Notes at the Margin

PKVerleger LLC

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RECOVERY IN OIL USE LAGS THE ECONOMY

The oil industry suffered several dramatic losses during the last week of May 2021. The victory of environmental plaintiffs in a Dutch lawsuit over Shell and Engine No. 1's success in replacing two directors of ExxonMobil were the ones noted everywhere. Less conspicuously, data on US personal consumption spending released Friday, May 28, warn that US gasoline use has failed to increase at the rate many forecasters expected. The slower than anticipated recovery confirms the information conveyed by excess returns to storage for gasoline: markets are in balance even with lower production. Put simply, circumstances in US gasoline markets may have changed permanently.

As explained below, vehicle miles traveled (VMT), which formerly accrued at the same rate as gasoline sales when measured as the percentage change from the same month in the prior year, now increase by three to four percentage points more than gasoline sales from the same month one year earlier or, as is the case recently, decrease by three to four percentage points less than gasoline decreases. The latter difference has held steady from September 2020 through March 2021. The conclusion, should the variation remain, is that gasoline sales have peaked and are now in slow decline.

The US Bureau of Economic Analysis released data on constant dollar motor fuel consumption for April 2021 on May 28. On the same day, the US Energy Information Administration published data on gasoline supplied. Most who track oil markets focus on the EIA data. However, as noted here many times, the EIA data are plagued by issues tied to collection methods and accuracy. The agency's numbers are so terrible that the St. Louis Federal Reserve Bank, which manages the widely used FRED database, refuses to carry the information. Apparently, the officials there consider statistics published by China more reliable than those offered by the EIA.

Despite the EIA data's shortcomings, most corporate planners, company officials, reporters, and traders rely on it. Those numbers show a ten-percent rise in motor gasoline supplied between February and March 2021. March use was put at 8.577 million barrels per day. The increase will be welcomed by all associated with the industry.

The change looks less robust, though, when compared to March 2019 consumption. March 2020 use was, after all, sharply depressed by the Covid-19 lockdown. Compared to March 2019, March 2021 use was down more than two percent. Given historical growth rates, consumption remained roughly six percent lower in March 2021 than what would have been reported had the nation not been forced to shut down.

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The BEA data offer a similar view. The agency obtains information on consumer expenditures on gasoline as part of its massive data collection effort to calculate the nation's GDP. The agency's statisticians developed their approach such that US economic activity could be described as accurately as possible.

The BEA data for March and April show an increase in March 2021 gasoline consumption of 8.8 percent over March 2020 and forty-seven percent for April 2021 consumption over April 2020. The April numbers should please everyone.

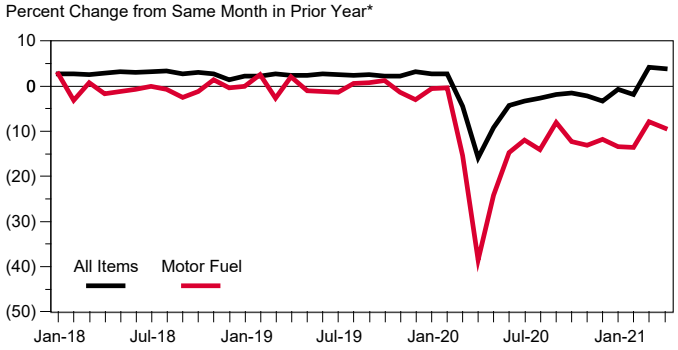
However, the picture today is substantially different from that of 2019. March 2021 consumption was 7.8 percent below March 2019. April 2021 consumption, as estimated by the EIA, was 9.4 percent below 2019 use.

OPIS' daily statistics confirm these numbers. Through April and now May, OPIS has reported that sales volumes at the stations it surveys are running more than ten percent below 2019 volumes.

Digging into the BEA data, a more troubling picture for oil emerges when one compares the growth in personal consumption expenditures in constant dollars to personal consumption spending on motor fuels. One finds the beginning of a strong recovery in the former data. In contrast, motor fuel purchases (primarily gasoline) by consumers are lagging.

The contrast is shown in Figure 1. This graph shows the year-over-year percentage change in personal consumption expenditures on all items and the change in personal consumption of motor fuels from January 2018 to April 2021.

Figure 1
Y-o-Y Change in Total US Personal Spending on All Items vs. Y-o-Y Change in Spending on Motor Fuels, 2018 to 2021



*Note: 2019 months used for comparison with February through April 2021.
Source: US BEA; PKVerleger LLC.

These data show that constant-dollar consumption expenditures on all items in March and April 2021 rose by four percent relative to the same months in 2019. Spending on motor fuel, though, was down by nine percent. Through April, the data show no substantive recovery in gasoline use.

The data through April also illustrate that US consumers continued to limit the share of their spending allocated to motor fuels. Figure 2 (page 3) traces this percentage from 2010 to April of this year.

The data presented in Figures 1 and 2 lead to an important question: *Are consumers driving less, or are consumers altering their consumption patterns to use less gasoline while driving*

the same distance? Data published by the US Department of Transportation on VMT provide a tentative answer. It seems that consumers are cutting gasoline use while driving roughly the same amount.

Figure 3 illustrates this development. The graph compares the year-over-year change in VMT to the same shift in gasoline supplied as reported by the US Department of Energy from January 2014 to March 2021.

From a distance, there appears to be little difference in the two data series. Gasoline use and VMT seem to move together. However, a closer examination reveals an interesting result. From 2014 to August 2020, VMT rose 0.7 percent more each month than gasoline use. The variation, though, was statistically insignificant, meaning the two series were essentially identical.

