Moses Rahnama

Company: S-Oil (010950 KS)

Recommendation: Short

Target Price: W69,191

Expected Return: 28%

Background and Sentiment

S-Oil is one of the largest refiners in South Korea with 670 kbd of capacity. The company also has chemicals and lubes segments. The chemicals segment has capacity of 3.3 mtpa consisting of > 50% paraxylene (PX) yield along with other aromatics and olefins. The lubes segment has a capacity of 45 kbd and produces base oils.

- S-Oil is one of the top names in Asia for exposure to IMO 2020. Sentiment on the stock has turned positive as Jan 1, 2020 approaches. The stock has rallied 8% in Dec and is only down 1.6% YTD despite 35% negative 2020 eps revisions, while outperforming the KOSPI Energy & Chemical Index by 6.3 % YTD. S-Oil has 88% buy rating from analysts.

Investment Thesis Summary

My short thesis on S-Oil is based on three themes

1) inflated refining earnings in anticipation of IMO; S-Oil is pricing a 7.9 $/b refining margin for 2020, while I expect margins to be 6.8 $/b.

2) weakness in chemicals margins are expected, but I believe there is downside risk to the >95% PX utilization rates street is modelling. Every 5% drop in PX utilization is worth 3% on 2020 eps.

3) stock has outperformed most peers and is trading at a premium to comps.

2020 street eps and ebitda for S-Oil are 13% too high and I recommend shorting the stock with a W69,191 price target and a return objective of 28%.

Last Price (12/27/2019)	Won	**96,100**
52-wk high (2/18/2019)	Won	111,000
52-wk low (05/27/19)	Won	79,900
Shares Outstanding (mm)		113
Free Float		36%
Market Cap	Bn Won	10,819
Net Debt	Bn Won	6,587
Preferred Equity	Bn Won	10
Enterprise Value	Bn Won	17,416
FCF Yield		6%
Dividend Yield		4%
Target EBITDA Multiple		**7.0x**
12-Month Target Price	Won	**69,191**
Upside (Downside)		***(28%)***

S-Oil performance vs KOSPI Chemicals & KOSPI200 Energy&Chems indices



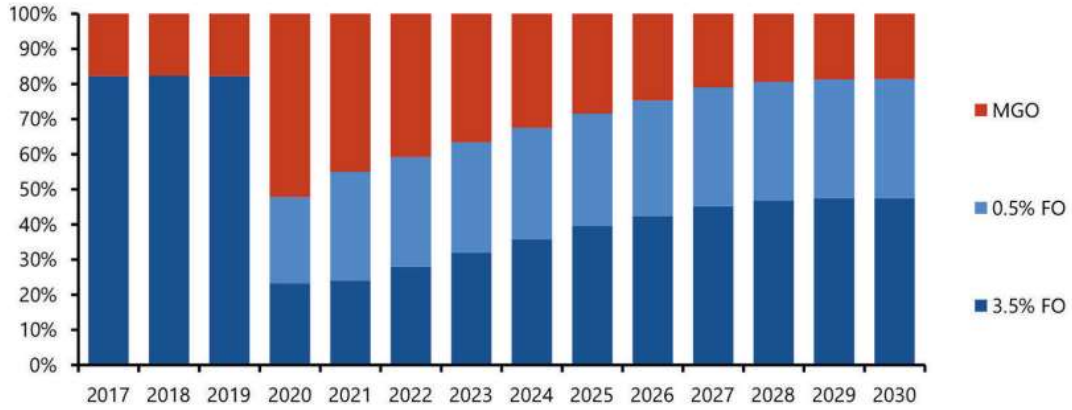
Refining Earnings Overestimated

IMO 2020 Update

IMO 2020 is a UN regulation that lowers the sulfur content in marine fuel (Fuel Oil/FO) from 3.5% to 0.5% on Jan 1, 2020. This is significant because marine fuels represent ~4% (4 mmbd) of end product oil demand. The situation around IMO 2020 has been well discussed: ships without scrubbers switch from high sulfur fuel oil (HSFO) to IMO compliant fuels (sulfur <0.5%), global HSFO demand will decline 2 mmbd, or nearly half of the HSFO market. Ships without scrubbers will either switch to Marine Gasoil (MGO) or Very Low Sulfur Fuel Oil (VLSFO).

Key question is what happens to the excess 2 mmbd HSFO supply and how this impacts the oil market / refining earnings.

Projected marine fuel oil market share



What does IMO 2020 mean for S-Oil?

IMO 2020 can boost earnings for refining in 3 ways

1. Increasing middle distillate cracks because of a significant demand shift from HSFO to MGO. This will benefit all refiners globally.
2. Increasing gasoline cracks through a reduction in gasoline supply by diverting FCC feedstock (VGO) into VLSFO blend pool. This will also benefit all refiners globally.
3. Most importantly for S-Oil, many believe IMO will create significant feedstock advantage- cheaper sour crude - for complex refiners who can process these sour crudes and produce negligible HSFO.

All three rely on the assumption that the global refining system is not able to adapt to a new market environment and substitute 2 mmbd of HSFO with VLSFO and MGO without causing a significant movement in cracks. It also assumes that simple refineries currently running sour crudes will only be able to meet the new regulations by running sweet crudes (which have a lower sulfur content) or cut runs because of HSFO yield and poor economics.

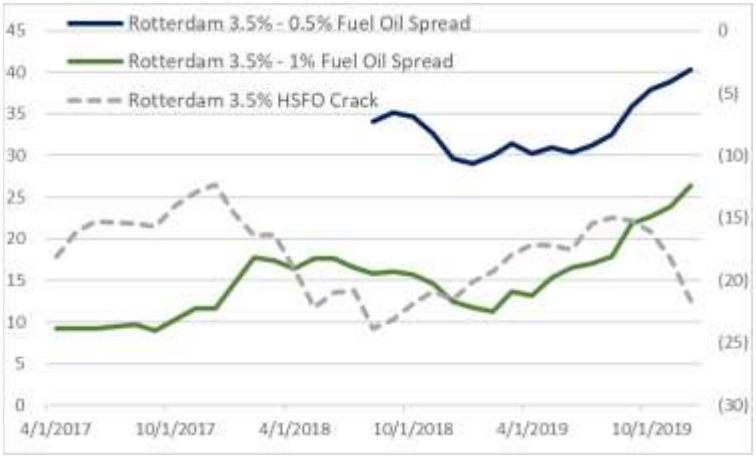
I believe sentiment around all three is overdone and refining earnings will not be materially higher next year.

Refiners have broadly adapted and weak HSFO cracks are grossly overstated in industry margin indicators

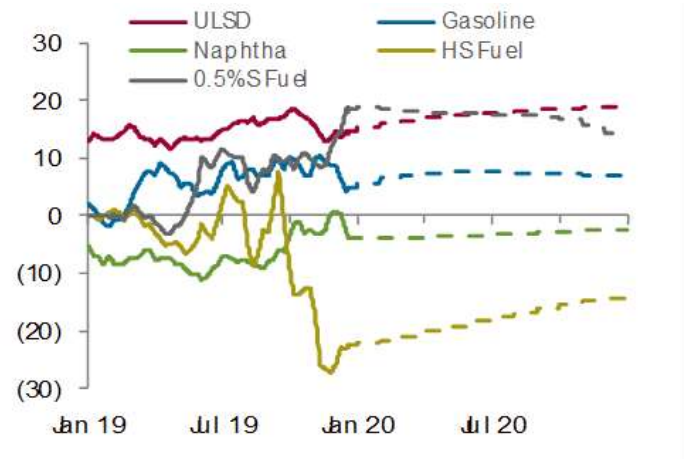
Historically, the **3.5% HSFO pool was comprised of some fuel oil with sulfur streams <3.5% and some >3.5%.** In the past refiners mixed 0.5% or 1.0% fuel oil into the 3.5% blend pool, as there was no disincentive. But now they are seeing huge economic signals to segregate.

The spread between high and low Sulfur FO has widened so much that refiners have every incentive to eliminate sulfur from the HSFO pool. This can be achieved by running sweeter crude, or by modifying refining operations, such as running cokers harder, tweaking hydrocrackers and FCCs, or blending intermediary products such VGO to reduce the FO sulfur content.

