C-MACC

Chemical Market Analysis & Consulting Company

July 26, 2020

Products Mentioned
- *Brent, Natural Gas*
- *Naphtha, Ethane,*
- *Ethylene, Propylene,*
- *Polyethylene, PVC,*
- *Silicones, Polysilicon*
- *Methanol, EVA,*
- *Surfactants, Polyols,*
- *Polypropylene,*
- *Polyurethanes, MEG*
- *Polycarbonates,*
- *MTBE*

Companies Mentioned
- *TPC Group, CP Chem*
- *LyondellBasell, Dow*
- *ExxonMobil, BHP*
- *Methanex, Elkem*
- *Westlake, Shintech*
- *OxyChem, Formosa*
- *Celanese, Perstorp*
- *Chevron, Noble*
- *Givaudan, GCL-Poly*
- *Occidental. DuPont*
- *Advanced Petro., BP*
- *OQ Chem, Wacker*
- *Momentive, Daicel*
- *Lotte, Coca-Cola*
- *Akzo, PPG, Axalta*
- *Avient, Stepan, BASF*
- *ADNOC, Worley*
- *Evonik, Solvay*
- *Indorama, Grace*
- *Sumitomo, Arkema*
- *Lanxess, Honeywell*
- *Norsk Hydro, S-Oil*
- *Albemarle, Winpak*
- *Air Products, Total*
- *Asian Paints, Ineos*
- *PetroChina, Sinopec*
- *Sasol, Covestro*
- *Croda, Sika, Repsol*
- *Braskem, Huntsman*
- *Eastman, JM, ASIX*
- *PTTGCA, Trinseo*
- *Orion, Olin, Kraton*
- *Cabot, HB Fuller*
- *IFF, DSM, Ecolab*
- *Linde, RPM, CCMP*
- *Entregris, Quaker*
- *Sherwin Williams*

C-MACC Sunday Recap

Unchecked Optimism, Without Reason and Action, Can Upset

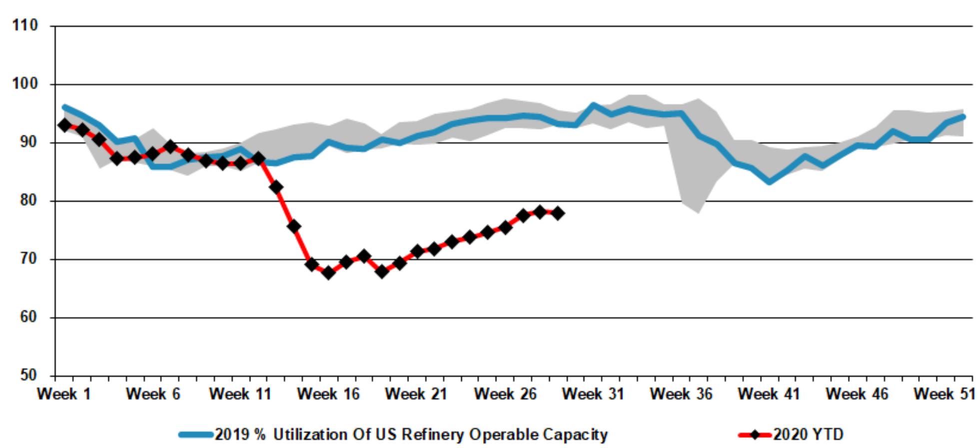
- **We were concerned that overly cautious 2Q guidance would lead to overly optimistic 3Q and 2H20 expectations, and that appears to be the case so far. The nature of our business model has us working with as close to real-time data as you can get – this is not the time to rely on stale models or forecasts.**
- **We do not have a crystal ball and there are no guarantees that our view of the market will be correct, but many of our near-term expectations are emerging**
- **We would hope that companies reporting in the weeks to come take a more measured approach when setting expectations – we are reminded of 4Q 2019 calls – those reporting early dismissed COVID – those reporting later had more information and were far more conservative.**

This week we discussed 20 Chemical and related products and 80 Companies

For those who are not full-service clients and focused on specific areas of the chemical market or topics, our research reports can be sorted by keyword or topic and purchased individually on our website. www.c-macc.com

Last Sunday we noted the likelihood that part of the strength in the US propylene market was driven by continued suppressed levels of output from US refineries and reiterated our concern that refinery rates may start to slow if the COVID resurgence began to impact driving patterns again. For the chart of the week we show exactly that concern, as US refining rates have plateaued, well below normal and the last data point is a step down. We do not show this in an attempt to gloat over being right on one data point – we believe that the stalling of refining rates is consistent with what should be an inevitable economic response to greater concerns over the virus spread and more restrictions that are being placed on "normal" activity by the many US states that have a COVID resurgence problem. We addressed this broader concern in detail in the Perspectives piece that is linked here and summarized below.