Figure 2
Share of US Consumer Total Expenditures Allocated to Motor Fuels, 2010 to 2021

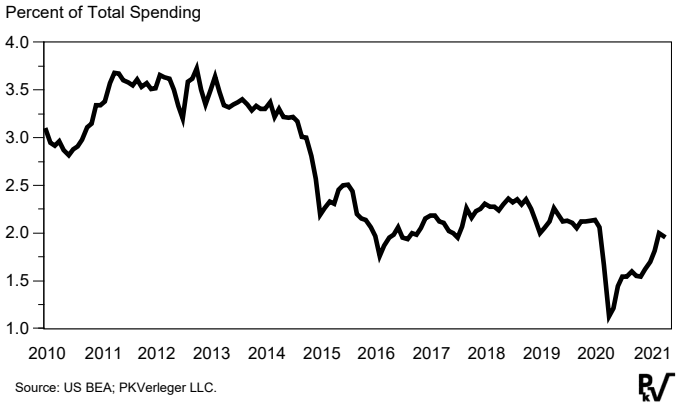
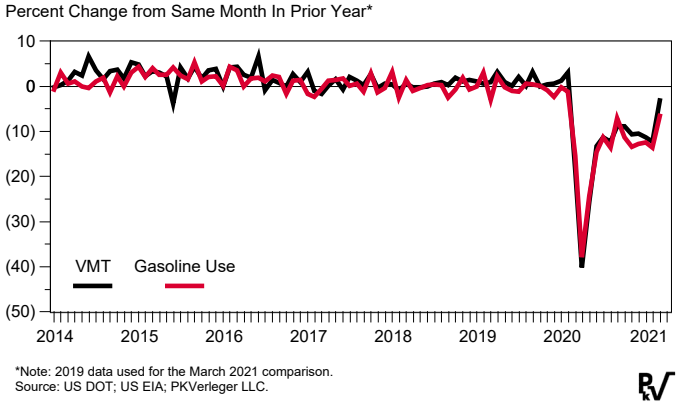


Figure 3
Y-o-Y Change in US VMT, Not Seasonally Adjusted, vs. Y-o-Y Change in Gasoline Consumption, 2014 to 2021



However, the year-over-year percentage change in VMT exceeded the year-over-year change in gasoline supplied reported by the DOE by 2.2 percentage points from September 2020 to March 2021 (with March 2021 compared to March 2019), a statistically significant difference.

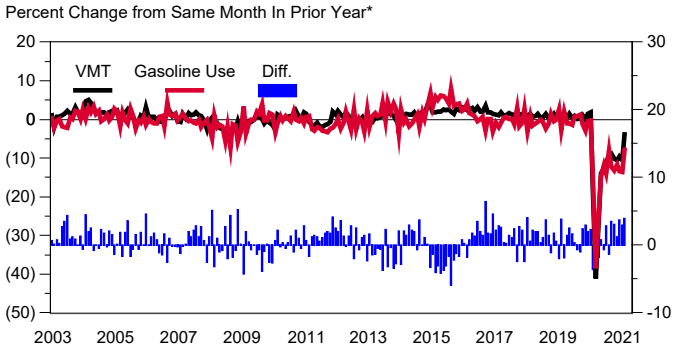
The data for the last six months suggest that something may have shifted and that less gasoline is being used per mile traveled. This finding could have important implications.

The same pattern can be seen in the data on gasoline consumption reported by the BEA (constant dollar expenditures on motor fuels) compared to VMT. Here, one can compare the

seasonally adjusted VMT data published by the Department of Transportation to the data on gasoline consumption, which are also seasonally adjusted. (We note that the DOT data pass the St. Louis Federal Reserve's quality tests and thus are included in the FRED database, unlike the DOE data.)

Figure 4 compares the year-over-year percentage change in VMT by month as published by the DOT to the year-over-year change in constant dollar consumer expenditures on motor fuels reported by the BEA. The comparison begins in 2003 and ends in March 2021. Again, the percentage change for March 2021 is measured against March 2019.

Figure 4
Y-o-Y Change in US VMT, Seasonally Adjusted, vs. Y-o-Y Change in Gasoline Consumption, 2003 to 2021



*Note: 2019 data used for the March 2021 comparison.
Source: US DOT; US BEA; PKVerleger LLC.

As with the DOE comparison, the percentage change in VMT exceeds the percentage change in fuel consumption by 0.6 percentage points on average to September 2020. That difference is also statistically insignificant. As before, though, the gap between the percentage change in VMT and motor fuel consumption widens to three percentage points between September 2020 and March 2021, which is also statistically significant (the standard error is one percentage point).

The difference is graphed at the bottom of Figure 4. A wedge may be developing, although it is difficult to draw long-run conclusions from six months of data.

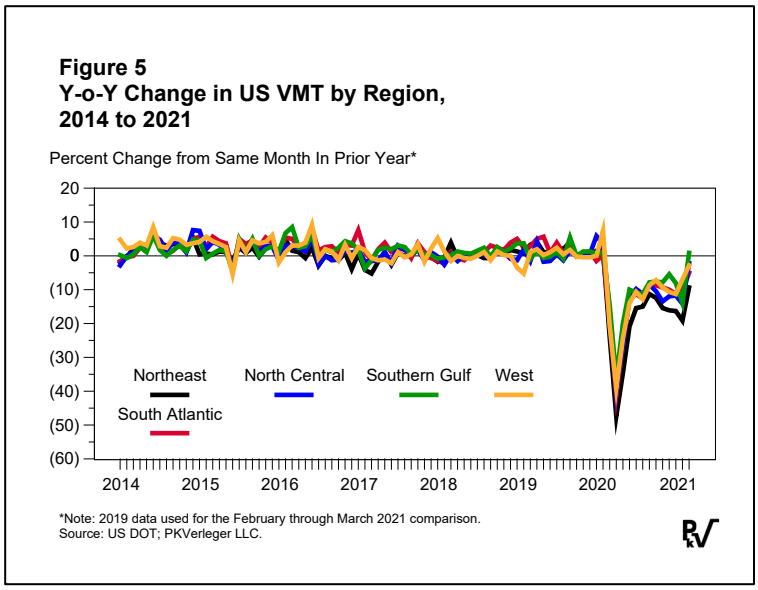
Several explanations can be offered for the divergence.