Cal-2020 fuel oil spreads (LHS) vs 3.5% HSFO crack (RHS), $/b



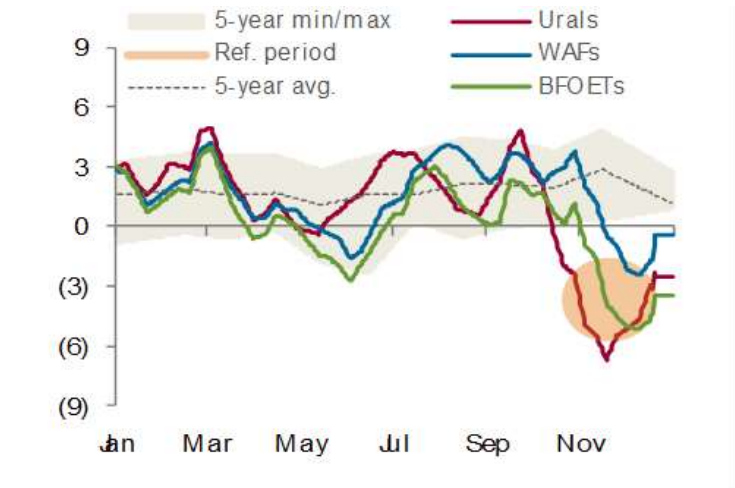
Singapore crack spreads, $/b



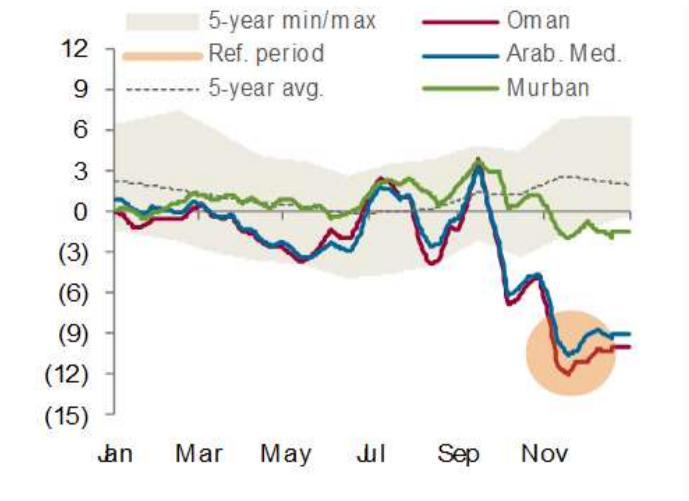
Most refiners with high HSFO output have stated that they are taking measures to adapt to these new regulations and do not expect to bear heavy losses. I believe global refiners have indeed adapted to this new environment. **Simple refineries will not see substantial run cuts, we will not see a blowout in distillate or gasoline cracks, and sour crude diffs will not widen significantly from current levels.**

The supply and demand transition has happened to a large degree without causing a major dislocation, and the **market has underestimated the extent to which to refiners have prepared for IMO**.

Northwest Europe simple indicator margins, $/b



Singapore simple indicator margins, $/b



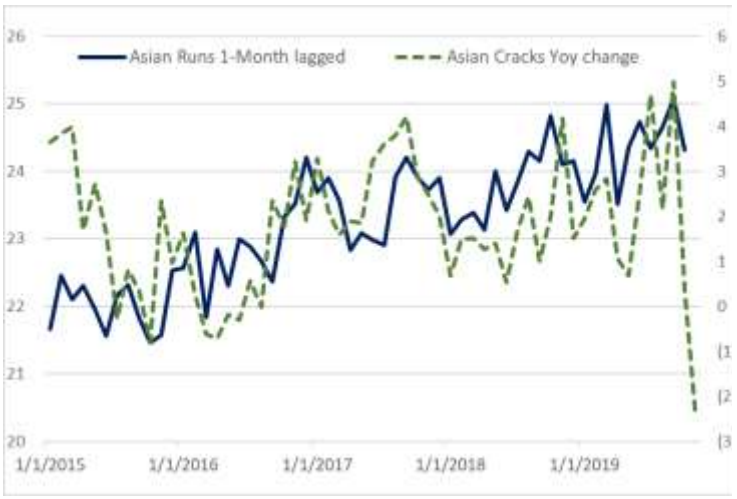
Near record low indicator cracks and still no run cuts

If we assume refiners are operating the same as they did in the pre-IMO environment, an analysis of historical **indicator cracks** and refinery runs suggests that we should have seen close to 1.5 mmbd run cuts in Asia and Europe in November, and we should see cuts of up to 3 mmbd in December. (These cracks are based on multiple crude types and various refinery configurations.)

European margins (RHS) vs European refining runs (LHS), $/b, mmbd



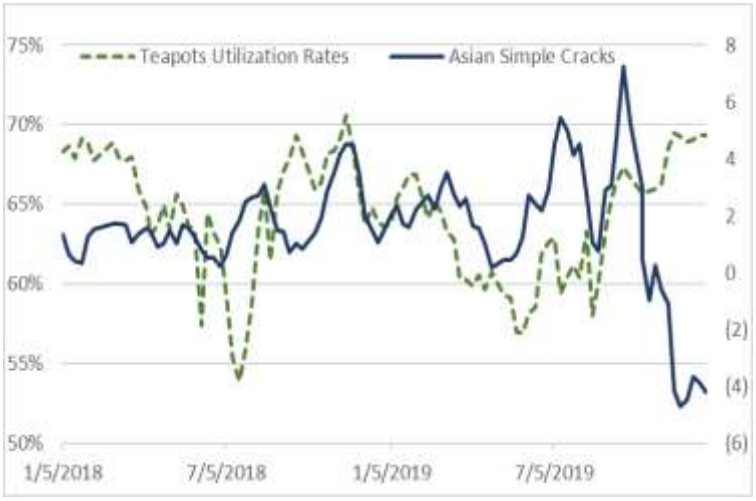
Asian margins (RHS) vs Asian refining runs (LHS), $/b, mmbd



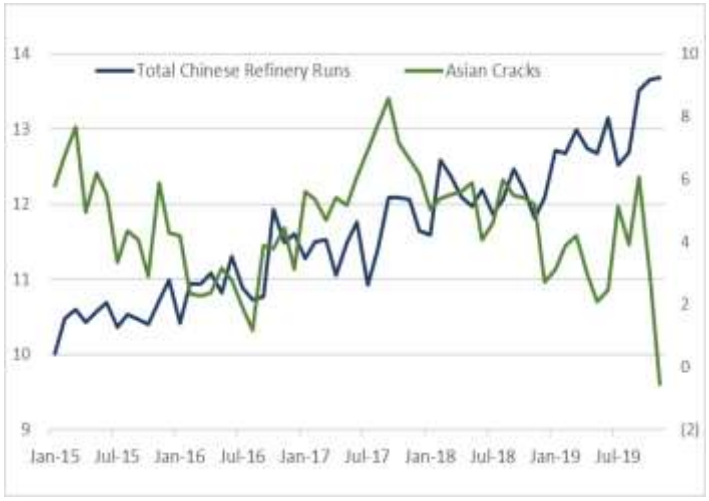
However, latest refining runs data suggest quite the opposite, and no news or announcements from companies indicate any major economic run cuts (such events are often reported or announced almost immediately).

China's November total refining runs were up by 1.8 mmbd y/y (16%), and so far in December, Chinese teapots (some of the most disadvantaged refineries in the world) are running at near 5-yr high utilization rates, while Asian **indicator cracks** are near 5-yr lows.

Shangdong independent refineries utilization rates (LHS) vs. Asian simple cracks (RHS), %, $/b



Total Chinese refinery runs (LHS) vs. Asian complex cracks (RHS), mmbd, $/b



Less than a week before IMO officially kicking off and still no movement in cracks?

A good place to start is to look at anecdotal evidence and guidance from companies. We can then apply this to similar regional systems in broader refining industry to explain how the industry has adapted to IMO.

