

Reducing the Duration of a Bond Portfolio

A pension fund manager forecasting a rise in interest rates intends to decrease the duration of his bond portfolio.

By using the 30-Year Government of Canada Bond Futures (LGB), the manager can quickly decrease the duration of the bond portfolio.

SETTING:

Value of bond portfolio	\$20,000,000
Total modified duration of the portfolio	13.72
Yield of the portfolio	4.73%
Targeted modified duration of the portfolio	10
Price of the LGB	93.74
Cheapest-to-deliver bond	Can 5% June 1 st , 2037
Conversion factor	1.16
DV01 of the cheapest-to-deliver bond (per \$100,000 notional amount)	\$176.20
DV01 of the LGB (per \$100,000 notional amount)	\$151.90

DV01 refers to the dollar value of a basis point.

Step 1

The pension fund manager must determine the dollar value of a basis point.

For the current portfolio: $\$20,000,000 \times 13.72 \times 0.0001 = \$27,440$

For the targeted portfolio: $\$20,000,000 \times 10 \times 0.0001 = \$20,000$

Difference between the targeted and the actual DV01 of the portfolio: $\$20,000 - \$27,440 = -\$7,440$

Step 2

The manager applies the following hedge ratio to determine how many LGB contracts must be sold to obtain the desired duration.

$$\frac{\text{Targeted portfolio DV01} - \text{Current portfolio DV01}}{\text{LGB DV01}} = \text{Number of LGBs}$$

$$\frac{-\$7,440}{\$151.90} = -48.9 \text{ contracts}$$

==> Number of LGBs to sell = 49

Adjusting the total modified duration of a portfolio to investor's specifications is simple with the help of futures contracts. By selling (or buying) futures contracts, it is possible to decrease (or increase) the total modified duration of the portfolio.