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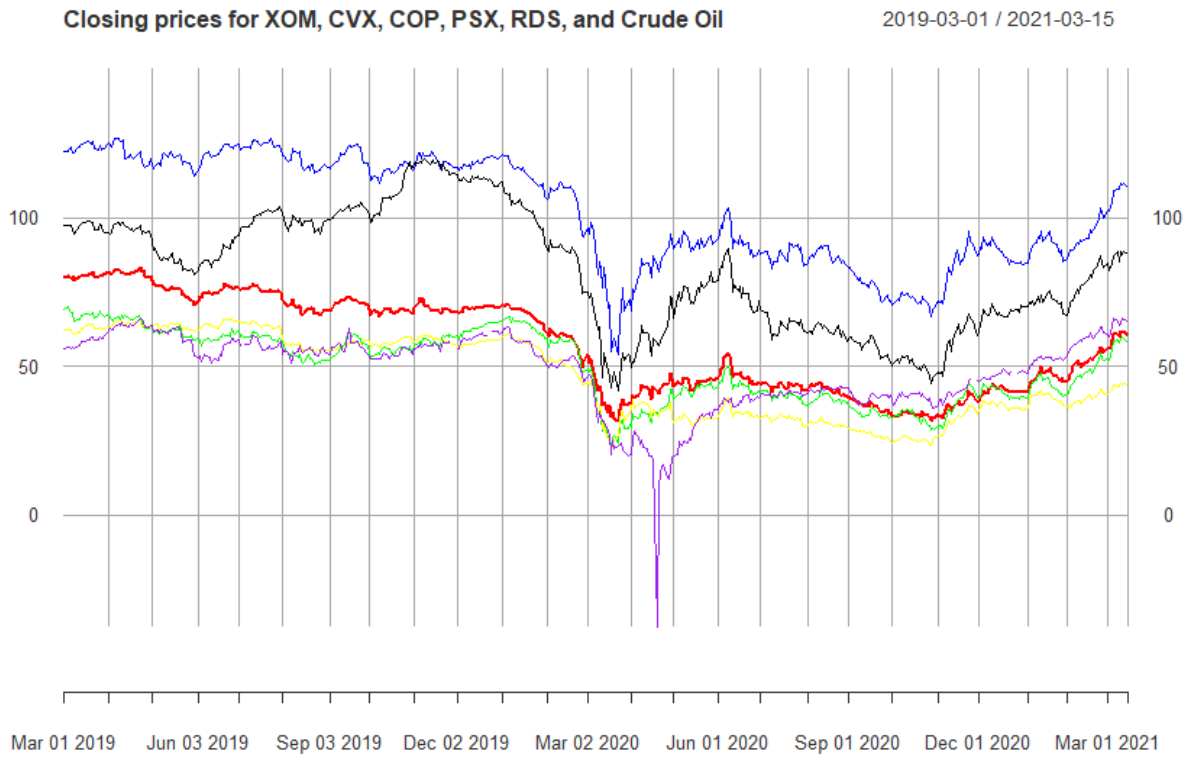
1. Introduction and Similarities between Oil Sector Equities and Crude Oil Futures

The purpose of this research is to provide consolidated analysis of select oil sector equities(XOM, CVX, RDS.A, COP, and PSX) and Crude Oil futures. In particular we will take a look at the relationships between them, each companies fundamental data and forecast, current OPEC+ news and data, as well as the economic outlook in the US and abroad. Our end goal will be to determine why holding equities in the oil sector is a good short-term position and in an effort to trim exposure to the sector also determine which company is better positioned for a long term holding amid increasing calls among policy makers to move towards renewable energy.



CVX(Blue), XOM(Red), COP(Green), PSX(Black), RDS(Yellow), Crude Oil(Purple)

In the graph above we see the closing prices for each respective equity/ commodity from March, 2019 to March 15th, 2021. As you can observe the stocks and crude oil tend to move strongly with each other as you would expect for the exception of late March into early April, while equities in the oil sector began to rally along with broader market, crude oil briefly went negative due the inability for physical delivery to take place and the sudden reduction in demand as restrictions due to COVID-19 were set into place. Shortly after broader markets rallied oil related equites began to consolidate along with crude oil futures into the late fall and early winter of 2020. Vaccination efforts within the U.S. and abroad, the federal reserves monetary policy, government stimulus, the broader economy beginning to reopen from restrictions, and OPEC+ tightening supply has led to oil being up around 34% this year with equities following suit.

While the rise this year has brought equities and crude oil back relatively close to late 2019 levels the question we must ask is: Will oil continue to rise throughout the summer and remainder of this year? Assuming increased demand globally and OPEC+ maintains output cuts it is certainly in the cards for a position in the oil sector to perform well in 2021. Furthermore with pushes in policy towards green energy we must also asses which one of these companies is better positioned to adjust and continue to be a good investment into the future. With that being said short term exposure to the sector should benefit investors but as we look at long term holdings we need to look at the correlation among these stocks, monitor policy changes, and OPEC+ updates. In the correlation matrix below we can see the stocks in question move strongly together, as a result as time goes on it may be in an investors best interest to reduce exposure to the sector by identifying which equities are properly positioned to win in a move towards renewables.

Figure 1.1 Correlation Matrix for XOM, CVX, COP, PSX, RDS.A

	XOM.Close	CVX.Close	COP.Close	PSX.Close	RDS.A.Close
XOM.Close	1.0000000	0.9750496	0.9558901	0.8793598	0.9813772
CVX.Close	0.9750496	1.0000000	0.9589886	0.9215710	0.9644488
COP.Close	0.9558901	0.9589886	1.0000000	0.8943098	0.9381923
PSX.Close	0.8793598	0.9215710	0.8943098	1.0000000	0.8764335
RDS.A.Close	0.9813772	0.9644488	0.9381923	0.8764335	1.0000000

One important note as we begin to look at these companies, all forecast made as it relates to stock price will be done using ARIMA models computed by the statistical programming language R, once the software determines the best fitted model we will apply that to our price data.

Another note to avoid confusion in regards to forecasted graphs displayed within each equities analysis is that when analyzing financial time series data it is a general rule of thumb to do a log transformation on the data. This will depict the growth rate of the stocks, and a log transformation will scale the unit value(price in USD) of each data set so it will be equally scaled which makes analysis easier.

2. Exxon Mobil Analysis and Forecast

Exxon Mobil is engaged in the exploration, production, transportation and sale of crude oil and natural gas, and the manufacture, transportation and sale of petroleum products. The Company also manufactures and markets commodity petrochemicals, including olefins, aromatics, polyethylene and polypropylene plastics, and a range of specialty products. The Company's segments include Upstream, Downstream, Chemical, and Corporate and Financing.

To understand the outlook for Exxon it's imperative that we breakdown each segment of business: Upstream, Downstream, Chemical. We'll take a look at each portion of business, analyze forecast for each one and break down the drivers behind them.

2.1 Upstream

The Upstream division is involved in the Exploration and Production (E&P) activities, which include oil and natural gas exploration, field development, and production. Upstream currently has an estimated value of $20.6 B of Exxon Mobil business.

Exxon Upstream Strengths:

- *Strong Global Presence*
    - Geographical diversity allows the company to partially protect itself from operational and financial risk associated with regional regulatory changes and geopolitical uncertainties.
- *Large base of Reserves*
    - At the end of 2016, Exxon's total crude oil and NGL reserves stood at almost 9.29 billion barrels, which basically means that the company held enough reserves at the end of last year to continue to produce crude oil and NGLs for at least 16 more years at last year's rate without any net reserve additions.

Forecast for Upstream Division

We will look at 3 forecast for the upstream division of Exxon:

1. E&P EBITDA Margin
    a. This refers to Exxon's earnings before interest, taxes, depletion, depreciation, and amortization from its upstream operations, expressed as a % of the division's total revenues.

b. Projected to rise from 11% in 2020 to 17% in 2027.
c. Driving factors:
    i. Rebound in Commodity Prices
    ii. Declining costs of development, finding, and production
    iii. Improving Production Mix

2. Crude Oil and Natural Gas Liquids Produced
    a. Crude Oil and Natural Gas Liquids Produced refers to the quantity of liquids produced by Exxon Mobil's consolidated subsidiaries in terms of barrels per day.
    b. Projected to increase from 1.62 M in 2020 to 1.82 M by 2027
    c. Driving factors:
        i. New projects to increase production
        ii. Continued Increase In Guyana Resource Base
        iii. Permian Basin Will Drive Future Growth
        iv. Papua New Guinea (PNG) LNG project
        v. 30% operating in 3 offshore Oil Projects in Russia
    d. Risk:
        i. Geopolitical tensions / terrorism
3. Average Crude Oil and NGL Sales Price($ per unit)
    a. The average liquid sales price refers to the price realized for crude oil and natural gas liquids (NGL) by subsidiaries of Exxon Mobil upstream division. It is effectively the weighted average of the price the company receives on its crude oil and NGL sales across the world. This is dependent on global crude oil prices and the company's proportion of sales in different countries.
    b. Projected to increase from $35.41 in 2020 to $52.62 in 2027.
    c. Driving Factors:
        i. Long Term Forecast
        ii. Slower Demand Growth
        iii. Rising Non-OPEC supplies
        iv. Diminishing Pricing Power of OPEC
        v. Declining costs of development, finding, and production
        vi. Statistical Model
            1. It is worth noting that TD Ameritrade analyst are performing forecast based on a linear regression model which forecast crude oil prices to remain steady in the short term and gradually increase to $100 a barrel by the end of their forecast period.

2.2 Downstream

The Downstream division is responsible for the manufacture, marketing, sales, and transportation of various refined products, including Gasoline, Aviation Fuel, Fuel Oil, and Middle distillates. These products are sold through four main channels namely retail, industrial, wholesale, and aviation and marine. The downstream division estimated value is $253.4 B.

<u>Exxon Downstream Strengths:</u>

- *Strong Global Presence*

- *Large Refining Capacity*
    - Exxon Mobil is the world's largest refiner, with the most distillation, conversion, and lube base-stock production capacity. Its refineries are 60% larger than the industry average, which gives it cost advantages over competitors due to economies of scale.
- *Strong Brands*

Forecast for Downstream Division

Although downstream has 3 forecast, the E&P EBITDA is common among all divisions so we will analyze 2.

1. Petroleum Product Sales
    a. The Petroleum Product Sales represents the average daily petroleum product sales volume reported by the company.
    b. Project to increase from 4.89 M at the end of 2020 to 7.2 M by the end of 2027
    c. Driving Factors:
        i. Exxon is looking to reduce exposure to stagnant markets
        ii. Industry focus on upstream activities
2. Estimated Revenue per Barrel
    a. The Estimated Revenue per Barrel is the average revenue earned by Exxon Mobil on the sale of a single barrel of refined product. It is derived by dividing the company's total downstream sales revenue (including inter-segment sales revenue) by the total number of barrels of refined products sold by it in a given year.
    b. Projected to increase from $78.86 at the end of 2020 to $121.53 by the end of 2027.
    c. Driving Factors:
        i. Correlation with oil prices
        ii. Improving mix of revenues

2.3 Chemical

Exxon is a major manufacturer and marketer of petrochemicals, including olefins, aromatics, polyethylene and polypropylene plastics, as well as a wide variety of specialty products. The chemicals business is integrated with the downstream business which gives it access to a wide variety of feedstock. The Chemical Division estimated value is $35.1 B.

Exxon Chemical Strengths:

- *Feedstock advantage through vertical integration*
    - The segment's integration with the upstream, transportation, and downstream divisions gives it easy access to a wide variety of feedstock at low prices.
- *Global Reach*
    - The firm has petrochemical manufacturing facilities across the globe, which enables it to provide easier access of manufactured products to customers.

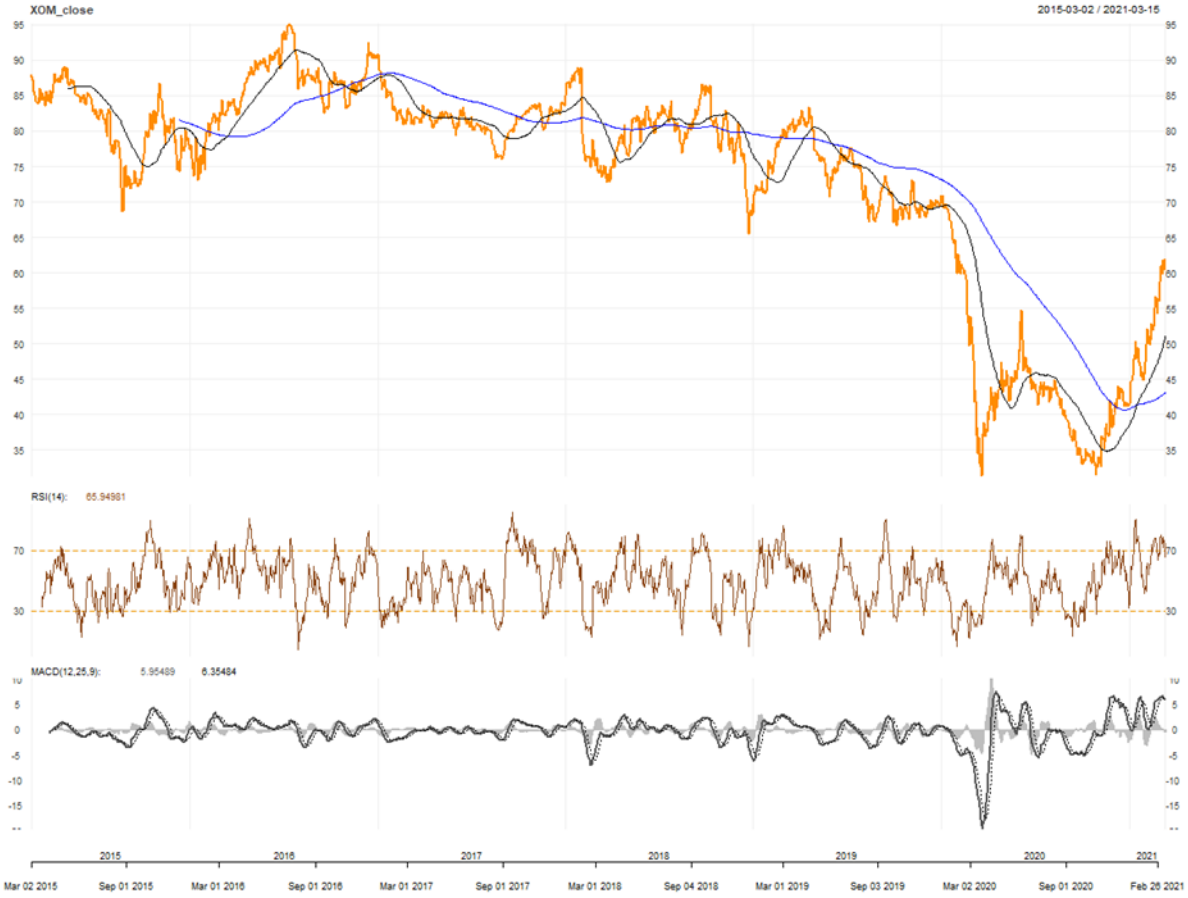
- *Full integration across all Exxon's operations*
    - More than 75% of the firm's refining capacity is integrated with its chemical and lubricant manufacturing facilities, which makes it an industry leader in the domain. Also, its expertise in power generation enables it to maintain high standards in energy efficiency.
- *Technology Leadership*
    - Exxon Mobil is an industry leader in its technological capabilities. This gives it a cost advantage in raw material costs, while also maintaining premium product quality and process efficiency.

