

TOP *of* MIND



OIL'S SEISMIC SHOCK

The global oil market is experiencing a massive demand shock, with demand for transportation fuels sitting in the crosshairs of the coronacrisis. At the same time, major oil producers have engaged in a war for oil market share, resulting in a sizable supply shock. The impact of these simultaneous shocks on oil prices, OPEC+, the oil industry, and credit and financial markets more broadly are Top of Mind. We feature interviews with three energy experts, Pulitzer Prize-winning author, Daniel Yergin, PIRA Energy Group Founder, Gary Ross, and our own head of Global Commodities Research, Jeff Currie. They discuss the enormity of the current oil shock, how we got here, and what's in store—namely, sharply lower, and even negative, crude oil

prices as oil infrastructure is overwhelmed by the supply surge. But they also argue that the sharper the price decline, the sharper the eventual rebound as oil production is shut in. We conclude that all of this will lead to a healthier global oil industry. And we discuss why this will be painful for credit markets, but likely won't pose systemic risk.



Something has to give here because the world oil industry is going to run out of storage space and that's going to be a very serious issue for everybody.

- Daniel Yergin

When you step back, recent developments are a... culmination of an unsustainable supply management strategy that is coinciding with an enormous demand shock, and the answer has to be low prices.

- Gary Ross

Paradoxically, the demand shock could ultimately create an inflationary oil supply shock of historic proportions because so much oil production will be forced to be shut in.

- Jeff Currie



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Investors should consider this report as only a single factor in making their investment decision. For Reg AC certification and other important disclosures, see the Disclosure Appendix, or go to www.gs.com/research/hedge.html.

Macro news and views

We provide a brief snapshot on the most important economies for the global markets

US

Latest GS proprietary datapoints/major changes in views

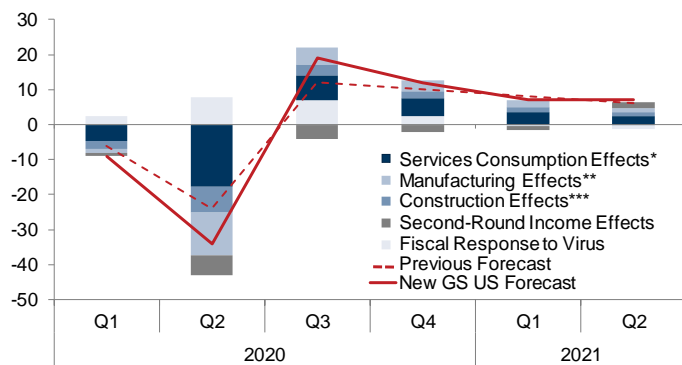
- We've lowered our full-year 2020 GDP forecast to -6.2% based on a deeper virus drag and labor market spillovers, and expect -34% qoq ann. growth in Q2 with a stronger recovery in H2.
- We now expect the unemployment rate to peak at 15%.

Datapoints/trends we're focused on

- Jobless claims, which we see rising by more than 2mn for at least another week, peaking at 5.5mn and remaining elevated.
- Fed action; its likely aggressive use of Congress' \$454bn addition to the US Treasury's Exchange Stabilization Fund.
- Fiscal; we think Congress will pass a Phase 4 package focused on state aid and worth several hundred billion in the summer.

Deeper trough, bigger rebound

US real GDP annualized quarterly growth, percent



* Includes cutbacks to consumption categories requiring face-to-face interaction
 ** Includes reduced domestic and foreign demand for goods, supply chain disruptions, and plant shutdowns.
 *** Includes cutbacks to structures investment, homebuilding, and home sales.

Source: Goldman Sachs Global Investment Research.

