CHAPTER 2
Mechanics of Futures Markets

Problem

The author's website (https://www-2.rotman.utoronto.ca/~hull/) contains daily closing prices for the crude oil futures contract and gold futures contract. You are required to download the data for *crude oil* and answer the following:

(a) Assuming that daily price changes are normally distributed with zero mean, estimate the daily price movement that will not be exceeded with 99% confidence.

(b) Suppose that an exchange wants to set the maintenance margin for traders so that it is 99% certain that the margin will not be wiped out by a **two-day** price move. (It chooses two days because the margin calls are made at the end of a day and the trader has until the end of the next day to decide whether to provide more margin.) How high does the maintenance margin have to be when the normal distribution assumption is made?

(c) Suppose that the maintenance margin is as calculated in (b) and is 75% of the initial margin. How frequently would the margin have been wiped out by a two-day price movement in the period covered by the data for a trader with *a long position*? What do your results suggest about the appropriateness of the normal distribution assumption? Note that the investor receives a margin call and is expected to top up the margin account to the **initial margin level by the end of the next day**.

(d) In (c), assuming that margin balances in excess of the initial margin are withdrawn and all margin calls are met on the **first day**, calculate the number of margin calls for the whole period of time.

Please consider the number of times of negative balance in problem (c) and the number of margin calls in problem (d) separately.

Useful Excel functions:

1. stdev

2. sqrt

3. normsinv

4. if