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Capital Markets

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Oil Strategy – Redefining the Supply Risk Premium*

Oil Price Revision and Indicators of Physical Tightness

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- The oil market has long forgone a supply **risk premium**. While many instances of disruption risk have turned into disruption reality, the risk premium remains elusive in the financial market. In the wake of major supply outages this year, some structural, others transient, we see a developing trend of the risk premium pricing instead into the physical market. In other words, if the **financial market** will not pay for it, the **physical market** will.
- We are revising lower our oil **price outlook** for both WTI and Brent. To be clear, we are not necessarily expressing a bearish view on the market. Instead, we question the market's ability to accurately reflect the fundamental backdrop when factors like the US president play an outsized role in shaping market sentiment. We see WTI and Brent averaging $56.50 and $62/bbl through the balance of this year and $58 (down from $61.75/bbl) and $63.50/bbl (from $67.60/bbl) next year.
- Following a plethora of outages this year, two investor camps have emerged. On one hand, wide-ranging catastrophic outages are no longer a hypothetical, a black swan or a fat tail, meaning that a supply risk premium has arguably never been more relevant. On the other, the laissez faire attitude towards pricing in **disruption risk** has meant that the swift normalization of output has embolden the skeptics to question the need for a risk premium going forward.
- What if the recent outages serve as a catalyst for major consuming countries to **fortify inventories** and hold a greater degree in storage? The financial market no longer pays for a disruption risk premium, but the premium simply shifts to the physical market, and one that individual refiners will pay for security of supply.
- In a rare offering of transparency, the Chinese government recently suggested that it currently carries 80 days of **import cover**. How does the risk premium change if this figure structurally increases to 90 days, 120 days or more? In other words, how does the market put a price on disruption risk premium if days of cover increases to feasibly cover even large and prolonged outages? The financial market may not pay up for a disruption premium, but an **insurance premium** may emerge in the physical market.
- Physical markets are tight, for now. The question is how long the improved fundamental framework can last given the **weaker demand** backdrop and the ramp up of sizable **new oil fields** this fall and into next year. However, the physical market can remain tight if a buying frenzy as part of a larger calculated inventory build out at the individual refiner level of consuming countries could support prices.
- **Tanker rates** are skyrocketing across the globe. Asia has become increasingly short on crude and the availability of tankers has become scarce. Our VLCC fixing and loading data suggest a record 27 tankers loading between the US, Mexico and Caribbean this month. This compares to a monthly average of 15 VLCCs this year.
- Given the shortage of tankers, barrels fixed today will not be physically delivered into Asia until Christmas. It is a telling sign for the oil market if Asian refiners are not only willing to pay the highest transport costs in years, but also wait for over two months for **physical delivery**.
- Despite heading into an IMO 2020 world, **medium, sour benchmarks** such as the Oman benchmark are pricing at a premium to global light, sweet markers like Brent. The upcoming fuel spec change is, by consensus, expected to punish sour crudes on a relative basis. In other words, sour barrels should set the **price floor**, globally. The developing premium from the world's preeminent sour benchmark to Brent suggests that one of these crudes is mispriced. Given the physical tightness in medium sours, we see Brent prices re-rating higher on both an absolute and relative basis over the coming months.

All values in USD unless otherwise noted.

Priced as of prior trading day's market close, ET (unless otherwise stated).

For Required Conflicts Disclosures, please see page 11.

*Re: Shift in Risk Premium – Contrary to popular belief, it has not gone away…it is evolving into the physical market

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Figure 1: Global Supply and Demand Balance

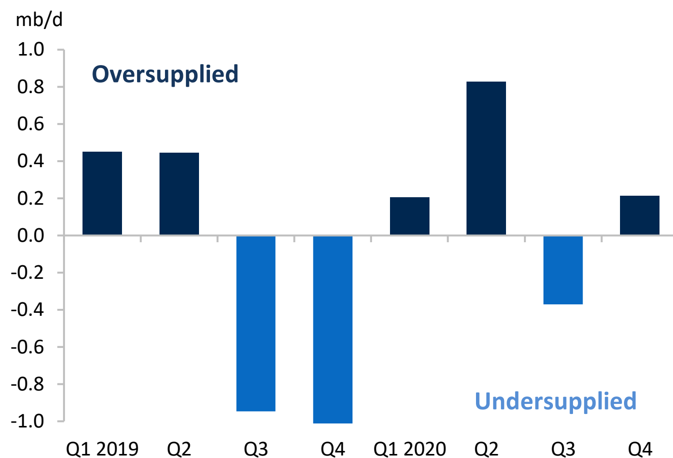
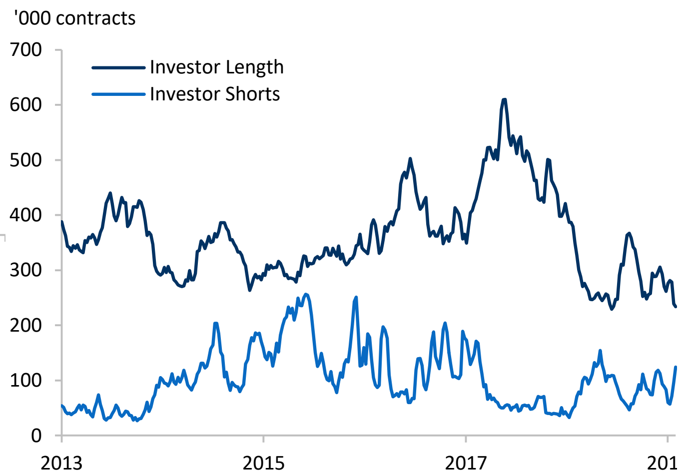