Japan

Latest GS proprietary datapoints/major changes in views

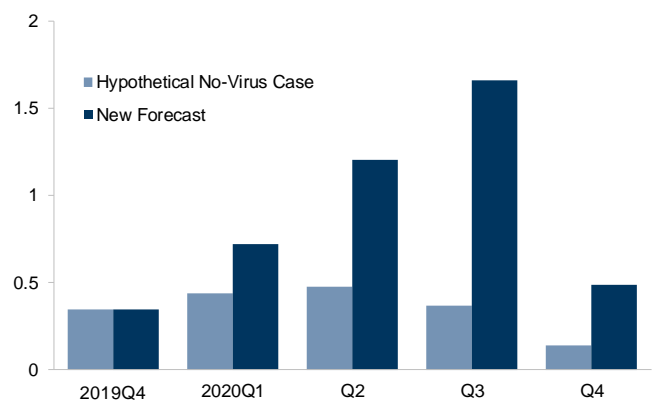
- We've lowered our full-year 2020 GDP forecast to -3.1%, and expect a 7.2% qoq annualized contraction in Q2, with risks skewed toward further downside.
- We estimate the postponement of the Tokyo Olympics will reduce 2020 GDP by around ¥800 bn, or about 0.2% of GDP.

Datapoints/trends we're focused on

- A potential Tokyo lockdown, which we estimate could reduce national qoq ann. GDP by around 11pp if lasting one month.
- The gov't's fiscal response; while we expect a roughly ¥30 trillion package to be passed by early May, the direct boost to GDP will likely be a more modest ¥6 trillion.

A greater fiscal impulse

Public demand contribution to real GDP growth, pp (qoq ann)



Source: Goldman Sachs Global Investment Research.

Europe

Latest GS proprietary datapoints/major changes in views

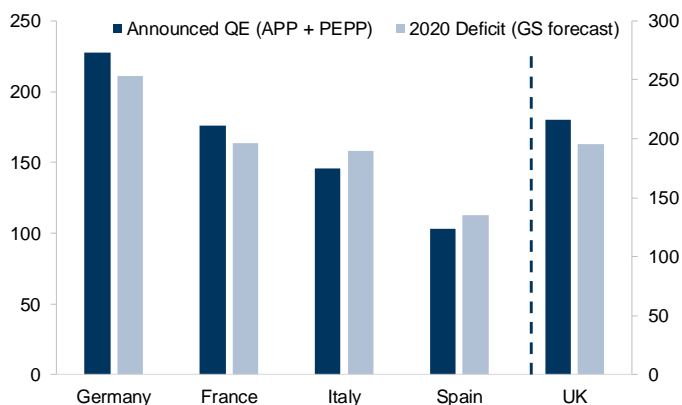
- We think the ECB's decision to relax the issue/issuer limit on sovereign purchases under PEPP should enhance the purchase space by more than EUR 1.5tn.
- We now expect Euro area countries to agree to an ESM credit line with limited conditionality for crisis-stricken countries.

Datapoints/trends we're focused on

- Sovereign risk; while the ECB's PEPP program should contain risk for now, we expect renewed focus on Euro area sovereign risk given expected 9ppt area-wide fiscal deficits in 2020.
- A joint coronabond, which we think remains unlikely, as northern European countries continue to perceive it as debt mutualization.

Extra ammunition

QE purchases and 2020 deficits; EUR bn (lhs) and GBP bn (rhs)



Note: Assumes 0.8 sovereign share allocated by capital key, 0.9 gilt share in UK.
 Source: Goldman Sachs Global Investment Research.

Emerging Markets (EM)

Latest GS proprietary datapoints/major changes in views

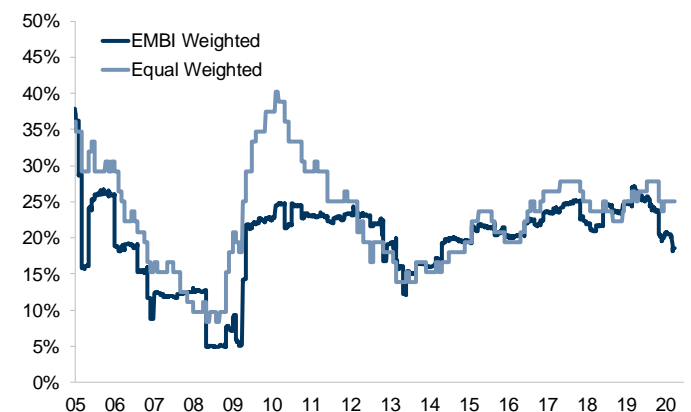
- We expect even looser policy in China, with the augmented fiscal deficit rising by 5.3pp to 16.8% of GDP in 2020.
- We've lowered our full-year LatAm growth forecast to -3.8%, which would be the worst contraction of the post-war period.