Refining systems in Europe and Asia are very similar: both heavily rely on crude imports and are relatively simple, compared to more complex North American and Middle Eastern refining systems. **Simple refiners in Europe and Asia were expected to be the biggest victims of IMO, and so main driver behind dislocation in cracks and diffs.**

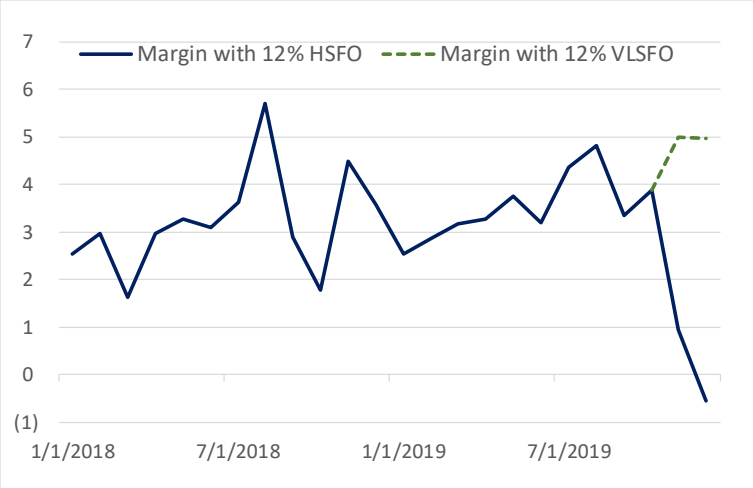
GALP in Europe is a great example. GALP historically had 16% FO yield with 12% HSFO. Recently at a sell-side event, the CEO confirmed that as of November, GALP has switched almost all its HSFO output to IMO compliant fuel. They achieved this by a combination of running more sweet crude, optimizing refinery operations, and blending different products to make IMO compliant fuel.

"Our main takeaway from the lunch was the flexibility of Galp's refinery with the company having been able to shift almost all of its High Sulfur Fuel Oil (HSFO) production to an IMO compliant alternative. This softens the impact of the sell-off of HSFO cracks over 4Q". (Barclays Note on December 10th, 2019)

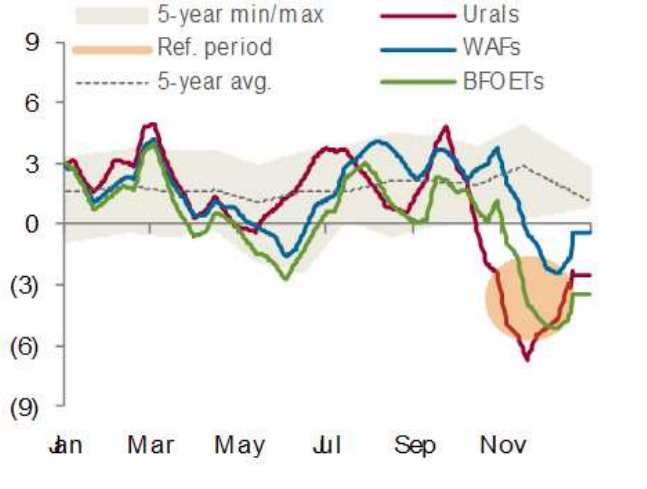
The company then reaffirmed its 4Q refining margin guidance of above 4 $/barrel. If we assumed GALP produced 12% HSFO in November and December, its margins would come close to 1.5 $/b in 4Q19. But running 12% VLSFO in November and December would put the margin at 4.5 $/b. **This is a huge difference for a refiner that was considered an "IMO Loser"**.

Other companies in Europe with simple refining configurations have stated similar plans: most notably, Greek companies such as Motor Oil Hellas (MOH GA) and Hellenic Petroleum (ELPE GA) that have around 12% and 22% HSFO yield respectively.

GALP margin with different fuel oil sulfur scenarios, $/barrel



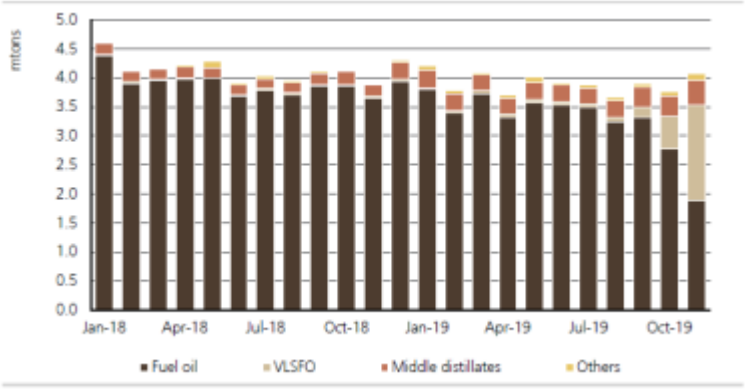
North West Europe simple indicator margins, $/barrel



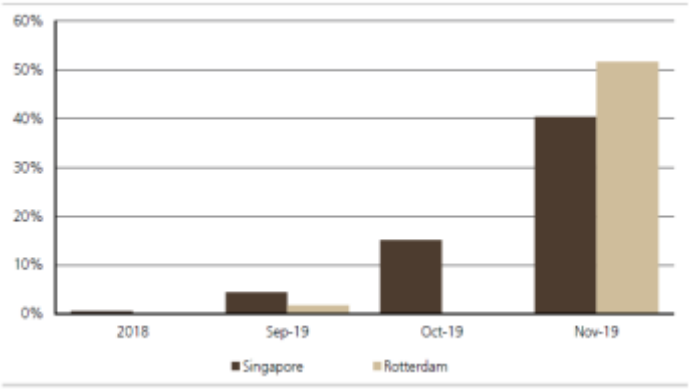
Transition has largely happened. November and early December was the inflection point.

November data from ports of Singapore and Rotterdam shows that share of VLSFO in total bunker fuel sales at these ports were 40% and 52% - a significant jump from October and September levels.

Monthly fuel sales at Port of Singapore



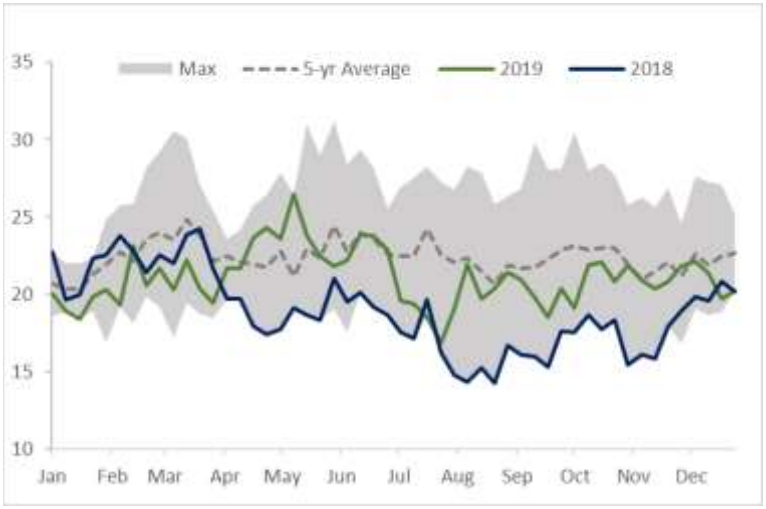
VLSFO as a % of total fuel sales in Singapore and Rotterdam



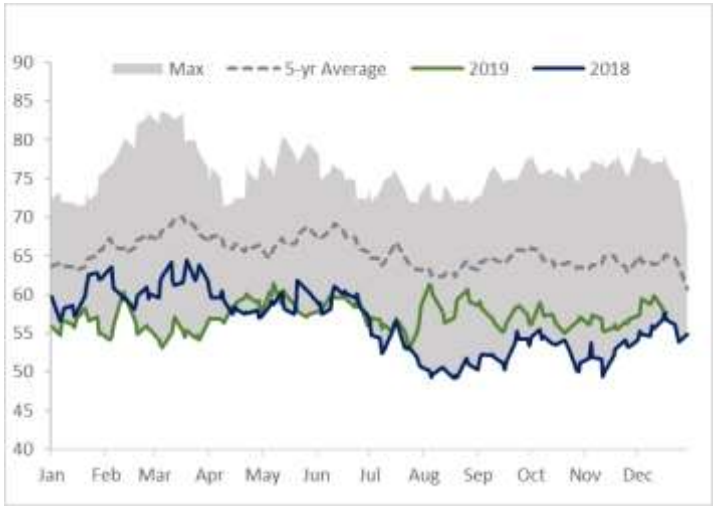
Moreover, we are NOT seeing HSFO builds in areas that are supposed to be most oversupplied. In fact, we are at 5-yr seasonal lows in the US, Singapore, and ARA, and **the latest weekly data showed draws in Singapore and ARA**. This clearly indicates that the excess HSFO supply has disappeared or is already absorbed into other sectors.

While gasoline storage is at 5-yr seasonal highs, with distillate inventories at the lower end of 5-yr seasonal range.

