SSOE CRUDE OIL FORECASTING

- Vasu Singh

- Energy Staple of the World

- Contributes 1/3rd of the worlds energy consumption

- Important to businesses that heavily rely on fuel , such as airlines, plastic producers, agricultural etc.

- One of the most Actively traded commodities

- Price is extremely sensitive to the geopolitical and weather events

Business Background

- SSOE is a leading bulk commodity trading solutions provider and logistics partner to clients around the world.

- They are mostly involved in physical trading of commodities

- They also have a derivatives trading desk which trades in Crude Oil and iron ore which started 3 years back.

- Their risk committee has a lot of restrictions so they are only allowed to make 1 trade per day (buy or sell)

Problem Statement

- The aim is to predict the direction of change of WTI and BRENT values and predict if the market will be bullish or bearish.

- Both these values are closely related with a correlation coefficient of 0.95 – 0.96 , so we will be considering only the BRENT values.

- Trading is done for 90 days forward.

- The events that effect the market will show their effect for 3-4 months after the event . And also volatility decreases

Why Analytics ?

- SSOE trades only on their market understanding

- Not able to relate the magnitude of relation of the commodities with all the variables.

- Apart from the existing variables, we can also include more variables

- We at GDNA can bring all the different variables and relate them to the crude oil prices

Options Trading

- An option is a contract that allows (but doesn't require) an investor to buy or sell an underlying instrument like a security, or even index at a predetermined price over a certain period of time.

- Options are considered lower risk due to the fact that you can withdraw (or walk away from) an options contract at any point. The price of the option (its premium) is thus a percentage of the underlying asset or security.

September 25,2014
Enter into a call contract

November 1,2014
Spot Price = $100/barrel

February 25,2015
Strike Price = $95/barrel

Premium = $3/barrel

Payoff Received = ($100 – $95)*1000 = $5,000

Net Profit = $5,000 – $3*1000 = $2000

CALL VS PUT

- A call option is a contract that gives the investor the right to buy a certain amount of shares of a certain security or commodity at a specified price over a certain amount of time.

- Betting that the market will go up

- A put option is a contract that gives the investor the right to sell a certain amount of shares of a certain security or commodity at a specified price over a certain amount of time.

- Betting that the market will go down

Analytics Problem

- Data taken from Bloomberg since 2013 . Data is on daily basis, but there are some variables that are on weekly basis

- A total of around 80 variables across 14 different categories

US Oil Rig Count
(Baker Hughes)

Wkly	673	▲	14
4 Wk Avg	673	▲	0
YOY	862	▼	(189)

WTI FCC	#####	#NAME?
WTI Topping	#####	#NAME?

Forties FCC	#####	#NAME?
Forties Topping	#####	#NAME?

Urals FCC	#####	#NAME?
Urals Topping	#####	#NAME?

Dubai FCC	#####	#NAME?
Dubai Topping	#####	#NAME?

ARA Weekly Stocks
(PJK / Genscape – in KT)

Crude (Mbbl)	57.9	▲	1.5
Gasoil	#NAME?	#NAME?	
Gasoline	#NAME?	#NAME?	
Fuel Oil	#NAME?	#NAME?	
Naphtha	#NAME?	#NAME?	
Kero	#NAME?	#NAME?	

OPEC Production
Feb-20

Production	#NAME?	#NAME?
Compliance	#NAME?	#NAME?
Spare Capacity	#NAME?	#NAME?

