

Book **Key**

Page B/N = Bond/Note

CF = Conversion Factor

CTD = Cheapest to Deliver

DC = Delivery Curve

DS = Delivery Set

F = Financing Cost

FR = Federal Reserve

IRR = Implied Repo Rate

Note: Bond and Note will be used interchangeably unless otherwise stated.

RP = Repo Rate

These are the notes taken from chapter one in the Bond Basis Book, 3rd Edition.
There are many direct quotes from the book. Page reference are to the left.

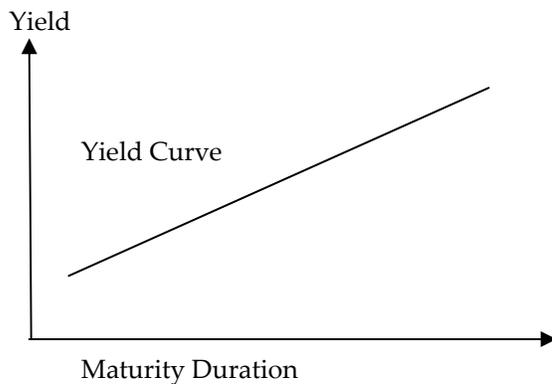
Book

Page **Cash Bonds/Notes**

1 Can be set aside for future delivery.

Nearly all kept in electronic book entry at FR.

Have accrued interest/income that offset cost of financing, until future delivery.



If yield curve is positively sloped, as above, then, holding bonds for future delivery produces net income.

For this reason, futures prices tend to be lower than, cash prices/CFs. Therefore, bond-basis tends to be positive.

2 **Bond Basis is about what's cheapest to deliver, and when to deliver.**

2

If you want to understand the basis, you need to understand the following:

- Futures contracts specifications
- Definition of bond basis
- Conversion factors
- Futures invoice pricing
- Carry: the profit or loss of holding a bond
- Implied Repo Rate
- Buying and selling the basis
- Sources of profit in a basis trade
- RP reverse rates

3 **Futures contracts specifications**

Contract size 5,10,30y = \$100,000

Contract size 2y = \$200,000 (because of the low volatility the 2y exhibits)

Contract specs:

Exhibit 1
Deliverable Grade for CBOT US Treasury Futures

Futures Contract	Contract Size (Face Value)	Deliverable Grade
Treasury Bonds	\$100,000	US Treasury bonds. Both maturity date and, if callable, the first call date must be no less than 15 years from the first day of the contract expiration month.
10-Year Treasury Notes	\$100,000	US Treasury notes. Remaining term to maturity must be no less than 6 years 6 months and no greater than 10 years from the first day of the contract expiration month.
5-Year Treasury Notes	\$100,000	US Treasury notes. Remaining term to maturity must be no less than 4 years 2 months and no greater than 5 years 3 months from the first day of the contract expiration month.
2-Year Treasury Notes	\$200,000	US Treasury notes. Original term to maturity must be no greater than 5 years 3 months from the first day of the contract expiration month. Remaining term to maturity must be no less than 1 year 9 months from the first day of the contract expiration month and no greater than 2 years from the last day of the contract expiration month.

Tic Size

30y	1/32 of a point a point = \$1,000 1/32 of \$1,000 = \$31.25 Or $\$1,000 * .03125 = \31.25
10y	1/2 of 1/32 of a point a point = \$1,000 1/2 of 1/32 of \$1,000 = \$15.625 Or $\$1,000 * .015625 = \15.625
5y	1/2 of 1/32 of a point a point = \$1,000 1/2 of 1/32 of \$1,000 = \$15.625 Or $\$1,000 * .015625 = \15.625
2y	1/4 of 1/32 of a point a point = \$2,000 1/4 of 1/32 of \$2,000 = \$15.625 Or $\$2,000 * .0078125 = \7.8125

4 Bond Basis: Definition

Basis = Cash price - (Futures price * Conversion Factor)

Let's talk about \$100 face value

Most of the calculations done in bond world are based on "Per \$100 of Face Value". Get used to it.
Let's look at the Basis definition using \$100 face value.