Figure 2: WTI Managed Money Investor Positioning



Source: Source: RBC Capital Markets, CFTC, IEA, EIA, JODI, Petro-Logistics SA, company and government sources

Trendless Short Term Volatility

Tourist traders have distorted fundamental signals in both directions

Global oil fundamentals were soft this summer, but physical markets have improved considerably over recent weeks even before the Saudi production outages from last month. How sustainable is a positive trending fundamental backdrop? A historic degree of OPEC compliance, coupled with flat US production to date this year, followed by several months of global inventory drawdowns have muscled both WTI and Brent into backwardation, but headlines concerning the broad macro economy are seemingly digested asymmetrically from the true fundamental oil market news flow. Simply put, oil prices remain hostage to the trade war and broad concerns of a looming global recession. The influx of non-energy specialists dabbling in the market, or what we have called 'tourist traders', have distorted fundamental signals in both directions and have helped to create, what we see as a vicious cycle of trendless short term price volatility.

We see a vicious cycle of trendless short term price volatility

We are revising lower our oil price outlook for both WTI and Brent for the balance of this year and into next. To be clear, we are not necessarily expressing a bearish view on the market. Instead, we question the market's ability to accurately reflect the fundamental backdrop when single factors like the US president play an outsized role in shaping market sentiment. We see WTI and Brent averaging $56.50 and $62/bbl through the balance of this year and $58 (from $61.75/bbl) and $63.50/bbl (from $67.60/bbl) next year (see page 3 for quarterly average breakdown). We see choppy trading in Q4 as the market digests the ramping up of Johan Sverdrup in the North Sea and fields in Guyana, followed by a market consensus view for heavy balances next year.

Investor Positioning – Buyer Strike

Investor length in WTI is lower today than when oil prices were at $26/bbl back in 2016

Despite the recent price weakness, the short sellers are not to be blamed given that the degree of shorts in the market are, by historical standards, relatively low (See Figure 2). Investors are not willing to outright short oil given the heightened degree of geopolitical risk in the market. Instead, near term rallies are faded and the price weakness has been perpetuated by a buyer's strike. Investor length in WTI is trending near multi-year lows. In fact, even despite the recent attacks and subsequent production outages, investor length in WTI is lower today than when oil prices bottomed at $26/bbl back in 2016.

Figure 3: Oil Price Forecasts, Period Averages

Price Forecast ($/bbl)	2019					2020				
	Q1	Q2	Q3	Q4	'19 Avg	Q1	Q2	Q3	Q4	'20 Avg
WTI	$54.90	$59.91	$56.44	*$56.50*	**$56.94**	*$59.00*	*$54.75*	*$61.00*	*$57.50*	***$58.07***
Brent	$63.83	$68.47	$62.02	*$62.00*	**$64.07**	*$64.50*	*$61.00*	*$66.00*	*$62.50*	***$63.50***
WTI-Brent Spread	-$8.93	-$8.56	-$5.58	*-$5.50*	**-$7.13**	*-$5.50*	*-$6.25*	*-$5.00*	*-$5.00*	***-$5.44***

Source: RBC Capital Markets estimates

The contributing reasons driving the buyer strike are clear. Lingering dark clouds centered on macroeconomic woes, a looming global recession and Trump's erratic foreign policy are major overhangs, all of which is masking a physical oil market where global fundamentals have improved over recent months.

The market likely has an inherent floor given that there is little length to liquidate further

A significant flush lower in oil prices, reminiscent of last year's 40% Q4'18 retracement is, in our opinion wildly unlikely, given the limited degree of potential length liquidation from current levels. The bullish spin on current investor positioning is that if length is already trending near multi-year lows, the market likely has an inherent floor. Put another way, if shorts do not pile on given the geopolitical backdrop and if the world stays relatively intact, there is little further length to liquidate.