> The data on traffic volume may have been distorted by the drop in traffic. The DOT uses a sampling technique to measure VMT based on a limited number of traffic monitors. Changes in travel patterns due to the pandemic could have systematically altered the computations in ways that have not been identified yet.
>
> Drivers could be achieving better fuel economy due to using newer, more efficient vehicles or because traffic is less congested.
>
> The increased penetration of electric and hybrid vehicles may have boosted the overall fuel economy.

While the cause of the change is not clear yet, it appears from the analyses underlying Figures 3 and 4 that US gasoline consumption may have been reduced by three to four percent relative to VMT during the worst of the pandemic and as it winds down in the United States. If this is the case—and more evidence is certainly required—the data point to the likelihood

of US motor fuel use having peaked and now being in a gradual decline. There have been very few occasions when VMT has increased from the prior year by more than three percent more than gasoline use.

The consumption decline will vary by region, though. The DOT provides VMT data by state. Figure 5 shows the change in VMT from the same month in five areas: the Northeast, the South Atlantic, the North Central, the Southern Gulf, and the West.



One can observe from the regional data that the US Northeast lags the rest of the country. March 2021 VMT for the region, which extends to Washington, DC, was nine percent lower than in March 2019.

The South Atlantic, which extends to Florida, was down by four percent, half the decline in the Northeast. The Midwest (North Central) was down by only two percent, while the Southern Gulf was *up* by one percent. The western states were down three percent.

The regional variations explain some of the differences in market conditions. For years, we have followed the price spread between prompt and forward gasoline delivered in Los Angeles. At the end of May 2019, prompt gasoline sold for a premium of more than ten cents per gallon in the volatile LA market. Friday, the price spread was two cents per gallon even though stocks were reportedly low.

The message from the market in the West, then, is that travel is still lower than two years ago. Furthermore, consumption is probably four or five percent lower than in 2019, given the factors causing the wedge between VMT and gasoline sales growth.

The IEA's Potential "Oil Chip" Shortage

In its recently released *Net Zero by 2050* report, the International Energy Agency asserts that no further investment in new exploration for oil and gas is required. In its view, the current capacity is adequate. As *The Wall Street Journal* notes,

> Investment in new fossil-fuel supply projects must immediately cease if the world is going to slash net carbon emissions to zero by 2050, the International Energy Agency said Tuesday.

> The Paris-based energy watchdog also said in a report that hitting the net-zero target would require a rapid acceleration of wind and solar capacity and a halt in sales of combustion-engine cars by 2035.
>
> The IEA said hitting net-zero emissions is crucial in limiting the rise in global temperatures to 1.5 degrees Celsius above preindustrial levels—a goal laid out in the 2015 Paris climate agreement.[1]

Environmentalists have hailed the IEA's assessment. Analysts such as BP's economists, in contrast, have warned that underinvestment in oil and gas over the next decade could cause severe fuel shortages.

In addressing the road to a net-zero world in 2050, BP has looked carefully at the world requirement for additional investment in oil and gas development. The firm noted that more investment would be needed before 2035 but also that some projects would have to be shut before the end of their useful lives.

> The relative resilience of oil demand during the first half of the Outlook in Net Zero implies that several trillions of US dollars of new oil investment is needed over the next 15 years or so to ensure adequate supplies. But the pace at which oil demand falls in the second half of Net Zero is faster than the natural decline rate of production, implying that some of these investments by 2050 may not be fully utilized and so may become uneconomic.[2]

This detail seems to have escaped the IEA authors, possibly because training in economics seems to disqualify individuals from working for the agency. For example, the Energy Intelligence Group interviewed one of the IEA study's principal authors, Christophe McGlade.[3] McGlade seems well trained in energy issues, which means he is a good energy "accountant." He can count barrels, Btu, or joules. He can write about energy issues, as one finds on the IEA website.[4] Nothing he has written, however, seems to reflect an understanding of how markets work.

In contrast, the BP forecast was prepared under the direction of Spencer Dale, the company's chief economist. Before joining BP, Dale was chief economist at the Bank of England. He clearly understands markets, which is evident in the BP report.

We note this difference and emphasize it because the IEA authors and the agency's executive director appear blissfully ignorant of the economic crisis that might occur if their prescription for fossil fuel investment is followed. We back up this criticism with two graphs.