Exhibit 1: Not only have refining rates fallen in the US, but there are reports suggesting that movements in gasoline inventories point to more significant drops in real gasoline demand than suggested by the stalling refining rate. Note that the air travel recovery in the US is also showing signs of stalling



Source: Bloomberg and C-MACC Analysis

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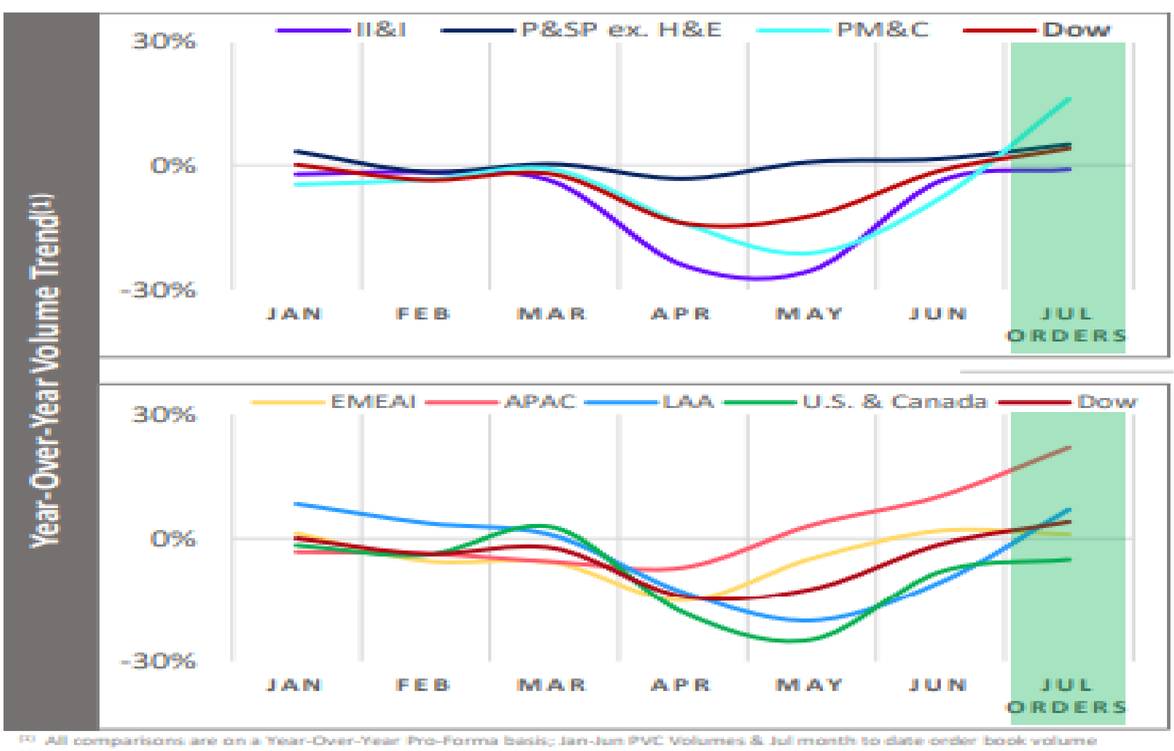
In our Monday Perspectives piece, we wrote about the potential confluence of a second dip in economic growth and an overly optimistic chemical sector coming out of Q2 earnings. The optimism comes from a better than expected second quarter for many and pricing strength near-term, especially for polyethylene but also for propylene. Our concern is that the optimism is driven by a number of one-off factors that could vanish quickly:

1. An overly cautious (but appropriate) initial view of Q2, leading to production cut back decisions, extended turnarounds, and an effort to reduce inventories. We believe that these measures overshot.
2. A quick economic rebound in China driving demand for chemicals and plastics well above what was expected when local producers elected to take production cuts and extend turnarounds
    a. This resulted in a run up in China pricing in June and opened a wide arbitrage for every region to send product to China – both the US and Europe sent ethylene to China.
3. The strength in China pricing combined with stable US costs and lower US production to tighten the polyethylene market and drive expectations of higher pricing in the US through July and August.
    a. But the China markets have already turned – in response to the step up in supply and we see the potential for a significant reversal of pricing, especially if there is stalled economic growth.

