

Futures

Didem B. Aykurt

Colorado State University Global

FIN560: Derivatives and Assets Pricing

Dr. Peter Bush

May 26, 2024

Futures Contracts

This paper aims to demystify the concepts of initial maintenance, margin accounts, and margin calls using real-world examples. Understanding the initial margin is crucial for investors utilizing margin accounts. It represents the percentage of a security's purchase price that must be covered by cash or collateral when using a margin account. In simpler terms, it's the amount of money investors need to put up to open a position using borrowed funds. The current initial margin requirement set by the Federal Reserve Board's Regulation T is 50% of a security's purchase price. However, this is a minimum requirement, and some equity brokerage firms may set their initial margin requirement even higher. The initial margin is not just a regulatory requirement but a key factor in managing the risks of margin trading. To open a margin account at a brokerage firm, investors must first post a certain amount of cash, securities, or other collateral—the initial margin requirement. A margin account allows them to use leverage to purchase securities with a total value more significant than the account's available cash balance. Securities in the margin account act as collateral for the borrowed funds. While this magnifies potential profits, it also increases the risk of losses. If the value of securities purchased declines significantly, the account holder may need to deposit additional funds to cover the loss. Futures contracts and exchanges set initial margin requirements as low as 5% or 10% of the contract value. For example, if a crude oil futures contract is quoted at \$100,000, an account holder can enter a long position by posting only a \$5,000 initial margin (5% of the contract value), effectively giving them a 20x leverage factor. During high market volatility, futures exchanges may increase initial margin requirements as needed.

Brokerage firms offer margin accounts, which allow investors to borrow money to buy securities such as stocks or bonds. With a margin account, investors can use borrowed funds (leveraging) to increase their returns. This process, known as margin trading, can be a powerful tool for

investors, but it also involves higher risk due to the borrowed funds. The maintenance margin serves as a form of collateral in a margin account. It represents the minimum amount of equity an investor must maintain in the account after purchasing. FINRA (Financial Industry Regulatory Authority) currently requires a maintenance margin of 25% of the total value of securities in the margin account. If the account equity falls below this threshold, the investor may receive a margin call, which means they need to either add funds or liquidate positions to meet the requirement. Many brokerage firms may set even higher maintenance margin requirements (e.g., 30% to 40% of the securities' total value). Understanding these concepts is essential for investors to make informed decisions about their investment strategies. Let's explore these concepts further with real-world examples.

1) One of the investors starts 10 short futures positions with a \$1,500 initial margin per one and a gold future price of \$276.50, and \$1,100 is a maintenance margin. The size of the one contract is 100 Oz. How much cash or cash balance for the initial margin?

$$\begin{aligned}\text{A) The Initial Margin} &= \$1,500 * 10 \\ &= \$15,000\end{aligned}$$

B) Assume the future settlement price on the first day is \$278.00 per Oz. So, the investor has a short future contract price of \$276.50 per Oz.

$$\begin{aligned}\text{Lost Amount per Oz.} &= \$276.50 - \$278.00 \\ &= (\$1.50)\end{aligned}$$

$$\begin{aligned}\text{Lost Amount per Contract} &= (\$1.50) * 100 \\ &= (\$150)\end{aligned}$$

$$\begin{aligned}\text{Lost Amount for 10 Futures Positions} &= (\$150) * 10 \\ &= (\$1,500)\end{aligned}$$

$$\begin{aligned}\text{New Balance After the Price Change in Margin Account} &= \$15,000 - \$1,500 \\ &= \$13,500\end{aligned}$$

A margin call happens when the balance in a margin account drops below the necessary maintenance margin. In this situation, it should be maintenance margin:

$$\begin{aligned}\text{Maintenance margin for 10 future Positions} &= \$1,100 * 10 \\ &= \$11,000\end{aligned}$$

To check if a margin call occurs, we can calculate the equity in the margin account:

$$\begin{aligned}\text{Equity} &= \text{Balance} - \text{Maintenance Margin} \\ &= \$13,500 - \$11,000 \\ &= \$2,500\end{aligned}$$

Now, let's compare the equity with the maintenance margin:

If Equity > Maintenance Margin: No margin call occurs.

If Equity <= Maintenance Margin: A margin call occurs.

In this case, Equity \$2,500 is less than the \$11,000 maintenance margin; a margin call would occur because the balance in the margin account falls below the required maintenance margin.

- C) Suppose the second day's futures settlement price is \$281.00 per Oz. Let's check the new margin account balance that might cause a margin call to occur, and the account can top back to the original level.

$$\begin{aligned}\text{Lost Amount} &= \$278 - \$281 \\ &= (\$3)\end{aligned}$$

$$\begin{aligned}\text{Lost Amount per contract} &= (\$3) * 100 \\ &= (\$300)\end{aligned}$$

$$\begin{aligned}\text{Lost Amount for 10 futures Positions} &= (\$300) * 10 \\ &= (\$3000)\end{aligned}$$

New Balance After the Second Price Change in Margin Account:

$$\begin{aligned}\text{New Account Balance} &= \$13,500 - \$3000 \\ &= \$10,500\end{aligned}$$

To check if a margin call occurs, we can calculate the equity in the margin account:

$$\begin{aligned}\text{Equity} &= \text{Balance} - \text{Maintenance Margin} \\ &= \$10,500 - \$11,000 \\ &= \$500\end{aligned}$$

Equity is less than the maintenance margin, which means a margin call occurs.

The maintenance has been restored to \$15,000.

D) If the investor liquidates the short position by selling at a futures price of \$276.00 on the third day. What is the investor's financial balance in their margin account?