Financial Market No Longer Paying For a Disruption Risk Premium?

The market is laser focused on supply disruptions and has largely overlooked the vulnerability of the consumer

Despite steady escalation of tensions ranging from shot down drones and ship seizures this summer, leading to a parade of escalating disruptions, the market has long forgone a supply risk premium. A month after digesting the impact of the biggest disruption in oil market history, two camps have emerged. On one hand, wide-ranging catastrophic outages are no longer a hypothetical, a black swan or a fat tail, meaning that a supply risk premium has arguably never been more relevant. On the other, the laissez faire attitude towards pricing in disruption risk has meant that the swift normalization of output has embolden the skeptics to question the need for a risk premium going forward.

The past month was a lesson in oil supply vulnerability as well as a tale in unrelenting resiliency. One can argue that the market accurately priced the direction of the recent outages given the swift reversion toward normalized output levels, which once again, cemented the Kingdom's status as the world's most reliable supplier even during times of catastrophe. Despite potential geopolitical escalation risk, the underwhelming price response begs the question of whether the market has lost its appetite for upside risk to oil prices. We believe that it is premature for participants to suggest with unwavering confidence, that the market no longer needs a risk premium, particularly if conflict ratchets further.

The financial market no longer pays for disruption risk, but the premium simply shifts to the physical market

Questions remain though, particularly around crude quality and the ability for global refiners to run replacement barrels. The market has spent the past month laser focused on the supply disruptions and the resiliency of the Kingdom, and has largely overlooked the vulnerability of the consumer. What if the recent outages serve as a catalyst for major consuming countries to fortify inventories and hold a greater degree in storage? The financial market no longer pays for a disruption risk premium, but the premium simply shifts to the physical market.

Figure 4: China, Japan, Korea Floating Roof Tank Crude Storage

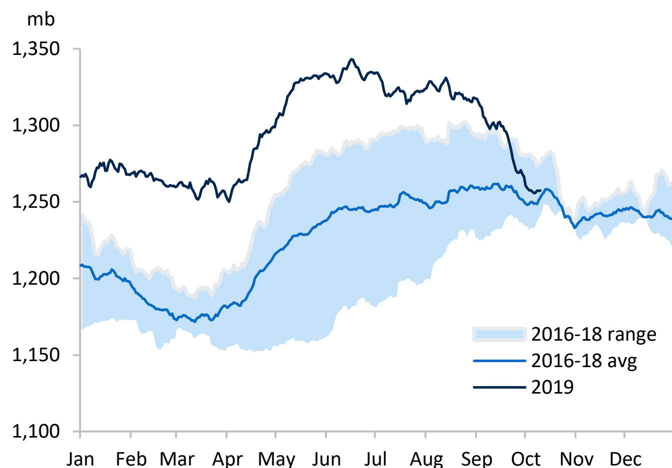


Figure 5: Brent Time Spreads (1 vs 6 Mo Contract)

Source: RBC Capital Markets, IEA Orbital Insight

Does strategic stockpiling redefine how we think about the supply risk premium?

Consuming Asian countries tightened the market back in the spring by shoring up stockpiles for energy security

Risk Premium Evolving and Shifting To the Physical Market

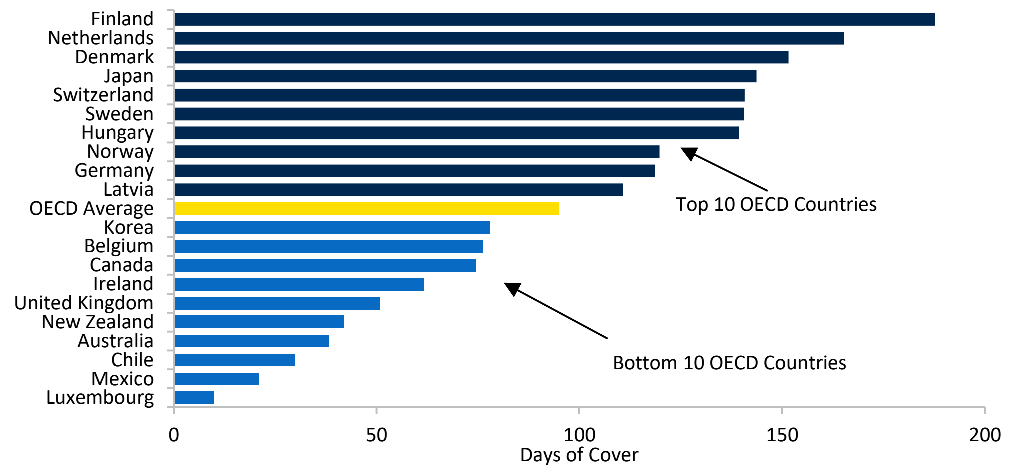
The average OECD country holds 95 days of import cover (See Figure 6). Put another way, at the current run rate, demand can, on average, last 95 days absent additional imports or domestic production. An unlikely scenario, but this is the metric that best exemplifies the country's degree of energy security at a snapshot in time.