Datapoints/trends we're focused on

- Sovereign downgrades and FX peg breaks, which will likely only rise after South Africa's downgrade and Nigeria's devaluation.
- FX mismatches, which could possibly present financial stability risk for EMs with large Dollar-denominated debts amid monetary easing and broad currency depreciation.

The next shoe to drop?

Share of countries in EMBI with IMF programs, percent



Source: IMF, Datastream, Goldman Sachs Global Investment Research.

Oil's seismic shock

The global oil market is experiencing an almost unimaginable demand shock, with demand for transportation fuels sitting in the crosshairs of the coronacrisis that has now pushed the world economy into [recession](#). At the same time, the historic 2016 agreement between OPEC and Russia (so-called OPEC+) to make coordinated production cuts in the face of growing non-OPEC supply has collapsed, leading to a supply shock as Saudi Arabia, Russia and other OPEC producers engage in a war for oil market share. The implications of these simultaneous demand and supply shocks for oil prices, OPEC+, the oil industry, and credit and financial markets more broadly are Top of Mind.

We first speak to two renowned energy experts, Pulitzer Prize-winning author, Daniel Yergin, and Founder of PIRA Energy Group, Gary Ross, to provide context on how oil producers ended up in a price war amid one of the most devastating oil demand shocks in modern history. Both agree that the OPEC+ falling out was already brewing, even if it was unexpected at this moment.

But Ross emphasizes that if you're a major low-cost oil exporter like Saudi Arabia or Russia eyeing a massive decline in oil demand, a loss in market share to higher-cost producers, and a rise in future supplies from other large exporters that are currently on the sidelines (think Iran, Libya, and Venezuela)—not to mention the forces of ESG bearing down on the fossil fuel market—the only answer is a strategy that targets lower oil prices, which will hopefully grow the market—and your role in it—over time. And both he and Yergin argue that Saudi Arabia and Russia can withstand a sustained period of low prices, with Russia especially well-positioned to do so (see pgs. 12-13 for our Middle East economist Farouk Soussa's and Russian economist Clemens Grafe's takes on this.)

Yergin, for his part, is more mindful of the geopolitical consequences of such a strategy, especially given the US' growing focus on oil as the higher-cost US shale oil industry—centered in important electoral states—is now getting pummeled by the oil price collapse. And he argues that an oil war won't provide as much boost to oil demand and to the economy more broadly today given the economic fallout from the coronacrisis. For these reasons, he believes that an agreement among major producers to curtail output could come sooner than later.

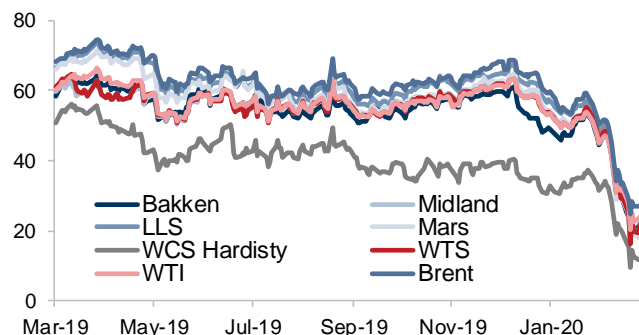
All that said, both Ross and Yergin agree that the supply shock is increasingly looking like a drop in the bucket compared to the growing virus-related demand shock. So no matter what actions OPEC+ takes, we are headed for an enormously oversupplied market and a period of sharply lower oil prices. In their view, how quickly prices recover is therefore largely a function of the trajectory of the virus and the mitigation measures to contain it.