Opening Price: \$281.50

Settlement price: \$276.00

Calculate the profit or loss from the short position for a buyer:

Profit or loss = (Settlement price – Opening price) * Number of contract

$$\text{Profit/loss per Contact} = (\$276 - \$281) * 100 = (\$500)$$

$$\text{Profit/loss per Short Position for Buyer} = \$500 * 10 = (\$5,000)$$

$$\begin{aligned}\text{Profit/loss for Seller (investor)} &= -1 * (\text{Profit loss for Buyer}) \\ &= -1 * (\$5,000) = \$5,000\end{aligned}$$

Let's calculate the final balance in the investor's margin account:

$$\text{Final Balance margin account} = \text{Initial Margin} + \text{Profit/loss from futures Contract}$$

$$= \$15,000 + \$5,000$$

$$= \$20,000$$

Upon receiving the margin call, the invested amount was raised to meet the margin requirement, and subsequently, the deposited amount was restored to \$15,000.

$$\text{Deposit Amount for Investor} = \$15,000 - \$10,500$$

$$= \$4,500$$

$$\text{In this case total outlay for the investor} = \$15,000 + \$4,500 = \$19,500$$

Given the margin balance of \$20,000 on the day of closing out, the investor would have replenished their account again. Ignore interest costs, and investor gain will be:

$$\text{Gain/loss for Investors without interest cost} = \$20,000 - \$19,500 = \$500$$

2) The current price of gold is \$864 per troy ounce,

the number of contracts is 10,

The initial margin percentage is 7%, Initial margin = $0.07 * \$864 * 10 = \604.80

the maintenance margin percentage is 5%, Maintenance cost = $0.05 * \$864 * 10 = \432.00

Figure 1: Calculate margin call deposit from Excel file.

A	B	C	D	E	F	G	H	I	J	K
Initial Margin Percentage	0	\$60.48								
Maintenance Margin Percentage	0	\$43.20	Date	Price per	Daily profit/loss	Final Balance	Equity = New Balance -	Margin Call deposit	Closing Balance	
Number of Contractor	10	\$17.28	7-Jul-16	\$864						\$846.72
			8-Jul-16	\$860	\$604.80	(\$40.00)	\$564.80	\$132.80	-	\$860
			9-Jul-16	\$858	\$602.00	(\$20.00)	\$582.00	\$150.00	-	\$858
			10-Jul-16	\$852	\$600.60	(\$60.00)	\$540.60	\$108.60	-	\$852
			11-Jul-16	\$842	\$596.40	(\$100.00)	\$496.40	\$64.40	\$220	\$842
			12-Jul-16	\$840	\$589.40	(\$20.00)	\$569.40	\$137.40	-	\$840

There is no margin call, as the closing balance exceeds the maintenance margin.

Therefore, no margin call deposit is required from Day 2 to Day 5.

Appendix (question 2)

Figure 2: All the formulas show how to use and calculate the variable result.

A	B	C	D	E	F	G	H	I	J	K
Initial Margin Percentage	0.07	=E3*B1								
Maintenance Margin Percentage	0.05	=E3*B2	Date	Price per Ounce	Opening Balance	Daily profit/loss	Final Balance Margin Account	Equity = New Balance - Maintenance Margine	Margin Call deposit	Closing Balance
Number of Contractor	10	=C1-C2	42558	864						=E3-(C1-C2)
			42559	860	=\$E3*\$B\$1*\$B\$3	=(E4-E3)*\$B\$3	=F4+G4	=H4-(E\$3*\$B\$2*\$B\$3)	-	=(E4-K3)+K3
			42560	858	=\$E4*\$B\$1*\$B\$3	=(E5-E4)*\$B\$3	=F5+G5	=H5-(E\$3*\$B\$2*\$B\$3)	-	=(E5-K4)+K4
			42561	852	=\$E5*\$B\$1*\$B\$3	=(E6-E5)*\$B\$3	=F6+G6	=H6-(E\$3*\$B\$2*\$B\$3)	-	=(E6-K5)+K5
			42562	842	=\$E6*\$B\$1*\$B\$3	=(E7-E6)*\$B\$3	=F7+G7	=H7-(E\$3*\$B\$2*\$B\$3)	=(E3-E7)*B3	=(E7-K6)+K6
			42563	840	=\$E7*\$B\$1*\$B\$3	=(E8-E7)*\$B\$3	=F8+G8	=H8-(E\$3*\$B\$2*\$B\$3)	-	=(E8-K7)+K7

References

Kagan, J. (2022). Maintenance Margin: Definition and Comparison to Margin Accounts.

<https://www.investopedia.com/terms/m/maintenancemargin.asp>

Lioudis, N. (2024). Trading Gold and Silver Futures Contracts.

<https://www.investopedia.com/articles/optioninvestor/06/goldsilverfutures.asp>

Barrantes, A. (2024). What is futures contract? Definition.

<https://www.omnicalculator.com/finance/futures-contract>

Bohen, T. (2020). Margin Call: What It Is, How It Works, and How to Calculate It.

<https://stockstotrade.com/margin-call/>

Anderson, A. (2023). Margin Call.

<https://www.wallstreetoasis.com/resources/skills/trading-investing/margin-call>

Financial Wars (2018). Lesson 10: All about margin and leverage in forex trading.

<https://www.youtube.com/watch?v=RgmDywwNlZA>

FXTM (2020). What is Margin Call?

https://www.youtube.com/watch?v=wnDJ_3Q5XpM&t=2s

WallStreetPrep (2024). Margin Call Price.

<https://www.wallstreetprep.com/knowledge/margin-call-price/>