In a rare offering of transparency, the Chinese government recently suggested that it currently carries 80 days of import cover. Utilizing geospatial satellite imaging data, our math suggests that Beijing holds a similar 86 days of import cover. How do investors think about the risk premium if this figure structurally increases to 90 days, 120 days or more? In other words, how does the market put a price on disruption risk premium if days of cover increases to feasibly cover even large and prolonged outages? The financial market may not pay up for a disruption premium, but an insurance premium may emerge in the physical market. We have seen this movie before.

Chinese crude imports have increased by a staggering 880 kb/d, on average, this year, which includes a robust rate of stockpiling 680 kb/d during Q2'19 when US sanctions sent Venezuela and Iran into a tailspin. During the spring, we argued that vigorous Chinese stockpiling propelled the physical market to the firmest physical level since the Arab spring, sending Brent spreads to the highest level in years (See Figure 5). Adding Saudi to Venezuela and Iran means that 25% of total Chinese imports are sourced from countries that have undergone a catastrophic supply shock this year. The combination of 10 mb/d of imports, domestic production of 3.8 mb/d with being the fastest demand growth country on the planet, leaves China among the most exposed from an energy dependency perspective.

While the ferocious degree of Chinese imports anchored tight global balances last spring, Japan and Korea also stockpiled at breakneck speeds for a combined 230 kb/d during Q2'19. Prior to sanctions, Japan typically imported some 300 kb/d from Tehran, while Korea was the world's largest importer of Iranian condensate. Given that waivers were discontinued in the spring, these major importers of Iranian crudes not only turned to alternative sources, but they also began building a war chest of barrels for strategic purposes. The pickup in stockpiling for a rainy day fund could meaningfully tighten the market. We could see a similar scenario play out again physically, even if balances are otherwise expected to be weak next year.

Figure 6: Days of Import Cover, Top/Bottom 10 OECD Countries



Source: RBC Capital Markets, IEA

Consumer stockpiling in a backwardated market is indicative of a premium placed on energy security

How do we measure a physical risk premium? We can highlight this in two ways: storage and freight rates. As noted, Japan, South Korea and China imported and stockpiled barrels at ferocious levels this past spring. The robust buying patterns resulted in a tightening global physical market. Storing barrels in a backwardated market involves paying for the physical cost of storage, naturally, but also includes paying away the monthly roll yield. Storing a barrel becomes increasingly expensive the steeper the term structure becomes and thus, continued stockpiling is indicative of a premium placed on energy security.

A buying frenzy could support a physical market that is looking soggy over the coming months

The bottom line is that a buying frenzy as part of a larger calculated inventory build out at the individual refiner level rather than a government imperative could support a physical market that otherwise looks soggy over the coming months. Similar to this spring, the firming of the physical market could be viewed as artificial tightening, but in an oversupplied market, any barrel that is taken off the market is a barrel off the market, irrespective of if it goes into demand or into tactfully building reserves.

Figure 7: Atlantic Basin Physical Differentials to Dated Brent*

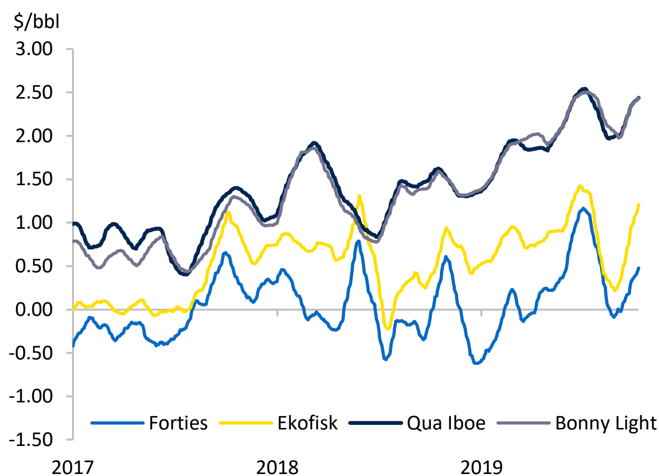
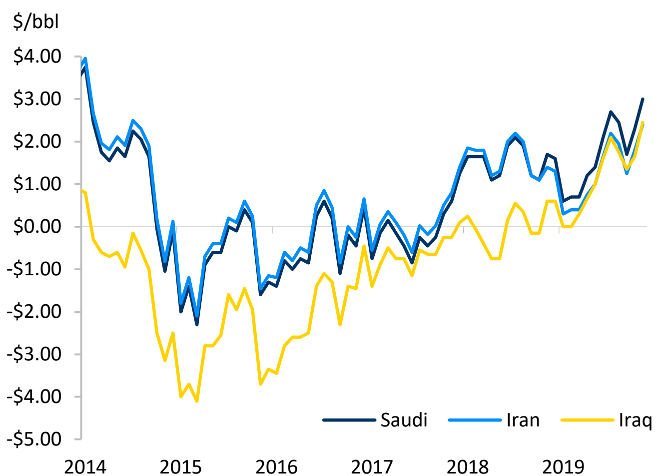


