FLORIDA STATE UNIVERSITY
The COLLEGE of BUSINESS

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Senior Seminar 4934

Option Pricing and Financial Risk Management

Homework #1

*For this homework you will need to use the excel file **Oil.xls**. Note that there are futures prices for crude oil, heating oil, and propane only. Part of this assignment is your ability to organize and analyze data. Note that the prices and dates are not aligned, requiring you to manipulate the data before you can evaluate the problems below. The use of the lookup function will help.*

1. Question on Minimum Variance hedge

    a.) Using the data in the oil.xls file, calculate the standard deviation and correlation of *returns* between the various oil commodities (all 10). Use the spot prices only. (Help Note: Use the **Data Analysis** to calculate the correlation)
    b.) Calculate the minimum variance hedge ratios using only *spot crude oil* prices, and hedged with the *futures prices of heating oil and propane* using 1 month, 2, month, and 3 month maturity contracts.
    c.) Explain the implication of these numbers

2. Margin Calls

    a.) Assuming you enter into *2 futures* contract every *3 months* beginning in January, April, July, and October, mark-to-market daily the position of holding three month futures contract, both the short and long position using the initial and maintenance margins from NYMEX and the prices from the *3 month crude oil futures*.
    b.) Highlight when you receive margin calls.

3. Convenience Yields

    a.) High convenience yields imply what for future prices in relation to spot prices?
    b.) Explain the relationship between storage costs and convenience yield
    c.) Are forward prices upward or downward bias in these markets?
    d.) What is the average daily convenience yield for the crude oil prices using one month futures on Brent Cushing spot and 3 month Treasury rates?

4. Plot the historical-term structure

    a.) Starting in 1975, collect monthly historical Treasury rates for the 1 month, 1 year, 10 year and 30 year bonds. Plot them in excel in a 3D plot.
    b.) Highlight the points where there was an inverse yield curve
    c.) Discuss the potential implication for the economy.