Linear Regression and Futures Hedging

Finance 5330: Project 1

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An energy company is looking to hedge heating oil against future heating oil contracts for a ten year period rolling the hedge forward every month. The data was collected from the EIA with prices daily from 1986 until 2021. In the case of this company, looking at futures contracts outside of heating oil is counter-productive, as we want a contract as close to the underlying as possible.

Analyzing the data with both a log transformation as well as no transformation lead to minimal differences in the output for our hedge ratios.Overall, we feel that because the hedge ratios are so close together, we should use the ratios without the log transformation in order to increase interpretability and simplify the problem.

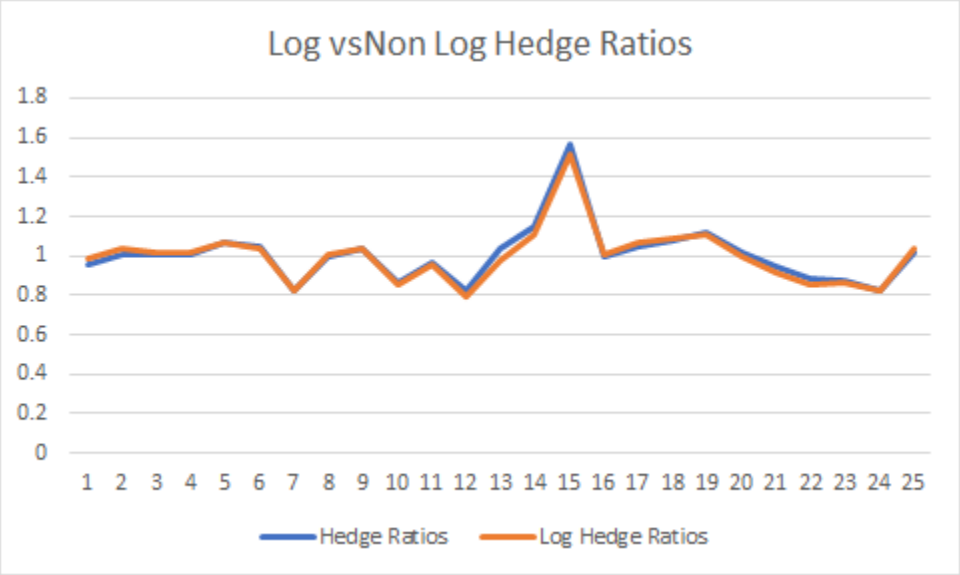

Figure 1: Plotted Log vs Non-Log hedge ratios.

(D) Based on our analysis we would recommend using the normal log ratios without the transformation. For our hedging strategy we are going to be committing to delivering 2.4 million gallons of heating oil in the next two years. We will be delivering 100,000 gallons each month and adjusting our hedge accordingly in order to maintain a consistent price on heating oil. Our exact dates

and hedge quantities are in the table below. Our quantity of short hedge positions is denoted by the negative values. Each period also represents the month that the trade will occur.

Periods	Hedge Ratios	Short/Long	Quantity Needed
0	-95.43%	Short	(2,290,330.91)
1	-100.80%	Short	(2,318,293.43)
2	-100.62%	Short	(2,213,700.70)
3	-100.51%	Short	(2,110,781.73)
4	-107.01%	Short	(2,140,234.25)
5	-104.36%	Short	(1,982,897.56)
6	-82.66%	Short	(1,487,963.61)
7	-100.17%	Short	(1,702,907.69)
8	-103.47%	Short	(1,655,538.35)
9	-86.15%	Short	(1,292,243.73)
10	-96.63%	Short	(1,352,856.91)
11	-82.23%	Short	(1,068,957.72)
12	-103.27%	Short	(1,239,234.21)

13	-115.42%	Short	(1,269,577.93)
14	-156.47%	Short	(1,564,744.55)
15	-99.94%	Short	(899,431.23)
16	-104.86%	Short	(838,861.68)
17	-107.66%	Short	(753,591.65)
18	-111.96%	Short	(671,738.62)
19	-101.92%	Short	(509,611.60)
20	-94.13%	Short	(376,535.99)
21	-88.44%	Short	(265,313.25)
22	-87.33%	Short	(174,660.69)
23	-82.08%	Short	(82,080.43)
24	-102.01%	Short	-