

**5.3 RETURN-TARGET PRODUCTS: THE CASE OF A
PLAIN-VANILLA BOND WITH SIGNIFICANT CREDIT RISK**

The non-equity product considered in this section belongs to the class of return-target structures. It is a five-year senior bond with a mixed coupon structure (fixed and then floating plus a spread)

issued by a bank whose average annual credit spread over the period spanned by the life of the product is around 125 basis points (bp). The issuer provides a service of liquidity enhancement which consists in locking the credit spread used to determine the fair value of a bond on the secondary venue at a value determined at a time close to the issue date and in taking the commitment to buy back the bond at any early date decided by the investor.

Figure 5.7 shows the product information sheet for this bond, which gives a brief overview of the product, followed by the representation of its the risk-return profile according to the three pillars of the risk-based approach.

The values reported in the financial investment table (including the fair value and its decomposition in the risky and the risk-free components) are calculated according to the methodology described in Sections 2.2 and 2.3.1. The net fair value represents the expected discounted value of the pure payoffs structure of the product, while the gross fair value (which includes the fair value of the service of liquidity enhancement) also depends on the specific micro-structural conditions of the trading venue available if exiting before maturity. Investors interested in the possibility of an early redemption should consider the liquidity enhancement as part of the fair value of the product, while buy-and-hold investors should consider the value of this service as a pure cost item.

Figure 5.8 illustrates the graphical comparison between the risk-neutral densities of the final values of the product and of the risk-free asset, respectively.

The table of probabilistic scenarios as it appears in the product information sheet of Figure 5.7 is obtained by applying to the above densities the superimposition technique described in Section 2.3.3, Chapter 2.

The bimodal shape exhibited by the probability density of the bond reflects the default risk of the issuer under the standard hypothesis of a recovery value of 40% for a senior note. The probability of realising negative returns is around 9.5% and it discloses clearly the credit risk of the issuer as resulting from an annual average credit spread of around 125bp over a time horizon of five years. Most of the remaining probability mass of this bond is placed in the scenario "in line with the final value of the risk-free asset" which, in fact, has a probability of more than 87%. In order to better explain the

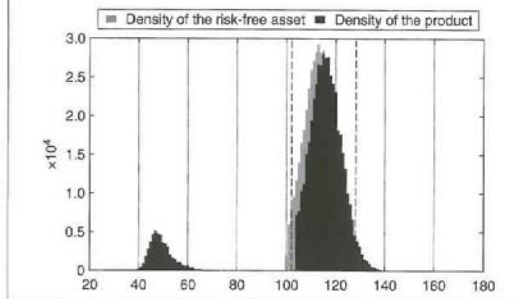
Figure 5.7 Product information sheet for a return-target non-equity product: a five-year senior bond

PRODUCT DESCRIPTION						
The product is a five-year senior coupon bond issued by Bank XYZ and denominated in euros.						
The coupons are paid every six months as specified below:						
- a fixed rate of 2% for the first year;						
- a floating rate equal to the six-month Euribor plus a spread of 0.3% (30 basis points) from the second to the fifth year.						
The capital redemption is a bullet payment due on maturity in December 2015. The issuer does not intend to start trading in a secondary market, but commits to buy back the bond for the duration and the total amount issued at a spread of 90 basis points.						
ISIN code	IT0000000000					
Status	Senior					
Issue date	15.12.2010					
Expiry date	15.12.2015					
Notional Amount	1,000,000,000					
RISK-RETURN PROFILE						
Financial Investment Table						
Risk-free component	91.3%					
Risky component	5.0%					
Net fair value	96.3%					
Value of the liquidity enhancement service	1.6%					
Gross fair value	97.9%					
Costs	2.1%					
Price	100%					
Probability Table						
Scenarios	Probabilities	Mean Values (Risk-free mean)				
The final value of the investment is lower than the issue price	9.5%	45.3				
The final value of the investment is higher than the issue price but lower than that of the risk-free asset	0%	—				
The final value of the investment is higher than the issue price and in line with that of the risk-free asset	87.4%	115.6 (114.1)				
The final value of the investment is higher than the issue price and higher than that of the risk-free asset	3.1%	131.1				
Degree of Risk						
VERY LOW	LOW	MEDIUM LOW	MEDIUM	MEDIUM HIGH	HIGH	VERY HIGH
Recommended Investment Time Horizon:					5 years	
Minimum Time Horizon:					1.5 years	