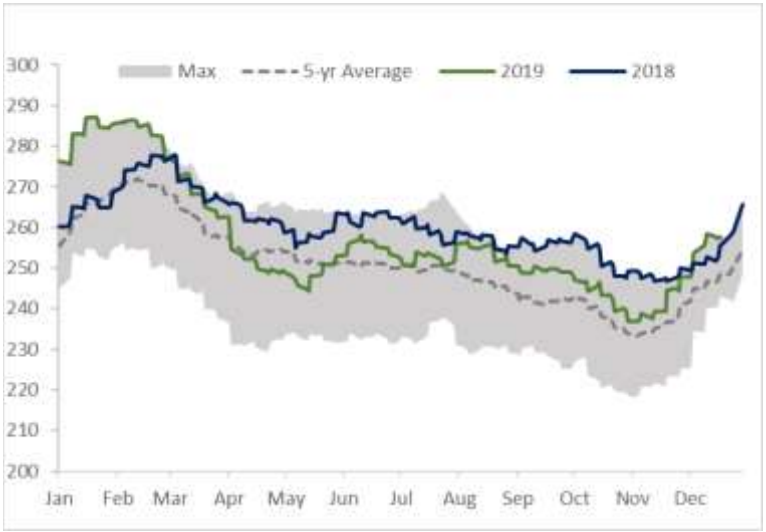
Singapore fuel oil inventories, mmb



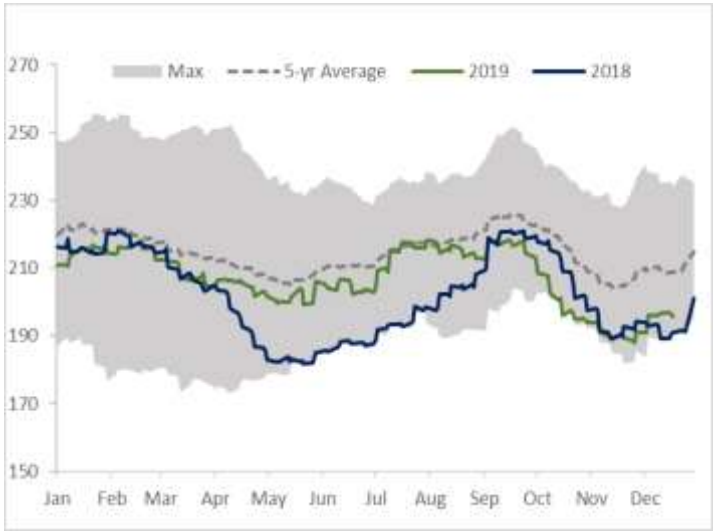
US + Singapore + ARA fuel oil inventories, mmb



US + Singapore + ARA gasoline inventories, mmb



US + Singapore + ARA distillates inventories, mmb



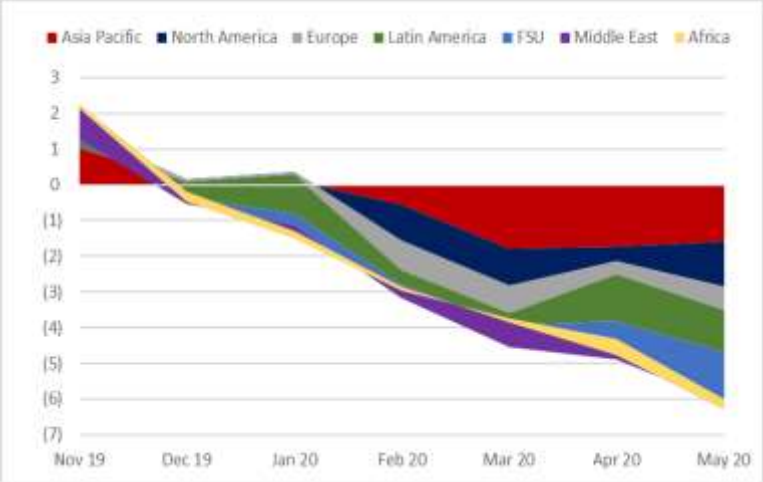
The evidence suggests that simple refiners have significantly reduced HSFO output and continue to operate with broadly positive margins. **I believe most indicator margins provided by consultants and data providers are simply wrong. They assume the same HSFO yield in their margins and no longer represent the physical market.**

Lower turnarounds and new capacity mean more supplies

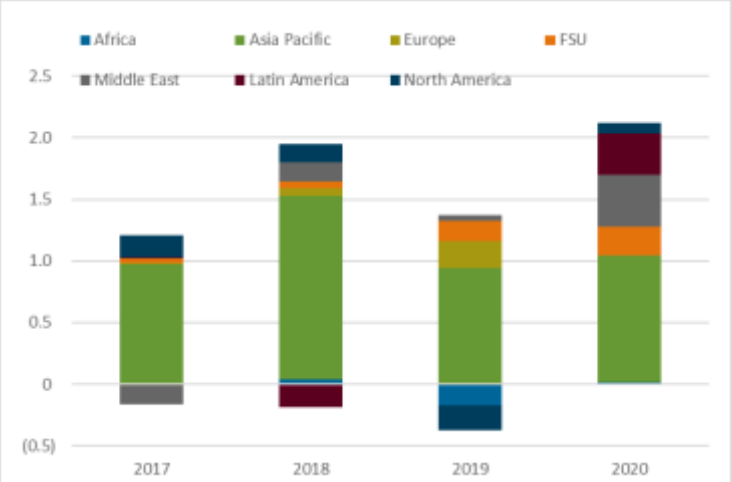
Planned turnarounds announced by companies worldwide suggest 1Q 2020 will have significantly lighter turnarounds globally, particularly in Asia. Global turnarounds are expected to be 3-4 mmbd lower Y/Y.

Additionally, 2 mmbd of refining capacity is scheduled to come online in 2020 primarily supplied by Jazan in Saudi Arabia (0.42 mmbd) and Hengli / Zhejiang (ZPC) in China (0.76 mmbd). Chinese crude import quotas released this week are in line with these assumptions.

Global CDU turnarounds YoY change, mmbd



Global refining capacity additions, mmbd

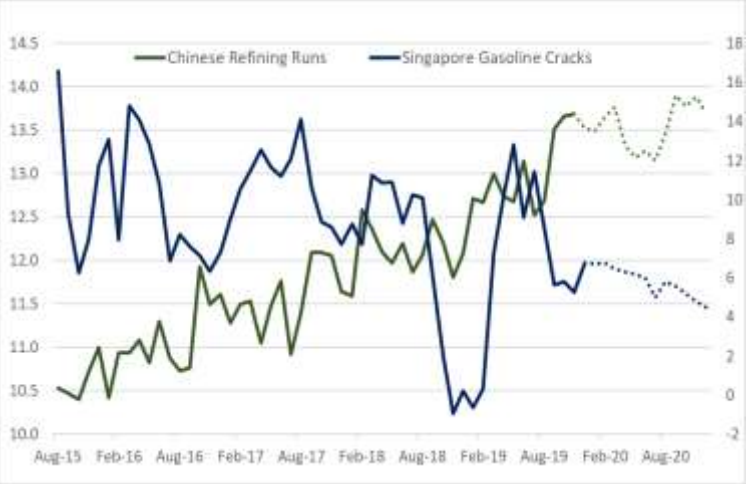


Product exports from China will heavily weigh on Asian margins, as Chinese excess production often floods S-Oil's markets. China exported a record 0.48 mmbd of gasoline in October. With close to 0.72 mmbd of new refining capacity coming online in China, and moderate growth expectation in China gasoline demand, it is hard to justify higher gasoline cracks in 2020 than what the forward curves suggest.