We then sit down with Jeff Currie, GS Global Head of Commodities Research, to better understand the magnitude of the current imbalance in oil markets, and the unique physical constraints of oil infrastructure, which, he says, could actually drive landlocked crude oil prices like WTI negative in the coming days, as pipeline bottlenecks emerge and storage capacity is filled. At that point, Currie explains, production will be forced shut, and some capacity will be permanently lost. The upshot? The current unprecedented oil demand shock and associated price collapse could ultimately create a large, negative oil supply shock and rapid price increase. The violent nature of this process,

Currie says, will permanently alter the energy industry and its geopolitics, create inflationary pressures as economic activity normalizes and shift the debate around climate change.

Oil prices have collapsed to cash costs

Global oil prices by type, Dollars



Source: Bloomberg, New York Times, Reuters, Goldman Sachs GIR.

Damien Courvalin, GS Head of Energy Commodity Research, digs further into why oil price volatility becomes so violent when supply and demand imbalances become very large—namely, because prices are the mechanism that force the physical market back into balance. As a result, during large surpluses like we have today, prices must spike lower to motivate producers to shut in production that has nowhere to go, but may need to spike higher as demand rebounds if enough damage is done to supply in the meantime. Who will be a likely beneficiary of this violent rebalancing and price volatility? According to Courvalin, the answer is low-cost producers like Saudi Arabia that will be able to quickly and easily ramp up supply to meet rising demand as well as the other source of fast-cycle production: shale oil.

This aligns with our interviewees' generally shared view that while US shale oil is set for a tough period ahead, these developments will ultimately lead to a long overdue rationalization of shale producers, leaving a healthier US shale—and broader oil—industry in its wake.

Finally, Amanda Lynam, GS Senior Credit Strategist, looks at the implications of the oil price plummet for credit markets. She sees potential for HY Energy default and downgrade rates to surpass the levels from the 2015 peak, and also expects ratings pressure within IG Energy, especially among the sizable BBB cohort, some of which have already become "fallen angels," deteriorating from IG to HY. In her view, this pressure on the Energy sector will continue to weigh on the wider IG and HY markets given the still sizable share of the sector in the indices. But she believes these energy pressures are unlikely to pose systemic risk to the broader financial markets given the Fed's recent actions that implicitly make it a "market liquidity" provider of last resort.

We wish good health and good luck to all of our clients and their families during this trying time. P.S. Don't forget to check out the podcast version of this and other recent GS Top of Mind reports—on [Apple](#) and [Spotify](#).

Allison Nathan, Editor

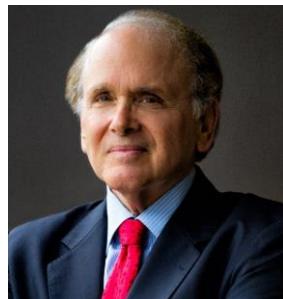
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Interview with Daniel Yergin

Dr. Daniel Yergin is Vice Chairman of IHS Markit. He is a renowned author on energy and geopolitics and won the Pulitzer Prize for his book, *The Prize: The Epic Quest for Oil, Money and Power*. His new book, *The New Map: Energy, Climate and the Clash of Nations*, will be published this summer. Below, he discusses the oil shock, and its industry and geopolitical implications.

The views stated herein are those of the interviewee and do not necessarily reflect those of Goldman Sachs.



Allison Nathan: Is this the biggest oil shock you've ever witnessed?

Daniel Yergin: Yes, this is the biggest oil shock I've ever witnessed because it comes at a time when the global economy is largely shutting down. The most analogous shock was the one that

occurred in 1998, when oil production was going up and demand was going down in the wake of the Asian financial crisis. During that shock, the global industry ran out of places to store oil, resulting in a collapse in oil prices to \$10/bbl.

Today, oil supply is also rising as Saudi Arabia and Russia engage in a war over market share, and we're seeing the biggest drop in oil demand in modern times. In Q1, demand fell by about 6 Mb/d instead of rising by 1 Mb/d. And, right now, as Europe and North America shut down, even as China comes back, we're looking at a demand drop of 20 Mb/d in April, or larger. So we're headed for an unprecedented oil supply glut. But this is not just about oil. To the extent that turmoil in the oil markets is exacerbating stresses in the credit and broader financial markets, it has even greater global ramifications.

Allison Nathan: Were you surprised by the failure of OPEC+ to reach an agreement on further production cuts in the wake of the demand shock?

