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Financial futures

Bond, bill, and note futures

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Short-term interest rate contracts: Some tricks to make this simpler

- The relevant "price" to watch in interest rate futures is the yield, not the price of the asset.
- The key variable that affects settlement is basis point change, where a basis point is one percent of once percent, for example, 3.96% to 3.97% is a one basis point move.
- Contracts are designed such that a one basis point move will always affect settlement by some easy-to-calculate amount; for example, a one basis point move in T-Bill futures affects settlement by exactly $25 per contract.
- Because you are watching yields rather than price, when you are long you gain when yield falls rather than rises.

Eurodollar Quotations

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Eurodollar (CME) 3-month deposit rate, $1 million

March 11, 2011

	Open	High	Low	Prior Price Settle	Chg	Implied Yield Settle	Chg	Vol
Mar	99.685	99.688	99.685	99.685	**0.003**	0.315	0.003	65,277
Apr	99.680	99.680	99.670	99.670	**0.005**	0.330	0.005	4,546
May	99.655	99.655	99.655	99.650	**0.005**	0.350	0.005	3,701
May 20, 2000								**OI**
June	93.01	93.04	93.01	92.03	0.01	6.97	**0.01**	497,518
July	92.87	92.88	92.86	92.88	0.03	7.12	**0.03**	8,718
Aug	92.76	92.77	92.75	92.76	0.05	7.24	**0.05**	3,984

Source: CMEGroup for March 2100, *Wall Street Journal* for May 2000.

This contract reflects the yield on a bank deposit for **three months** for $1 million in a European account on a dollar-denominated account. The initial margin on this account was only $870 (2000) and maintenance is $600.

Note that the yield equals 100 - price.

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... in the words of the CME

"All CME interest rate futures contracts are traded using a price index, which is derived by subtracting the futures' interest rate from 100.00. For instance, an interest rate of 5.00 percent translates to an index price of 95.00 (100.00 - 5.00 = 95.00). Given this price index construction, if interest rates rise, the price of the contract falls and vice versa. Therefore, to profit from declining interest rates, you would buy the futures contract (go long); to profit from a rise in interest rates, you would sell the contract (go short). In either case, if your view turns out to be correct, you will be able to liquidate or offset your original position and realize a gain. If you are wrong, however, your trade will result in a loss."

Notice something very important here: Even though this is a 3-month contract it appears to be priced using the discount formula for a 1-year contract! That is true of all of this class of futures. The time adjustment is made in **settlement**.

Margin account adjustment for the CME Eurodollar future

- Each change in the interest rate of one basis point (1% of 1%, or .0001, will cause the price to move in the opposite direction of 1 cent.
- Therefore, a fall in the interest rate of one basis point will add $25 to the margin account.
- Why? $1 million X .0001 equals $100. But the future is for a Eurodollar bank deposit of three months, so the gain is $100/4 equals $25.
- For all but the last month of the contract, the minimum price movement, the "tick" is one basis point, but for the last month it is one fourth of one basis point.

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The Eurodollar contract (cont.) from *WSJ*, May 18, 2000

May 20, 2000								OI
June	93.01	93.04	93.01	92.03	0.01	6.97	**0.01**	497,518
July	92.87	92.88	92.86	92.88	0.03	7.12	**0.03**	8,718
Aug	92.76	92.77	92.75	92.76	0.05	7.24	**0.05**	3,984

Source: CMEGroup for March 2100, *Wall Street Journal* for May 2000.

On the CME, this contract has a nominal face value of $1 million, represents a Eurodollar Time Deposit in Europe with a 3-mo maturity has an initial margin of only $1350 (2008) and a maintenance margin of $1000. Price quotations rise and fall by basis points (the Chg for July shows a three basis point drop for that day for the settle) and the minimum CME price movement is one-half basis point.

Note also connection between the change in the settle and the change in the yield!! Because of the clever arithmetic, they are designed to offset each other basis point for basis point! This makes hedging easy using this contract!

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The Eurodollar contract (cont)

from *WSJ*, May 18, 2000

May 20, 2000								OI
June	93.01	93.04	93.01	92.03	0.01	6.97	0.01	497,518
July	92.87	92.88	92.86	92.88	0.03	7.12	0.03	8,718
Aug	92.76	92.77	92.75	92.76	0.05	7.24	0.05	3,984

Source: CMEGroup for March 2100, *Wall Street Journal* for May 2000.

This is the ultimate and best interest rate hedging contract, far better and simpler that T-Bills. The quotes and the settlement for this bill are simple - they are 100 minus the yield.