behaviour of the product with respect to the risk-free asset, the conditional mean of the non-equity product corresponding to this scenario is flanked by the mean value of an investment in the risk-free asset with the same maturity. This choice follows from the analysis performed in Section 2.3.3. In the case considered in this example, this additional information clarifies that the bond performs better than the risk-free asset, the former having a mean value of 115.6 and the latter of 114.1.

In order to complete the representation of the risk-return profile of this product, it can be seen that the spread paid by the issuer

Figure 5.8 Partition of the risk-neutral density of the bond with respect to the point of zero return and to the two fixed positive thresholds identified with the superimposition technique



(corresponding to an average value of 37bp) is not enough to compensate their credit spread of around 125bp, even if the value of the liquidity enhancement service is included in the assessment. This point can be appreciated by looking at the fair value reported in the financial investment table that is strictly less than 100 also when the liquidity service is taken in account (gross fair value equal to 97.9%), with the impact of the costs quantified in percentage terms as 2.1%.

Figure 5.9 illustrates some simulated trajectories of the bond over the implicit time horizon of five years.

The degree of risk is "medium", corresponding to an average annualised volatility of around 3.8%. As explained in Section 3.6, the risk classification of this product requires the preliminary assessment of all the risk factors of the investment including the credit risk. It is worth recalling that the effect of the latter source of risk on the value of the product over time can be captured by looking at the jumps experienced by some trajectories which default.

The recommended investment time horizon corresponds to the maturity of the bond and it is therefore equal to five years. Moreover, the presence of a form of liquidity enhancement aimed at increasing the likelihood of an early redemption under secure conditions can be disclosed to the investor by supplementing the

Figure 5.9 Trajectories of a five-year senior coupon bond

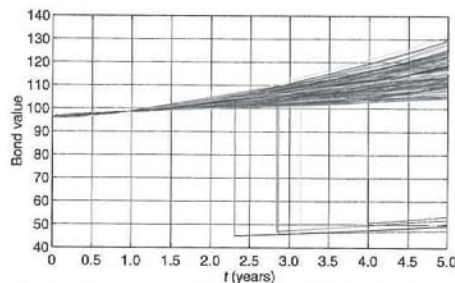
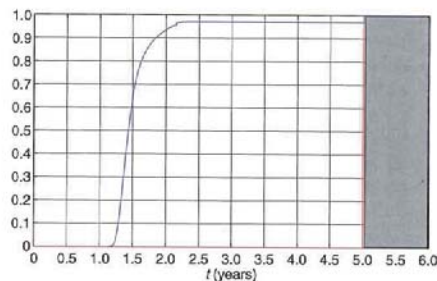


Figure 5.10 Plot of the cumulative probability distribution of the first-passage times used to determine the minimum time horizon of the bond (blue line)



The red line represents the unique possible holding period for this product under the hypothesis of absence of the liquidity enhancement.

information on the recommended time horizon with the indication of the minimum time horizon obtained according to the criterion of the cost recovery, as explained in Section 4.2. Figure 5.10 shows the cumulative probability distribution (the blue line) of the first times the value of the bond hits the barrier of the issue price; the expected value of the corresponding density function is around 1.5

years. It is worth recalling that this information is valuable only for those investors who are interested in the possibility of liquidating the bond before the maturity; while for buy-and-hold investors the minimum time horizon collapses into the one which is implicit in the financial structure of the bond as represented by the red line, ie, the probability distribution of the first hitting times when no early exit is allowed.

Figure 5.10 demonstrates a final technical detail in this regard, namely, the difference in the number of trajectories that do not recover the costs until maturity. This number is higher in the case of complete illiquidity of the bond, since the investors could not benefit from an early exit from the investment and would bear the complete exposure to the credit risk of the issuer for the entire life of the product.