<u>Forecast for Chemical Division:</u>

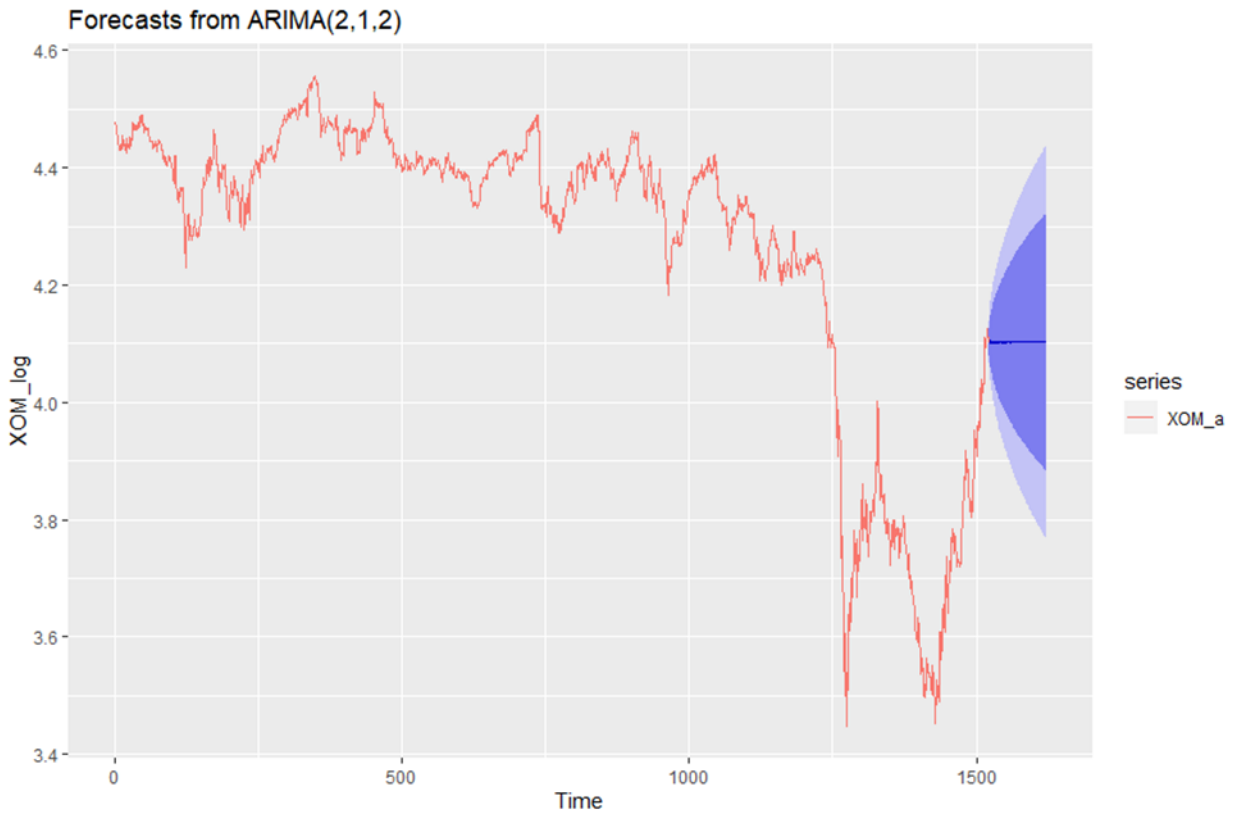
Chemical division has 3 forecast, the E&P EBITDA is common among all divisions so we will analyze 2.

1. Chemical Prime Product Sales
    a. This refers to the total sales from the chemicals division of Exxon Mobil in millions of metric tons.
    b. Projected to increase from 25.45 M at the end of 2020 to 28.66 M by 2027.
    c. Driving Factors:
        i. Expansion in US Gulf Coast
        ii. Rising Demand
        iii. Low-cost advantage in US
        iv. Product extension in Saudi Arabia
        v. New specialty chemicals facility in Singapore
2. Revenues per Metric Ton
    a. This represents the amount of revenues earned by Exxon Mobil per metric ton of chemical products sold.
    b. Projected to increase from $907.34 at the end of 2021 to $1.52k by 2027.
    c. Driving Factor:
        i. Chemical prices linked to price of Crude Oil
            1. As crude oil and NGLs are the main raw materials used by the chemicals industry, revenues generally grow in line with the price of crude oil. We expect this trend to continue in the future.

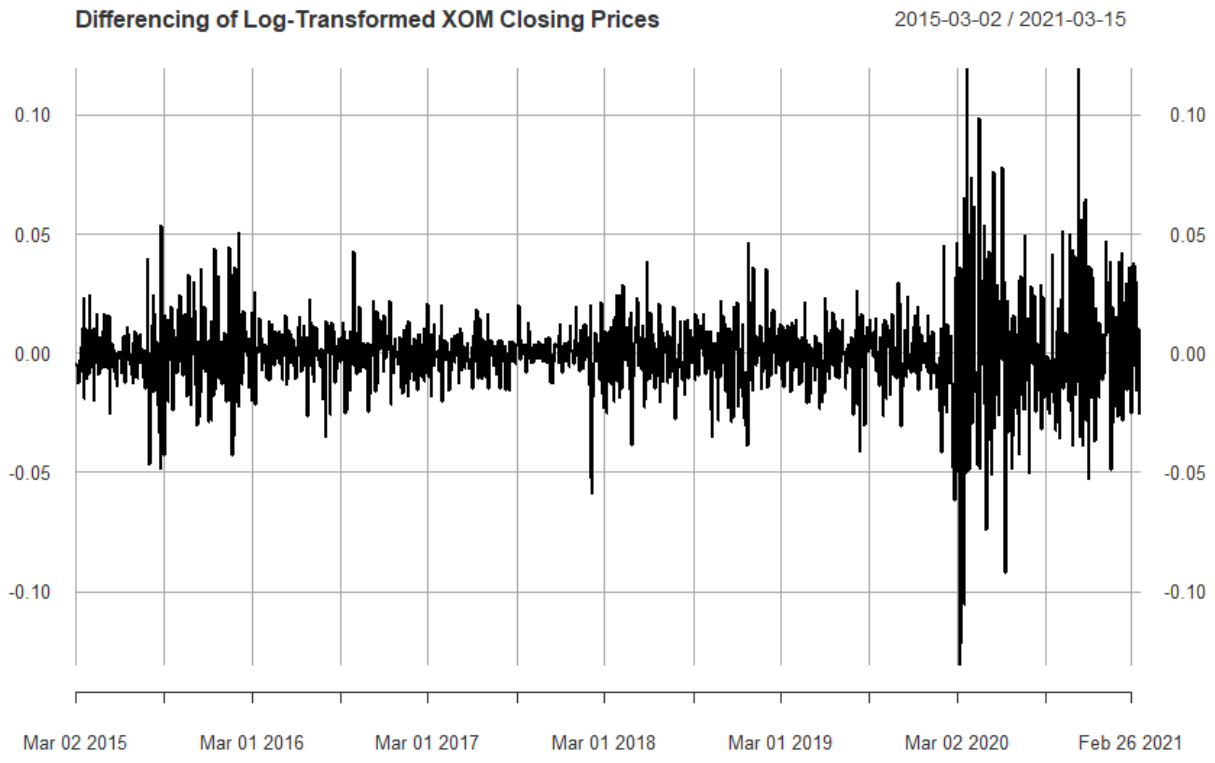
2.4 Graphs and Forecast of XOM Stock


XOM_close
2015-03-02 / 2021-03-15
RSI(14): 65.94981
MACD(12,25,9): 5.95489 6.35484
2015
2016
2017
2018
2019
2020
2021
Mar 02 2015
Sep 01 2015
Mar 01 2016
Sep 01 2016
Mar 01 2017
Sep 01 2017
Mar 01 2018
Sep 04 2018
Mar 01 2019
Sep 03 2019
Mar 02 2020
Sep 01 2020
Feb 26 2021

The log transformed data of Exxon closing prices is the same chart of the price graph however the values depict the growth rate of the stock, and a log transformation will scale the unit value(price in USD) of each data set so it will be equally scaled which makes analysis easier.

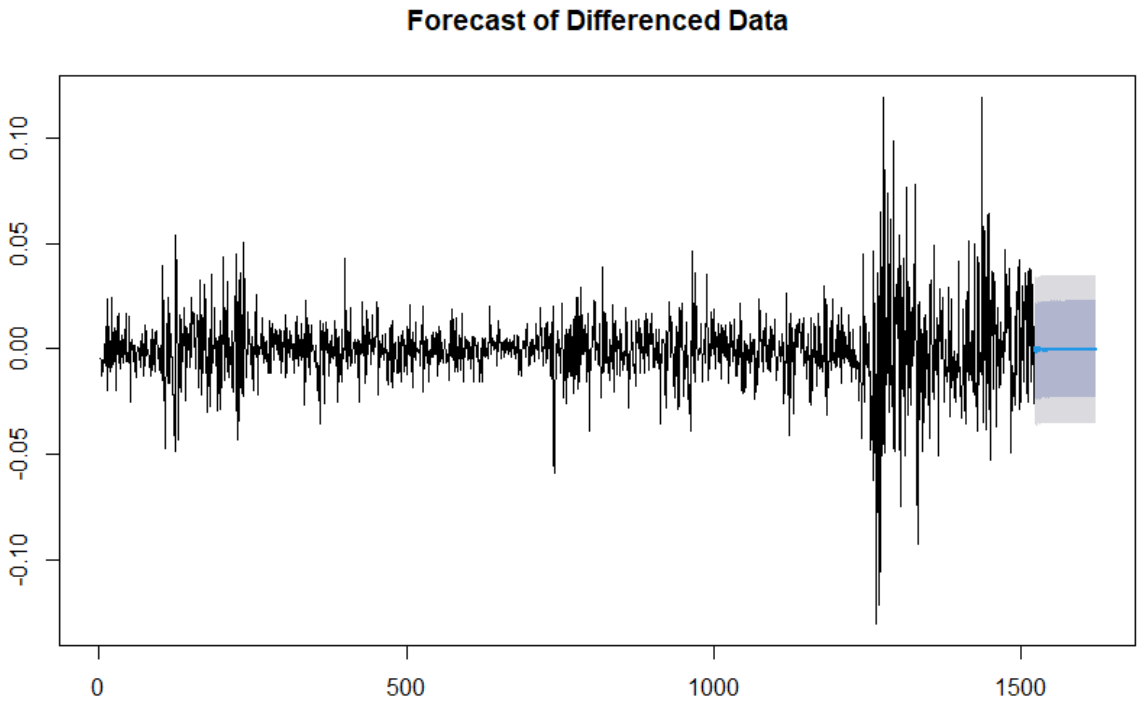


The above graph is a forecast of XOM log-transformed data, the dark blue shade represents a 80% confidence level and the light blue represents a 95% confidence level. The forecast is made entirely based on statistics and represents scenarios for upwards and downwards movement. Assuming the economic outlook continues to rise, OPEC+ continues to tighten supply and Crude oil continues to rise amid increasing demand, monetary policy continues to push inflation it would be safe to say the outlook for Exxon should increase towards price levels between 65-75 within the next 100 days. However it's imperative for us to continue to actively monitor changes related to COVID-19, OPEC+ mandates and monetary policy changes from the FED which could drastically affect prices of Crude Oil and increase volatility among the sector.