Figure 8: OSP for Medium Crude to Asia Relative to Dubai



Source: RBC Capital Markets, Reuters, Refinitiv, Company Sources *30 Day Moving Average

Signs of Physical Market Tightness

Soaring freight rates, firm quality differentials all suggest that the physical market is tight, for now

The physical oil market is tight, for now. The marginal barrel is clearing with ease, freight rates are the highest in decades and contradictory to IMO 2020, the sour market is tight and pricing at a premium to light, sweets in several key regions. We highlight three major indicators of physical tightness that are underestimated and under the radar.

Theme 1: Physical Market - Atlantic Basin – Tight for now but Beware Additional Supply

Market indicators suggest that the physical oil market is tight for the time being. Q3 saw significant global drawdowns, the Saudis hiked OSPs (See Figure 8) into Asia to the highest level since before the 2014 price collapse, and for now, the world's foremost indicator of oil market health, the Atlantic Basin physical crude differentials, are materially tighter than a month ago (See Figure 7).

While marginal barrels in the North Sea and West Africa struggled in mighty fashion to clear this summer, sellers have been matched with buyers with relative ease since early September, which is meaningful given seasonal refinery turnarounds. Oil prices should firm once refiners return from maintenance particularly in the event that lack of spare capacity is exposed. If marginal barrels are clearing, which is reflected in Brent term structure strength, the question is how long the improved fundamental framework can last given the weaker demand backdrop and the ramp up of sizable new oil fields this fall and into next year.

The Atlantic Basin will tell whether the market can absorb the ramp up of new supply over the coming months

The most influential test for the durability of the current improving fundamental backdrop is whether the global oil market can absorb the long anticipated ramp up of additional supply like Guyana or the Johan Sverdrup field in the North Sea. We anticipate that the Norwegian field will add an additional 150-200 kb/d by year-end before ramping to 440 kb/d by mid next summer.

In short, this is a big test given that these barrels are entering the market at the most inopportune time (fall refinery maintenance season) in precisely the least optimal region (the extremely visible North Sea) where any instances of difficulty clearly will be well magnified and reflected in the Atlantic Basin physical market in real time.

Figure 9: VLCC Tanker Loadings, Americas Region*

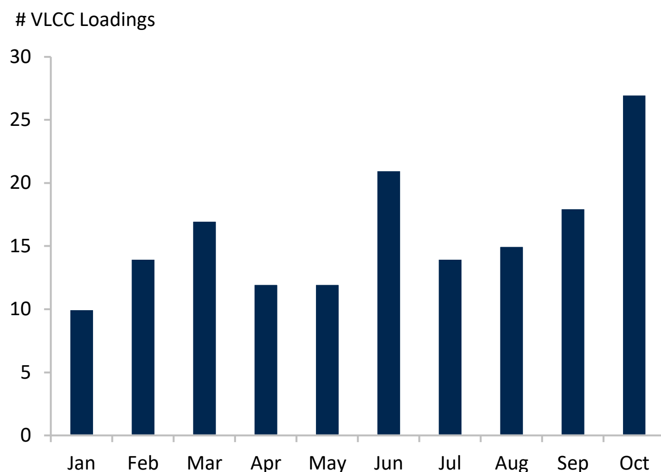


Figure 10: VLCC Tanker Rates US Gulf Coast to Asia, 3 Day MA

Source: RBC Capital Markets, EIA, True North Chartering, Company Sources *Includes US, Mexico & Caribbean fixtures through Oct 9th

Theme 2: Soaring Freight Rates Indicate Tightness, but US Export Economics Remain Fluid

It is a telling sign of physical tightness if Asian refiners are willing to both pay the most expensive freight in years…

Very Large Crude Carrier (VLCC) tanker rates are skyrocketing across the globe. The rate to charter a VLCC from the US Gulf to Asia have nearly quadrupled, trading to astronomical levels of reportedly near $20 MM since the attacks in Saudi Arabia last month. The question remains whether rates are firm thanks to demand for crude following the Abqaiq attacks or whether the supply of freight is tight given increased scarcity of tankers following the recent sanctions on China Ocean Shipping Company (COSCO). In the week subsequent to the attacks on the Kingdom, US to Asia VLCC freight rates jumped over 30% to $7.1 MM (See Figure 10). This was a clear function of structurally short Asian refiners scrambling to secure delivery of supply. Subsequently, rates spiked to $10 MM as transactions involving Iranian oil resulted in secondary sanctions effectively sidelining a host of Chinese ships.