China gasoline exports (LHS) vs Asian gasoline cracks (RHS), mmbd, $/barrel

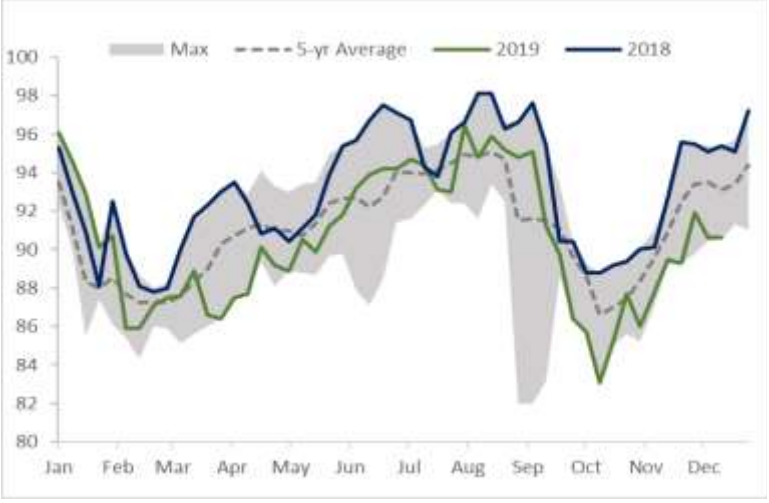


China refinery runs (LHS) vs Asian gasoline cracks (RHS), mmbd, $/barrel

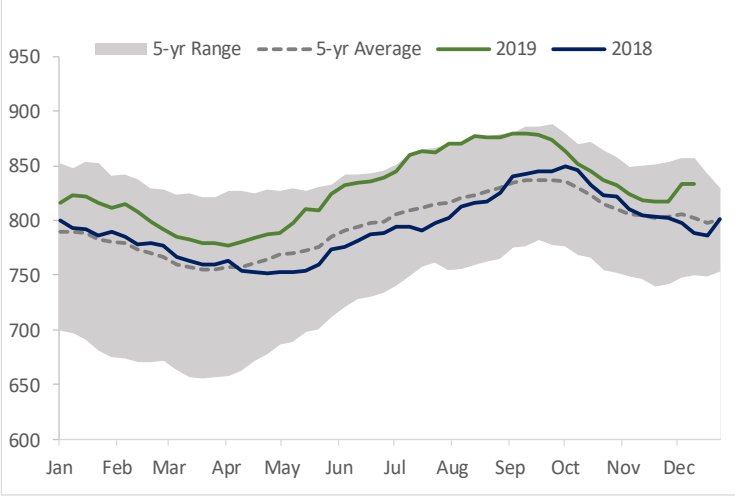


Last but not least, U.S. refineries have been running at 5-yr low seasonal rates. **That is another 2 mmbd of supply as they ramp up**. Meanwhile total U.S. oil products inventories are growing to seasonal highs.

US refinery rtilization rate, %



US total oil products inventories, mmb



Lower turnarounds and new capacity also support my thesis that cracks in 2020 will not see significant movements because of IMO.

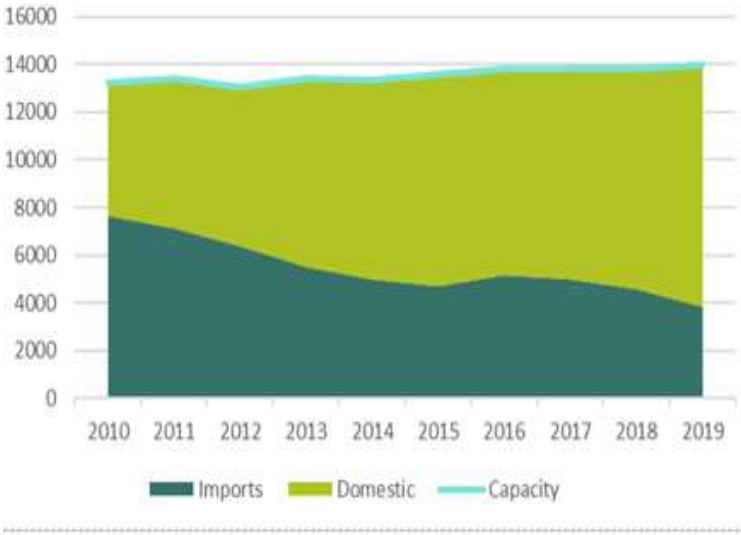
Why sour diffs will not widen significantly?

As I explained above, I believe most refiners have found ways to solve the sulfur problem without a massive shift in crude diet. But even if we see a much bigger change in crude slates, I still believe sour crude diffs will not widen significantly.

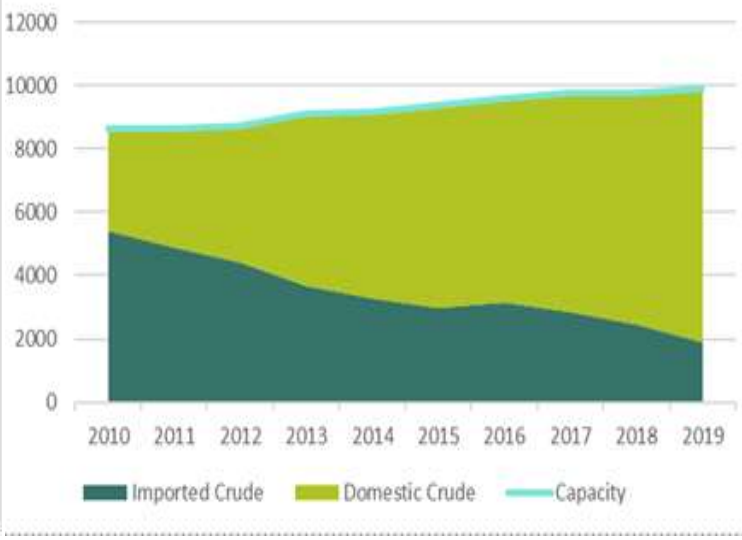
The easy way out would be to blame OPEC. The additional 0.5 mmbd cuts announced in December will certainly tighten sour crude balances even more, but there is another factor that has been completely overlooked: **The US refining system and infrastructure bottlenecks.**

EIA numbers suggest U.S. coastal refiners have the capacity to absorb up to 3 mmbd of sour crudes, which will put a floor on sour crudes and prevent a blowout. We can see below how since 2010, U.S. coastal refineries have switched nearly 3 mmbd of imported crude with domestic crudes and are therefore running much lighter and sweater feedstocks. The majority of change has happened in PADD 3.

PADD 1,3,5 (coastal) refining runs, mmbd



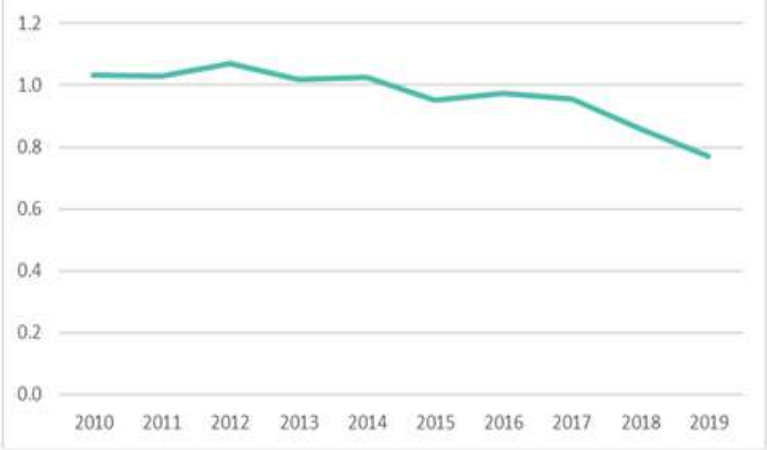
PADD 3 (Gulf Coast) refining runs, mmbd



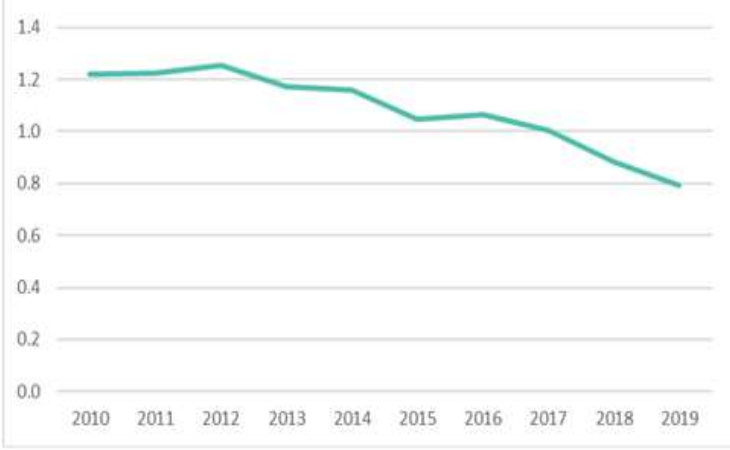
While it doesn't look like coastal refiners have a lot of sulfur delta to make up for going from 0.8% to 1%, but almost all of this is PADD 3 related where the crude slates being run are much lighter and much less sulfur than 10 years ago **while the complexity index has increased and so has the refineries' ability to run higher sulfur crudes**.

If we assume IMO will reverse this trend and substitute 3 mmbd of light-sweet domestic crude with for instance Arab Medium coming into PADD 3, we will go back to the 1.1% sulfur and API of 33 that we had in 2010. **PADD 3 refiners can essentially run at least 3 mmbd of medium sours and some smaller number of heavier sour crudes without changing anything in the refinery system**, or even more, given that refining system is more complex today than in 2010.