The basis formula can be written as:

$$B = P - (F * C)$$

Where

B= Basis (which is a combination of the cash and futures price)

P= cash price PER \$100 face value

F= futures price PER \$100 face value of the futures contract

C= Conversion factor for the bond

5 Bond and futures prices are quoted for \$100 face value, and the prices themselves are stated in full points and 32nds of full points.

6 When calculating the basis, all prices are converted to decimal, then to 32nds.

Conversion Factors (CF)

6,7 CBOT uses these for invoice pricing.

This places the notes on roughly equal footing.

CF is the decimal price at which a bond would be traded IF it yielded 6% to maturity.

That's why they call them "6% Conversion Factors".

Let's look at a table of CFs from the CBOT:

CBOT® 5-YEAR U.S. TREASURY NOTE FUTURES CONTRACT								
This table contains conversion factors for all medium-term U.S. Treasury notes eligible for delivery as of March 29, 2006.								
		Coupon	Issue Date	Maturity Date	Cusip Number	Issuance (Billions)	6% Conversion Factors	
							Mar. 2006	Jun. 2006
1.)		3 5/8	06/15/05	06/15/10	912828DX5	\$14.0	0.9120	-----
2.)		3 7/8	05/16/05	05/15/10	912828DU1	\$15.0	0.9226	-----
3.)		3 7/8	07/15/05	07/15/10	912828DZ0	\$13.0	0.9199	-----
4.)		3 7/8	09/15/05	09/15/10	912828EG1	\$13.0	0.9173	0.9212
5.)		4 1/8	08/15/05	08/15/10	912828ED8	\$13.0	0.9281	0.9317
6.)		4 1/4	10/17/05	10/15/10	912828EJ5	\$13.0	0.9307	0.9340
7.)		4 1/4	01/17/06	01/15/11	912828ES5	\$13.0	0.9274	0.9307
8.)		4 3/8	12/15/05	12/15/10	912828EQ9	\$13.0	0.9336	0.9367
9.)		4 1/2	11/15/05	11/15/10	912828EM8	\$13.0	0.9397	0.9425
10.)		4 1/2	02/28/06	02/28/11	912828EX4	\$14.0	0.9369	0.9397
11.)	@	4 3/4	03/31/06	03/31/11	912828FA3	\$14.0	-----	0.9489
Number of Eligible Issues:						11	10	8
Dollar Amount Eligible for Delivery:						\$148.0	\$0.0	\$0.0

The CFs are produced following an auction of a new issue.

This table was released after the 5y auction on March 29th, 2006.

(You can get the table at the CBOT web site.)

The 1st column simply numbers the issues. The 2nd, 3rd, and 4th columns are self explanatory.

Take note, the issue date is listed as mm/dd/yyyy.

The dd is the day. The CBOT issue dates do NOT coincide with the ACTUAL issue date.

The actual issue date is a few days before that. The CBOT does this because....

I don't know? It's has something to do with the coupon and yata yata yata. It's not important.

The 5th column is the CUSIP number.

The CUSIP is the "License Plate" of the note. Each car has a license plate to identify it.

Each Note/Bond has a CUSIP Number to identify it.

The 6th column is the size of the issuance.

The rest of the columns are the 6% Conversion Factors for each cash note.

The '@' sign is for the note that's newly issued (the on-the-run).

7 Example:

You're short ten 5yr futures. It's delivery day.
You must delivery 1 Million dollars of 5 years notes.
to the **trader who's long** 1 Million dollars of 5 years notes.
(5yr note futures are worth \$100,000 a contract.
\$100,000 * 10 = \$1,000,000)

You're long one 5yr CASH contract.
That contract is worth \$1,000,000 in the cash market.
You deliver that cash market note to the trader who's
long \$1,000,000 of 5yr futures.