Currency & Correlation on Oil

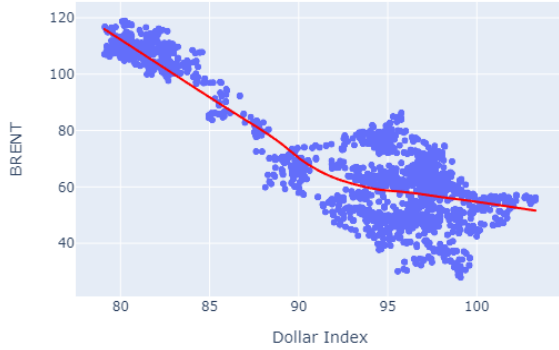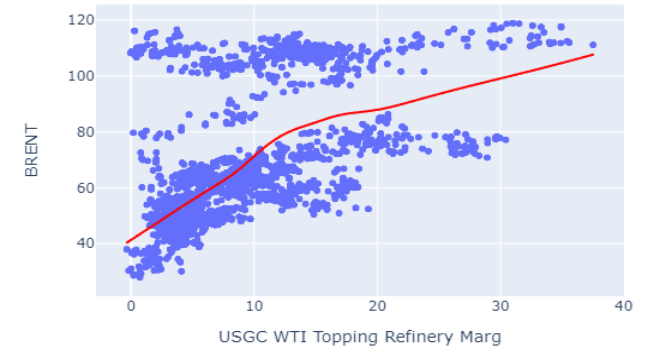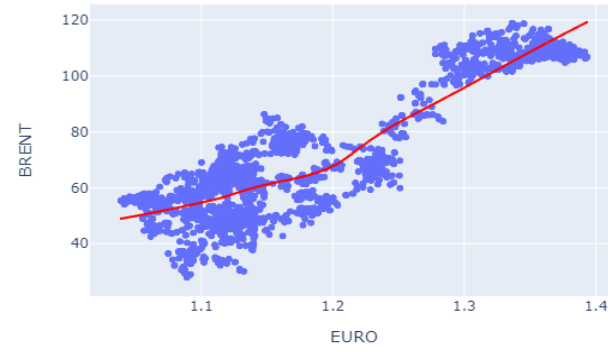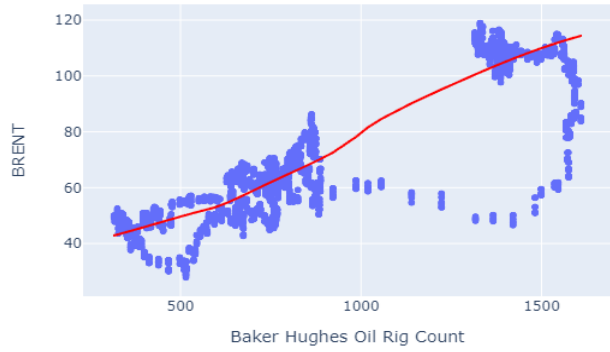|	Last	Change
Dollar Index	#NAME?	#NAME?
EUR	#NAME?	#NAME?
INRUSD	#NAME?	#NAME?

KEY EVENTS

1. US- CHINA TRADE WAR
2. ME TENSION - US IRAN HORMUZ
3. ECONOMIC RECESSION
4. HONKONG UNREST

Microsoft Excel Worksheet

EDA

- Data Pre-processing

- Missing Data

- Correlation Matrix

- Scatterplots of Highly Correlated Variables with BRENT
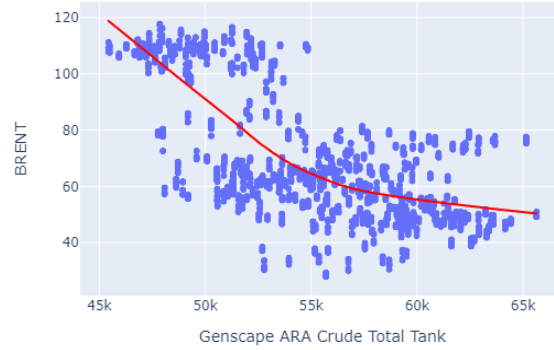
Correlations Graphs

Categorization of all the variables into their respective categories along with their meanings