The differenced data derived from the log-transformed data shows us daily volatility changes for XOM, as you can see volatility drastically increases from March 2020 to the end of the time series. This is largely due to COVID-19 and excess supply of crude oil at a time when demand was significantly reduced. Ideally we would like to see the volatility revert back to pre March 2020 levels and as we can see in the forecasted time series below it seems to be where things are heading moving forward, again we must note this does not take into account economic data, OPEC data and changes related to COVID-19 which can have a very strong affect on the sector. However as vaccination efforts have increased and demand should rise in correlation with that both forecasted price should lean towards the higher predicted values and volatility should revert

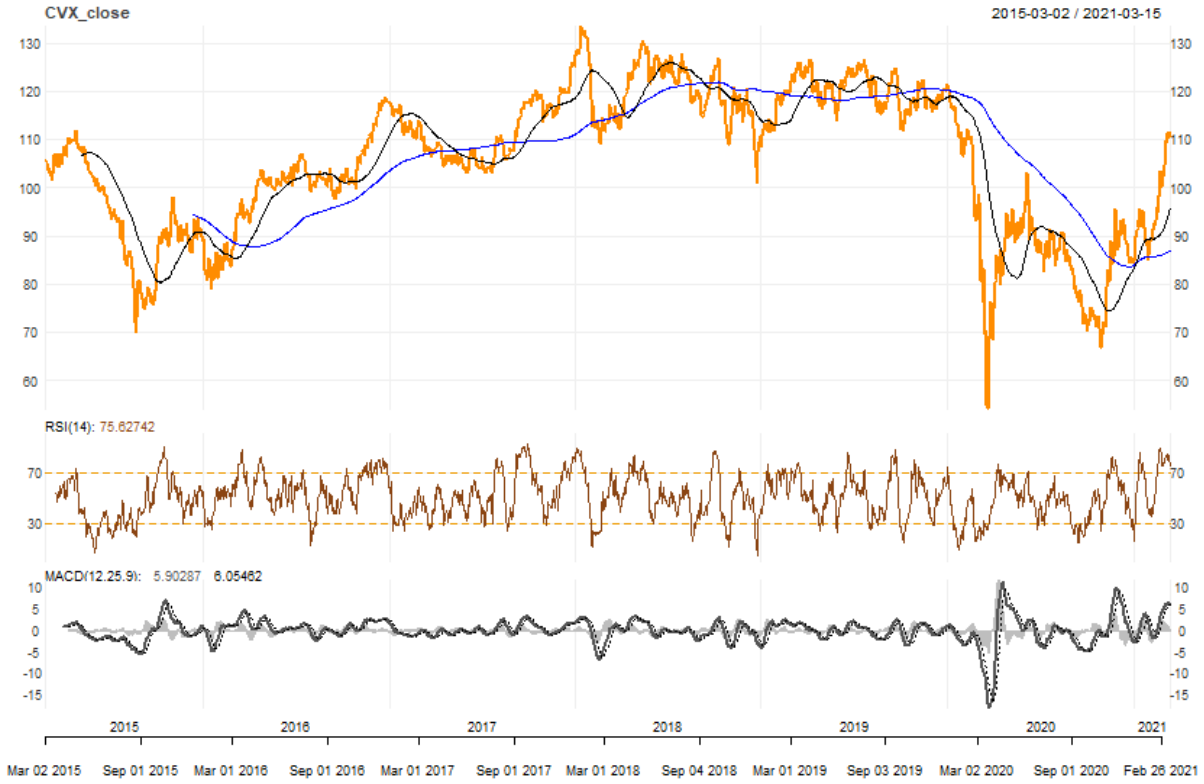
back towards it’s mean value.



3. Chevron Analysis and Forecast

Chevron Corporation (Chevron) manages its investments in subsidiaries and affiliates, and provides administrative, financial, management and technology support to the United States and international subsidiaries that engage in integrated energy and chemicals operations. The Company operates through two business segments: Upstream and Downstream. Upstream operations consist primarily of exploring for, developing and producing crude oil and natural gas; liquefaction, transportation and regasification associated with liquefied natural gas; transporting crude oil by international oil export pipelines; processing, transporting, storage and marketing of natural gas, and a gas-to-liquids plant. Downstream operations consist primarily of refining of crude oil into petroleum products; marketing of crude oil and refined products; transporting of crude oil and refined products, and manufacturing and marketing of commodity petrochemicals.

Analyzing downstream and upstream activities will relate to XOM along with the other various names through the research as well as the movement and direction of stock price, while of course prices are different XOM and CVX are strongly correlated and strongly correlated to Crude Oil prices.



3.1 Downstream

This division includes the sale of refined products. Chevron operates a refining network to convert crude oil into final products such as gasoline, jet fuel, gas oils, kerosene, residual fuel oil, and other products such as naphtha, lubricants, asphalt, and coke. At the end of 2014, the company had a refining network capable of processing 1.8 million barrels of crude oil per day.

<u>Strengths of downstream division:</u>

1. Strong Global Presence
    a. Chevron's refined products are available on all the six continents. Its retail stations are located in the U.S., Western Canada, Latin America, Asia, Africa, and in parts of Europe.
    b. Similar to Exxon with a broad global presence which mitigates risk associated with geopolitical conflicts and changes.
2. Strong Pipeline network in the U.S.
    a. Chevron has an extensive pipeline network to transport refined petroleum products in the U.S., which accounts for about 43% of global unit sales of these products. The firm also has direct and indirect interests in international pipelines, however the total pipeline mileage for this segment is lower than that for the U.S.

<u>Forecast for downstream division:</u>

1. Average Daily Refined Product Sales
    a. Chevron's Average Daily Refined Products Sales Volume refers to the sum total of refined products, like gasoline, diesel and kerosine, produced and sold by Chevron and its subsidiaries in terms of millions of barrels per day.
    b. Forecast project an increase from 1.88 M in 2020 to 2.4 M in 2027.
    c. Key Drivers:
        i. Divestment of downstream assets
        ii. Improving vehicle fuel efficiency
        iii. Growing use of natural gas and biofuels
    d. Mitigating:
        i. Growing economic activity and vehicle ownership in developing nations
2. Estimated Revenues per Barrel
    a. Estimated Revenues per Barrel refers to the average price per barrel realized by Chevron and its subsidiaries on the sale of of refined products, like gasoline, diesel and kerosine.
    b. Forecast project an increase from $99.51 in 2020 to $145.93 in 2027
    c. Key Drivers:
        i. Long-term forecast
        ii. Slower demand growth
        iii. Rising non-OPEC supplies
        iv. Diminishing pricing power of OPEC
3. Downstream EBITDA Margin
    a. Downstream EBITDA Margin refers to the operating profit expressed as a percentage of revenues. Operating profit is calculated by subtracting total operating expenses from the revenues generated in this division (except D&A).
    b. Forecasted to increase from 13.5% in 2020 to about 22.6% by 2027.
    c. Key Drivers:
        i. Increased tight oil production in the U.S.
    d. Mitigating:
        i. Industry overcapacity
        ii. Shrinking WTI-Brent Spread

3.2 Upstream

Crude Oil and Natural Gas Liquids (NGL) production constitutes a large proportion of Chevron's upstream activities. The company explores for oil reserves and extracts the oil in crude form along with natural gas liquids. It then sells crude oil in the market, as well as to its downstream business.

<u>Strengths of upstream division:</u>

1. Strong Global Presence
    a. As mentioned above
2. Large base of proved reserves
    a. At the end of 2016, Chevron's total crude oil and NGL reserves stood at over 6.3 billion barrels, which basically means that the company held enough reserves to

continue to produce crude oil and NGLs for at least 12.6 more years at 2016's rate without any net reserve additions.

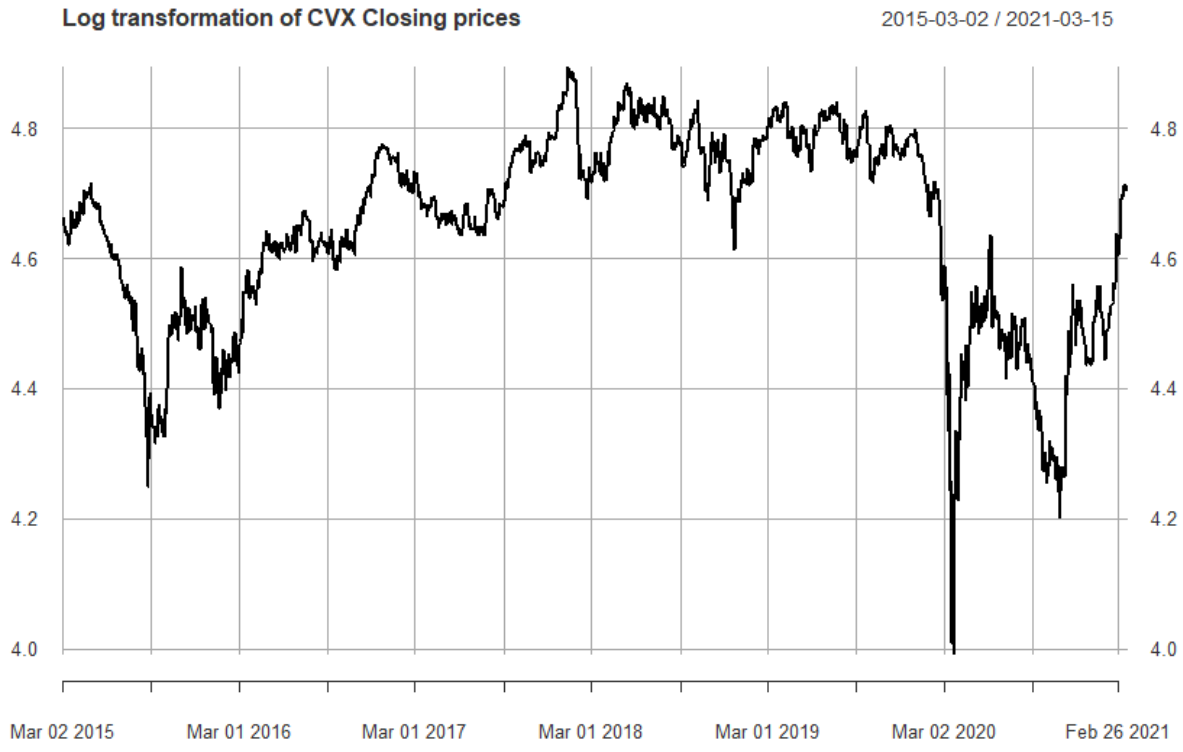
3. Geographically dispersed operations
    a. Chevron's global oil and gas production facilities are located globally across different regions. While 29% production is attributable to the company's U.S. operations, the remaining 71% of gas production comes from its international operations. This indicates the diversity across different regions

Forecast of Upstream division:

Downstream EBITDA Margins are forecast for upstream as well as downstream.

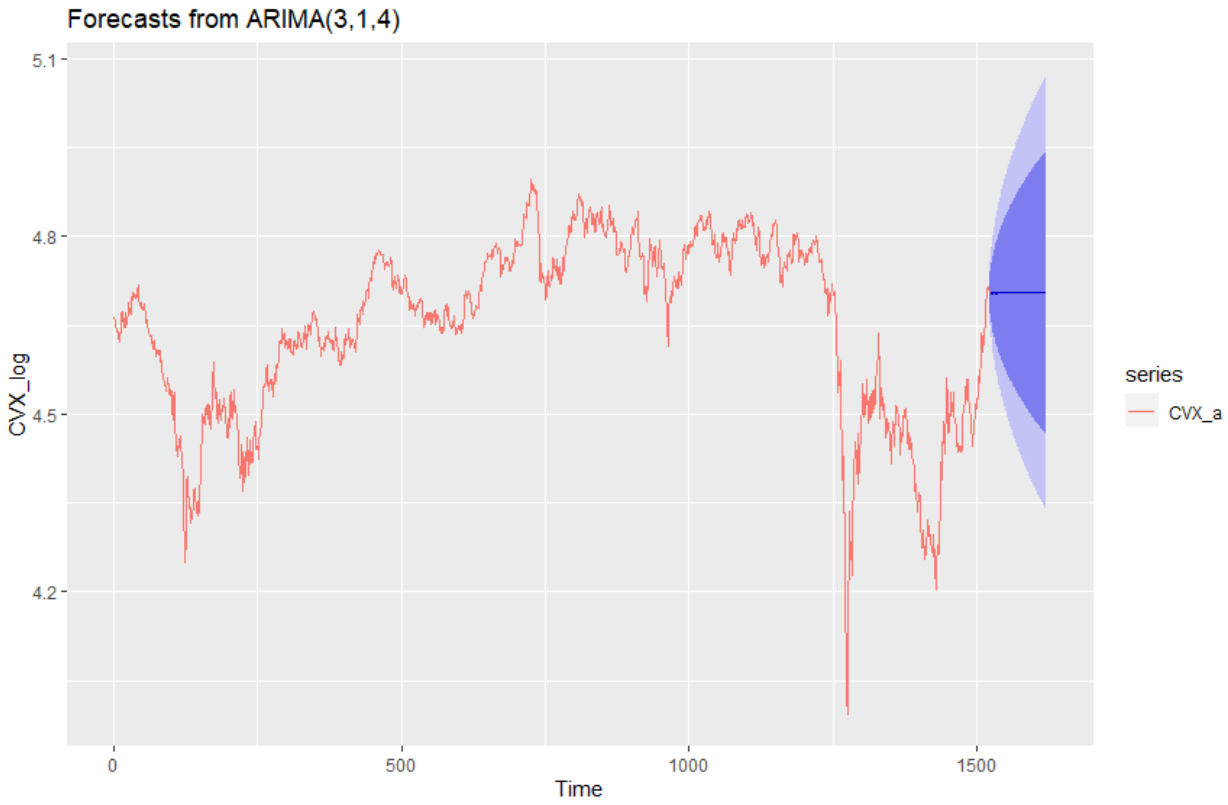
1. Upstream Intersegment Elimination as % of Gross Revenues
    a. Projected to increase from 6% in 2020 to about 20.5% in 2022 and stay consistent with that percentage until 2027.
    b. No available data on TD Ameritrade for key drivers for this forecast.

