C|G|F™

Strategy

Cross Hedging: Hedging a Portfolio of Canada Mortgage Bonds (CMBs)

A portfolio manager that manages a portfolio of C$20 million of Canada Mortgage Bonds (CMBs) issued by the Canada Housing Trust is concerned about a potential increase in interest rates. So, the manager decides to hedge the portfolio using bond futures contracts to protect the portfolio from losing value if interest rates do rise. However as there is no exchange-traded futures contract listed on CMBs, the manager will need to cross-hedge the portfolio of CMBs.

In a cross-hedge, the manager looks for a futures contract that offers the highest possible correlation to the portfolio (as measured by the coefficient of determination r^2) and the closest price sensitivity to the portfolio (as measured by the dollar value of a basis point). Based on an evaluation of available research data, the manager decides to use 5-Year Government of Canada Bond Futures (CGF) to cross-hedge the portfolio of CMBs.

The CMB program was introduced in June 2001 as an initiative by Canada Mortgage and Housing Corporation (CMHC), Canada's national housing agency. The objective of the program is to reduce mortgage financing costs for Canadian mortgage borrowers. CMBs are issued by Canada Housing Trust, a special purpose trust created by the Government of Canada, which holds residential mortgages issued by banks and other financial institutions as backing assets. CMBs are for the most part issued with a maturity term of five years and are fully guaranteed by the Government of Canada. The bonds are semi-annual coupon, fixed rate, bullet maturity bonds that carry a full timely payment of interest and principal guarantee of the Government of Canada as provided through CMHC. CMBs carry S&P's AAA credit rating, Moody's Aaa credit rating and DBRS' AAA credit rating, and are zero percent risk weighted under the BIS guidelines.

Strategy

The portfolio manager hedges the portfolio of CMBs against a rise in interest rates by selling a specific number of CGF bond futures contracts. The manager constructs a cross-hedge using the CGF as it exhibits a very high correlation (r^2 of 90.5%) and exhibits a very close price sensitivity to the portfolio of CMBs (a dollar value of a basis point of $4.456 per $100 nominal value for the CGF compared to a dollar value of a basis point of $4.527 per $100 nominal value for the portfolio of CMBs).

Notwithstanding the fact that the CGF is highly correlated to the portfolio of CMBs, the manager will need to consider the impact of the two different markets on the hedged portfolio. Specifically, the manager will need to construct the cross-hedge to take into account the yield relationship between the cash instrument (the CMBs) and the futures market (the CGF). Consequently, the manager must adjust the resulting hedge ratio by a factor (determined from a regression analysis of yield changes of the CGF on CMBs) to reflect the less than perfect correlation relationship between the two instruments.

See other side >>

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SETTING:

Price of the CGF (per $100 nominal value)	$116.72
Cheapest-to-deliver bond	CAN 5.25% June 1st, 2013
DV01 of the CGF (per $100 000 nominal value)	$44.56
DV01 of the portfolio of Canada Mortgage Bonds (per $20,000,000 nominal value)	$9,054
Hedge ratio factor adjustment (yield beta factor determined from a regression analysis)	0.776

DV01 refers to the dollar value of a basis point.

Step 1:

Determine the number of CGF bond futures contracts (hedge ratio) to sell to hedge the portfolio of CMB bonds by using the price sensitivities of the CGF and the portfolio of CMBs (that is, the ratio of the DV01 of the two instruments).

$$\frac{\text{DV01 of CMB Portfolio}}{\text{DV01 of 5-year CGF futures}} = \frac{\$9{,}054}{\$44.56} = 203.19 \text{ contracts}$$

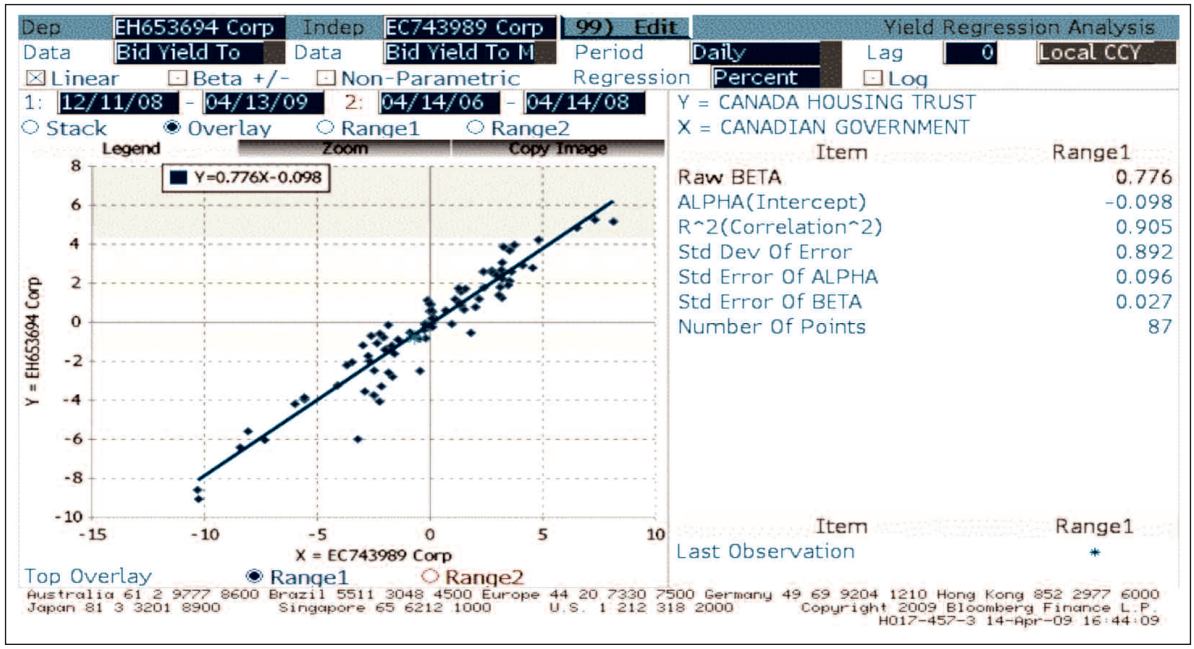
Step 2:

Since the manager is cross-hedging the portfolio of CMBs, the manager adjusts the hedge ratio computed in Step 1 (203.19 contracts) by a factor adjustment determined from a regression analysis of yield changes of the CGF (based on the cheapest-to-deliver bond) on CMBs.

203.19 contracts x 0.776 yield beta factor adjustment = 157.68 contracts

Therefore, the manager is required to sell 158 CGF contracts to hedge the portfolio of CMBs.

Yield Beta: Regression Analysis of the Yield Changes of the CGF on CMBs



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