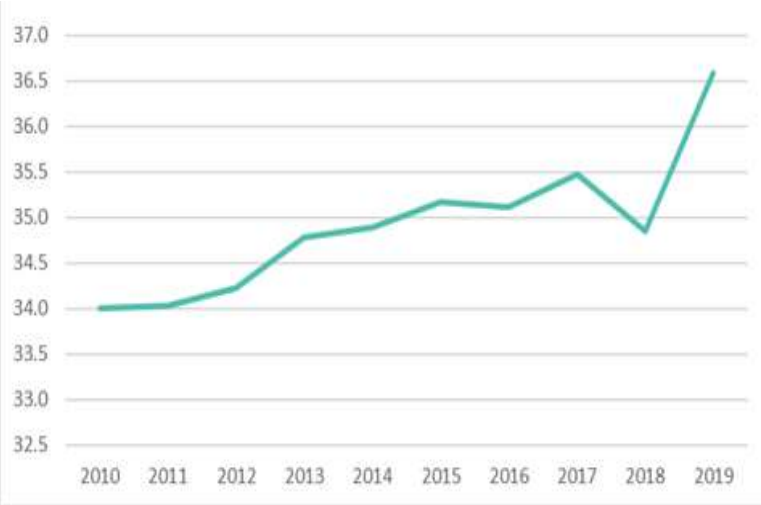
Weighted crude sulfur content for PADD 1,3,5 (coastal) refiners



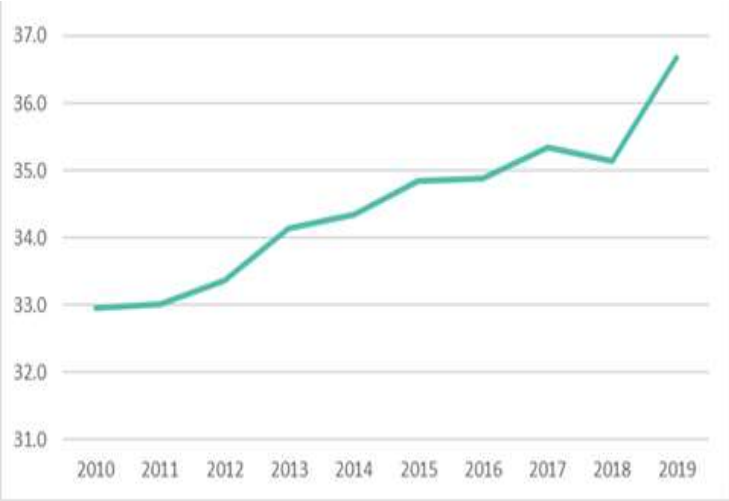
Weighted crude sulfur content for PADD 3 (Gulf Coast) refiners



Weighted crude API for PADD 1,3,5 (coastal) refiners



Weighted crude API for PADD 3 (Gulf Coast) refiners

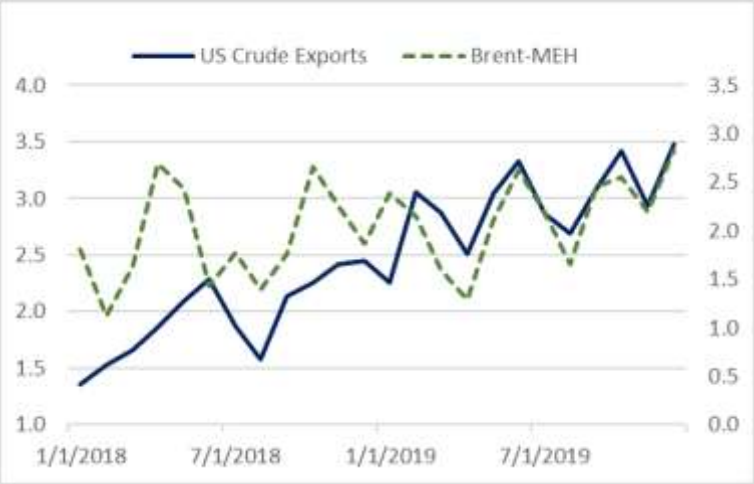


But where is the floor for sour diffs?

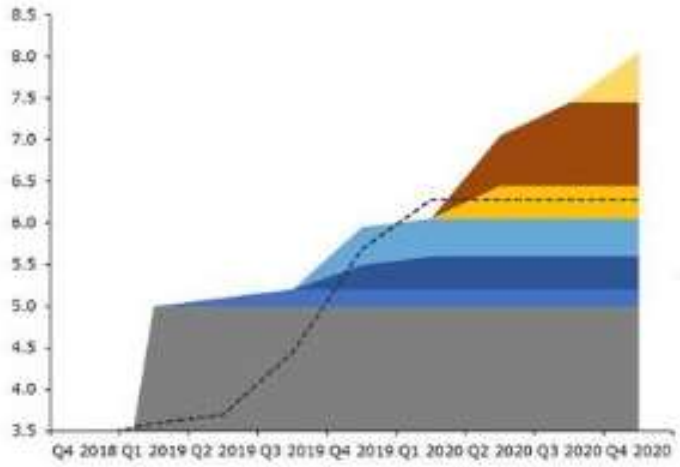
Let's assume we are in the consensus IMO world where all the simple refineries cannot operate without shifting to sweet crude and these grades are in extremely high demand. **This is a key assumption for this analysis, otherwise why would sweet crudes rally?**

US crude export capacity and domestic infrastructure bottlenecks are now significantly resolved. The key reason behind the change in feedstock for US refiners was the weakness in domestic light/sweet grades driven by rapidly growing production, pipeline bottlenecks, and lack of export capacity/permission. That completely changed this year with all the new Permian pipelines and new export capacity in multiple ports, such as Corpus Christi. Despite significantly narrower Brent-WTI and Brent-MEH spreads, US exports continue to climb to record levels. **(MEH and WTI are essentially the same quality.)**

US exports (LHS) vs Brent - MEH spread (RHS), mmbd, $/b



USGS export capacity, mmbd



I must say that I am using Brent as bridge for this analysis, since both Dubai and MEH prices are closely linked to Brent, and there is no high-quality data available for me to directly do run the math for MEH – Dubai as I can for MEH – Brent.

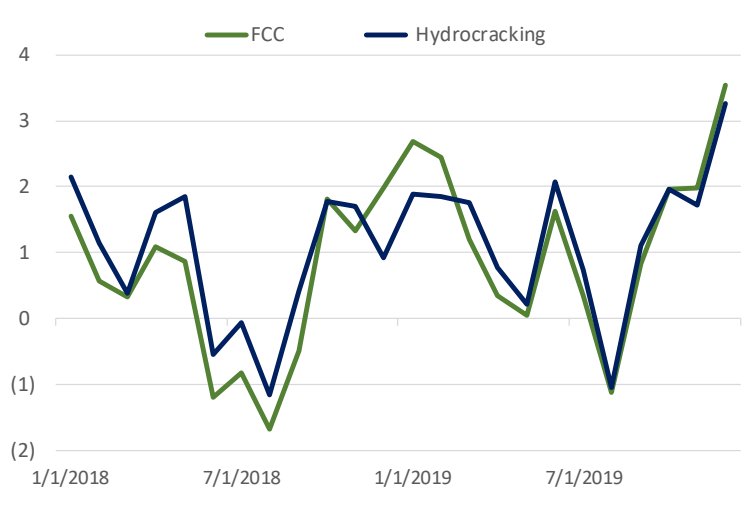
Sour crudes like Dubai will need to price lower than coastal sweet crudes (such as MEH for Gulf Coast refiners). VLO, MPC, PSX, and PBF refineries in the Gulf Coast run around 1 mmbd of MEH crude. Accounting for other refineries in the region, the total MEH linked crude runs is significantly higher given MEH is the main benchmark for light domestic crudes in the USGC.

MEH is lighter (~5 higher API) and sweeter (~0.06% less sulfur) than Brent (Brent is made up of four different crudes: Brent, Forties, Oseberg and Ekofisk). This means for a simple refinery outside the US that will run these crudes to lower HSFO and sulfur output, **MEH should have a quality premium to average Brent crude.** Premium should be even higher for Forties crude that has over 0.82% sulfur content.