The trader who's long the note futures, who just received
your 5yr cash note must pay you an amount equal to
the INVOICE PRICE.

Let's go over that again...

You're long 5yr Cash Note/Short 5yr Futures

↓
it's Delivery day

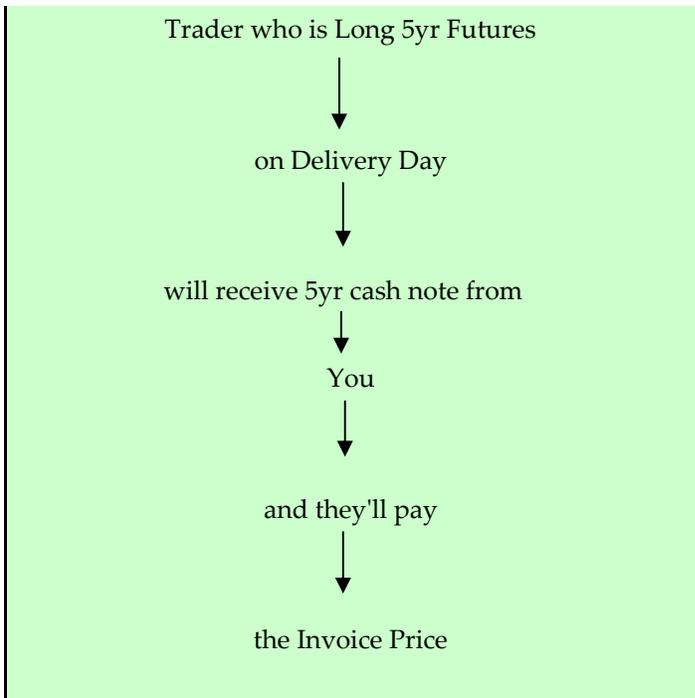
↓
you must Deliver 5yr cash note to

↓
Trader who's long 5yr futures

↓
you will Receive

↓
the Invoice Price

(next page)



7 Invoice Price equation (from book)

Contract:

7 1/2% of 11/15/2016

Delivered on 06/29/2001 @ a futures price of 103/30

$$\begin{aligned}
 \text{Invoice Price} &= (\text{Futures Price} * \text{CF}) + \text{Accrued Interest} \\
 &= (103.9375 * 1.1484) + 0.91712 \\
 &= 120.2789
 \end{aligned}$$

Remember that everything is done in PER \$100 face value

So, you multiply 120.2789 by the point value of the contract to get the INVOICE AMOUNT.

$$\begin{aligned}
 \text{Invoice Amount} &= \text{Invoice Price} * \text{Contract Point Value} \\
 \$120,278.90 &= 120.2789 * \$1,000
 \end{aligned}$$

What's the Accrued Interest (AI)?

The most important thing to know about AI, for now, is that it's used in forward pricing of B/N. Just keep that in mind. We'll get back to it.

Carry

- 11 Difference between coupon income you'd make holding a B/N (being long over night) and the financing cost.

Positive carry = good for long basis position

Negative carry = bad for long basis position

$$\text{Carry} = \text{Coupon Income} - \text{Financing Cost}$$

What's the financing cost (F)?

$$F = \text{RP Rate} + \text{Accrued Interest}$$

Implied Repo Rate (IRR)

- 15 You can read about the IRR on pg 15 if you'd like.

What's important to know for now is:

The B/N with the HIGHEST IRR is the Cheapest to Deliver (CTD)

Sources of Profit in the Basis Trade

- 20,21 The 2 main sources are

The Carry Trade

Changes in the price of the Basis

Repo Rates (RP)

- 24 A repo rate is the rate you finance the b/n, if you are long.

If you finance overnight, then it's called

Overnight Rate (O/N)

If you finance any longer than overnight it's called

Term

The rate you lock in has a huge affect on your basis trade.

RPs also have an affect on the basis trade during the day. More on that later.

End chapter one.