Daniel Yergin: It was already clear that the OPEC+ agreement, which was really an agreement between Saudi Arabia and Russia, was fraying because of the different perspectives and needs of the two countries. But the abrupt way the coordination ended, and the oil war started, was not anticipated to be this violent, particularly in the middle of a global health and economic crisis. Oil market wars have occurred before, but it's pretty bizarre to have one in the middle of what could turn out to be the worst economic crisis since WWII.

Allison Nathan: Is this oil war happening now in spite of the virus-induced demand shock, or because of it?

Daniel Yergin: It was induced by the virus-led demand shock, because that's what set the stage for it—the Russians and the Saudis had very different perspectives about how to respond to it. The Saudis wanted to respond with a very big production cut, but, having borne the brunt of cuts in the past, were worried about market share. For that reason, the Saudi policy since 2014 has been that they won't make any cuts without Russia.

The Russians, on the other hand, have always been more split on whether it's more beneficial to go along with the Saudis and OPEC, or to go it alone. And this time around they wanted to

wait until June before taking any action to assess where things stood at that point.

The Russians also had another thing in mind, which is that, as they continue to cut back production, they give up market share to the US. It is quite striking that US oil production has increased by almost 60% since OPEC+ was created, and in February the US ironically reached the highest point of its production at 13.1 Mb/d, which was almost 2 Mb/d more than the Russians and 3.5 Mb/d more than the Saudis. So I think the Russians had come to see the issue not only in the context of market share, but as a strategic rivalry with the US.

Allison Nathan: How much have US sanctions on Russian oil assets—Nord Stream 2 and Rosneft—played into that?

Daniel Yergin: I think US sanctions loomed pretty large for the Russians. Sanctions have become a major tool of US foreign policy, facilitated by the rapid growth of US shale oil—at least in the minds of the Russians. The fact that the US imposed sanctions on the Nord Stream 2 pipeline, an \$11 billion signature project for the Russians, just as the pipeline neared completion was likely absolutely infuriating to the Russians.

Allison Nathan: The US seems to be contemplating intervening in this oil war, partly by threatening more sanctions on Russia. Would that be productive?

Daniel Yergin: History shows that President Putin doesn't respond to sanctions. Sanctions just strengthen the relationship between China and Russia that has been developing in common cause against what they see as US unilateralism. Relations between the US and Russia have not been this bad since the early 1980s. So I think the US doesn't have a lot of leverage here, and new sanctions are only going to make the situation less amenable.

Allison Nathan: What about potential US pressure on the Saudi side? Will Saudi give in to US pressure?

Daniel Yergin: Something has to give here because the world oil industry is going to run out of storage space, and that's going to be a very serious issue for everybody. The stakes will continue to go up. You can feel the pressure rising in the US. But I'm not sure "give in" is the right phrase here; no one is going to want to give in.

That said, 13 Republican senators wrote a pretty strong letter to Saudi Arabia putting the US-Saudi relationship on the table, which is notable because these are senators that have been generally supportive of the relationship. President Trump has now stepped in to call both the Saudi crown prince and President Putin to push for some renewed production restraint. Until recently, Trump had been in favor of low oil prices, but he now is concerned about a rapid decline in US oil production and damage to the US shale industry.

Allison Nathan: But isn't this more about economics than geopolitics? Won't Saudi Arabia ultimately be worse off economically if they don't pursue market share?

Daniel Yergin: Some would argue that Saudi Arabia doesn't want to be in the position that they were in in the mid-1980s, when they were just giving up market share. But they have to find a balance between going down that road and what you're going to see in terms of political reactions elsewhere. And while Saudi Arabia wants to assert its primacy as an oil producer, the hit to needed revenues will be very large.

Allison Nathan: Is Saudi Arabia or Russia better positioned to withstand low prices?

Daniel Yergin: Both will have some staying power but not at very depressed prices. From 1998, Russia learned the lesson of financial crises. It has a very capable central bank and it's not a mono-cultural economy; it's the world's largest exporter of wheat. Russia's oil production costs are competitive with Saudi costs. And the Russians have money that was going to go into national projects and big signature initiatives, which will be diverted to bolstering the economy. It's not going to be easy for them, but they have more resilience than people think.

