed, the implementation of Basel II was marked by the onset of the global financial crisis of the late 2000s, later turning into an economic and debt crisis in Europe. This financial crisis was a mix of unique and conventional events, with underregulation or ineffective regulation being rightly blamed for playing a central role. So, one of the key challenges from this is to set up a proper degree of regulation, but what degree is appropriate has been a controversial question for almost a century. The tragic irony is that the failure of one bank can trigger the failure of other banks through interbank exposures or bank panics 3. Hence, regulators must take control of banks in bad times in order to limit the losses of depositors or of the deposit insurance fund (Dewatripont, Rochet, and Tirole, 2010). The crisis revealed failures of bank supervision and regulation, as well as the significance of liquidity risk on bank soundness and financial stability, prompting regulatory changes that subsequently lead to the introduction of a new set of rules, known as Basel III (BCBS, 2010a, 2013a, 2013b, 2014a, 2014c). The underlying purpose of Basel III, however, is not intended to fully supersede Basel I and II, but to partially amend some rules and primarily work alongside them. In that direction, the BCBS firstly undertook measures in order to increase the quality, consistency and transparency of the capital base by raising the existing minimum capital requirements and introducing additional capital buffers. Common Equity Tier 1 (CET1) capital of risk-weighted assets (RWA) required was raised to a new minimum threshold of 4.5% from a minimum of 2.0 as in Basel II, while the minimum Tier 1 capital of risk-weighted assets required was raised to 6.0% from the previous minimum of 4.0%. In addition to the higher minimum thresholds, the rules introduced a mandatory capital conservation buffer, equivalent to 2.5% of risk-weighted assets; and a discretionary counter-cyclical buffer, allowing national regulators to impose additional holdings of capital up to 2.5% of risk-weighted assets during periods of high credit growth. Both capital buffers have to be met by the CET1 capital (BCBS, 2010a). Besides capital requirements, Basel III also introduced requirements on liquidity and leverage. These requirements include: a LCR for managing short-term liquidity, requiring banks to hold greater amount of high quality liquid assets (HQLA)
than total net liquidity outflows over 30 days (BCBS, 2013a); a NSFR for managing long-term liquidity leverage, requiring banks to hold greater available amount of stable funding (ASF) than required amount of stable funding (RSF) (BCBS, 2014c); and a leverage ratio, requiring banks to hold Tier 1 capital of at least 3.0% relative to total exposures (BCBS, 2013b, 2014a).

To sum up, it is important to note and keep in mind what financial regulation is meant to achieve. The primary rationale for regulation is to protect small depositors, holders of insurance policies, or investors in pension funds, or the public insurer of the corresponding assets, from the default of those financial institutions. The second function of prudential regulation is to contain domino effects, that is, systemic risk. But, there are many opposite views about banking regulation. Dewatripont, Rochet, and Tirole (2010) figured out and noted that regulation is too often designed to fight the previous crisis rather than the next one, and is typically one step behind market developments. In addition, central banks could support the regulatory efforts to reduce reliance of banks on the central banks.

A CRITICAL REVIEW OF BASEL III

Economists, policymakers and regulators generally see Basel III as a better regulatory framework than Basel II. However, the changes made in developing the new framework are not a perfect remedy with one-sided positive effects. In fact, they can lead to adverse effects that can make it difficult for banks to meet the new requirements, and may adversely reflect on the macroeconomic environment. In other words, there are still open ‘devil’s holes’ on the way to adjusting to the new rules imposed that have the potential to spread as contagion and grow over time. For a proper identification of these, we are going to find our review on the elementary banking concepts of capital, liquidity and leverage.