While attribution of surging freight rates as a function of Asia's pull on crude relative to a scarcity of supply for tankers is, by nature, unclear, firm tanker rates are in large part supported by the Asian pull for barrels from the Americas. For example, our VLCC fixing and loading data suggest a record 27 tankers loading between the US, Mexico and Caribbean this month (See Figure 9). This compares to a monthly average of 15 VLCCs this year. Of the 27 loadings, 16 originate from the US Gulf (compared to YTD averages of 14), which suggests four million additional barrels are leaving the Gulf in October than during the average month this year.

And also wait for over two months for physical delivery

Further indication of market tightness lies in the details. The timeframe between fixing and loading a VLCC is a month-long process. This means that Korean refiners who booked tankers last week for $13 MM will see the vessel load in the Americas region in mid-November. This is followed by a 45-day voyage to Asia. This means that barrels fixed today will not be physically delivered into Asia until Christmas, but the scramble for additional barrels remain firm. It is a telling sign for the oil market if Asian refiners are not only willing to pay the highest transport costs in years, but also wait for over two months for physical delivery. In other words, the crude quality and quantity of barrels desired by Asian refiners are physical short in geographically closer regions like the Middle East and West Africa. The willingness to pay for time and cost is extremely telling about the energy security premium that Asian refiners are willing to pay, particularly heading into IMO 2020.

Export economics are a fluid, but US crudes must adjust in real time to remain competitive and prevent stockbuilds over the coming months

A freight charge of $13 MM to voyage from the Gulf to Asia suggests a steep $6.50/bbl transport cost compared to a $2.60/bbl trip prior to the Saudi supply disruption last month. While tanker fixtures have been strong, which should translate into firm US exports, the steep tanker rate means that exports economics are extremely fluid. There exists a scenario, in which freight rates remain elevated due to heavy loadings from Mexico, the Caribbean or South America and unless the US export arbitrage window opens, US barrels may be left behind in the Gulf Coast. North American crude pricing must adjust in real time (either Gulf Coast prices lower, or Brent prices higher) to maintain the current level of exports and prevent meaningful regional stockbuilds over the coming months. This leads to wider North American price spreads relative to global waterborne barrels. Tankers in the Americas are ballast into the Gulf Coast, meaning that arriving empty factors into the elevated cost of chartering a VLCC.

Theme 3: Emerging Sour Price Premium Suggest Upcoming Re-rating of Sweet Pricing

The recent price weakness suggests that the market is trading the notional headline of returning production without considering crude quality. The market simply does not appreciate that degree of nuance despite the importance. Medium sour crudes are tight, globally. Two prominent examples include the hiking of Saudis Official Selling Prices (OSPs) for their 33 degree API, 2% sulfur content crudes into Asia to the highest level since before the 2014 price collapse. Second, while major financial benchmarks have been weakening over the

Sour crudes have rallied in the past month. Heading into IMO 2020, we anticipate a re-rating higher for light, sweet crudes

past month, major medium, sour benchmarks such as Oman or Dubai have rallied sharply relative to global light, sweet markers like Brent. Since the attacks in the Kingdom, sour markers like Dubai (30.4 API, 2.13% sulfur) and Oman (30.5 API, 1.78% sulfur) have outperformed Brent (38 API, 0.4% sulfur) by $2.69/bbl and $3.19/bbl, respectively. Oman is currently pricing at a 70¢/bbl premium to Brent, a rare and telling development in the physical market given that the sour benchmark historically priced at a $3.50/bbl discount including at $2.50/bbl back of Brent in mid-September prior to the attacks in Saudi. Additionally, the upcoming IMO 2020 spec change is, by consensus, expected to punish sour crudes on a relative basis. In other words, sour barrels should set the price floor, globally. The developing premium from the major sour benchmarks to Brent suggests that one of the crudes is mispriced and that the physical market is tighter than Brent futures implies. Given the tightness in medium sours, we see Brent prices re-rating higher on both an absolute and relative basis over the coming months.