Allison Nathan: So how long is the price war likely to last?

Daniel Yergin: Positions look very entrenched right now, and some people talk about the price war lasting 1-2 years, in part because it took two years from 2014 to 2016 to get from a free-for-all in the market owing to substantial US shale oil growth, to OPEC and Russia agreeing to manage the market by establishing OPEC+. I don't think so. It's a very different world now. Back then, the global economy was in good shape, and lower oil prices were a stimulus to economic growth. Today, low prices won't provide the same stimulus; motorists won't drive more because the coronavirus is compelling people to stay home. The oil war cannot be separated from the overall coronacrisis and its trajectory. How long economic activity remains in the current freeze will be a key variable.

The extra production from the market share battle equates to only a fraction of the collapse in demand. With the political pressures building, we could have a scenario in which this gets resolved soon. Let's not forget that OPEC+ was essentially created in a meeting between Mohammad bin Salman and Putin on the sidelines of a conference in 2016, so there was some personal investment by the leaders in the deal that was made. And of course, it was only a few months ago that Putin made a very significant state visit to Saudi Arabia. And now you have someone else who is no longer on the sidelines of the oil collapse—Donald Trump. The Saudis are the chair this year of the G20 group of major nations, and the G20 is supposed to remedy international economic problems. So that might provide the platform for the Saudis to change their position in light of the changed circumstances of the global crisis.

Allison Nathan: Given all of the above, how low could oil prices go from here, and for how long?

Daniel Yergin: If we run out of oil storage and oil can't be moved, as in 1998, we'll see prices go sharply lower—to very

low double digits, and in some cases to single digits. As that happens, production will be shut in. We're already seeing that in some parts of the world. To be clear, we're going to end up with high inventories—likely higher than those in the 2014-2016 period—in almost any supply scenario. Even if OPEC+ did agree to cut production, you'd still have a lot of extra oil pouring into the market because of the demand collapse. Those inventories will be sitting on the back of the oil price and will have to be worked off when the recovery comes. So we are in for a period of low prices, at least for the next several months, and maybe longer, no matter what actions OPEC+ ends up taking.

Allison Nathan: What are the industry implications? Will this be the end of US shale producers?

Daniel Yergin: There was already a change coming; for a time there, it had been growth at any cost. But investors had already started to reject that premise and become much more focused on returns for their investment. For that reason, even before the virus took over, we had anticipated that instead of seeing a 1-2 Mb/d increase in US production, we would see around a 400 Kb/d increase. Now we're looking at how much US production will decline. Shale producers are cutting capex dramatically, and some bankruptcies and consolidation will occur. It will be a very tough period for shale producers.

But shale oil isn't going away. You'll see a change of ownership, and I think people will operate differently. Shale was already moving into a maturing stage, and now it's suddenly going to mature very fast and in a lasting way, with companies putting greater focus on their relationships with investors and their access to capital when this is over.

As for the majors, they will slow their spending, particularly capex on new projects, and focus on preserving their dividend. Everyone is going to be very operationally focused, because you have to worry about what happens if somebody gets sick at a drill site or on a platform. And particularly in such a global industry, there are many concerns about how to manage the need for people to travel between countries when travel is shut down, implications for supply chains, and so forth. The logistics and continuity of operations is going to be a very big preoccupation for all management in this environment.

Allison Nathan: Does this mark the beginning of the end for OPEC?

Daniel Yergin: Over the years, many obituaries have been written for OPEC. Ironically, this year is the 60th anniversary of OPEC and people are still railing against it, as they did in the 1970s/80s. But OPEC has come a long way since then, becoming much more engaged in dialogue and stability. It's still there as a framework for producers. That said, OPEC is on the sidelines now. This is really about the big three—Saudi Arabia, Russia, and the US—and the wrestling match among them. And how this wrestling match will turn out in the context of a global pandemic and a major recession will be key to shaping the future of oil in this very difficult period.