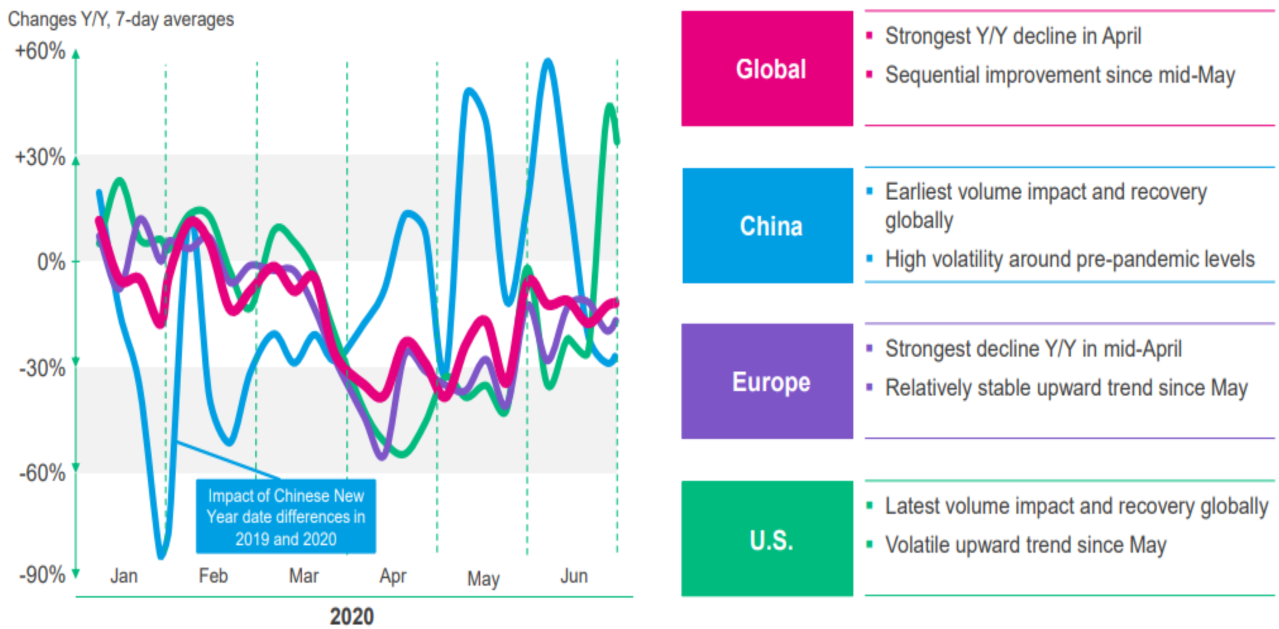
But so far our concerns have not been shared by those reporting earnings and we see the sector falling into the trap of reading too much into better than expected 2Q numbers and current momentum and not paying enough attention to the economic indicators and the COVID concerns. In Exhibit 2 we are concerned that the better July trends shown by Dow are a "head fake". In Exhibit 3, we show Covestro's year on year volume trends, which not only show significant volatility but also make very little sense given the way various economies are moving and suggest swings in inventory and more volatility to come.

Exhibit 2: Dow volume/order books reflect strength in July that is led higher by APAC and LAA, while Europe and EMEAI reflect much more moderated improvement. Also, see business segment level detail for Dow on slide 8 in LINK that forecasts a greater relative durable goods improvement/rebound in 3Q relative to the Plastics business. We also flag management's estimates for business growth relative to GDP on slide 9



Source: Dow

Exhibit 3: Covestro core YoY volume chart shows falling momentum in China in June relative to late May/early June, a gradual improvement in European conditions relative to late May and a spike higher in US volume from mid-June. Despite some regional spikes, the global growth trend has moderated



