



CBOT® Treasury Futures

A SIMPLE TREASURY LONG HEDGE

Chicago Board of Trade Treasury futures can help you protect your purchasing power when you fear yields may drop and drive up the cost of acquiring assets. The deep liquidity of the CBOT Treasury futures markets means that you can establish this protection for relatively low transaction costs, and you can do so quickly—in minutes as opposed to the hours or days that some markets can take. Also, should your needs or outlook change, you can reverse course just as quickly, easily, and cost-effectively.

To see how this might work, consider this scenario. You plan to use an anticipated \$50 million cash contribution to buy as much as you can of the on-the-run 5-year Treasury note, the 3% coupon maturing in November 2007—simply, the 3s of Nov 07. The potential problem is that between the day you resolve to do that and the day you will receive the cash, the Fed could lower the fed funds rate target 25 basis points (bps). When the Fed alters its target rate, the normal expectation is that the 2-year and 5-year yields will respond almost one-for-one to the shift in the Fed target rate.

Defining the Challenge

Obviously, a 20 or 25 bp drop in the 5-year yield will erode the purchasing power of this \$50 million contribution. To highlight the challenge you can face, Exhibit 1 details the full prices of various par amounts of the 3s of Nov 07 before and after a 20 bp yield drop.

Notice that with the 3s of Nov 07 priced 100-19+ to yield 2.86%, the full price of \$49 million par will be \$49,582,847.90. A 20 bp drop in yield will boost that to \$50,023,664.15, an increase of \$440,816.25. Assuming you are strictly limited to the \$50 million contribution, and assuming you are restricted to trading in round lot increments of \$1 million par, then the yield drop forces you to cut your purchase from \$49 million par to \$48 million par.

Exhibit 1: How Much Note You Can Buy (3% of November 2007)

\$ Million Par	Full Price	
	at 2.86% yield	at 2.66% yield
48	48,570,953.04	49,002,773.04
49	49,582,847.90	50,023,664.15

Planning and Executing Your Response

Anticipating this kind of adverse yield shift, you can go long CBOT 5-year Treasury note futures to protect the buying power of the \$50 million contribution. In planning a strategy of this kind, you should:

- Define your hedging target
- Find the right number of futures contracts
- Consider possible outcomes

Define your Target

Exhibit 2 shows that at a 2.86% yield, \$49 million par of the 3% of November 2007 will cost \$49,582,847.90 and that at a 2.66% yield, the cost will rise to \$50,023,664.15, a \$440,816.25 difference. Your hedging target in turning to the futures market is to make enough from the hedge to make up for that much potential shortfall in purchasing power.

Find the Right Number of Futures Contracts

The easiest way to determine how many futures contracts to use is in terms of the dollar value of a basis point (DV01). The display of initial market data in Exhibit 2 shows the 3s of Nov 07 to have a 4.42-year modified duration and \$49 million par, at a yield of 2.86%, to have a \$49,582,847.90 full price.

Using the standard DV01 formula, you can see that a 1 bp yield change will cause the full price of this much of the security to change \$21,915.62 in the opposite direction.



$$(((0.01 * \text{duration}) * \text{full price}) * 0.01) = \text{DV01}$$

$$(((0.01 * 4.42) * 49,582,847.90) * 0.01) = 21,915.62$$

The CBOT 5-year Treasury note futures contract, in contrast, has a \$44.60 DV01. To define the size of the hedge position, simply divide the DV01 of the position being hedged by the

$$21,915.62 / 44.60 = 491.38, \text{ round to } 491$$

Consider Possible Outcomes

The event causing the yield shift might be a 25 bp Fed ease. When the Fed shifts its fed funds target rate, yields at the shorter end of the yield curve tend to respond almost one-for-one. If the Fed does ease 25 bps, you can typically expect to see the 5-year Treasury yield drop 20 or 25 bps.

To see what kinds of results your forward hedge might generate given moves of these magnitudes, consider Exhibit 3.

The DV01 column contains the relevant DV01s. The Yield Change column lists the projected yield changes in basis points. The Position Size column shows that you will need 491 futures contracts. The Treasury position indicates that you are short (since you have yet to buy the Treasury) one \$49 million par unit of the relevant Treasury issue.

In these scenarios, given these assumptions, the futures position will essentially offset the shortfalls caused by the changes in the price of the Treasury note. The tiny amounts of variation are due to the rounding error in the hedge ratio.

Should yields rise, this strategy will generate a loss. If the key factor is an expected Fed move, you can often see evidence of what the Fed will do ahead of time and lift your hedge early.

Conclusion

This example shows that strategies involving CBOT Treasury futures are operationally simple as well as economically effective. They exact very little cost in terms of either the time it takes you to plan and execute them or in terms of transaction cost. Clearly, CBOT Treasury futures can generate effective protection when interest rates threaten to move against your position.

Exhibit 2: Initial Market Conditions

5-year Treasury Note (3% of November 2007)

Quoted Price:	100-19+ (100.609375)
Yield:	2.86%
Modified Duration:	4.42 years
Days since last coupon payment:	70
Days in coupon period:	181
Full Price:	101-06 (101.189485)
DV01 (\$49 million par):	\$21,915.62

5-year Treasury futures, March 2003 (FVH3)

Price:	112-30 (112.9375)
DV01:	\$44.60

futures DV01. In this case, you can see that a futures hedge position of 491 futures contracts should essentially protect the buying power of this \$50 million contribution.

Exhibit 3: Assessing Possible Results

	DV01 (in \$)	Yield Change (in bps)	Position Size	Results (to nearest \$)
Treasury	21,915.62	-20	-\$49 million par	-438,312
Futures	44.60	-20	491 contracts	437,972
Treasury	21,915.62	-25	-\$49 million par	-547,891
Futures	44.60	-25	491 contracts	547,465