Interview with Jeff Currie

Jeff Currie is Global Head of Commodities Research at Goldman Sachs. Below, he explains why the unprecedented oil surplus will push crude oil prices sharply lower—and even negative—in the near term, but could lead to an inflationary shock over the medium term.



Allison Nathan: How big is this oil shock?

Jeff Currie: Not only is this the largest economic shock of our lifetimes, but oil sits in the crosshairs as transportation is the cornerstone of social interactions. Since the current defense against the coronavirus is social distancing, transportation has

taken a disproportionate hit, likely more than 2x the economic growth hit. As of this morning, 118 countries representing 92% of global GDP have enacted some form of social distancing with many of the most populous regions facing total lockdowns. While most analyses including our own use the Wuhan experience as the prototype to estimate near 25 million b/d (25%) of lost demand, it is important to remember that places like Italy and now even New York have employed far more stringent policies that include shutting down gasoline stations on highways to prevent movement between cities, or nationwide lockdowns. This is on top of an airline industry that has now been nearly completely shut down on a global basis, which suggests that the number is far larger, maybe close to 30 million b/d. In other words, the world has gone local, and oil was the driver of globalization.

Allison Nathan: What does such a large demand shock mean to oil markets?

Jeff Currie: At first, it is extremely negative to oil prices and has already sent some grades of crude oil into negative territory. But, paradoxically, the demand shock could ultimately create an inflationary oil supply shock of historic proportions because so much oil production will be forced to be shut in. You simply cannot shut down that much demand and not expect to have substantial and persistent ramifications to supply. I like to remind people that the global economy is a complex physical system with physical frictions, and energy sits near the top of that complexity. The one thing that separates energy from all other commodities is that it must be contained within its infrastructure, which for oil includes pipelines, ships, terminals, storage facilities, refineries, and distribution networks—all of which have relatively small and limited spare capacity. We estimate that the world has around a billion barrels of spare storage capacity, but much of that will never be accessed as the velocity of the current shock will almost certainly breach crude transportation networks first, which we are already seeing evidence of around the world. With the oil having nowhere to go, producers will either have to shut in production—or, given the cost of shutting down a well—may instead be willing to pay someone to dispose of a barrel, hence why you can get negative prices.

Allison Nathan: So are you saying that benchmark crude oil prices—like WTI and Brent—can go negative?

Jeff Currie: WTI might go negative but Brent is likely to stay near \$20/bbl. The key reason is that Brent is a waterborne crude priced on an island in the North Sea, 500 meters from the water. In contrast, WTI is landlocked and 500 miles from the water. As I like to say, I would rather have a high-cost waterborne crude oil that can access a ship than a landlocked pipeline crude oil sitting behind thousands of miles of pipe, like the crude oils in the US, Russia and Canada. In 1998, when we had a similar type of market in which the Asian financial crisis and an OPEC supply increase also created a large surplus that breached storage capacity, it was these landlocked crude oils that were hardest hit. So, while markets like WTI, particularly WTI Midland or Canada's WCS, can go negative, Brent is likely to stay near cash costs of \$20/bbl. Another factor that was at play in 2008/09 and is also a feature of this crisis are Dollar funding constraints that prevent oil owners from acquiring Dollars that are required to secure storage and transportation capacity. We believe that the Fed's recent actions alleviate some of this risk, but, remember, oil itself creates Dollar liquidity given its importance in trade, and another sharp drop in oil prices could create additional Dollar shortages.

Allison Nathan: You mentioned OPEC, does the current OPEC+ price war mean anything now?

Jeff Currie: Unfortunately, no. At the time that the price war began in early March—when the demand shock was roughly 5.0 Mb/d—the logic of it made sense. It gave OPEC and Russia the first opportunity since 2012 to undercut all of the higher-cost shale output. As we have long-argued, the OPEC+ coordinated production cut in 2016 never made economic sense because it only served to create artificially high prices that induced uneconomic investment in higher-cost production. Just consider that since 2016 OPEC+, including Iran and Venezuela, have cut production by 4.4 Mb/d, while shale oil and other non-OPEC producers have increased production by 5.7 Mb/d. This came at the expense of not only OPEC+ producers who lost \$220bn in revenues and market share, but also of equity and debt shareholders of the higher-cost producers that made the uneconomic investment, which we estimate has destroyed roughly \$1 tn worth of market cap since 2016. The policy of production cuts was a disastrous mistake.