Source: Covestro

We repeat the paragraph we included last week. "***The implications of the rapidly rising COVID cases in the US are being avoided by many politicians, but what they may think or say will likely become irrelevant. People's behavior will be driven by how safe they feel, and for the moment, every day there is reason to feel less safe. Fewer schools are likely to open in August and September than expected today and fewer companies will expect employees to come back to the office if they can work from home. The drop in gasoline demand that we saw in March and April could easily happen again – and gasoline could remain weak for the rest of the year. We already know that jet fuel demand is going to be drag on refining for some time. Weak propylene demand could be overshadowed by weaker supply – hard to call".*** In the last 7 days we have seen

- A pivot in Washington and an admission that things are worsening
- Multiple school districts in the more impacted states, delaying "in class" tuition into September and offering parents the choice of in class versus online teaching for the whole semester.
- Further restrictions on gathering
- More and more mask mandates
- And as discussed above – lower demand for transport fuels. Keeping schools out and employees at home will keep gasoline demand well below normal.

None of this bodes well for second half consumer spending and the propylene dynamic puts the greater risk, in our view, on the buyers of propylene (or propylene derivatives where prices are linked to propylene) selling into consumer discretionary markets. In our Perspective piece we highlighted the stretched valuations on Sherwin Williams, and PPG, but Axalta, while much cheaper, is also at risk.

Headline Summary

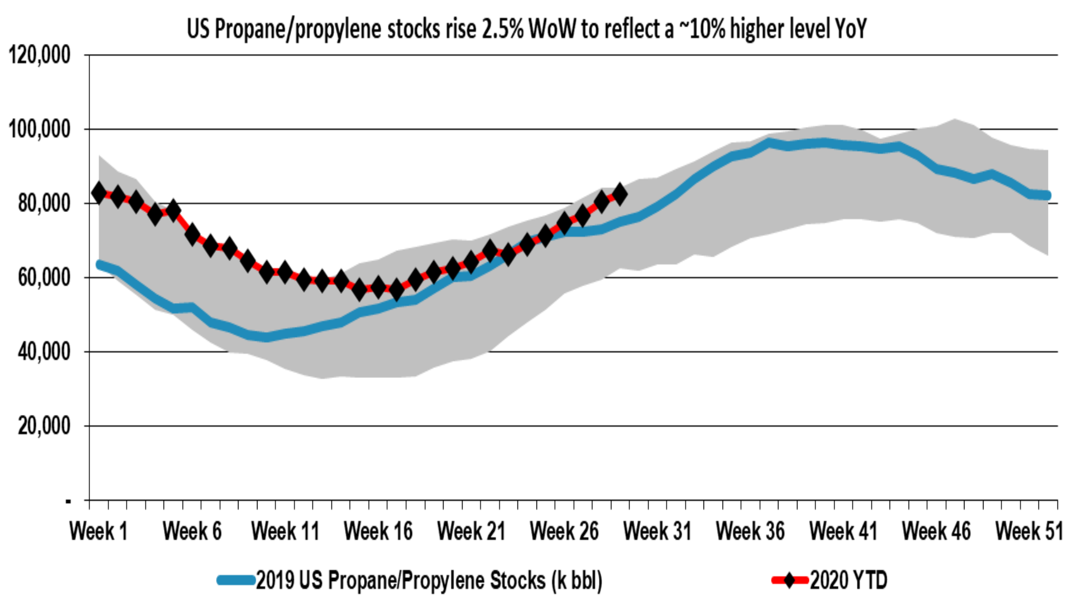
1. The Second Time Around - Chevron's $13 Billion Noble Energy Deal Signals Return Of Upstream M&A – see LINK and also our report discussing our upstream strategic thoughts in LINK.

One of our pushbacks on a major recovery in oil prices, aside from the potential for prolonged constrained demand, has been the idea of further cost reductions, especially in the Permian, with some of that coming from consolidation. The Chevron/Noble deal is likely to be only the first of what should be major consolidation in the Permian, leaving only a few (much larger) players – able to spread overheads over a much larger base and apply acquired know-how to existing best practices. Some of these cost reductions may be incremental, but they will all add up to drive break-even pricing lower over time. We expect a lot more consolidation moves – but sellers are going to have to be willing to take equity (as Noble did), as the oil price uncertainty makes cash offers very unlikely. A stock deal is much better the potential drift into Chapter 11.