Figure 6 (page 7) traces US auto production in thousands of units per month from January 1993 to the present. These data are collected and published by the BEA. Note that the

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[1] *David Hodari, "Stop New Oil Investments to Hit Net-Zero Emissions, IEA Says,"* The Wall Street Journal*, May 18, 2021 [https://tinyurl.com/f86rvsw].*

[2] *BP,* Energy Outlook 2020 Edition *[https://tinyurl.com/b4a3j3xh], p. 137.*

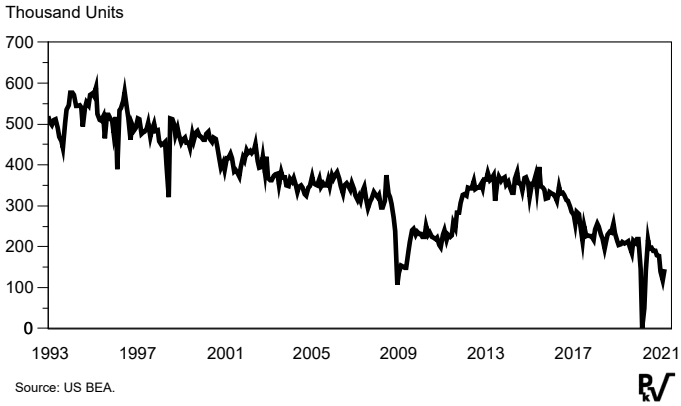
[3] *Rafiq Latta, "Q&A: The Thinking Behind IEA's Net-Zero Report,"* International Oil Daily*, May 28, 2021 [https://tinyurl.com/8axfd8].*

[4] *"Christophe McGlade, WEO Senior Analyst," IEA [https://tinyurl.com/fwk6akr2].*

number of units produced in March 2021 was only slightly higher than the number made in January 2009, when disruptions from the Great Recession were at their peak.

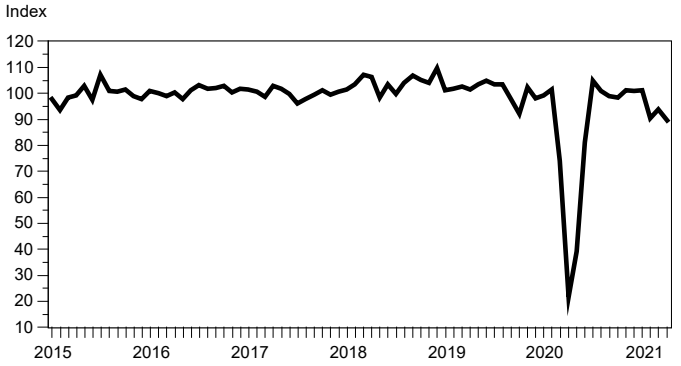
Figure 7 tracks the Federal Reserve Board's index of industrial production of autos and auto parts from 2015 through April 2021. In the latter month, output was more than ten percent below the peak.

Figure 6
US Domestic Auto Production, Weekly Data, Seasonally Adjusted, 1993 to 2021



Source: US BEA.

Figure 7
Index of US Industrial Production of Autos and Auto Parts, 2015 to 2021



Source: US Federal Reserve.

Production is down not because demand for autos is depressed. Consumers, especially car rental companies, are desperate to buy new cars. Unfortunately, the automakers cannot manufacture them because they cannot get the computer chips needed for each vehicle.

Automakers have fallen victim to the global computer chip shortage. Bloomberg identified three causes of the chip problem in February:

> The stay-at-home era: This pushed chip demand beyond levels projected before the pandemic. Lockdowns spurred growth in sales of laptops to the highest in a decade. Home-networking gear, webcams and monitors were snapped up as office work moved out of the office, and Chromebooks were hot as "school" left the school.
>
> Stockpiling: PC makers began warning about tight supplies early in 2020. Then around mid-year, Huawei Technologies Co.—a Chinese smartphone maker that also dominates the global market for 5G networking gear—began building up inventory to ensure it could survive U.S. sanctions that were set to cut it off from its primary suppliers. Other companies followed suit, hoping to grab share from Huawei, and

> China's imports of chips climbed to almost $380 billion in 2020, up from $330 billion the previous year.
>
> Disasters: A bitter February cold snap in Texas led to power outages that shut semiconductor plants clustered around Austin; it was late March before Samsung's facilities there were back to normal. A plant in Japan run by Renesas Electronics Corp., a major provider of automotive chips, was damaged by fire in March, disrupting production for weeks. And Taiwan suffered its worst drought in decades, raising concerns that manufacturing could be affected.[5]

The Bloomberg authors add that the auto industry compounded its problems by drastically cutting orders early in the pandemic, expecting a drop in sales. When they attempted to boost orders, they were "turned away because chipmakers were stretched to supply computing and smartphone giants such as Apple Inc." An article in *The Economist* in January offered this comment:

> In the 20th century the world's biggest economic choke-point involved oil being shipped through the Strait of Hormuz. Soon it will be silicon etched in a few technology parks in South Korea and Taiwan.[6]

Recently, *The Economist* extended its analysis, warning that the chip shortage would last for some time, in part because the industry is cyclical:

> "The most important thing [to recognize]," says Malcolm Penn, who runs Future Horizons, a chip-industry consultancy, "is that shortages are a natural part of the industry." Chipmaking, he says, is a good example of what economists call a "pork-cycle" business, named for the regular swings between under- and over-supply first analyzed in American pork markets in the 1920s. As with pigs, the supply of chips cannot quickly react to changes in demand. Capacity was tight even before the pandemic, says Mr. Penn, pointing out that investment by chipmakers in factory equipment has been below its long-term average for many years.[7]

To remedy the problem, some chipmakers are planning to invest in new plants:

> Taiwan Semiconductor Manufacturing Company, the world's biggest contract chipmaker, plans to spend $30bn on new capacity this year alone. Samsung Electronics and Intel, two other giants, have penciled in $28bn and $20bn respectively; second-tier chipmakers are ramping up spending too.

