UNIVERSITY OF TEXAS AT AUSTIN

Quiz #24

Asian options.

Please, provide your **final answer only** to the following questions:

Problem 24.1. (2 points) An Asian arithmetic-average-strike call option is at least as valuable as an otherwise identical Asian geometric-average-strike option. *True or false?*

Solution: FALSE

Problem 24.2. (2 points) Asian options are always strictly more expensive than otherwise identical vanilla options. *True or false?*

Solution: FALSE

Problem 24.3. (2 points) The price of a geometric average price Asian call option is strictly greater the price of an otherwise identical arithmetic average price Asian call option. *True or false?*

Solution: FALSE

Problem 24.4. (2 points) One specific use for Asian options is when an investor is exposed to risk due to an exchange rate which can vary over time. *True or false?*

Solution: TRUE

Problem 24.5. (2 points) One specific use for Asian options occurs when there is a possibility for short-term manipulation of the price of the underlying. *True or false?*

Solution: TRUE

Problem 24.6. (5 points) Let $A(T)$ denote the arithmetic average of a set of observed stock prices, and let $G(T)$ denote the geometric average of the same set of observed stock prices. Which one of the following inequalities is **always** correct?

(a) $(K - A(T))_+ \geq (K - G(T))_+$
(b) $(A(T) - K)_+ \geq (G(T) - K)_+$
(c) $(A(T) - K)_+ \geq (S(T) - K)_+$
(d) $(S(T) - K)_+ \geq (G(T) - K)_+$
(e) None of the above.

Solution: (b) We already established that $A(T) \geq G(T)$. The equality holds iff all of the stock-prices entering the calculation are equal. This implies that (a) is not always correct while (b) is always correct.

To rule out (c) and (d), consider the simple situation in which just two stock-prices are sampled: $S(T/2)$ and $S(T)$. In case that $S(T/2) < S(T)$, we get

$$A(T) = \frac{1}{2}(S(T/2) + S(T)) < S(T) \quad \Rightarrow \quad (S(T) - K)_+ > (A(T) - K)_+.$$

In case that $S(T/2) > S(T)$, we get

$$G(T) = \sqrt{S(T/2)S(T)} > S(T) \quad \Rightarrow \quad (G(T) - K)_+ > (S(T) - K)_+.$$