The regulatory changes regarding capital requirements can be summarised into the following two conclusions: i) increased Tier 1 capital ratio and ii) increased CET1 ratio. Since the CET1 capital makes up the core of Tier 1 capital, the second conclusion can be conveniently said to supplement the first one. In addition, the holdings of CET1 capital are also required to meet the newly introduced capital conservation and discretionary counter-cyclical buffers. The conclusions combined indicate that banks have to increase the high quality equity attributed to their risk-weighted assets, which can be done either by raising new equity or by decreasing the amount of risk-weighted assets held. If banks are willing to engage in the issuance of new equity, the higher equity will most likely lead to higher weighted average cost of capital (Kashyap, Stein, and Hanson, 2010; Miles, Yang, and Marchegggiano, 2011). This relationship can be properly explained through the dividend signaling theory (see in Modigliani and Miller, 1958, 1963) which states that a bank paying dividends at a stable rate shows credible signs of solvency and profitability, thus reducing the probability of panic among depositors and bank run during bad times (see more in Bhattacharya, 1979; John and Williams, 1985; Miller and Rock, 1985). So, the increase of the amount of equity will have to be followed by an increase of the amount of dividends paid in order to keep the rate of dividends stable. To meet the capital requirements, banks may also increase the capital ratio by decreasing the amount of risk-weighted assets. One possible way to do it is by reducing the amount of total assets while maintaining the same asset structure. Another way is to restructure by acquiring more of the safer assets and disposing of the riskier assets while maintaining the same amount of assets overall. In both cases, banks will face lower interest revenues as a result of asset restructuring, which, combined with the higher holdings of equity, have a negative impact on bank profitability. Asset restructuring and lower interest revenues also result in credit tightening, leading to higher lending rates at equilibrium and slowing down future credit growth. Furthermore, the decline in interest revenues lowers productivity of employees, and the unfavourable prospects for future credit growth resulting from the higher lending rates may cause contraction in the amount of trade operations. Consequently, banks will need fewer employees to accomplish the reduced amount of work.

The introduction of the LCR and the NSFR as part of the requirements to deal with short-term and long-term liquidity impose the following restrictions on banks’ asset-liability management: i) increasing holdings of HQLA to meet the short-term net cash outflows (up to 30 days); and ii) maintaining capital structure to meet long-term liquidity needs. As HQLA includes Level 1 assets at their market value, as well as Level 2A and Level 2B assets at their market value, reduced by applied haircuts, banks are required to hold assets that exhibit low risk, low volatility, no or very weak correlation to the risky assets and earn low interest. The amount of HQLA to obey the LCR requirement is also dependent on the amount of short-term net cash outflows or the difference between the expected short-term outflows and the expected short-term inflows. Keeping in mind that the increase of expected short-term inflows is limited by an aggregate cap of 75% of expected short-term outflows, banks will virtually have to possess at least 25% of HQLA. As for meeting the long-term liquidity requirements, banks will have to maintain a capital structure that keeps the ASF greater than the RSF. Since equity is assigned a higher ASF factor and liquid assets are assigned a lower RSF factor, the regulation is inherently pushing banks towards equity-based funding and investments to more liquid assets. These changes in the capital and asset structure will cause a decline in interest revenues, and possibly a credit tightening, with the resulting effects being the same as already mentioned. In fact, the effects are very close to those necessary to meet the capital requirements, where the only difference is that they may result from restructuring of both the short-term and long-term assets and liabilities.

Significantly, as a general conclusion, the analysis of the three banking concepts shows that new rules framed within Basel III reveal multiple sources of adverse effects – devil’s holes – which will likely reflect in the banking industry as well as in the real economy. These effects tend to result in: i) lower profitability (Härle et al., 2010); ii) higher lending rates and lending spreads (Elliott, 2009; BCBS, 2010b; MAG, 2010a, 2010b; Kashyap, Stein, and Hanson, 2010; Cosimano and Hakura, 2011; Roger and Viček, 2011; Slovik and Cournède, 2011; Sütőrvári and Téply, 2013); and slower economic growth (BCBS, 2010b; MAG, 2010a, 2010b; IIF, 2011; Slovik and Cournède, 2011).