Contrast these plans with ExxonMobil's current intentions. Before the shareholder vote, the company had pared its capital expenditure plans for 2021 to $16 billion, around half that of Taiwan Semiconductor and Samsung.[8]

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[5] *Debby Wu, Sohee Kim, and Ian King, "Why the World is Short of Computer Chips, and Why It Matters," Bloomberg, April 26, 2021 [https://tinyurl.com/p43rvna8].*

[6] *"The struggle over chips enters a new phase,"* The Economist*, January 23, 2021 [https://tinyurl.com/b3rawe8].*

[7] *"The global chip shortage is here for some time,"* The Economist*, May 22, 2021 [https://tinyurl.com/9feentnv],*

[8] *Casey Merriman, "Humbled Exxon Seeks Redemption," World Energy Opinion, Energy Intelligence, April 2021 [https://tinyurl.com/488rhef3].*

Pressure from the IEA and other national and international organizations threaten to discourage or force cuts in oil and gas exploration investments. The reductions could create a "chip-like" situation where global oil demand in the late 2020s or early 2030s cannot be met, just as chip demand today cannot be satisfied.

The potential shortage would also occur when the oilfield service industry's capacity has been decimated by the lack of expenditures on drilling. Again, the analogy from the chip industry is almost perfect. *The Economist* explains that constraints in the chip sector relate to the supply of equipment used to make them:

> Many cheap, workaday parts are made in older factories designed to process silicon wafers that are 200mm in diameter, or even smaller. (These days 300mm is the standard.) Efforts to boost capacity are stymied by the fact that few toolmakers still make the old-style machines.

The IEA scenario calling for no new investment in fossil fuel exploration and production lays the foundation for a market disruption, one that could exceed the current microchip shortage in magnitude. Such a disruption would boost oil prices. Producers could worsen the situation by limiting their output.

The IEA assumes that the oil price will be $35 per barrel in 2030. As the study authors explain,

> Projections of future energy prices are inevitably subject to a high degree of uncertainty. In IEA scenarios, they are designed to maintain an equilibrium between supply and demand. The rapid drop in oil and natural gas demand in the NZE means that no fossil fuel exploration is required and no new oil and natural gas fields are required beyond those that have already been approved for development. No new coal mines or mine extensions are required either. Prices are increasingly set by the operating costs of the marginal project required to meet demand, and this results in significantly lower fossil fuel prices than in recent years. The oil price drops to around USD 35/barrel by 2030 and then drifts down slowly towards USD 25/barrel in 2050.[9]

This projection reflects a view that countries and companies will cooperate and that no one attempts to exercise market power. One might say it is the type of world envisioned by Henry Kissinger, who saw the lion and the lamb coexisting.[10]

One can hope the IEA is correct. For the last fifty years, though, oil producers have used their monopoly power to boost prices above operating costs. This will likely be the case if investment in competitive sources is not forthcoming.

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[9] *"Net Zero by 2050: A Roadmap for the Global Energy Sector," IEA, May 2021 [https://tinyurl.com/rcwhsb6f], p. 51.*

[10] *This joke about Kissinger and his efforts to establish peace in the Middle East circulated forty years ago: "The Biblical Zoo in Jerusalem arranges an exhibit displaying Messianic times, the centerpiece being a cage with a lion and lamb peacefully co-existing. Visitors are amazed, and one in particular decides he simply must find out who is responsible for this miracle. With some inquiries he learns that, of all people, the talented zoo keeper is none other than Henry Kissinger. He seeks out Kissinger and asks, "By God, how do you do it? I've never seen anything like it." And Kissinger answers, in his trademark monotone deadpan: "Every day - a new lamb." [https://tinyurl.com/8ddntkh]*

The conclusion, then, is that an oil shortage of monumental proportions will occur if the IEA's net-zero prescription is followed.

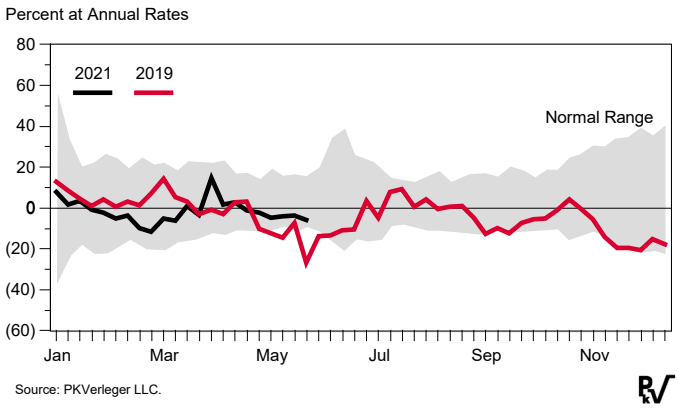
Market Commentary

Tight crude oil markets may be just over the horizon. Excess returns to storage for WTI and Brent have moved into and now toward the bottom of the normal range.

Figure 8 shows this trend. This graph compares excess returns to storage for the second Brent contract in 2021 against the normal range and 2019. One can observe that the excess returns are close to the bottom of the normal range. One can also note that returns for 2021 are closely tracking the path followed in 2019.

Looking back, spot Brent was $75 per barrel on June 1, 2019. Prices later increased to almost $90 by late fall. A similar pattern is possible if OPEC continues its output cuts. Bloomberg reported on May 31 that oil-exporting countries would respond carefully to market conditions over the next few months as Iranian production increases.[11] A similar price rise is likely in 2021 absent a cut in purchases by China, which may happen.

Figure 8
Excess Returns to Storage for Brent, Second Contract: 2019, 2021, and Normal Range



As Figure 9 (page 11) shows, stocks in the critical Cushing market are down significantly from their peaks. The stock decline has boosted backwardation. Figure 10 (page 11) presents the normal range for the sixth spread (sixth future less cash) as calculated using a Working/Brennen supply of storage curve. The most recent observations are in line with predictions.

