STRATEGY PAPER

CBOT® Treasury Futures

A SIMPLE TREASURY SHORT HEDGE

Chicago Board of Trade Treasury futures can help you protect the value of an asset when you fear yields may rise and erode asset values. 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. It is also important to realize that, should your needs or outlook change, you can reverse course quickly, easily, and cost-effectively.

Defining the Challenge

Suppose you hold $100 million par of a 2-year Treasury note—say the 1 3/4% coupon issue that matures in December 2004—or, more simply, the 1 3/4s of Dec 04. As Exhibit 1 shows, it is currently priced at 100-08 to yield 1.62%. At this yield, the note has a duration of 1.86 years, and your position has a full price of $100,428,867.40.

Exhibit 1: Initial Market Conditions

2-year Treasury Note (1 3/4% of December 2004)	
Quoted Price:	100-08 (100.25)
Yield:	1.62%
Modified Duration:	1.86 years
Full Price:	100-13 3/4 (100.428867)
DV01 ($100 million par):	$18,679.77

2-year Treasury futures, June 2003 (TUM3)	
Price:	112-28 (112.875)
DV01:	$40.00

Your plan is to sell this note in three weeks to meet an obligation due then, but rising yields might erode the value of your holding enough to leave you short on this obligation. If the Fed raises its fed funds target rate, you can expect the 2-year yield to come close to matching that move. Exhibit 2 shows that an instantaneous 30 basis point (bp) jump in the 2-year yield will drop the value of your holding to $99,871,372, a $557,495 loss.

Structuring and Executing Your Hedge

To protect against this possibility, you can go short CBOT 2-year Treasury note futures. A properly constructed short futures position should gain as much as the Treasury position loses. Conversely, if yields drop, the Treasury position should gain enough to make up for the resulting futures loss. Either way, this short hedge should allow you to fulfill this obligation. In structuring the hedge, you should:

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

Define your Target

The goal of the hedge is to protect the value of your asset. The short futures position should, make almost exactly as much as the Treasury note position will lose. In this example, your target will be in the range of $464,000 to $558,000—the amounts you would lose if yields rose from 25 to 30 bps.

Find the Right Number of Futures Contracts

The one special wrinkle to be aware of in structuring hedge positions with CBOT 2-year Treasury note futures is that this contract has a $200,000 par value, in contrast to the $100,000 par of other CBOT Treasury futures contracts. If you take your futures DV01 from a quote service, it is likely to be scaled to $100 par. With the longer-dated contracts, you would multiply this by 1,000 to scale it to the futures contract size. In the case of the 2-year, you must multiply by 2,000 to scale the DV01 correctly.

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Exhibit 2: The Effects of a Range of Yield Increases

Yield Change (in bps)	Initial Full Price	Final Full Price	Loss
20	100,428,867	100,056,764	-372,103
25	100,428,867	99,964,013	-464,854
30	100,428,867	99,871,372	-557,495

Otherwise, the hedge ratio calculation is the same as for other Treasury futures contracts. You divide the DV01 of your Treasury position by the futures DV01 to arrive at the hedge ratio. Given the initial market data in Exhibit 1, this will be 465 contracts.

18,679.77/40.00 = 466.9943, round to 467

Consider Possible Outcomes
To see what kinds of results your short hedge might generate given moves of these magnitudes, consider Exhibit 3.

The column labeled DV01 contains the DV01s of the $100 million par actual Treasury position and the 2-year Treasury note futures contract. The Yield Change column lists the projected yield changes in basis points. The Position Size column might need some explanation. The hedge ratio calculation shows that you will need 467 futures contracts. The Treasury position indicates that you are long one $100 million par unit of the relevant Treasury issue (since this is Treasury inventory you currently hold).

This display shows that 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. Given a 25 bp yield increase, the futures position will generate a $467,000 gain. That plus the actual value of the 2-year Treasury note position amounts to $100,431,013 ($99,964,013 + $467,000 = $100,431,013), slightly more than the initial $100,428,867.40 value of the Treasury note.

Should yields fall, this strategy will generate a futures loss. However, the Treasury position would then generate a gain that would offset the futures loss. In either case, with the CBOT 2-year Treasury note futures position in place, you can have reasonable confidence that your asset will amply fund your obligation.

Conclusion

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

Exhibit 3: Assessing Possible Results

Scenario a

	DV01 (in $)	Yield Change (in bps)	Position Size	Results (to nearest $)
Treasury	18,697.77	25	$100 million par	-466,994
Futures	40.00	25	-467 contracts	467,000

Scenario b

	DV01 (in $)	Yield Change (in bps)	Position Size	Results (to nearest $)
Treasury	18,679.77	30	$100 million par	-560,393
Futures	40.00	30	-467 contracts	560,400

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