3.3 Graphs and Forecast for CVX Stock

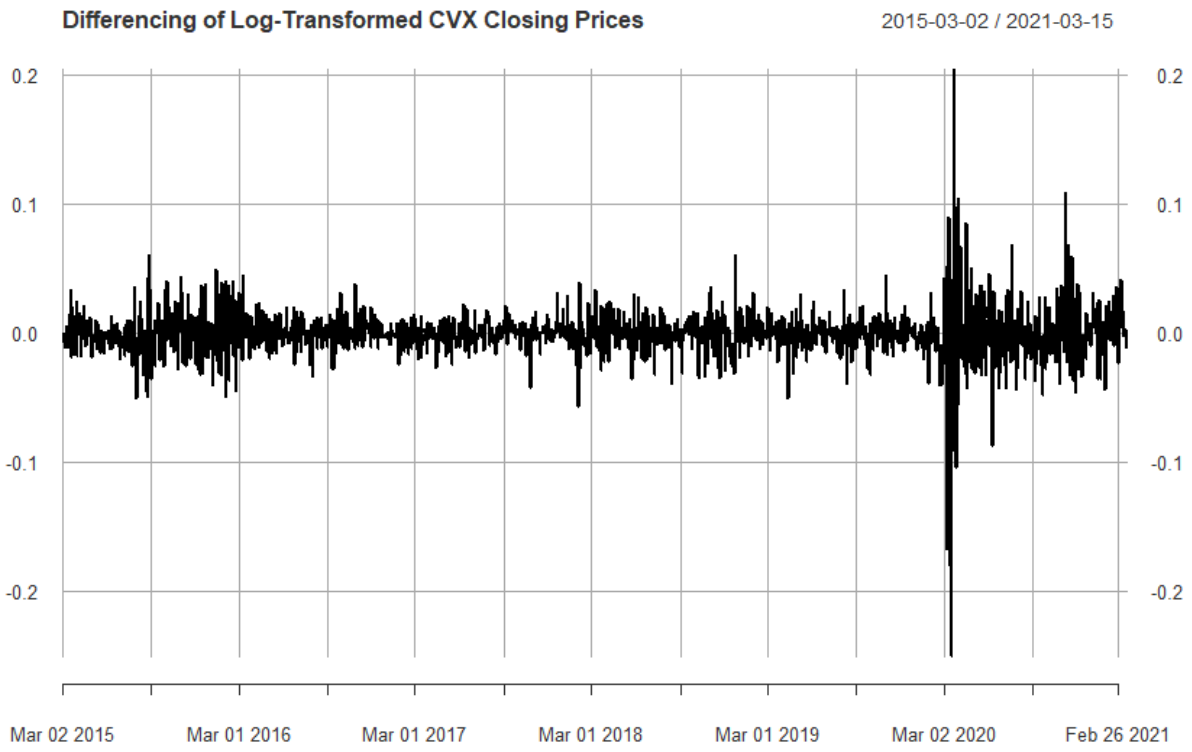


As mentioned before this began the log transformation of CVX stock data allows us to analyze and little easier and again represents the growth rate of the stock, and a log

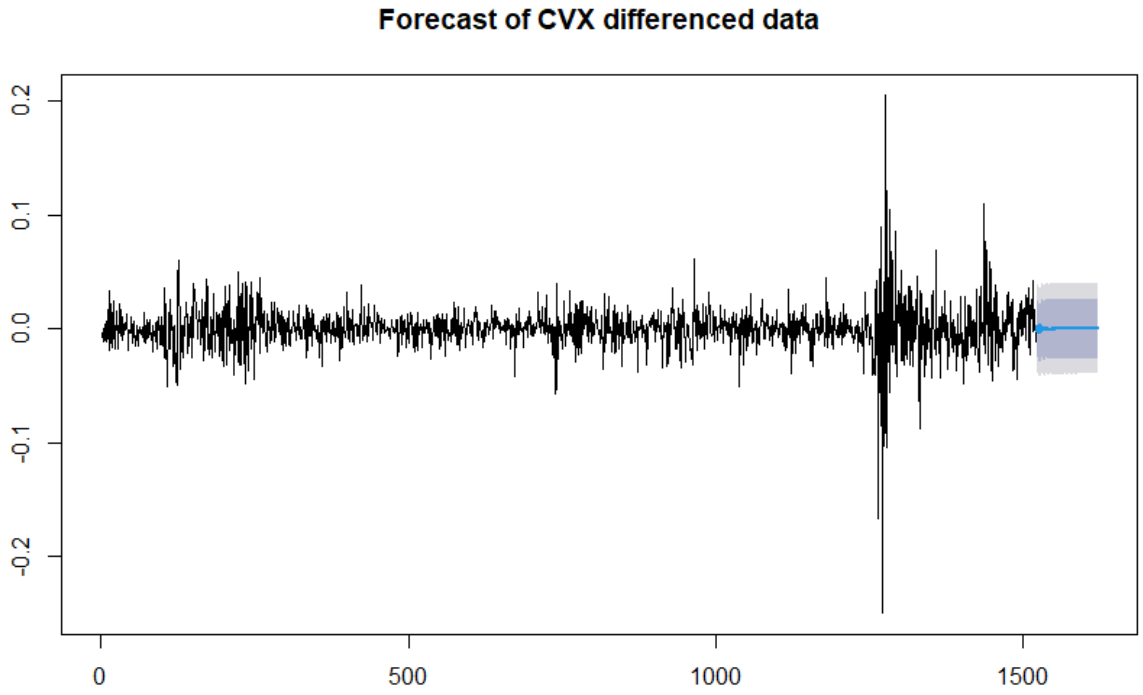
transformation will scale the unit value(price in USD) of each data set so it will be equally scaled.



The graph above shows forecast for CVX going forward 100 days for both upside and downside potential. Similar to the XOM forecast the dark blue shade represents an 80% confidence level and light blue a 95% confidence level. Also the same market effects apply for CVX as it did with XOM in order to achieve the upper portion of the forecast, assume we increase in price within the 80% confidence level that would place the share price around $115-130. One thing to note with these forecast is that it allows you to see downside ranges, as we have seen a rise in crude oil prices and in turn correlated equity values due to a positive outlook for demand and loosening COVID-19 restrictions one that to note is that it may be worth hedging these positions with uncertainty moving forward. We will discuss methods to achieve this later in the research.



As mentioned with XOM and will continue to be a constant moving forward, similar to the volatility displayed in XOM stock we also see the shocks from the March drop in broader markets. As you'll see in the forecast below we should see volatility revert to it's mean moving forward, however again with the constantly changing market effects we could again see spikes in volatility. The forecast represents volatility without acknowledgment to changing markets and it's purely dictated from CVX stock data.



4. Shell Analysis and Forecast

The Royal Dutch Shell plc is a company based in the Netherlands that explores for crude oil and natural gas around the world, both in conventional fields and from sources, such as tight rock, shale and coal formations. Its segments include Integrated Gas, Upstream, Downstream and Corporate. The Integrated Gas segment is engaged in the liquefaction and transportation of gas and the conversion of natural gas to liquids to provide fuels and other products, as well as projects with an integrated activity, ranging from producing to commercializing gas. The Upstream segment includes the operations of Upstream, which is engaged in the exploration for and extraction of crude oil, natural gas and natural gas liquids, and the marketing and transportation of oil and gas, and Oil Sands, which is engaged in the extraction of bitumen from mined oil sands and conversion into synthetic crude oil. The Downstream segment is engaged in oil products and chemicals manufacturing, and marketing activities.

Shell lacks the data from TD ameritrade that we could pull for XOM and CVX, with this we will use their website to discuss their four divisions of business and provide forecast for stock price and volatility.

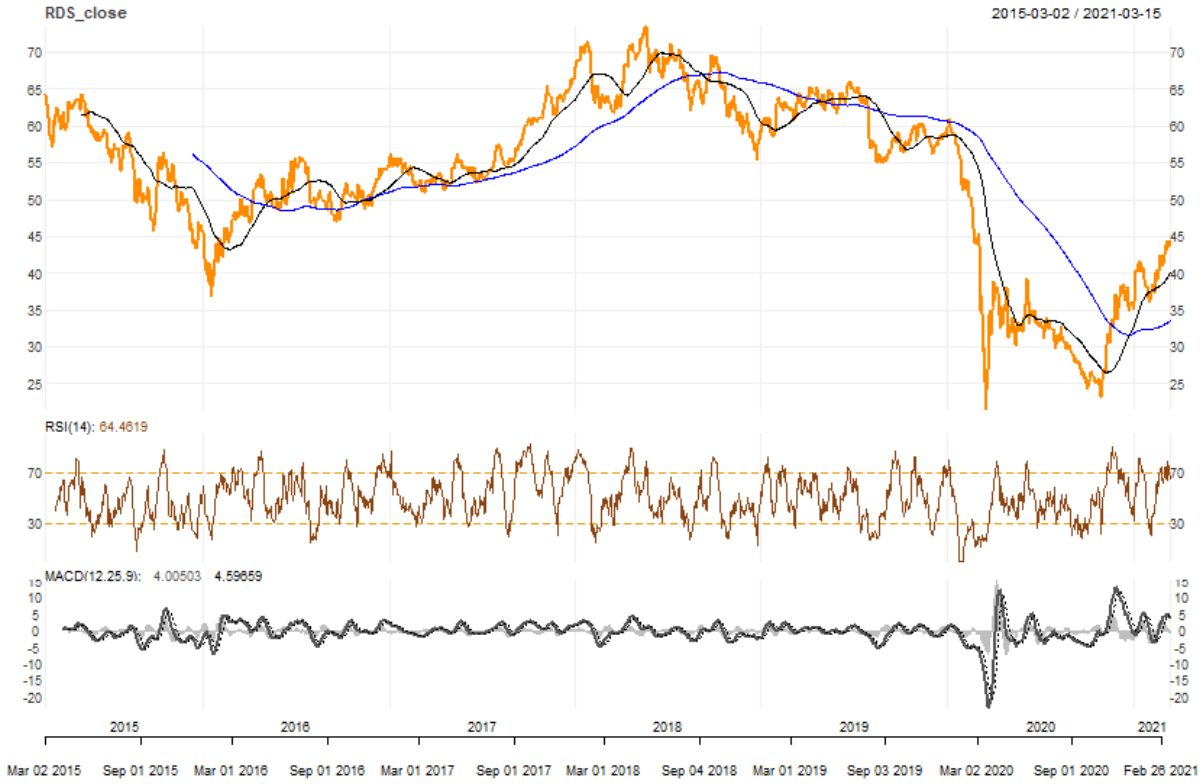
4.1 Divisions of RDS Business

1. Upstream
    a. Manages the exploration for and extraction of crude oil, natural gas and natural gas liquids. It also markets and transports oil and gas, and operates the infrastructure necessary to deliver them to market.

2. Integrated Gas
    a. Manages the liquefied natural gas (LNG) activities and the production of gas-to-liquids (GTL) fuels and other products. It includes natural gas exploration and extraction, and the operation of the upstream and midstream infrastructure necessary to deliver gas to market. It markets and trades natural gas, LNG, crude oil, electricity, carbon-emission rights and also markets and sells LNG as a fuel for heavy-duty vehicles and marine vessels.
3. **Renewables and Energy Solutions**
    a. Focused on finding commercial ways to meet the evolving energy needs of our customers. These solutions include hydrogen, power from renewable and low-carbon sources such as wind, solar and natural gas and decarbonisation options including nature-based solutions and carbon capture and storage. This part of Shell also develops new business models such as clean power-as-a-service, which addresses how digital technology can better help customers with their energy needs.
4. Downstream
    a. Downstream serves more than 30 million customers at 46,000 retail service stations every day. It manages different Chemicals and Products activities as part of an integrated value chain that trades and refines crude oil and other feedstocks into a range of products which are moved and marketed around the world for domestic, industrial and transport use. The products we offer customers include conventional fuels for road, aviation and shipping; low-carbon fuels such as biofuels, renewable natural gas (RNG), hydrogen and electric-vehicle charging. We also produce and sell lubricants, bitumen, sulphur and petrochemicals worldwide.

The biggest take away from examining Royal Dutch Shell as a business is their push towards Renewables and Clean Energy moving forward, comparatively to Exxon and Chevron they seem to be ahead of the curve and are already integrating this into their business strategy moving forward. While Exxon and Chevron are a little more levered up in regards to upstream and downstream business activities which can result in rising stock price in the near term so long as the outlook remains positive, Shell should also reap the rewards of this short term spike and benefit long term from the transition to Renewables.