BASEL IV ANTE PORTAS

Basel III is an evolution rather than a revolution. Its ongoing implementation represents a step-by-step process, in which lower requirements are introduced in the first year, then gradually increased year by year, to be fully in place by 2019. But even in this case, it is debatable whether banks have enough time to react, and it seems that the adverse effects from these rules are unavoidable. Considering the set of rules and its implementation as they are, the main challenge for banks is surely their commitment to the rules on the one hand, and the shareholders’ requests and expectations on the other, while for regulators it is, of course, the success of the framework in achieving its primary goals. Nevertheless, the implementation of the Basel Accords is a dynamic process, leading to continuous revisions and suggestions. That said, the BCBS has already published consultative documents with revision of the approaches for calculating the market risk (BCBS, 2013c), the operational risk (BCBS, 2014d) and the credit risk (BCBS, 2014b, 2015), which were deemed as an early sign for the creation of a new set of rules known as Basel IV (KPMG, 2013). Efforts were even made in defining the scope of the possible Basel IV, which will likely include (KPMG, 2013): i) requirements for banks to meet higher minimum leverage ratios, ii) simpler or standardised models rather than banks’ internal models for calculation of capital requirements and iii) more detailed disclosure of reserves and other financial statistics. The healthier capital management is a central point in Basel III, and could improve the financial health of a whole market. Good and appropriate capital requirements play an important role in preventing bank runs.
Conversely, there are many bankers who will not agree with the importance of capital management in modern banking. Frankly, a large part of the banking community is not satisfied with current capital requirements, as they are proponents of a different set of measures. Furthermore, they dislike the regulation. For example, Evgueni Ivantsov of Lloyds Banking Group argues that the BCBS missed the point by focusing on capital. “Normally, financial institutions fail not because they have insufficient capital, but because they suffer unbearable losses;” writes Ivantsov. “I do not dispute the idea of sufficiency of capital, but loss absorbency is no more than an ‘airbag’ and ‘seat belt’ for the banking industry’s passengers. Yet regulators keep on referring to the same mantra: more capital, more capital, more capital.” Some people believe that insisting only on capital targets, together with crash protection, comes at a huge cost. Consequently, recent estimates suggest US and European banks will need about €1,700bn of additional Tier 1 capital, €1,900bn of short-term liquidity and about €4,500bn of long-term funding to meet Basel III rules. Otherwise, meeting the capital requirements is only half the story. The other half is trying to run a profitable business, and to redesign the business model when so much capital is tied up. From these, we can conclude that Basel III will not realise its objectives. Therefore, many people believe that Basel IV is a strong likelihood. In other words, Basel IV looms on the horizon (Imeson, 2014).

Finally, the package of proposals about Basel III is problematic – it does not address and confront the fundamental shortcomings of Basel II. As long as the BCBS deny responsibility for the role played by its comprehensive set of accords in the global financial crash, banks and regulators will keep on receiving new proposals for Basel IV, Basel V and so on. They are in for enormous regulatory fatigue and regulatory capture, respectively. The biggest losers will be bank customers who will foot the bill for the implementation of the Basel III provisions (Moosa and Burns, 2012). One of the provisions is that after the Basel III system for bank regulation, a Basel IV system is needed in which the risk weights for sovereign debt are to be raised from zero to the level for mid-sized companies (Sinn, 2011). Basel IV should be taking into account and incorporating shadow banking into the regulatory framework (Blundell-Wignall and Atkinson, 2010) and the new and accelerating financial innovations as a cornerstone of the financial landscape (Dewatripont, Rochet, and Tirole, 2010).

CONCLUDING REMARKS

The major economic recession and financial crisis of 2008 and the frequency of the banking crises pushed the global policymakers to make an effort to reform banking sector regulation. The BCBS, together with the FSB, introduced new counter-cyclical polices. In particular, the reforms were introduced at both microprudential and macroprudential level to reduce the procyclicality and systemic risk across the financial system. Basel II evolved into a new regulatory capital framework known as Basel III, which strengthened the previous policy. To raise the resilience of the banking sector and improve overall stability, the BCBS set higher capital and liquidity requirements in terms of quality and quantity, and better risk management requirements from the banks.

Furthermore, a set of new regulatory initiatives was applied to different monetary regimes as a global rule; however, as one model does not fit all, there is a need for adaptive regulation to fit different central banks’ frameworks and policies. The introduced changes can lead to adverse effects, creating difficulties for banks to meet the new requirements and leading to lower profitability (because of simple market logic!). As a result of asset restructuring and credit tightening, banks will face decline in their interest revenues, further leading to credit tightening. This will consequently contract the amount of trade operations, increasing the likelihood of a reduction in bank industry employees and the negative effect on economic growth.

In sum, prudential regulation is often designed to correct some of the mistakes made in the previous crisis, rather than concentrating on future potential crises. The regulatory focus must expand to cover the shadow banking system institutions, as they can influence financial fragility. Therefore, Basel IV is very likely to be introduced to correct some of the negative effects of Basel III. With this article, we present a critical observation of Basel III regulation to emphasise the need for an adaptation of new banking standards, and provide a theoretical base and open an avenue for further scientific research.

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