

## MONTREAL EXCHANGE

# Lengthening the duration of a T-bill portfolio

### Situation

A money market manager expects short-term yields to decline and the yield curve to shift downwards, with yields falling the most in the 1- to 3-year sector compared to the rest of the curve. The portfolio consists of 6-month T-bills, but the manager would rather be invested in Government of Canada bonds with longer maturities in order to profit from this outlook.

### Strategy

To effectively lengthen the duration of the portfolio, without disrupting its T-bill composition, the manager can buy 2-year Government of Canada bond (CGZ) futures contracts.

#### Setting:

Value of T-bill portfolio	\$100,000,000
Total modified duration of the portfolio	0.4944
Yield of the portfolio	1.25%
Targeted modified duration of the portfolio	2
Price of the CGZ futures	110.82
Cheapest-to-deliver bond	CAN 0.25% November 1, 2022
Conversion factor	0,9101
Dollar value of a basis point (DV01) of the cheapest-to-deliver bond (per \$100,000 notional amount)	20.19
Dollar value of a basis point (DV01) of the CGZ futures (per \$100,000 notional amount)	22.20

## Step 1

The money market manager must determine the dollar value of a basis point.

For the current portfolio:  $\$100,000,000 \times 0.4944 \times 0.0001 = \$4,944$

For the targeted portfolio:  $\$100,000,000 \times 2 \times 0.0001 = \$20,000$

Difference between the targeted and the actual BPV of the portfolio:  $\$20,000 - \$4,944 = \$15,056$

## Step 2

He applies the following hedge ratio to determine the appropriate number of CGZ futures that must be bought to obtain the desired duration.

$$\frac{\text{Targeted portfolio DV01} - \text{Current portfolio DV01}}{\text{CGZ futures DV01}} = \text{Number of CGZ futures}$$

$$\frac{\$15,056}{\$22.20} = 678 \text{ futures}$$

**Number of CGZ futures to buy = 678**

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