Figure 11: Oman – Brent Spot Price Differential

Source: RBC Capital Markets, Bloomberg

Global Supply/Demand Balances

Figure 12: Global Supply & Demand Balance (mb/d)

Global Supply & Demand Balance			2019					2020		
mb/d	Q1	Q2	Q3	Q4	YoY	Q1	Q2	Q3	Q4	YoY
Demand										
OECD	*47.1*	*46.4*	*47.9*	*47.8*	***-0.1***	*46.6*	*46.3*	*47.6*	*47.6*	***-0.3***
Non-OECD	*52.0*	*52.7*	*53.4*	*53.6*	***1.1***	*53.1*	*54.2*	*54.5*	*54.6*	***1.2***
Total Demand	***99.0***	***99.1***	***101.2***	***101.4***	***1.0***	***99.7***	***100.4***	***102.1***	***102.2***	***0.9***
Supply										
OPEC Crude	*31.0*	*30.2*	*29.7*	*29.6*	***-2.1***	*29.4*	*29.8*	*29.7*	*29.9*	***-0.4***
OPEC Other Liquids	*5.4*	*5.3*	*5.4*	*5.4*	***-0.2***	*5.3*	*5.3*	*5.4*	*5.5*	***0.0***
Non-OPEC Crude & Biofuels & Proc Gain	*63.1*	*64.0*	*65.2*	*65.2*	***1.5***	*65.1*	*66.2*	*66.6*	*67.0*	***1.9***
Total Supply	***99.5***	***99.5***	***100.3***	***100.2***	***-0.8***	***99.8***	***101.3***	***101.7***	***102.4***	***1.4***
Stock Change	*0.5*	*0.4*	*-0.9*	*-1.2*		*0.2*	*0.8*	*-0.4*	*0.2*	
Call on OPEC	*30.6*	*29.8*	*30.7*	*30.8*		*29.3*	*28.9*	*30.1*	*29.7*	

Figure 13: Global Oil Demand (kb/d)

Global Demand	2019				2020					
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	YoY'19	YoY'20
OECD Demand										
US	20,659	20,580	21,017	20,979	20,398	20,667	21,104	20,962	40	-26
Other North America	4,292	4,330	4,534	4,416	4,197	4,278	4,456	4,408	55	-58
OECD Europe	13,888	13,989	14,600	14,131	13,713	13,919	14,496	14,116	-101	-91
OECD Asia	8,227	7,456	7,711	8,315	8,266	7,399	7,531	8,128	-132	-96
Total OECD Demand	**47,066**	**46,355**	**47,862**	**47,841**	**46,574**	**46,263**	**47,587**	**47,614**	**-138**	**-272**
Non-OECD										
China	12,998	13,645	13,449	13,589	13,344	14,010	13,939	13,965	447	394
India	5,158	4,998	4,925	5,225	5,429	5,405	5,090	5,479	213	274
Other Emerging APAC	9,649	9,802	9,927	10,124	10,185	10,091	10,101	10,394	347	317
Total Emerging APAC	**27,805**	**28,445**	**28,301**	**28,938**	**28,958**	**29,506**	**29,130**	**29,838**	**1,007**	**986**
South & Central America	**6,295**	**6,314**	**6,463**	**6,414**	**6,266**	**6,383**	**6,501**	**6,467**	**-21**	**33**
Middle East	**8,083**	**8,171**	**8,589**	**8,099**	**7,978**	**8,270**	**8,657**	**8,078**	**-103**	**10**
Africa	**4,348**	**4,295**	**4,184**	**4,328**	**4,361**	**4,373**	**4,250**	**4,393**	**61**	**56**
Non-OECD Europe	**803**	**799**	**833**	**862**	**853**	**821**	**839**	**874**	**62**	**23**
FSU	**4,626**	**4,704**	**5,012**	**4,927**	**4,685**	**4,828**	**5,086**	**4,954**	**114**	**71**
Total Non-OECD Demand	**51,960**	**52,728**	**53,382**	**53,568**	**53,101**	**54,181**	**54,463**	**54,604**	**1,121**	**1,178**
Global Demand	**99,026**	**99,083**	**101,244**	**101,409**	**99,675**	**100,444**	**102,050**	**102,218**	**983**	**906**

Source: RBC Capital Markets estimates, IEA, EIA, JODI, company and government sources

Figure 14: Global Oil Supply (kb/d)