4.2 Graphs and Forecast of RDS.A


RDS_close
2015-03-02 / 2021-03-15
RSI(14): 64.4619
MACD(12,25,9): 4.00503 4.59659
2015
2016
2017
2018
2019
2020
2021
Mar 02 2015
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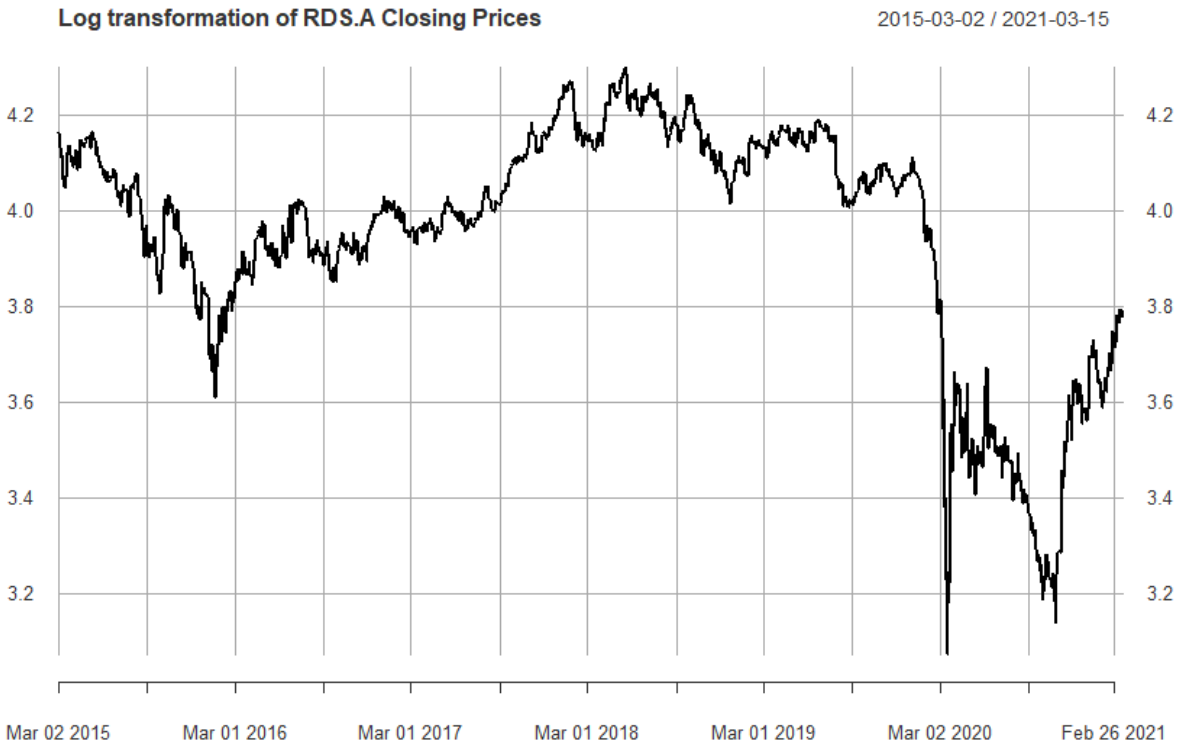
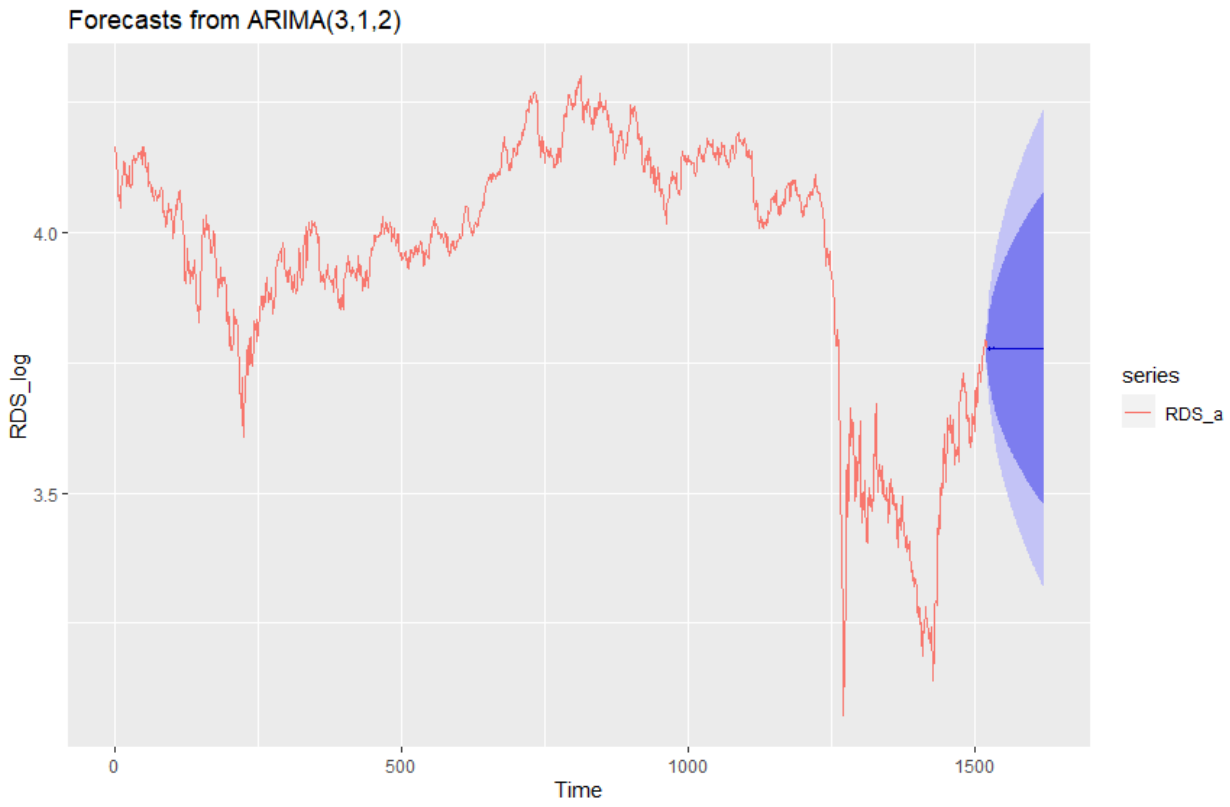
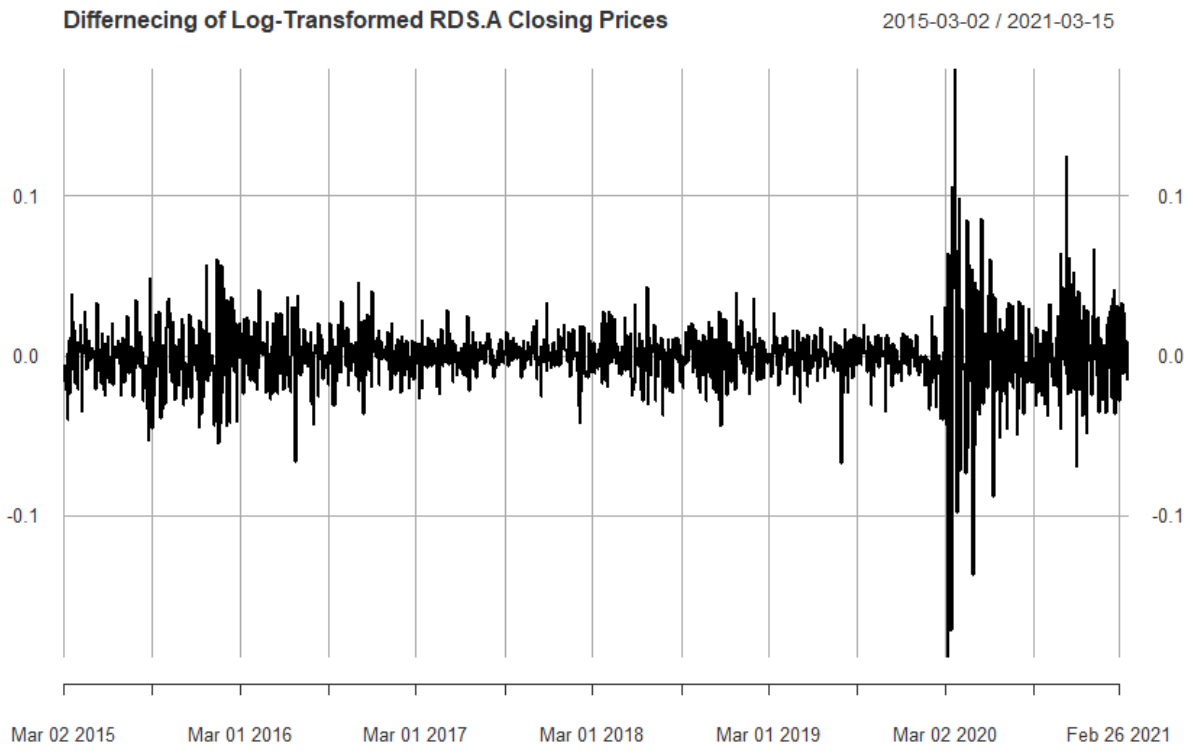
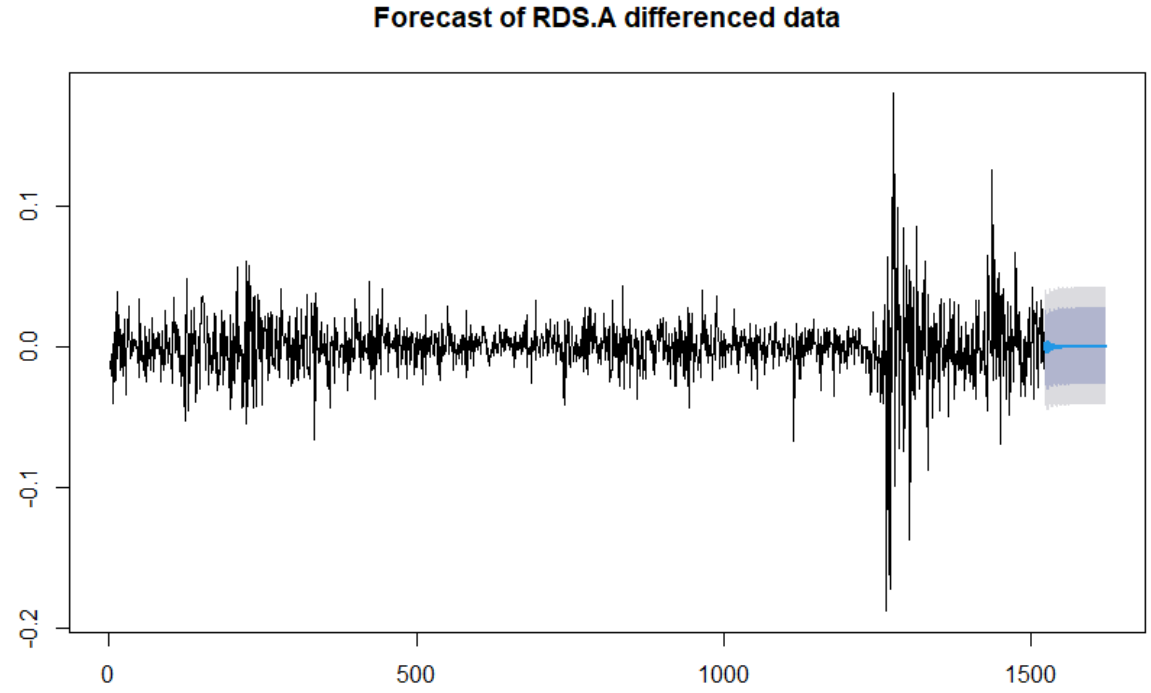
Feb 26 2021


Log transformation of RDS.A Closing Prices
2015-03-02 / 2021-03-15
Mar 02 2015
Mar 01 2016
Mar 01 2017
Mar 01 2018
Mar 01 2019
Mar 02 2020
Feb 26 2021



In an effort to avoid beating a dead horse we won't delve very deeply into the forecast as the same market dynamics that we discussed in XOM and CVX will have the same effect on RDS-A. Assuming outlook stays positive we should see RDS reach 50-65 dollars within the next 100 days as well as volatility revert to a normal level vs previous data. However as we have discussed in the previous two forecast the uncertainty in global markets can have a drastic affect on both volatility and price so it's worth noting the downside potential over the next 100 days.


Differnecing of Log-Transformed RDS.A Closing Prices
2015-03-02 / 2021-03-15
0.1
0.0
-0.1
Mar 02 2015
Mar 01 2016
Mar 01 2017
Mar 01 2018
Mar 01 2019
Mar 02 2020
Feb 26 2021


Forecast of RDS.A differenced data
0.1
0.0
-0.1
-0.2
0
500
1000
1500

5. Phillips 66 Analysis and Forecast

Phillips 66 is an energy manufacturing and logistics company with midstream, chemicals, refining, and marketing and specialties businesses. The Company operates through four segments: Midstream, Chemicals, Refining, and Marketing and Specialties (M&S). The Midstream segment gathers, processes, transports and markets natural gas, and transports, stores, fractionates and markets natural gas liquids (NGLs) in the United States. The Chemicals segment consists of its equity investment in Chevron Phillips Chemical Company LLC (CPChem), which manufactures and markets petrochemicals and plastics. The Refining segment buys, sells and refines crude oil and other feedstocks at refineries in the United States and Europe. The M&S segment purchases for resale and markets refined petroleum products, such as gasolines, distillates and aviation fuels, primarily in the United States and Europe, as well as includes the manufacturing and marketing of specialty products, and power generation operations.

Similarly to Shell, TD Ameritrade does not provide the same forecast and analysis that we were able to pull for Exxon and Chevron, therefore we will use their website to look at the divisions of business.