There is no financial asset associated with this contract .. it is a pure interest contract. There are no deliverables. As the expiration date approaches, *the settle on this contract converges not to 100, but to the yield on 90 day spot interest rates on settlement day! That will be a number like 94.00.*

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The Eurodollar contract (cont.)

from *WSJ*, May 18, 2000

May 20, 2000								OI
June	93.01	93.04	93.01	92.03	0.01	6.97	0.01	497,518
July	92.87	92.88	92.86	92.88	0.03	7.12	0.03	8,718
Aug	92.76	92.77	92.75	92.76	0.05	7.24	0.05	3,984

Source: CMEGroup for March 2100, *Wall Street Journal* for May 2000.

Important!!! Each rise or fall in the settle change column will cause your margin account to rise or fall by $25! No more, no less!! For example, the long holder of a June contract lost $25 from her margin account that day. The long holder of an August contract lost $125.

Why? Because a one-basis point (.0001) movement of a $1 million contract equals $100 and because this is a 90 day contract the actual spread on value is one fourth the spread on quote!

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How do you make the margin adjustment?

The impact on long position margin account
Single CME 3-Month Eurodollar contract

Day	Settle Quote	Chg	Yld	Chg	Chg Margin	Margin
1	93.03					870
2	93.01	-0.02				
3	92.97	-0.04				
4	92.94	-0.03				
5	92.95	0.01				
6	92.98	0.03				
7	93.00	0.02				

Easy to do ...; figure this out for the exam.

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The elegance of these contracts

- The EU contract is not tied to an actual financial asset, it is tied to only a deposit rate.
- They are not priced the same as the price of the financial asset that has the yield that they are tied to (the 13-week futures is not priced the same as a 13-week bill)
- Their elegance is in settlement … a one basis point move rate forces an opposite $25 move in settlement … simple as that.
- Other similar contracts: Fed Funds and various e-mini contracts.

UST Note and Bond Contracts

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5-Year U.S. Treasury Note - CMEGroup $100,000

March 11, 2011

	Open	High	Low	Prior Price Settle	Chg	Vol
Mar	117'262	118'010	117'165	117'280	**0'047**	131,653
Jun	116'285	117'035	116'182	116'285	**0'050**	745,989

Source: CMEGroup

Two oddities:
(1) Left of dash represents 32nds, e.g. 262 represents 26.5/32nds.
(2) These are deliverable and delivery is complicated and archaic.
(3) No way to tell the implied ask-yield rate at a glance (not sure if you can do it at all).

UST Note and Bond Deliverables

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U.S. Treasury notes with an original term to maturity of not more than five years and three months and a remaining term to maturity of not less than four years and two months as of the first day of the delivery month. The invoice price equals the futures settlement price times a conversion factor, plus accrued interest. The conversion factor is the price of the delivered note ($1 par value) to yield 6 percent. (CMEGroup specifications)

Yield Contango – consistent with my inflation forecast

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5 YEAR T-NOTES (CBOT:ZF) Markets | All Futures | Open Futures | Exc

Chicago Board of Trade (CBOT) › Interest Rates › 5 YEAR T-NOTES (ZF)

Market	Contract	Open	High	Low	Last	Change
ZF.H11.E	Mar 2011 (E)	117.820313	118.031250	117.515625	117.968750	+0.093750
ZF.M11.E	Jun 2011 (E)	116.890625	117.117188	116.570313	117.031250	+0.093750
ZF.U11.E	Sep 2011 (E)	115.148438	115.554688	115.148438	116.234375	+0.093750
ZF.Z11.E	Dec 2011 (E)	115.421875	115.421875	115.421875	115.421875	+0.093750
ZF.H12.E	Mar 2012 (E)	114.609375	114.609375	114.609375	114.609375	+0.093750
ZF.H11:M11.E	Mar 2011/Jun 2011 Spread	0.929688	0.960938	0.921875	0.921875	-0.007813

All quotes are exchange delayed. For charts, options, and latest headline news, click on the market name.

10 YEAR T-NOTES (CBOT:ZN) Markets | All Futures | Open Futures | Excl

Chicago Board of Trade (CBOT) › Interest Rates › 10 YEAR T-NOTES (ZN)

Market	Contract	Open	High	Low	Last	Change
ZN.H11.E	Mar 2011 (E)	120.250000	120.578125	119.796875	120.437500	+0.093750
ZN.M11.E	Jun 2011 (E)	118.937500	119.250000	118.421875	119.125000	+0.078125
ZN.U11.E	Sep 2011 (E)	117.390625	117.390625	117.281250	117.937500	+0.046875
ZN.Z11.E	Dec 2011 (E)	115.875000	115.875000	115.812500	116.937500	+0.046875
ZN.H12.E	Mar 2012 (E)	115.828125	115.828125	115.828125	115.828125	+0.046875
ZN.H11:M11.E	Mar 2011/Jun 2011 Spread	1.304688	1.421875	1.296875	1.328125	+0.015625

All quotes are exchange delayed. For charts, options, and latest headline news, click on the market name.

Source: ino.com for March 11, 2011