



FUTURES

King Saud University
Mathematics Department | ACTU461
Exercise's Lecture (5)
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FUTURES CONTRACTS

- Quoted in Public Market**
- Actively Traded**
- Standardized Contract**
- Regulated**
- No Counterparty Risk**

FORWARD CONTRACTS

- Privately Negotiated**
- Non-Transferrable**
- Customized Terms**
- Carries Credit Default Risk**
- Fully Dependent on Counterparty**
- Unregulated**

MARGIN ACCOUNT

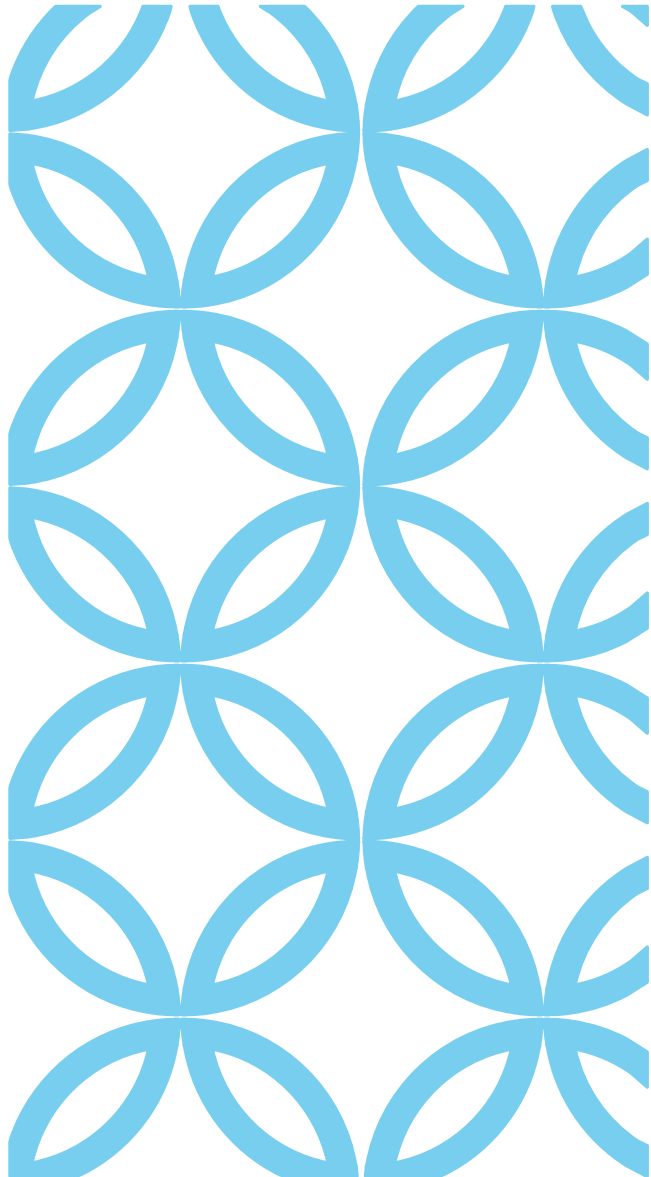
LONG
FUTURE

SHORT
FUTURE

$$M_t = M_{t-\frac{1}{365}} e^{\frac{r}{365}} + N(S_t - S_{t-\frac{1}{365}})$$

$$M_t = M_{t-\frac{1}{365}} e^{\frac{r}{365}} + N(S_{t-\frac{1}{365}} - S_t)$$

Settlements
could be
Weekly > 52
Monthly > 12 ..



maintenance margin : The minimum level that the Investors are required to keep the margin account at it.

Margin call?

When ..

margin account < maintenance margin

an investor's broker will require the investor to deposit funds sufficient to restore the balance to the initial margin level.

Determine which of the following is NOT a distinguishing characteristic of futures contracts, relative to forward contracts.

- A. Contracts are settled daily, and marked-to-market.
- B. Contracts are more liquid, as one can offset an obligation by taking the opposite position.
- C. Contracts are more customized to suit the buyer's needs.
- D. Contracts are structured to minimize the effects of credit risk.
- E. Contracts have price limits, beyond which trading may be temporarily halted.

Judy decides to take a short position in **20** contracts of S&P 500 futures. Each contract is for the delivery of **250** units of the index at a price of **1500** per unit, exactly one month from now. The initial margin is **5%** of the notional value, and the maintenance margin is **90%** of the initial margin. Judy earns a continuously compounded risk-free interest rate of **4%** on her margin balance. The position is marked-to-market on a daily basis. On the day of the first marking-to-market, the value of the index drops to **1498**. On the day of the second marking-to-market, the value of the index is **X** and Judy is not required to add anything to the margin account. Calculate the largest possible value of X.

- A. 1490.50
- B. 1492.50
- C. 1500.50
- D. 1505.50
- E. 1507.50

An investor enters a long position in a futures contract on an index (F) with a notional value of $200 \times F$, expiring in one year. The index pays a continuously compounded dividend yield of 4% , and the continuously compounded risk-free interest rate is 2% . At the time of purchase, the index price is 1100 . Three months later, the investor has sustained a loss of 100 . Assume the margin account earns an interest rate of 0% . Let S be the price of the index at the end of month three.

Calculate S .

- A. 1078
- B. 1085
- C. 1094
- D. 1105
- E. 1110

On 5 March, a company enters into a short future contract to sell **1000** barrels of oil at **51** the barrel. The initial margin is **50%** and the maintenance margin is **40%** of the market value of the futures' underlier. The annual continuously compounded interest rate is **6%**.

- 1) On 6 March, the price of a barrel of oil increase to **53**. Find the new balance in the margin account.
- 2) Find the minimum price of barrel of oil on 7 March that would lead to a margin call.