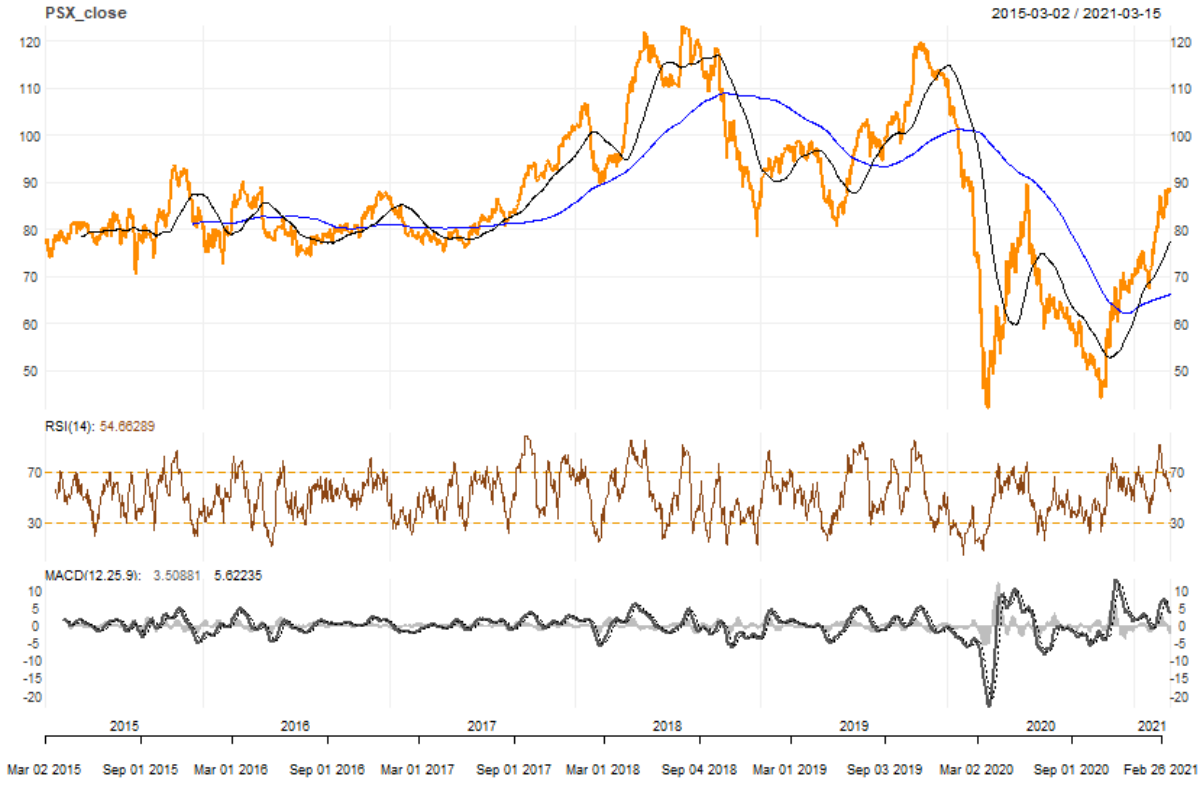
<u>Divisions of Phillips 66:</u>

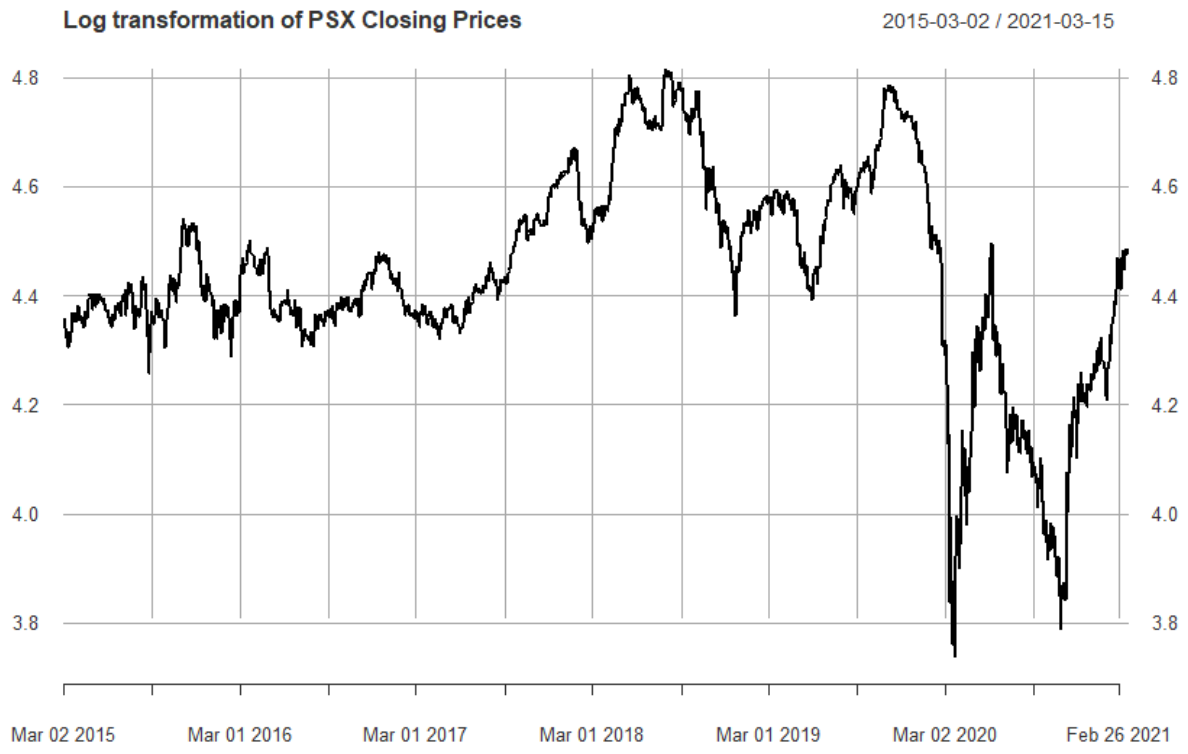
1. Refining
    a. 13 refineries in the U.S. and Europe processing crude oil and other feedstocks. Phillips 66 has a global refining capacity of 2.2 million barrels of crude oil per day.
2. Midstream
    a. Phillips 66 midstream business is broken down into 3 portions:
        i. Pipelines
            1. Used for transportation of crude oil, refined products, and NGLs to and from processing plants, terminals and storage facilities
        ii. Terminals
            1. Nationwide network of terminals stores crude oil and refined products and ensures transportation through pipeline connectivity and truck loading capabilities
        iii. NGL Processing and Export
            1. Processes raw NGLs into purified products such as ethane, propane, butane, isobutane and natural gas.
3. Chemicals
    a. Consist of Phillips 66 50% equity investment in CPChem, which owns or has joint venture interest in 30 global manufacturing facilities and 2 U.S. research centers.
4. Energy Research and Innovation
    a. Solid Oxide Fuel Cells
        i. A solid oxide fuel cell (SOFC) is a ceramic device that directly converts chemical energy from fuel gases, such as natural gas, into electricity at very high efficiencies with low emissions. Our SOFCs provide low-cost, clean and reliable power solutions for different applications: portable or

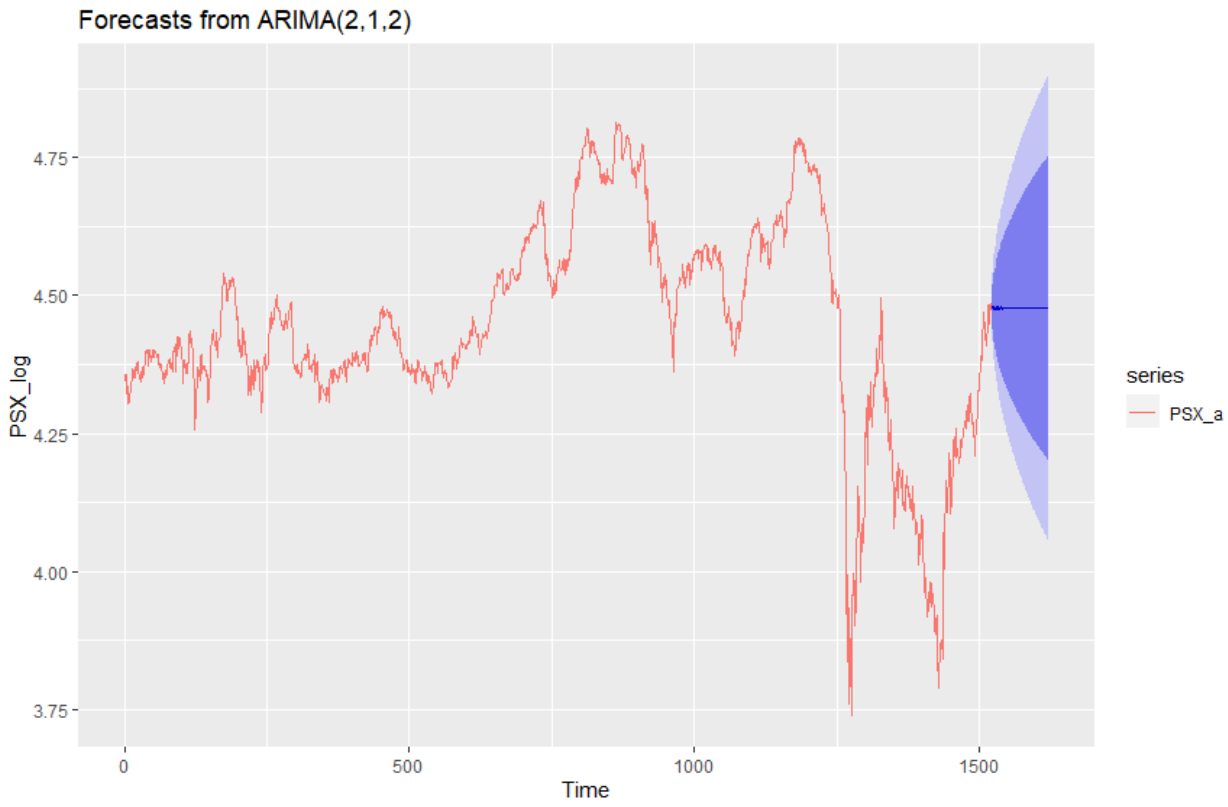
stationary, distributed or centralized, electricity or combined heat and power (CHP).

b. Organic Photovoltaics
    i. The organic photovoltaics (OPV) program at Phillips 66 develops the next generation of solar cell technology.
c. Batteries
    i. Phillips 66 research program improves the cost and performance of today's lithium-ion batteries and develops materials for next generation batteries to provide higher capacity, long cycle life, and reliable sourcing of lower cost materials.
d. Air, Water, Renewable fuels, SeRT
    i. Conducts research into air, water and renewable energy resources
    ii. SeRT technology offers a simple, low-cost process that looks and runs like many other refinery processes and is not manpower intensive. Phillips 66 offers consulting services in selenium separation and licensing of technology for selenium removal.

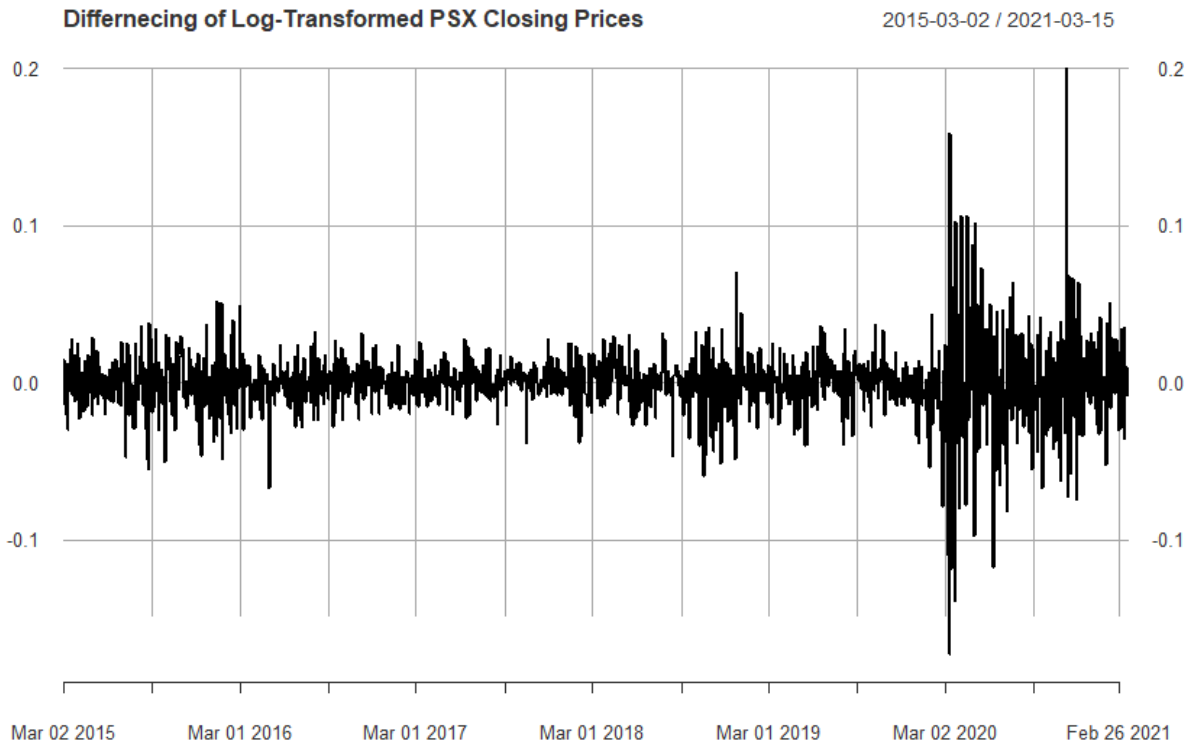
5.1 Graphs and Forecast for Phillips 66

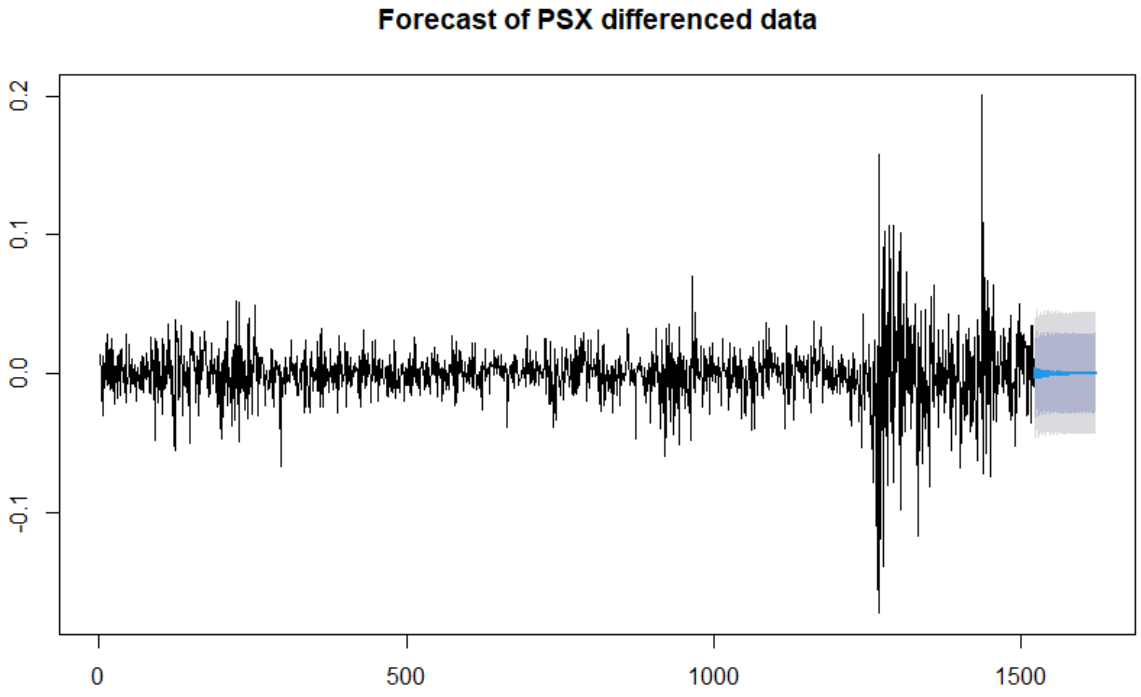



Log transformation of PSX Closing Prices
2015-03-02 / 2021-03-15
4.8
4.6
4.4
4.2
4.0
3.8
Mar 02 2015
Mar 01 2016
Mar 01 2017
Mar 01 2018
Mar 01 2019
Mar 02 2020
Feb 26 2021


