

It's hard to put a value on some things (think a loyal friend or a sunny day) but financial instruments shouldn't fall into that category. This article takes a look at calculating pricing for illiquid or OTC instruments not quoted by market services such as Reuters or Bloomberg.

How to price illiquid or OTC instruments at market value

Illiquid instruments

Certain accounting regimes require the valuation of assets at market value. The market value of investments can be based on Bloomberg or Reuters quotes for a lot of instruments. However, illiquid and OTC instruments are not quoted on markets and require a different approach. You can call your broker and hope to receive a meaningful price. Otherwise, you can calculate the market value yourself. Modelling the market value of your assets implies making the right assumptions and using the applicable market data. In this article we illustrate a simple pricing method for an illiquid instrument: a floating rate bond which is issued by the IKB Deutsche Industriebank. This bond pays 90 basis points (0.9%) over the three month Euribor rate per quarter. The bond was issued on 28 May 2003 and matures on 28 May 2013¹.

IKB was hit by the credit crisis at end of 2008 and beginning of 2009. This is reflected by the five-year credit spread rate (measured by the CDS spread which is the premium that has to be paid to receive five-year protection on a credit event from IKB). The higher this rate the more investors would like to pay to

receive protection for a bankruptcy of IKB. Figure 1 shows the credit default swap (CDS)-spread on IKB bonds with five-year maturity for the recent two years.

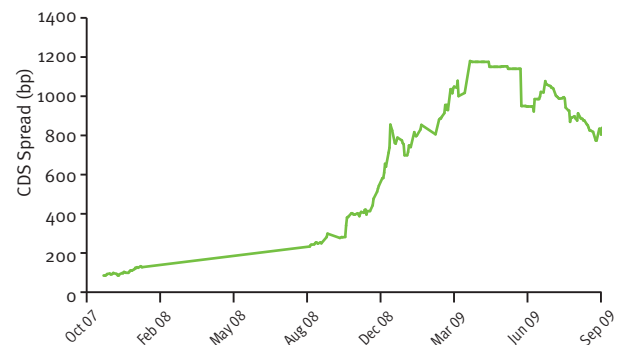


Figure 1: CDS spreads IKB

Observing figure 1 you see that it is not correct to price this bond without taking into account credit risks. Currently, the bond is rated BB+ by Fitch which relates to 'repayment does not pose a problem at present but may become problematic in the future'.

¹ the ISIN code for this contract is XS0169197646

“Generating information about the market value of the product“

Normally, the coupon (compared to the market) reflects the credit risk in this product. At issuance the rating of IKB was A+ (which is better than BB+), and the 90 basis-point margin was based on this.

Valuation Method

The valuation of such a bond involves two different interest rate curves, a forward rate curve to replicate the cash flows for the floating interest rate coupon and a separate curve to discount the cash flows. This implies two calculation steps:

1. The first step is the estimation of the cash flows until maturity that are received from the bond. The bond coupons are based on the three-month floating rate which can be derived from the current forward rate curve based upon three-month Euribor.

2. The second step is to generate the discount curve to price a bond issued by IKB. The discount curve is a combination of the interest rate curve and the credit spread yields. The interest rate curve is observed in the market.

The credit spreads are based upon the following two elements:

- The current credit spread curve for IKB
- The spreads on liquid IKB bonds with the same characteristics

Credit spreads

The credit spreads can be observed as the CDS quotes in the market or derived from the quotes for regular IKB bonds. IKB has issued sufficient liquid bonds to replicate a credit spread curve. Table 1 shows the credit spreads for both methods based on market data of 28 July, 2009.

Maturity	CDS	Bonds by IKB	To Use
Six Months	7.56%	6.78%	7.17%
One Year	6.72%	6.56%	6.64%
Two Years	6.23%	5.88%	6.06%
Three Years	5.98%	5.88%	5.93%
Four Years	5.83%	5.88%	5.85%
Five Years	5.72%	5.88%	5.80%

Table 1: Credit Spreads (as of 28 July 2009)

The credit spread for the remaining period (four years) is about 585 basis points. This implies that the market expects a coupon that is 5.85% higher than the Euribor rate. The discount curve for the IKB bond is created by adding the spreads to the interest rate curve for each maturity.

The following figure shows the discount and forward curve:

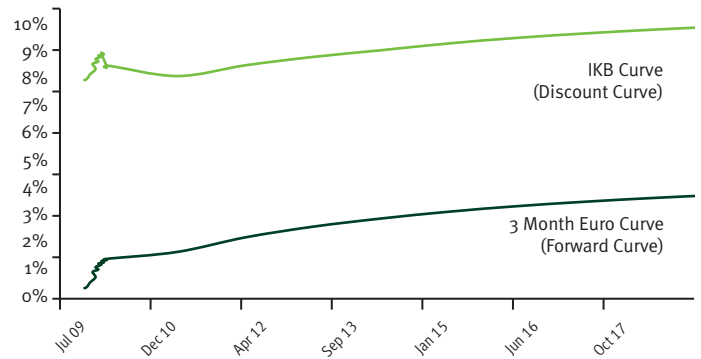


Figure 2: Curves (as of 28 July 2009)

Pricing

The following table shows the calculation method for pricing this bond. The first four columns show the replication of the cash flows using the coupon payment dates and the relevant (fixed) Euribor rates. These rates are derived from the forward curve and used to estimate the cash flows (based upon a nominal of €10 million). The columns ‘Discount Factor’ and ‘Market Value’ use the discount curve and cash flow to calculate the present value for a future cash flow.

Payment Date	Euribor	Coupon	Cash Flow	Discount Factor	Market Value
28 August 2009	1.27%	2.17%	€ 55.355	0.9938	€ 55.009
30 November '09	1.14%	2.04%	€ 53.213	0.9729	€ 51.770
...
28 February 2013	3.58%	4.48%	€ 114.432	0.7525	€ 86.114
28 May	3.61%	4.51%	€10.111.489	0.7360	€7.441.870
Total					€ 8.481.386
Accrued Interest					€ 36.701
Net Value					€ 8.444.684

Table 2: Market Value Calculation

The total market value of this bond is equal to 84.45 (relative to 100). This means that the margin of 90 basis points is currently too low for the current credit risk of IKB and the bond is trading below par. When trading this bond the value that is received or offered should be in the vicinity of 85.

Conclusion

This method generates information about the market value of the product and allows the holder of the product to analyze movements in time that are due to either market conditions (changes in the interest curve) or changes in the credit risks from IKB without contacting banks or brokers. <



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