	A	B	C	D	E	F	G
1	Variable	D/W	Category	Meaning			
2	Baker Hughes Oil Rig Count	D	US Oil Rig Count	Measures number of Oil Rigs functioning in the US. Leading indicator of demand			
3	WTI	D		WTI Spot Price			
4	BRENT	D		BRENT Spot Price			
5	Singapore Dubai	D	Refinery Margin	Benchmark Margin For Singapore Region. Optimized product yields based on **Hydrocracking(converting heavy fuel to light petroleum products**). In USD/barrel			
6	Singapore Dubai FCC	D	Refinery Margin	Benchmark Margin For Singapore Region. Optimized product yields based on **FCC (converting hydrocrabon fractions of petroleum into gasoline)**. In USD/barrel			
7	Singapore Dubai Topping	D	Refinery Margin	Benchmark Margin For Singapore Region. Optimized product yields based on **Topping (simplest refinery, only has a distillation column,produces naphtha only)**. In USD/barrel			
8	Singapore Dubai	D	Refinery Margin	Benchmark Margin For Singapore Region. Optimized product yields based on **Hydroskimming (complex than topping,includes catalytic reformer and hydrodeoxygenation)**. In USD/barrel			
9	NWE Forties Hydrocracking	D	Refinery Margin	Benchmark Margin For North West Europe. Optimized product yields based on Hydrocracking. In USD/barrel			
10	NWE Forties Hydroskimming	D	Refinery Margin	Benchmark Margin For North West Europe. Optimized product yields based on Hydroskimming. In USD/barrel			
11	NWE Forties FCC Refinery	D	Refinery Margin	Benchmark Margin For North West Europe. Optimized product yields based on FCC. In USD/barrel			
12	NWE Forties Topping Refinery	D	Refinery Margin	Benchmark Margin For North West Europe. Optimized product yields based on Topping. In USD/barrel			
13	NWE Urals Hydrocracking	D	Refinery Margin	Benchmark Margin For North Africa and Mediterranean. Optimized product yields based on Hydrocracking. In USD/barrel			
14	NWE Urals FCC Refinery	D	Refinery Margin	Benchmark Margin For North Africa and Mediterranean. Optimized product yields based on FCC. In USD/barrel			
15	NWE Urals Hydroskimming	D	Refinery Margin	Benchmark Margin For North Africa and Mediterranean. Optimized product yields based on Hydroskimming. In USD/barrel			
16	NWE Urals Topping Refinery	D	Refinery Margin	Benchmark Margin For North Africa and Mediterranean. Optimized product yields based on Topping. In USD/barrel			
17	USGC WTI FCC Refinery	D	Refinery Margin	Benchmark Margin For US Gulf Coast. Optimized product yields based on FCC. In USD/barrel			
18	USGC WTI Coking Refinery	D	Refinery Margin	Benchmark Margin For US Gulf Coast. Optimized product yields based on **Coking(highly complex refineries, produces petroleum coke)**. In USD/barrel			
19	USGC WTI Topping Refinery	D	Refinery Margin	Benchmark Margin For US Gulf Coast. Optimized product yields based on Topping. In USD/barrel			
20	USGC WTI Hydroskimming	D	Refinery Margin	Benchmark Margin For US Gulf Coast. Optimized product yields based on Hydroskimming. In USD/barrel			
21	Total Global CDU Outage	D	Refinery Outage	Global Crude Distillation Unit Outage			
22	Total United States CDU	W	Refinery Outage	US Crude Distillation Unit Outage			
23	Total Latin America CDU	W	Refinery Outage	Latin America Crude Distillation Unit Outage			
24	Total Northwest Europe CDU Outage	W	Refinery Outage	Northwest Europe Crude Distillation Unit Outage			
25	Total Mediterranean CDU	W	Refinery Outage	Mediterranean Crude Distillation Unit Outage			
26	Total Middle East CDU	W	Refinery Outage	Middle East Global Crude Distillation Unit Outage			
27	Total China CDU Outage	W	Refinery Outage	China Global Crude Distillation Unit Outage			
28	Total Other Asia Pacific CDU Outage	W	Refinery Outage	Asia Pacific Global Crude Distillation Unit Outage			
29	Geo USA	D	Geopolitically Volatile	Geopolitical Index of USA			
30	Goe South Korea	D	Geopolitically Volatile	Geopolitical Index of South Korea			
31	Geo Saudi Arabia	D	Geopolitically Volatile	Geopolitical Index of Saudi Arabia			
32	Geo United Kingdom	D	Geopolitically Volatile	Geopolitical Index of UK			
33	Geo Brazil	D	Geopolitically Volatile	Geopolitical Index of Brazil			
34	Geo Venezuela	D	Geopolitically Volatile	Geopolitical Index of Venezuela			
35	Geo China	D	Geopolitically Volatile	Geopolitical Index of China			
36	Geo India	D	Geopolitically Volatile	Geopolitical Index of India			
37	Geo Iran	D	Geopolitically Volatile	Geopolitical Index of Iran			

Variables | Descriptive_D | Correlation_Graphs_Daily | Descriptive_W | Correlation_Graphs_Week ...

THANK YOU