Forecasts from ARIMA(2,1,2)
PSX_log
4.75
4.50
4.25
4.00
3.75
0
500
1000
1500
Time
series
PSX_a

Assuming market dynamics affect the oil sector positively Phillips 66 stock could see a rise into the 90- 105 range within the next 100 days. One thing to mention in regards to all analyzed stocks so far and for the last one, ConocoPhillips, is that the sector has seen a rise within the last few weeks due to a positive outlook on demand for crude oil as well as the 10 year bond yield rising to new highs which positively affects commodities and value stocks.





6. ConocoPhillips Analysis and Forecast

ConocoPhillips is an independent exploration and production company. The Company explores for, produces, transports and markets crude oil, bitumen, natural gas, liquefied natural gas (LNG) and natural gas liquids. The Company operates through six segments: Alaska, Lower 48, Canada, Europe and North Africa, Asia Pacific and Middle East, and Other International. The Alaska segment explores for, produces, transports and markets crude oil, natural gas liquids, natural gas and LNG. The Lower 48 segment consists of operations located in the United States Lower 48 states and the Gulf of Mexico. Its Canadian operations consists of oil sands developments in the Athabasca Region of northeastern Alberta. The Europe and North Africa segment consists of operations and exploration activities in Norway and Libya. The Asia Pacific and Middle East segment has exploration and production operations in China, Indonesia and Malaysia.

We'll explore 3 divisions of ConocoPhillips, forecast for these divisions are similar to the other firms analyzed and the same drivers for those forecast are as well. With that being said we won't go into vast detail of each driver for the forecast we mention, instead we'll just focus on the numbers for COP.

<u>Strengths of ConocoPhillips:</u>

1. Strong Global Presence
2. Large Proven Reserves
3. Ability to spend on exploration of new oil & gas reserves

6.1 Crude Oil

Crude Oil accounts for about 78% of ConocoPhillips business and has an estimated value of $46.3 B. One important note for ConocoPhillips is the exposure to the Canadian Oil sandbox which might contain up to 12 billion net barrels of oil making Conoco one of the largest players in the area. As the pricing power of OPEC continues to diminish and non-OPEC supplies continue to grow Conoco is well positioned to directly benefit from that.

Forecast for Crude Oil division:

1. Midstream and Marketing EBITDA Margin
    a. Midstream & Marketing EBITDA Margin represents adjusted operating income generated by ConocoPhillips from midstream and marketing activities, expressed as a percentage of revenues from related activities.
    b. Forecasted to stay around 3% from the 2020 until 2027
2. Cash Equity & Other Income Margin
    a. This refers to EBITDA margin earned by ConocoPhillips from its equity affiliates and other income, which primarily comes from gains on asset sales and dividends on securities held by the company.
    b. Historically has been 100% therefore it is forecasted to remain there moving forward
3. Crude Oil price
    a. Crude Oil Price refers to the average price realized by ConocoPhillips on the sale of crude oil and condensates. This metric is tightly correlated with global benchmark crude oil prices such as the Brent Crude Oil index.
    b. At the end of 2020 the value was $39.56 and is forecasted to be $54.59 in 2027.
4. Crude Oil Sales Volume
    a. Crude Oil Sales Volume refers to the total quantity of crude oil produced per year by ConocoPhillips globally.
    b. Forecasted to reach about 280 million by 2027 from roughly 203 million at the end of 2020.
5. E&P EBITDA Margin
    a. EBITDA Margin refers to earnings before interest, taxes, depreciation and amortization adjusted for non-cash, non-operating items, as a percentage of revenues. ConocoPhillips' E&P EBITDA Margin is calculated by subtracting total exploration and production-related operating expenses from total hydrocarbon sales revenue
    b. Roughly 60% at the end of 2020, projected to be 80% by the end of 2027 as oil prices begin to recover gradually.

6.2 Natural Gas and Natural Gas Liquids

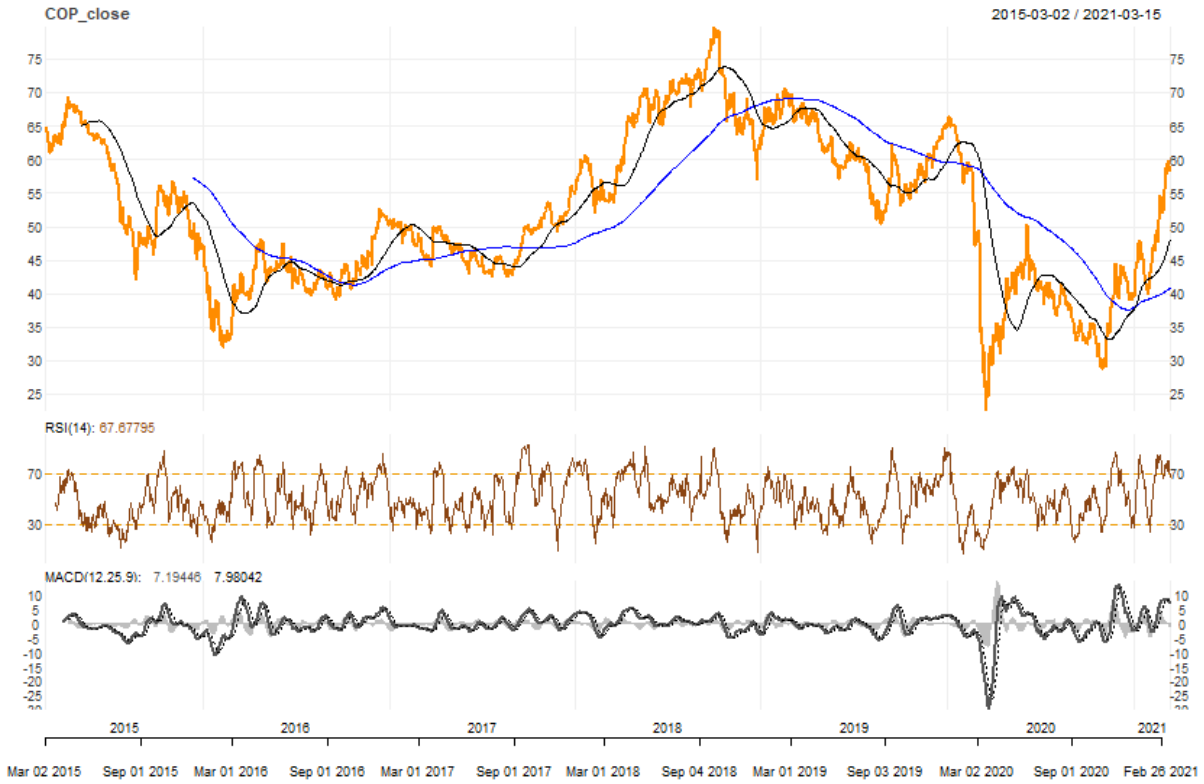
Natural Gas accounts for 14.9% of Conoco's market cap and has an estimated value of $8.8 billion. Natural Gas Liquids accounts for 7% of market cap and has an estimated value of $4.2 billion. We will analyze these two functions together as they are driven by similar factors. Midstream and Marketing EBITDA Margin, Cash Equity and Other Income Margin, and E&P

EBITDA Margin are common forecast among all three divisions of business therefore we will not review them again,

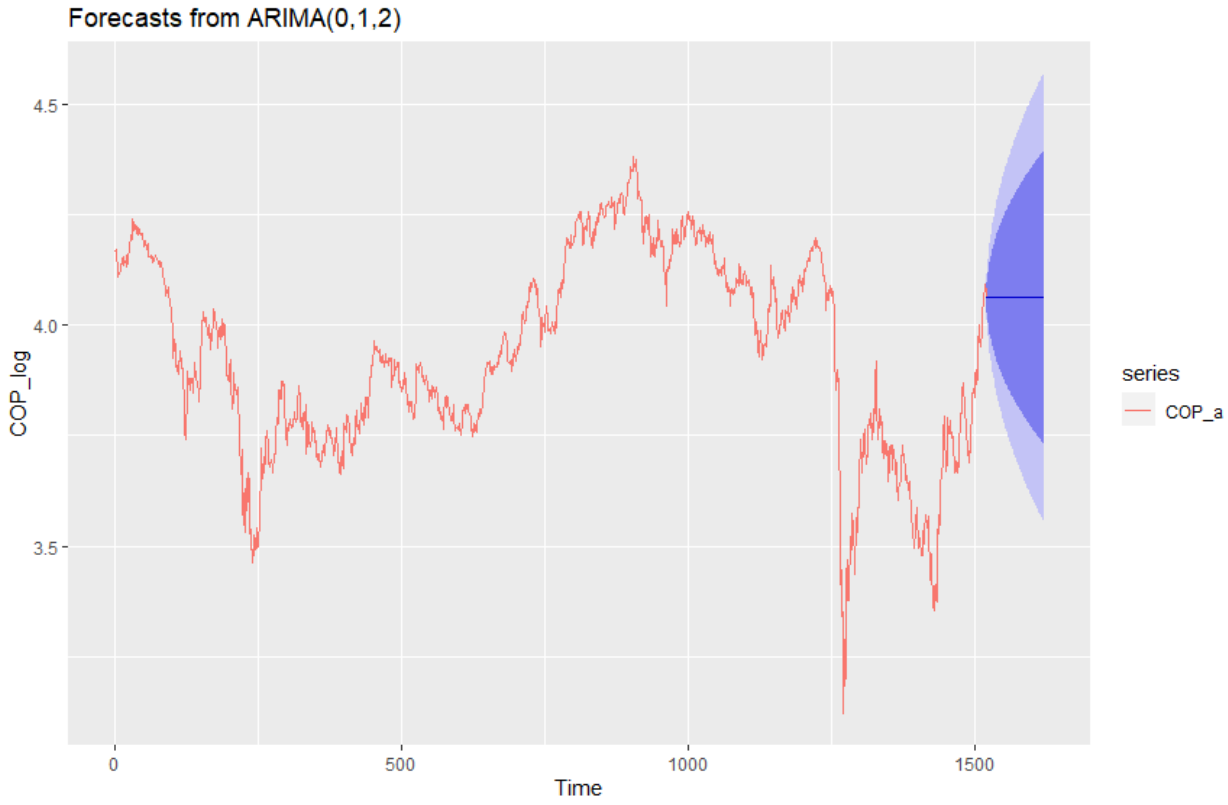
<u>Forecast for Natural Gas and Natural Gas Liquids:</u>

1. Price of Natural Gas($ per 1,000)
    a. The Price of Natural Gas refers to the average realized price ConocoPhillips recognizes from the sale of natural gas it produces. This is represented in USD per thousand cubic feet.
    b. Natural gas prices are generally tightly correlated with crude oil prices internationally. However, a glut of supply in the U.S. has led to a sharp decline in natural gas prices in North America.
    c. Forecasted to be $3.57 in 2027 up from $3.17 at the end of 2020.
2. Natural Gas Sales Volume
    a. Natural Gas Sales Volume refers to the total quantity of natural gas sold per year by ConocoPhillips.
    b. Projected to increase from 488.74 B at the end of 2020 to 758.65 B by 2027.