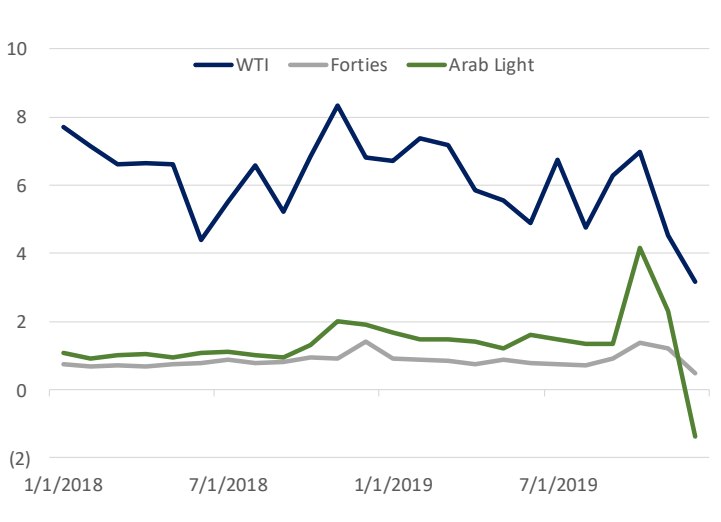
To determine the quality premium, I look at European ex-shipping refining margin spreads between WTI and average of Forties and Oseberg to best represent the Brent basket. As shown below, WTI quality premium over Forties and Oseberg should be around $3. Dubai basket also includes different crudes (Oman etc.), but on average has 1.5% more sulfur than Brent basket.

The VLSFO - HSFO spread and the sulfur difference between Dubai and Brent suggests that **MEH (WTI) has at least 4 $/b quality premium over Dubai (in the IMO consensus world).**

WTI margin premium to Forties and Oseberg in Europe (ex-shipping), $/b



European margins for WTI, Forties and Oseberg (including shipping), $/b



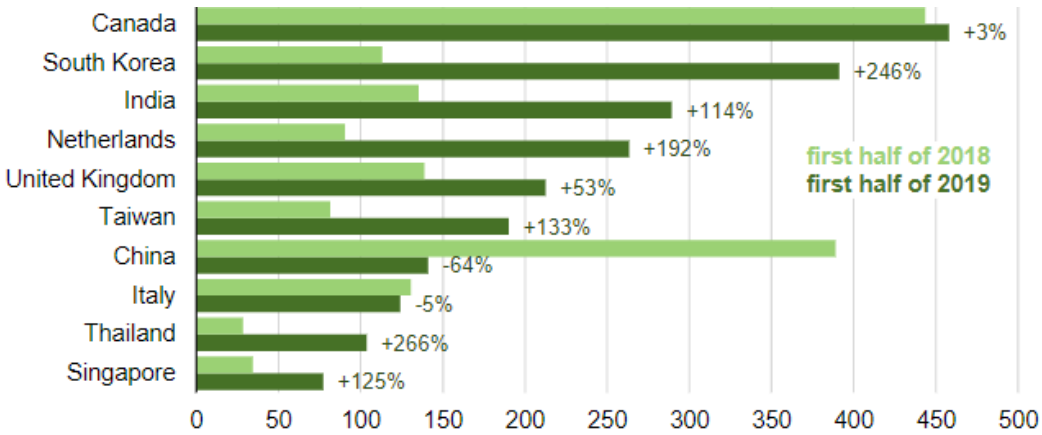
My calculations show if Brent – Dubai increases by $2 to 3 $/b, Dubai will price MEH out of USGC and demand switch will happen. Again, these calculations are under the assumption that most simple refiners will only survive IMO by running sweet crude. (I already undermined that assumption earlier. This is to find the floor in case I am wrong.)

The table below shows that the **absolute floor for Dubai-Brent is $3**, which would be a big disappointment for S-Oil's earnings next year.

Brent – Dubai implied floor calculation, $/b

	MEH	Dubai	Dubai - MEH	Comments
Current Spread	0	2	2	To simplify the spread for this calculation, I assume MEH price is $0 and Dubai $2
Value & Cost Adjustments				Assuming **Brent - MEH remains constant**
+ MEH Quality Premium	4			Simple refiners must switch to sweet or lose money, and sweet crude will be in high demand
- MEH Shipping Cost	(2)			MEH must get to markets **where quality premium will be realized** (Asia/Europe etc.)
+ Dubai Shipping Cost to USGC		2		Landed cost for a USGC refiner
= Intrinsic Relative Value	**2**	**4**	**2**	Even under **consensus IMO scenario** Dubai diffs should only widen by $2 to replace MEH in USGC
Brent - Dubai Floor	**3**			

Top destinations for US crude exports, kbd



Refining earnings

In a year with significantly lower TARs and potentially significant capacity addition, I assume products cracks will not be much higher than last year. **This means S-Oil's refining EBITDA will be 23% below consensus next year.**

Chems earnings

Weakness in chemicals earnings have been well telegraphed and are expected. S-Oil's earnings in chemicals will remain under pressure into 2021. Particularly the weakness in PX margins due to heavy capacity buildout will weigh on S-Oil's earnings. My supply/demand model below suggests utilization has to fall to 74% next year.

This is in line with the recent announcement from JX that intends to lower PX utilization in some plants to 60% starting January in response to the weak margin environment. JX has capacity of 3.6 mtpa (including 1 mtpa in a JV with SK), while S-Oil's PX capacity is 1.9 mtpa.

Most analysts are assuming 95%+ utilization for 2020 for S-Oil. This means there is room for even more negative earnings revision in the chems segment.

Assuming S-Oil will still run 15% above industry average (based on 2014-2018 5-yr average) at 90%, **there is still 7% downside risk to chemicals earnings.**

PX S/D (LHS) and utilization forecast (RHS), mtpa, %



Incremental PX S/D, mtpa



Lubes earnings

I am assuming modest recovery in Lubes margins given HSFO is a key feedstock. I expect lubes EBITDA to be 5% above the street in 2020.

Risks

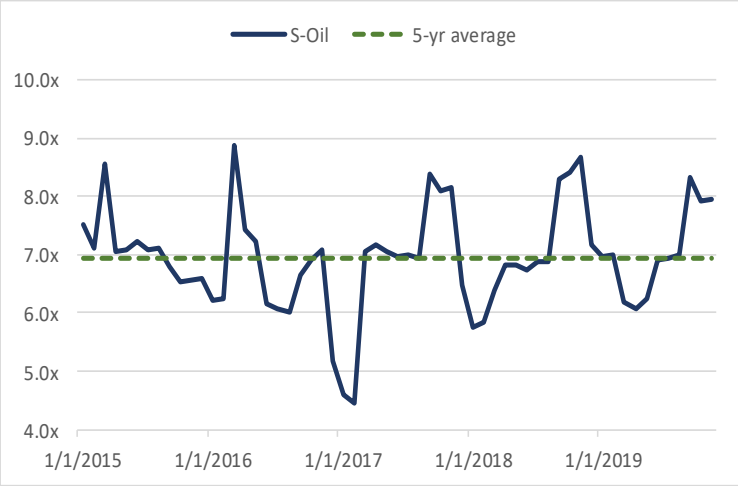
- **VLSFO blend quality**. If ships experience technical problems with blends, shippers are likely to panic and rapidly switch to MGO.
- **OPEC** could begin to roll back some of its product cuts by March. Adding back sour supplies.
- **Political breakthrough with Iran or Venezuela**. Flooding the market with sours and heavies. But more medium term.
- **HSFO Carriage ban** will go into effect March 1st. Ships without scrubbers cannot carry HSFO. This will increase compliance rate.
- **Major outages** at competitor refineries or petchem plants.
- **Delays in plant and refinery startups.** Very common risk.
- **Significant macro recovery** and a much stronger pull on demand in all sectors.
- **FX** moves in USD/KRW directly impact S-Oil earnings

Valuation

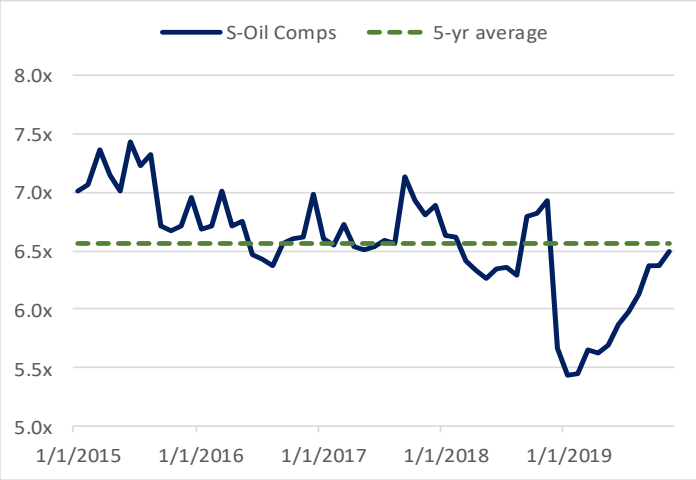
S-Oil is currently trading 1x above its 5-yr average forward EV/EBITDA multiple at 7.9x. While comps are just in line with 5-yr average. Also, S-Oil's multiple relative to group is now 25% above the 5-yr average, while the stock is still seeing negative revisions and has a lot of uncertainty around near to medium term earnings outlook. Hence, I am using the 5-yr average forward multiple of 7x for my valuation.