The current six-month spread is a negative $2 per barrel. It would take a drop of another twenty million barrels of Cushing stocks to double backwardation.

Products are unlikely to pull crude prices up. Instead, rising crude prices will lift product prices. Excess returns for gasoline remain close to their two-standard-deviation peak. Meanwhile, cracks are still relatively low after adjustments for the cost of RINs or the renewable volume obligation (RVO). For example, the two-standard-deviation high in the gasoline to

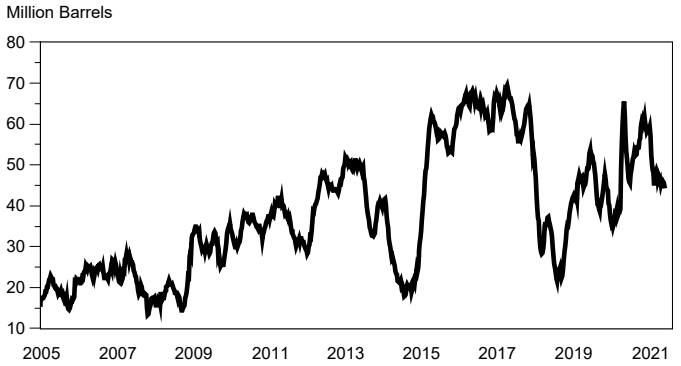
[11] *Grant Smith, Salma El Wardany, and Javier Blas, "OPEC+ Sees Tight Oil Market as Ministers Set for Supply Talks," Bloomberg, May 31,2021 [https://tinyurl.com/wrxfxpf8].*

crude margin (crack) is $20 per barrel. The current margin is $12 per barrel after deducting the RVO.

The gasoil and diesel markets are adequately supplied. Returns to storage for gasoil stand in the middle of the normal range. Excess returns to storage for distillate in New York are essentially zero, implying no incentive to store. Again, New York returns are affected by the Environmental Protection Agency's RVO requirements.

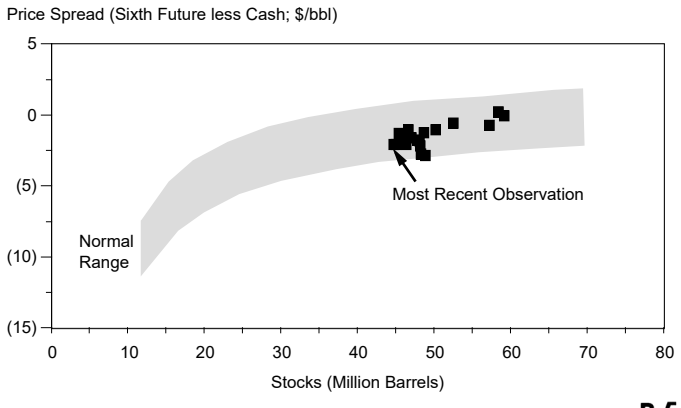
Natural gas markets are beginning to appear interesting. Excess returns are down from the peaks set in 2019 and, of course, 2020. Consumption growth and increased exports may be putting upward pressure on prices. We will try to take a closer look this month.

Figure 9
Crude Oil Stocks in Cushing, Oklahoma, 2005 to 2021



Source: US EIA.

Figure 10
Traditional Supply of Storage Curve for Crude Stored in Cushing



Source: PKVerleger LLC.

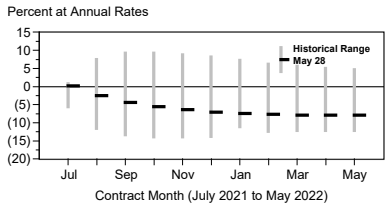
Table 1. Excess Returns to Storage on May 21 and May 28, 2021, for Two Crudes and Two Distillates (Percent at Annual Rates)

	WTI Cushing – No Storage Costs on May 28	Brent at Sullom Voe – No Storage Costs on May 28	WTI Cushing – No Storage Costs on May 21	Brent at Sullom Voe – No Storage Costs on May 21
Jul	0.2	1.6	-3.5	-5.3
Aug	-2.5	-5.9	-4.2	-3.9
Sep	-4.4	-6.1	-4.9	-4.5
Oct	-5.5	-6.7	-5.5	-5.0
Nov	-6.4	-6.9	-6.1	-5.4
Dec	-7.1	-7.2	-6.4	-5.7
Jan	-7.4	-7.2	-6.6	-5.8
Feb	-7.7	-7.2	-6.7	-5.8
Mar	-7.9	-7.1	-6.8	-5.7
Apr	-7.9	-6.9	-6.8	-5.7
May	-7.8	-6.8	-6.7	-5.6

Distillate Markets	New York May 28	ARA May 28	New York May 21	ARA May 21	New York Historical Average	ARA Historical Average
Jul	-1.4	7.1	0.0	5.7	9.9	11.0
Aug	-0.7	3.3	-0.2	3.1	9.4	9.1
Sep	-0.3	6.0	0.0	5.3	9.6	8.9
Oct	-0.1	4.6	0.3	4.2	9.8	9.2
Nov	-0.1	2.8	0.3	2.6	9.7	9.0
Dec	-0.2	1.0	0.3	1.0	9.3	7.7
Jan	-0.4	0.5	0.2	0.6	8.9	7.2

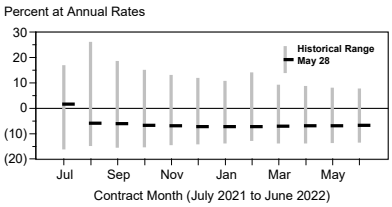
Source: PKVerleger LLC.

