EXAM FM QUESTIONS OF THE WEEK

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Week of February 20/06

An n-year bond has face and redemption amount 100. The bond has level semiannual coupons and the yield rate is a nominal annual rate of 6% compounded semiannually. The bond's amortized value just after the 8th coupon is 121.13 and just after the 10th coupon it is 120.39. Find the original purchase price of the bond.

The solution can be found below.

Week of February 20/06 - Solution

The yield rate is 3% every 6 months. Suppose that coupon amount is K. The amortized value from coupon t to coupon $t + 1$ follows the accumulation relationship

$$BV_t(1.03) - K = BV_{t+1}.$$

Therefore, $121.13(1.03) - K = BV_9$, and $BV_9(1.03) - K = 120.39$,

so that $121.13(1.03)^2 - K[(1.03) + 1] = 120.39$.

Solving for K results in $K = 4.0$.

The amortized value after the 8th coupon is the same as the outstanding balance of a loan amount P (the original bond price) with level payments of K, so that, retrospectively,

$$121.13 = P(1.03)^8 - K s_{\overline{8}|.03} = P(1.03)^8 - 4 s_{\overline{8}|.03},$$

from which we get $P = 123.70$.