Bull case for S-Oil is for refining margins to improve with higher cracks and wider diffs. If Brent - Dubai widens to $5, with a 7.5x multiple, price target will be W106,622 which is 11% above current price. Higher PX price and utilization will add more upside. (see sensitivity table)

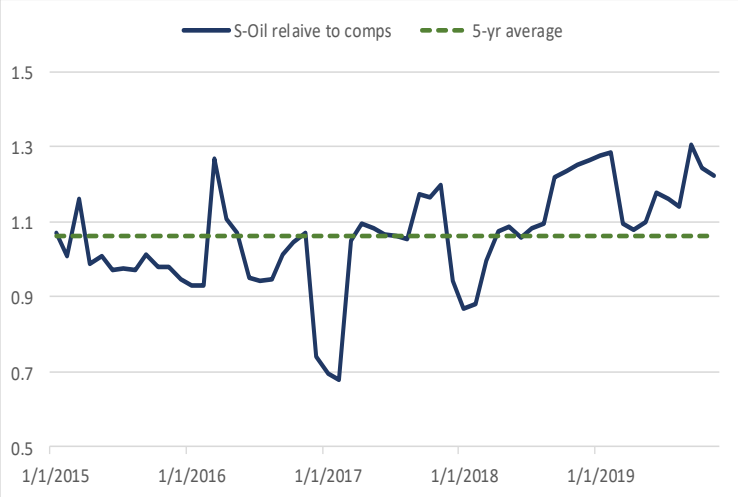
S-Oil next 12m EV/EBITDA multiple



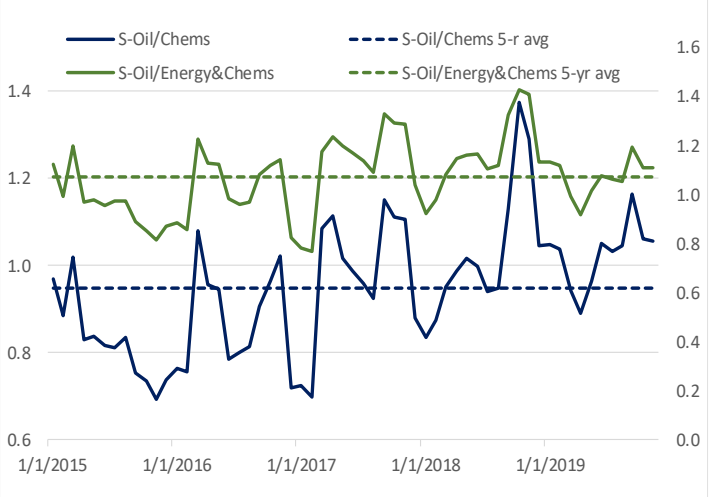
S-Oil comps next 12m EV/EBITDA multiple



S-Oil multiple relative to comps group



S-Oil multiple relative to KOSPI Chems (LHS) & KOSPI Energy&Chems (RHS) Indices



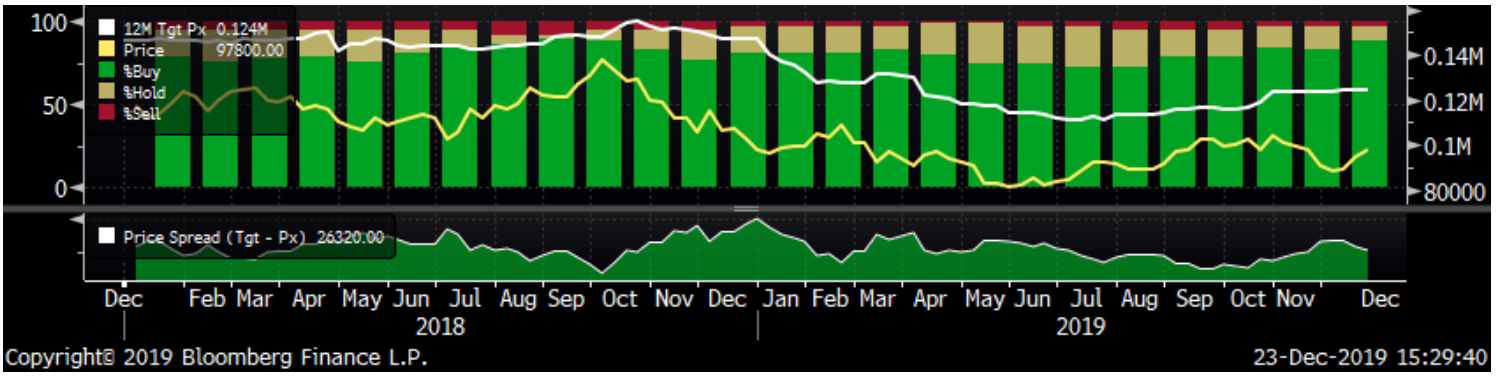
S-Oil 2020 Consensus Earnings Revision



2020 Consensus EBITDA vs EV/EBITDA



S-Oil Analyst Rating, 88% buy and only 1 sell



Stock performance sensitivity to refining margins

EV/EBITDA	Refining Margin $6.5	$7.0	$7.5	$8.0	$8.5
8.0x	(12%)	(1%)	11%	22%	33%
7.5x	(21%)	(10%)	1%	11%	22%
7.0x	(30%)	(20%)	(9%)	1%	11%
6.5x	(38%)	(29%)	(20%)	(10%)	(1%)
6.0x	(47%)	(38%)	(30%)	(21%)	(12%)

Stock performance sensitivity to PX utilization rate

EV/EBITDA	PX Utilization Rates 85%	90%	95%	100%	105%
8.0x	7%	9%	12%	15%	17%
7.5x	(3%)	(1%)	2%	4%	7%
7.0x	(13%)	(11%)	(8%)	(6%)	(4%)
6.5x	(23%)	(21%)	(18%)	(16%)	(14%)
6.0x	(33%)	(31%)	(29%)	(27%)	(24%)

S-Oil financial outlook summary

S-Oil: 010950 KS		2019	2020	2021
EBITDA	Bn Won	1,252	1,920	1,843
Vs Consensus(%)		-	*(13%)*	*(17%)*
Refining		-	*(23%)*	*(26%)*
Chemicals		-	*(7%)*	*(11%)*
Lubes		-	*5%*	*4%*
EPS	K Won	3.1	8.4	7.9
Vs Consensus (%)		-	*(12%)*	*(18%)*
FCF	Bn Won	209	631	681
Vs Consensus (%)		-	*(13%)*	*(8%)*
FCF Yield		2%	8%	9%
Dividend Yield		1%	4%	3%
Shares Outstanding	mm	113	113	113
Market Cap	Bn Won	10,819	7,790	7,653
Net Debt	Bn Won	6,587	5,640	5,238
Preferred Equity	Bn Won	10	10	10
Enterprise Value	Bn Won	17,416	13,440	12,902
Forward EV/EBITDA		9.1x	7.3x	-
Target EV/EBITDA		-	7.0x	7.0x
Target Price	Won	-	69,191	67,978
Upside (Downside)		-	***(28%)***	***(29%)***

S-Oil Comps

	2020 EV/EBITDA	Mkt Cap (m USD)
S-OIL CORP	7.9x	8,339
JXTG HOLDINGS IN	6.3x	13,260
SK INNOVATION	6.4x	10,762
IDEMITSU KOSAN C	6.1x	7,533
THAI OIL PCL	6.2x	4,221
LOTTE CHEMICAL C	4.8x	6,037
FORMOSA PETRO	11.6x	27,904
LYONDELLBASELL-A	7.0x	27,975
PHILLIPS 66	7.4x	43,943
VALERO ENERGY	6.1x	34,221
GALP ENERGIA	5.8x	12,609
REPSOL SA	4.3x	22,341
Mean	**6.5x**	**19,164**