Excess Returns to Storage for WTI — May 28 Returns vs. Historical Range



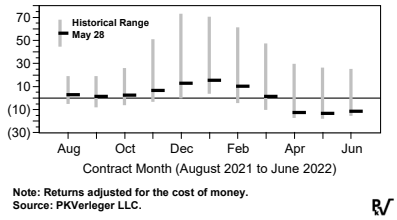
Note: Returns adjusted for the cost of money.
Source: PKVerleger LLC.

Excess Returns to Storage for Brent — May 28 Returns vs. Historical Range



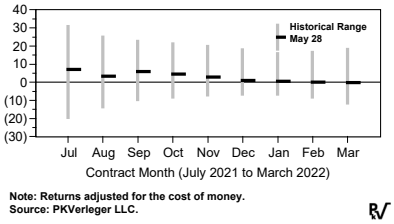
Note: Returns adjusted for the cost of money.
Source: PKVerleger LLC.

Excess Returns to Storage for Natural Gas — May 28 Returns vs. Historical Range



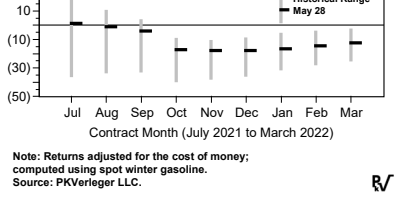
Note: Returns adjusted for the cost of money.
Source: PKVerleger LLC.

Excess Returns to Storage for Gasoil — May 28 Returns vs. Historical Range



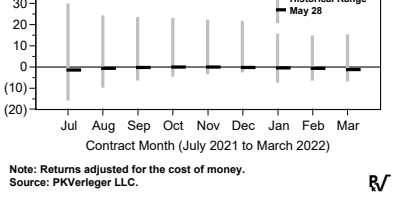
Note: Returns adjusted for the cost of money.
Source: PKVerleger LLC.

Excess Returns to Storage for Gasoline — May 28 Returns vs. Historical Range



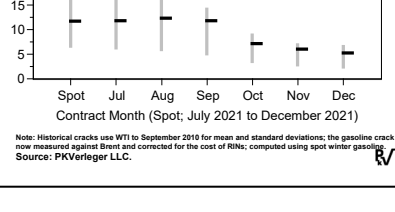
Note: Returns adjusted for the cost of money; computed using spot winter gasoline.
Source: PKVerleger LLC.

Excess Returns to Storage for Heating Oil — May 28 Returns vs. Historical Range



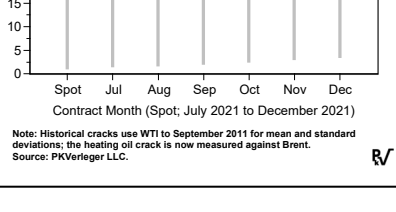
Note: Returns adjusted for the cost of money.
Source: PKVerleger LLC.

Refining Margins for Gasoline — May 28 Margins vs. Historical Range



Note: Historical cracks use WTI to September 2010 for mean and standard deviations; the gasoline crack is now measured against Brent and corrected for the cost of RINs; computed using spot winter gasoline.
Source: PKVerleger LLC.

Refining Margins for Heating Oil — May 28 Margins vs. Historical Range



Note: Historical cracks use WTI to September 2011 for mean and standard deviations; the heating oil crack is now measured against Brent.
Source: PKVerleger LLC.

Excess Returns to Storage for Crude, Products, and Natural Gas — Fourth Week of May vs. Prior Week and Fourth Week of May in Prior Years (Percent at Annual Rates)

	Current	Last Week	2020	2019	2018	2017	2016
Gasoline							
August	-1.0	0.2	25.8	-18.1	-7.4	-16.4	3.3
September	-4.2	-3.0	18.4	-19.3	-8.2	-15.1	-1.0
October	-17.1	-16.1	-6.9	-34.6	-21.3	-29.5	-19.8
November	-17.8	-16.9	-7.8	-34.3	-20.8	-27.5	-20.7
December	-17.8	-16.9	-7.1	-31.6	-19.9	-25.7	-20.2
Distillate							
July	-1.4	0.0	52.4	-0.4	-2.5	3.4	2.4
August	-0.7	-0.2	49.1	0.0	-1.5	4.1	3.5
September	-0.3	0.0	45.6	0.8	-0.9	4.9	4.9
October	-0.1	0.3	42.0	1.3	-0.7	7.3	5.9
November	-0.1	0.3	39.2	1.6	-0.7	7.6	6.6
Gasoil							
July	7.1	5.7	75.3	-0.7	-13.4	0.1	2.9
August	3.3	3.1	58.1	-1.1	-8.5	1.4	3.1
September	6.0	5.3	51.0	-0.1	-6.6	2.6	3.9
October	4.6	4.2	47.1	0.7	-5.5	4.8	4.7
November	2.8	2.6	41.9	-0.3	-5.5	4.4	4.7
WTI							
July	0.2	-2.6	0.1	-2.4	-2.7	-1.1	2.7
August	-2.5	-3.5	6.6	-1.3	-2.8	0.8	5.0
September	-4.4	-4.2	8.6	-1.1	-3.9	1.4	6.0
October	-5.5	-4.9	8.2	-1.5	-4.7	1.7	6.4
November	-6.4	-5.5	8.6	-1.9	-5.0	1.9	6.6
Brent							
July	1.6	-5.3	30.9	-18.0	-4.6	3.0	2.3
August	-5.9	-3.9	67.2	-29.1	7.7	8.3	6.4
September	-6.1	-4.5	46.9	-25.5	4.0	7.4	7.0
October	-6.7	-5.0	37.5	-22.5	1.8	6.9	7.0
November	-6.9	-5.4	32.5	-20.0	0.8	6.4	7.3
Natural Gas							
September	1.6	9.0	31.8	-3.2	-3.1	1.9	24.2
October	2.5	8.9	38.3	5.6	-2.6	3.2	31.8
November	6.5	12.6	81.8	15.7	0.1	7.2	48.4
December	12.7	18.7	127.2	29.9	6.0	16.0	67.5
January	15.3	20.4	112.9	36.0	9.3	21.7	67.2

Note: “Current” = May 28, 2021. All returns to storage are adjusted for the cost of money.