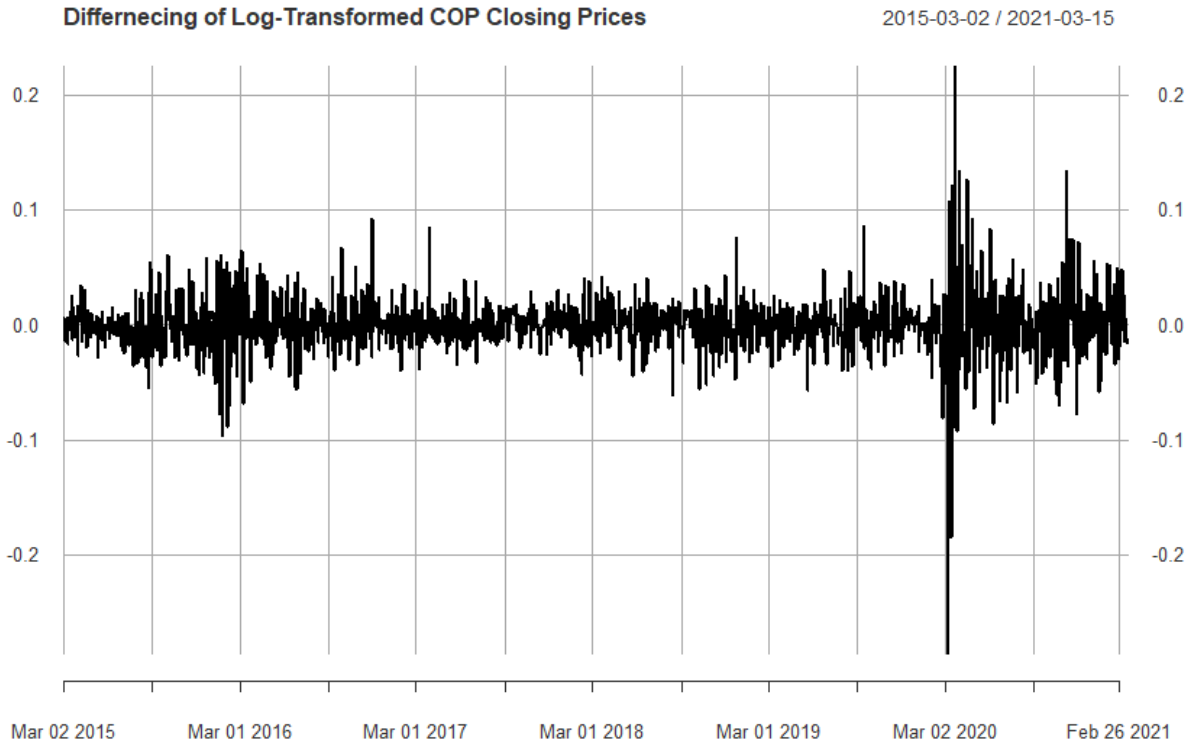
6.3 Graphs and Forecast for COP



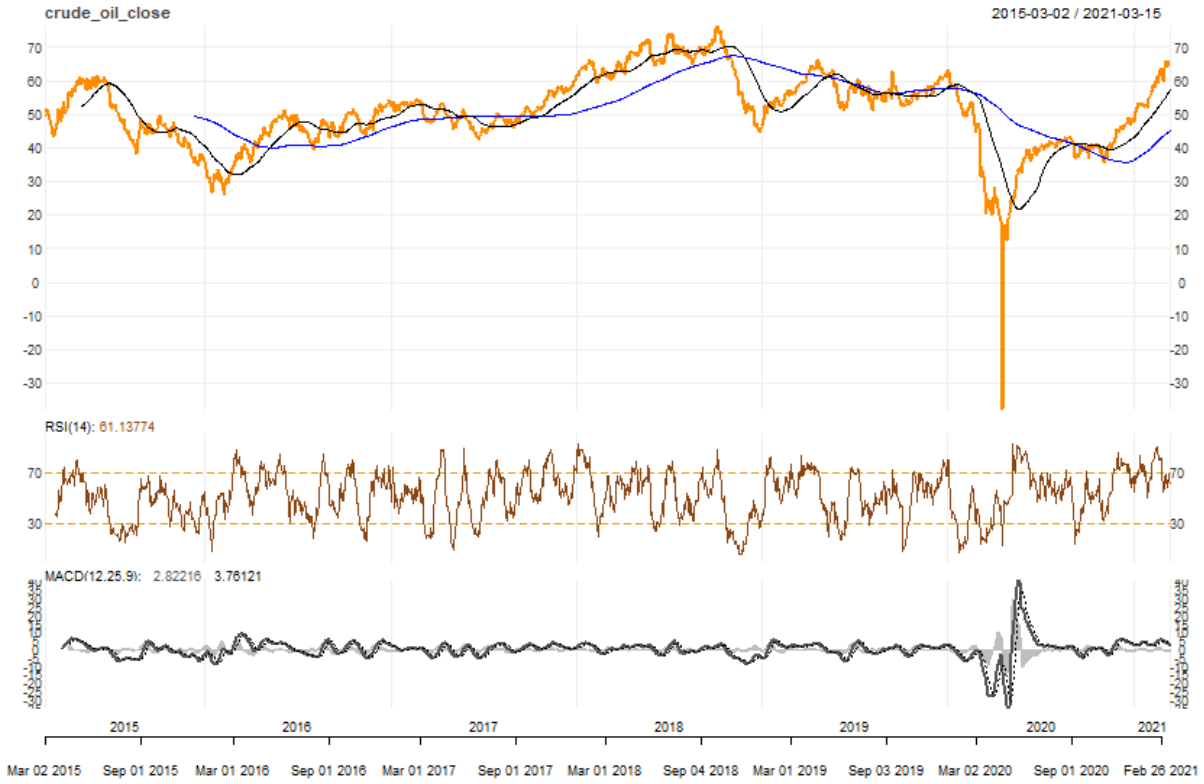

Log transformation of COP Closing Prices
2015-03-02 / 2021-03-15
4.2
4.0
3.8
3.6
3.4
3.2
Mar 02 2015
Mar 01 2016
Mar 01 2017
Mar 01 2018
Mar 01 2019
Mar 02 2020
Feb 26 2021

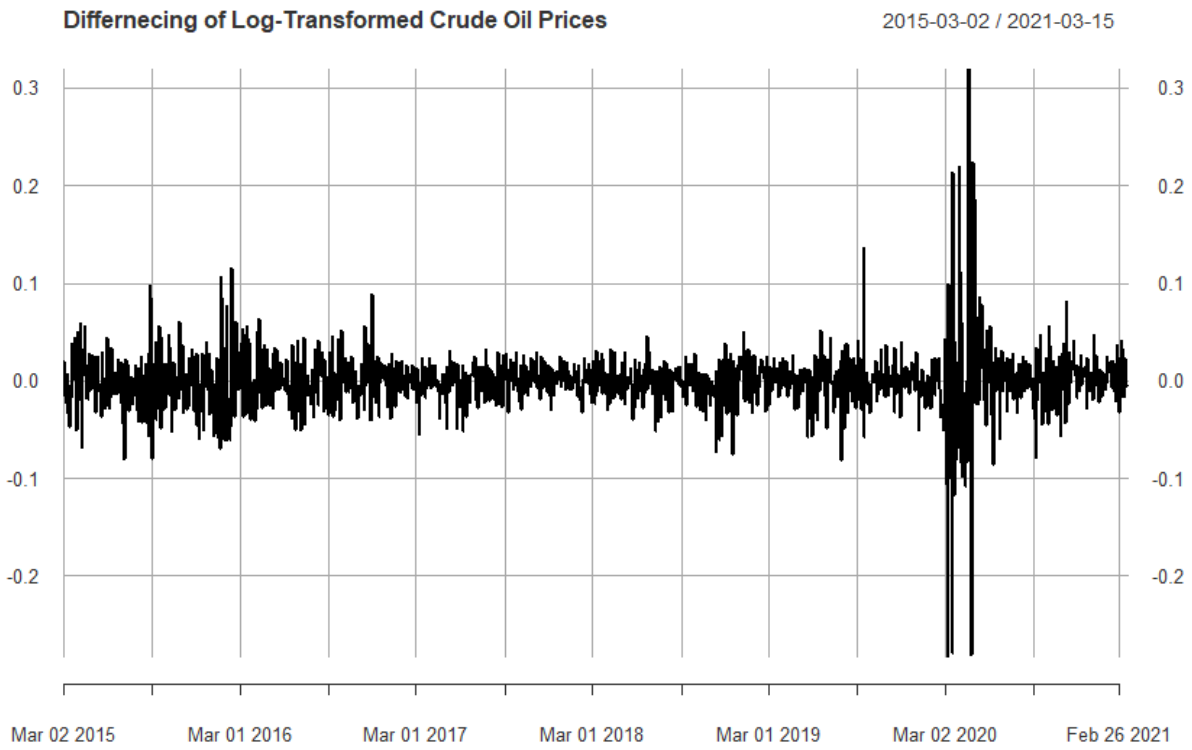

Forecasts from ARIMA(0,1,2)
COP_log
4.5
4.0
3.5
0
500
1000
1500
Time
series
COP_a

Again I don’t won’t to be repetitive about the forecast for volatility by discussions under forecast for previous names apply here as well in regards to how price could move. The blue and light blue shades represent the same confidence levels as before, best case scenario for COP stock with a positive outlook could place the price per share around $65-70 within the next 100 days.



7. Crude Oil Analysis


crude_oil_close
2015-03-02 / 2021-03-15
RSI(14): 61.13774
MACD(12,25,9): 2.82216 3.76121
2015
2016
2017
2018
2019
2020
2021
Mar 02 2015
Sep 01 2015
Mar 01 2016
Sep 01 2016
Mar 01 2017
Sep 01 2017
Mar 01 2018
Sep 04 2018
Mar 01 2019
Sep 03 2019
Mar 02 2020
Sep 01 2020
Feb 26 2021


Differnecing of Log-Transformed Crude Oil Prices
2015-03-02 / 2021-03-15
Mar 02 2015
Mar 01 2016
Mar 01 2017
Mar 01 2018
Mar 01 2019
Mar 02 2020
Feb 26 2021

Our Crude Oil analysis will not include forecast, as we know the prices of crude oil are driven by many factors and almost all of them have nothing to do with technical indications so I believe a forecast of price and volatility for crude oil wouldn't be worth exploring. Instead we'll take a look at the fundamentals of what drives prices.

Prices of oil in global markets are generally influenced by 4 main factors:

1. Oil Supply
2. Oil Demand
3. Oil Reserves
4. Global Political Uncertainties

As you can see from the differenced data Crude Oil is a pretty volatile commodity, a large portion of that volatility can be accounted for by the sharp increase in non-OPEC supplies relative to overall demand growth. If we take a look at the correlation coefficient between the annual change in global crude oil demand adjusted for the increase in non-OPEC supply and the change in Brent crude oil prices since 2004 you'll see the two have a correlation coefficient of 0.7, statistically this explains about 50% of the overall volatility of crude oil prices.

Oil prices are influenced by many factors as mentioned above, apart from demand-supply dynamics we also have to account for the affect speculators in the futures market have in driving oil prices up or down. Speculation typically relies more on overall sentiment compared to fundamental data, and market sentiment is commonly driven by the release of macroeconomic data and geopolitical events in oil-producing regions.

We should also consider the diminishing pricing power of OPEC and the rise in non-OPEC supplies:

1. The OPEC price controlling power has been severely restricted over the past few years because of internal conflicts and rising government spending by the member states. If oil prices persist to stay low many OPEC countries won't be able to fund government expenditures and as a result we have seen OPEC recently cut production levels to drive price up.
2. The cut in production coupled with a rise in demand globally as COVID-19 vaccinations roll out could see a solid rise of crude oil prices in the near term.
3. The increase in non-OPEC supplies has sharply risen over the previous years, in fact from 2010-2014 almost 70% of the net increase in global crude oil production has come from non-OPEC countries.

Another important consideration to look at is demand growth moving forward and understand what makes up crude oil demand growth:

1. 55% of the global demand for petroleum fuels comes from transportation. The remaining 45% of demand comes from the industrial and power generation sectors with the latter contributing just around 5%

2. Majority of the growth moving forward is expected to come from the transportation sector due to global demand in the industrial and power sectors remaining relatively stable in the long run. The primary driver for transportation is the growing economic activity and vehicle ownership in developing nations, of course this would partially be offset by increases in vehicle fuel efficiency and the use of natural gas and biofuels in the transportation sector.

8. Summary

This section will be broken down into two portions, short-term and long-term:

8.1 Short term

Throughout this research we have discussed the short term outlook under the forecast made for each individual equity and can come to the conclusion that holding all 5 equities could perform well in the near term. We have also discussed many of the factors at stake for them to perform well. I'd like to go into a few more details on some points not covered during individual analysis here.

If you go back and look at the detailed chart provided for each stock you can see they have all increased over the last month or so and are all in fact in an uptrend with the 50 simple moving average crossing over the 200 on all charts. However if you look at the relative strength index for them you'll see majority of them are right around 70 or over 70 indicating an overbought equity. It's worth noting the broader market is trading at all time highs and as things begin to normalize we could see a decline. As we have seen in the last week or two rising bond yields have caused declines already in a lot of the growth stocks and increased the price of value stocks including the oil sector.

As we know the Federal Reserve certainly can't and won't keep interest rates near zero forever and they also can't continue buying bonds forever, my personal assessment is that yields will continue to increase and revert back to normal which is natural but seems to be scary for investors in the growth names. Another big note is the increase in talks of inflation, almost 41% of the M1 Money Supply was added just last year, if talks come to fruition assets such as commodities, gold and other inflation hedges would be poised to directly benefit and in turn the equities discussed above would as well, the reasoning for this is that the stocks we researched don't have to increase working capital to benefit from rising crude oil and gas prices.

Before committing to holding all 5 in the near term, it would be good to assess the level of comfortability with the risk associated with that. Also if the portfolio is at a solid profit in some of these names is it worth taking the profit off the table and leaving the principal and offsetting the capital gains with losses in the broader portfolio. Of course none of these actions need to be taken per se, however it merits discussion due to the uncertainty facing the broader market and

specifically the oil sector. If there is a failure in vaccinations or a slowing of that process we could see that affect the market, but assuming all goes well I firmly believe being in these 5 names should be profitable with a short term outlook. With that being said we should consistently monitor the outlook for economic recovery, oil demand and decisions made by OPEC as any one of these could be a game changer for the holdings discussed.