2. **China's LPG demand** is expected to rise in August, boosted by chemical sector use as producers take advantage of LPG discounts to naphtha, as well as a spate of new projects starting up – see in LINK.
3. Rising naphtha stocks in Europe compete with cheaper LPG for petrochemicals producers' choice.

We group these together as they address what appears to be an anomaly with the propylene data – Exhibit 4 shows an increase in US propane/propylene inventories, and a level that is close to recent historic peaks. This only fits with the apparent very tight US propylene market if most of this inventory is propane – which we suspect it is. US propane exports should accelerate from here and prices will likely move to create that export arbitrage – this may provide a period of some of the highest PDH margins the US has seen recently .

Exhibit 4: US propane/propylene inventories increased WoW and reflect a higher level YoY – we link the higher inventories to downstream concerns with possible future upstream production/operating rates



Source: Bloomberg & C-MACC Analysis

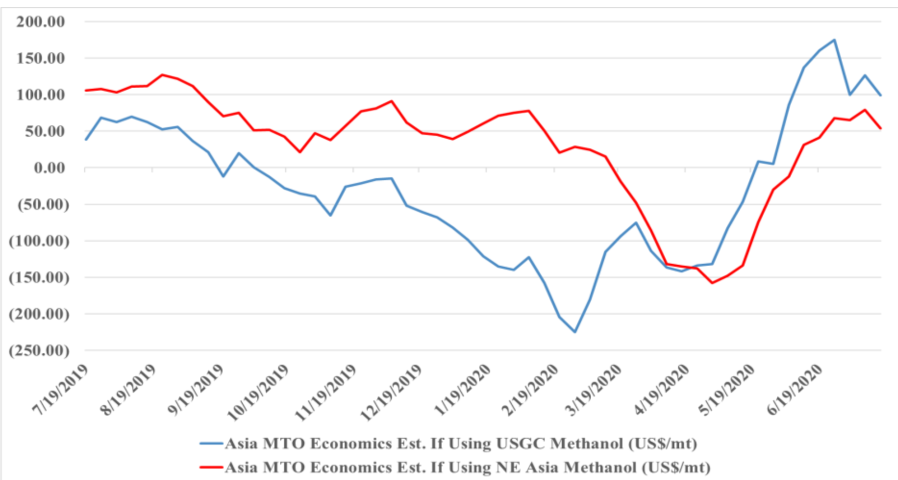
4. US refineries see fewer breakdowns in pandemic-cut production

Changing topics completely, we note an article suggesting that running a refinery at lower than design rates results in fewer unexpected problems. This is true with chemical plants and plenty of other processes and machinery – you are more likely to blow the engine on your car at 7,000 rpm than at 3,000 rpm! But process plants like refineries and chemical plants can develop issues at lower rates that only show up when you push the accelerator again. Any ethylene plant operator will tell you that steady-state is best, accidents and issues that result in downtime happen most often during changes in operations – shutdows, start-ups, and changes in operating rates – especially on the way up. The extreme ethylene bubble of 1988/1989 was in part aided by a number of plants that had been running at 80% of capacity for several years, objecting violently to attempts to push production higher. If refineries stay at low rates for a while, which we expect, there may be some unexpected bumps if and when they are required to run harder again.

Other Highlights – Week of July 20th

The only other highlight that we would make from last week is to point out a disagreement on MTO economics. In its quarterly report, Dow cited uneconomic China MTO margins as a reason why ethylene should remain tight. Dow was using data from a well known consultant in this analysis – we think the data was stale as our analysis shows that MTO has been in the money in China for weeks and at least one other market commentator agrees with us.

Exhibit 5: Trends depicted by our NE Asia MTO profit model are less optimistic than ICIS [LINK] (but apparently more optimistic than IHS/DOW), and we note avg. PE prices in Asia reflect a US$60/mt discount to ethylene and PP sits at a US$0.06/lb premium to avg. PGP including conversion costs. Combined, this suggests net integrated profit spreads from methanol into the key derivatives have been in the money during the past several weeks.