Non- OPEC Supply	2019				2020					
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	YoY'19	YoY'20
US	16,851	16,910	17,005	17,145	17,514	17,951	18,308	18,659	*1,467*	*1,130*
Canada	5,443	5,449	5,425	5,429	5,470	5,499	5,492	5,522	*69*	*59*
Mexico	1,880	1,984	1,986	1,855	1,878	1,867	1,856	1,846	*-151*	*-65*
Total North America	**24,174**	**24,343**	**24,416**	**24,429**	**24,862**	**25,317**	**25,656**	**26,027**	***1,385***	***1,125***
Brazil	2,561	2,748	3,088	3,169	3,179	3,225	3,221	3,207	*199*	*317*
Other South & Central America	1,934	1,994	1,973	1,964	2,009	2,010	1,992	2,014	*-6*	*40*
Non-OPEC S & C America	**4,495**	**4,742**	**5,061**	**5,133**	**5,188**	**5,235**	**5,213**	**5,221**	***193***	***357***
Norway	1,755	1,648	1,678	1,875	2,029	2,152	2,065	2,074	*-112*	*341*
Other OECD Europe	1,651	1,620	1,567	1,723	1,687	1,607	1,595	1,745	*28*	*18*
Total OECD Europe	**3,406**	**3,268**	**3,245**	**3,598**	**3,716**	**3,759**	**3,660**	**3,819**	***-84***	***359***
Kazakhstan	1,923	1,874	1,891	1,934	1,960	1,944	1,863	1,913	*-21*	*15*
Russia	11,667	11,419	11,435	11,493	11,463	11,518	11,548	11,583	*12*	*25*
Other FSU	1,052	1,053	1,134	1,003	1,015	1,003	1,033	1,041	*-79*	*-38*
Total FSU	**14,642**	**14,345**	**14,460**	**14,430**	**14,438**	**14,465**	**14,444**	**14,537**	***-89***	***2***
Non-OPEC Africa	**1,380**	**1,382**	**1,478**	**1,461**	**1,485**	**1,490**	**1,483**	**1,493**	***-23***	***63***
Non-OPEC Mideast	**3,168**	**3,327**	**3,344**	**3,277**	**3,302**	**3,290**	**3,308**	**3,328**	***11***	***28***
China	3,836	3,997	3,888	3,856	3,865	3,924	3,833	3,826	*9*	*-32*
Other Non-OPEC Asia Pacific	3,536	3,750	3,716	3,738	3,560	3,548	3,540	3,541	*-9*	*-138*
Total Non-OPEC APAC	**7,372**	**7,747**	**7,604**	**7,594**	**7,425**	**7,472**	**7,373**	**7,367**	***0***	***-170***
Processing Gains	**2,348**	**2,219**	**2,419**	**2,429**	**2,388**	**2,388**	**2,358**	**2,408**	***63***	***32***
Global Biofuels	**2,085**	**2,654**	**3,138**	**2,835**	**2,261**	**2,800**	**3,086**	**2,838**	***34***	***68***
Total Non-OPEC Supply	**63,070**	**64,027**	**65,165**	**65,186**	**65,065**	**66,216**	**66,581**	**67,038**	***1,490***	***1,863***
Global Supply	**99,478**	**99,528**	**100,298**	**100,234**	**99,843**	**101,272**	**101,681**	**102,433**	***-774***	***1,422***

OPEC Supply	2019				2020					
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	YoY'19	YoY'20
Algeria	1,153	1,114	1,101	1,136	1,100	1,150	1,160	1,165	*-37*	*18*
Angola	1,435	1,416	1,386	1,420	1,435	1,465	1,450	1,465	*-85*	*40*
Congo	355	333	335	336	320	325	330	330	*14*	*-13*
Ecuador	535	533	577	515	535	535	535	535	*-6*	*-5*
Equatorial Guinea	113	112	107	111	120	120	120	120	*-10*	*10*
Gabon	255	215	210	216	200	220	215	225	*30*	*-9*
Iran	2,857	2,161	2,001	1,900	1,900	1,800	1,750	1,750	*-1,285*	*-430*
Iraq	4,603	4,692	4,727	4,673	4,600	4,700	4,800	4,800	*88*	*52*
Kuwait*	2,712	2,655	2,656	2,704	2,720	2,740	2,740	2,740	*-90*	*53*
Libya	936	1,181	1,147	1,112	1,100	1,100	1,100	1,100	*33*	*6*
Nigeria	1,635	1,753	1,841	1,723	1,730	1,725	1,700	1,760	*120*	*-9*
Saudi Arabia*	10,178	9,860	9,557	9,800	9,900	10,100	10,100	10,150	*-412*	*214*
UAE	3,138	3,259	3,371	3,269	3,130	3,145	3,145	3,200	*179*	*-104*
Venezuela	1,131	921	722	700	650	650	575	575	*-652*	*-256*
OPEC Crude Total	**31,036**	**30,205**	**29,738**	**29,614**	**29,440**	**29,775**	**29,720**	**29,915**	***-2,114***	***-436***
OPEC Other Liquids	**5,373**	**5,296**	**5,395**	**5,435**	**5,338**	**5,281**	**5,380**	**5,480**	***-150***	***-5***

* Includes Neutral Zone

Source: RBC Capital Markets estimates, Petro-Logistics SA, IEA, EIA, JODI, company and government sources

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