Source: PKVerleger LLC.

Open Interest for Crude, Products, and Natural Gas — Fourth Week of May vs. Prior Week and Fourth Week of May in Prior Years (Number of Contracts)

	Current	Last Week	2020	2019	2018	2017	2016
Gasoline							
Total	397,905	401,682	374,686	376,864	480,175	383,626	402,738
July	165,187	149,631	114,724	131,365	176,765	137,962	138,660
August	65,636	47,389	45,163	63,731	68,593	51,412	45,033
September	49,020	40,600	51,851	51,140	68,848	53,509	54,152
October	28,663	26,287	35,017	38,304	48,036	40,290	33,476
Distillate							
Total	423,976	432,694	382,400	399,144	414,712	375,353	412,688
July	142,182	52,433	89,543	114,016	135,788	115,740	132,002
August	41,548	123,335	32,955	57,589	61,071	50,081	53,487
September	44,217	38,865	33,524	38,068	48,996	40,767	37,414
October	23,478	40,097	26,367	37,067	34,126	18,942	25,390
Gasoil							
Total	1,076,699	1,053,923	851,480	973,483	1,054,482	849,662	748,629
July	196,646	176,994	133,381	196,058	206,467	150,094	151,543
August	92,875	88,170	67,073	102,152	122,331	85,768	90,156
September	83,816	82,580	66,694	86,739	83,842	63,301	48,596
October	102,679	100,826	52,963	74,886	74,134	63,141	44,909
WTI							
Total	2,475,001	2,417,060	2,375,640	2,129,716	2,077,229	2,625,957	2,197,046
July	490,223	498,802	260,121	376,374	485,153	551,317	527,217
August	321,838	295,562	229,043	163,391	235,836	210,706	164,711
September	224,085	206,454	330,683	202,840	249,600	204,793	129,326
October	167,300	159,379	115,210	145,094	197,696	104,686	78,348
Brent							
Total	2,466,884	2,496,789	2,645,298	2,315,299	2,507,720	2,395,747	2,221,021
July	85,224	242,324	52,913	57,133	30,706	20,612	98,041
August	560,641	491,277	409,844	438,784	549,976	550,042	452,246
September	317,614	284,456	270,524	327,708	371,927	359,531	301,951
October	160,265	147,731	143,481	148,233	169,608	144,131	129,150
Natural Gas							
Total	1,217,590	1,190,853	1,281,288	1,293,629	1,533,519	1,535,613	1,072,399
July	310,761	290,055	360,574	366,025	308,674	324,648	366,844
August	90,044	76,802	80,995	101,401	105,267	150,996	85,994
September	145,090	122,423	153,112	180,510	174,734	159,184	119,719
October	133,696	132,472	107,280	129,601	150,425	188,359	111,739

Note: “Current” = May 28, 2021.

Source: PKVerleger LLC.

Gasoline Cracks – Fourth Week of May vs. Prior Week, Prior Month, and Fourth Week of May in Prior Years ($/bbl)

	Current	Last Week	Last Month	2020	2019	2018	2017	2016	30-Year Average
Spot	11.80	11.44	13.03	7.18	9.41	14.70	15.52	15.61	14.13
July	11.84	12.36	13.24	7.92	9.30	11.87	12.43	16.26	12.60
August	12.41	12.05	13.32	5.93	10.45	11.53	11.49	15.43	11.55
September	11.84	11.48	12.87	5.67	9.93	6.69	6.44	14.26	10.05
October	7.20	6.75	12.03	1.92	4.23	5.73	5.28	8.05	6.29
November	6.08	5.61	6.72	1.08	3.20	5.15	4.35	6.27	4.89
December	5.26	4.85	5.50	0.49	2.43	5.18	4.10	5.04	4.47
Average	9.49	9.22	10.96	4.31	6.99	8.69	8.52	11.56	9.14

Note: “Current” = May 28, 2021. Gasoline cracks measured against Brent from 2010 with RIN cost removed.

Source: PKVerleger LLC.

Heating Oil Cracks – Fourth Week of May vs. Prior Week, Prior Month, and Fourth Week of May in Prior Years ($/bbl)

	Current	Last Week	Last Month	2020	2019	2018	2017	2016	30-Year Average
Spot	16.60	16.78	10.63	7.29	14.18	16.37	14.44	13.58	10.04
July	17.06	16.74	12.67	7.70	14.13	16.18	13.66	13.95	10.30
August	17.13	17.09	13.47	8.57	15.51	16.14	13.56	13.58	10.44
September	17.51	17.60	14.10	9.45	16.74	16.59	13.69	13.56	10.91
October	17.99	18.10	14.72	9.98	17.70	17.02	13.95	13.71	11.42
November	18.43	18.55	15.30	10.30	18.37	17.38	14.23	13.94	11.98
December	18.86	18.93	15.81	10.46	18.84	17.63	14.46	14.06	12.50
Average	17.65	17.69	13.81	9.11	16.50	16.76	14.00	13.77	11.08

Note: “Current” = May 28, 2021. Heating oil cracks measured against Brent from 2011.

Source: PKVerleger LLC.