Source: Bloomberg & C-MACC Estimates, July 2020

The week of July 20th – click on the day or the report title for a link to the full report on our website

Monday – Weekly Margin and Pricing Analysis

Global Chemical Update – Noise Turns to Signals

- **Three items signal higher global ethylene cracker operating rates ahead: 1) Butadiene springs to life; 2) ethylene derivative values rise (e.g. polyethylene rose in all major regions) despite lower ethylene values globally WoW; and 3) Feedstock spreads (e.g. Asia naphtha/US ethane) were unmoved WoW.**
- **These items unite to suggest future headwinds for US ethylene derivative exporters as they should drive a reversal in pricing strength narrowing export netbacks. Today, however, there is still plenty of incentive to export**
- **Methanol values tick higher on a global scale WoW while USGC natural gas values fell – this is a plus for US producers/exporters, such as Methanex. Despite the forward curve we believe that natural gas will remain weak.**

Tuesday

The China Demand Pull, Cost Curve Developments & More USGC Polymer Price Hike Nominations

- **Improving China demand has been noted across multiple 2Q20 reports and we discuss 2H20 optimism for its strength relative to other markets.**
- **US Natural Gas values reflect weakness relative to Brent Crude WoW (a potential plus for US petrochemical margins), and we find both domestic spot and export support for a US PVC contract uptick MoM in July, but less support for an August hike.**
- **Other items today range from multiple material sector corporate reports (BHP, Celanese, Elkem, Perstorp, Givaudan, etc.), to Asia positives for spot methanol, to several global production issues worth consideration.**

Wednesday

China PE Falls WoW; Feedstocks Still Favor US Ethylene Production; Corporate Updates Roll In

- **China polyethylene spot markets are loosening to start the week, while domestic US markets remain tight and USGC ethane takes a step lower.**
- **US Natural Gas values reflect weakness relative to Brent Crude WoW (a plus for US petrochemical margins), and we highlight this ratio relative to two major global cracker cash costs and hydrocarbon gas liquid trends.**
- **Other items today range from multiple material sector corporate reports of note (Avient, Stepan, AkzoNobel, ADNOC, Worley, etc.), to LPG taking share from Naphtha in Asia, to a few thoughts on methanol as a bunker fuel.**

Thursday

Optimistic 2H20 Views Keep Street Expectations Elevated; US PGP Jumps (Again); Other Items

- **We comment on multiple 2Q20 sector reports (e.g. Dow, Covestro, Croda, Sika and Repsol), discuss Dow and Covestro volume trends, and examine 2H outlooks from multiple chemical producers. Expectations remain optimistic.**
- **US polymer grade propylene (PGP) spot values reflect strength mid-week, and we flag the WoW downtick in US refinery operating rates as supportive. PGP spot (& contract) strength poses as a 2H20 margin headwind for buyers.**
- **Other items today range from the PTTGCA move to add NGL storage in the NE US, a move upwards in the Asia naphtha crack as demand returns, and US MTBE moving to Mexico by rail due to other logistical issues.**

Friday

Approach High Expectations With Caution

- **We advise sector corporates to set more conservative 2H20 expectations than we have seen to date rather than paint a bullish outlook that might require threading-a-needle during a storm. Global polyethylene in particular is likely to be much more amply supplied in 2H20 than it appears today and the chemical industry may just be in the eye of the storm.**

- **We provide a few thoughts following the Dow 2Q20 earnings call yesterday and discuss more corporate releases (Honeywell, Winpak, S-Oil, Asian Paints & Air Products) and relevant takeaways for peer producers and suppliers.**
- **Other items today range from showcasing our estimated NE Asia MTO profit trends and HDPE price differences between the US and Asia, to the Sasol LDPE restart and Iranian PE flows, to sustainable wool packaging.**

July 20 – Perspectives

This is all going to end badly?

- **Since April 1st 2020, we have seen something quite unprecedented – almost all chemical companies have shown positive stock performance, while almost all have seen significant negative revisions for 2021 earnings, pushing up forward multiples for many companies at levels we have not seen previously.**
- **While this is against a backdrop of a broader market which seems to shrug off every piece of negative news (despite us being "Far from out of the woods") and follows a first quarter of significant stock declines, we see trouble ahead.**
- **A bubble of packaging-based demand coupled with outages in Asia have inflated prices over the past 8 weeks against a backdrop of ever worsening economic projections. Many chemical companies have done better in Q2 versus very low expectations and this has inflated hopes for the future, in our view.**
- **The conclusions discussed in this report suggest selling almost all stocks in the chemical space, especially on any 2Q20 earnings report/update driven strength.**

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