The question now is: can OPEC+, the US, or oil producers more broadly save this market? The answer is that the demand shock has become so large that there is almost nothing they can do, short of a massive, coordinated global production cut that would be nearly impossible to orchestrate; an announcement of a cut by OPEC+/US/Canada would fall far short of the demand loss, simply creating another selling opportunity should prices temporarily rise off the back of it.

Allison Nathan: So how long are oil prices likely to remain at depressed levels?

Jeff Currie: We are already hitting physical constraints. Oil in Canada is now sub-\$5/bbl. And the quicker and harder you hit

capacity constraints, the quicker and more violently the market rebalances as production is shut in, and deficits return to the market, ultimately putting upward pressure on prices. The key is that unlike in the bear market of 2015/16 that followed the shale oil revolution, during which production shut-ins were logically concentrated in the highest-cost production, in this environment, access to logistics, or, more accurately, *lack* of access to logistics, will determine where and when a producer shuts in. It will be indiscriminate, which will inflict substantial damage on wells that in some cases will be permanent. So once economic activity begins to normalize, the deficits will likely be substantial as supply will likely struggle to rebound to meet the rising demand. And if pipelines become clogged and prevent inventories from building in the near term, this could amount to very rapid risk reversal towards oil shortages that will push prices far above our \$55/bbl target for next year.

Allison Nathan: Why might some oil production capacity be permanently damaged as a result of this?

Jeff Currie: Because the capital stock of oil—oil fields and wells—is very different from the capital stock in the rest of the economy. Manufacturing capacity turned off because of the virus is sitting idle and ready to restart. But there is geology behind conventional oil fields in terms of field pressure and other factors that degrades when production is shut in, and may not be able to be restored. Offshore fields do not have this problem. In fact, shutting them down and restarting them can increase output. But, given the infrastructure bottlenecks, the impacted wells are likely to be exactly the onshore fields where shut-ins create lasting damage—mature, depleted and heavier-sourer reservoirs in places like the US, Canada, Russia and Latin America. So we are likely to lose substantial producing assets, perhaps as much as 5 Mb/d of supply.

Allison Nathan: What about shale oil? Won't it be able to rebound quickly as prices rise?

Jeff Currie: Shale is different because it doesn't have the same properties as conventional oil, and is less susceptible to permanent damage. But decline rates set in quickly, which means that the current collapse in drilling driven by the price decline will do a lot of the work in reducing shale output. And for those shale fields that get shut in prematurely, it is hit and miss on recovery, which means some wells will have to be re-fracked. That is not difficult, but it comes at a cost. And the key constraint on shale oil will be capital, not geology. The main difference between today and the 2015/16 period that saw a rapid rebound in shale oil production is that in 2015/16 capital never dried up. But even before the onset of the current crisis, shale oil producers were already facing sharply higher costs of capital due to persistently poor shareholder returns, which recent events have only exacerbated. So the likelihood of capitulation by US E&Ps—as well as other higher-cost producers, such as EM producers—is much higher today.

Allison Nathan: But even if companies deprived of capital end up shutting, won't the oil assets just be snapped up?

Jeff Currie: Yes, but the type of company that owns the assets matters. The problem with the industry structure over the last 5-10 years is that the producers were focused on short-term gains in production growth, not on shareholder value or

generating long-term returns. But we foresee these assets largely ending up on the balance sheets of integrated oil companies that are historically efficient stewards of capital, who will employ them like long-cycle assets with a view toward being capital accretive as opposed to fast, short-cycle assets that destroy capital. Our equity analysts have been arguing for some time for consolidation in the oil industry that sees the return of the dominance of the “seven sisters”—the large, integrated oil companies that have the balance sheets to survive hostile environments like the current one. This event will only accelerate that process. So the long overdue rationalization in the industry is finally set to occur. However, questions around ESG will likely come to a head as these companies will likely be forced to spend on carbon-based fuels again given how much capacity will be destroyed.

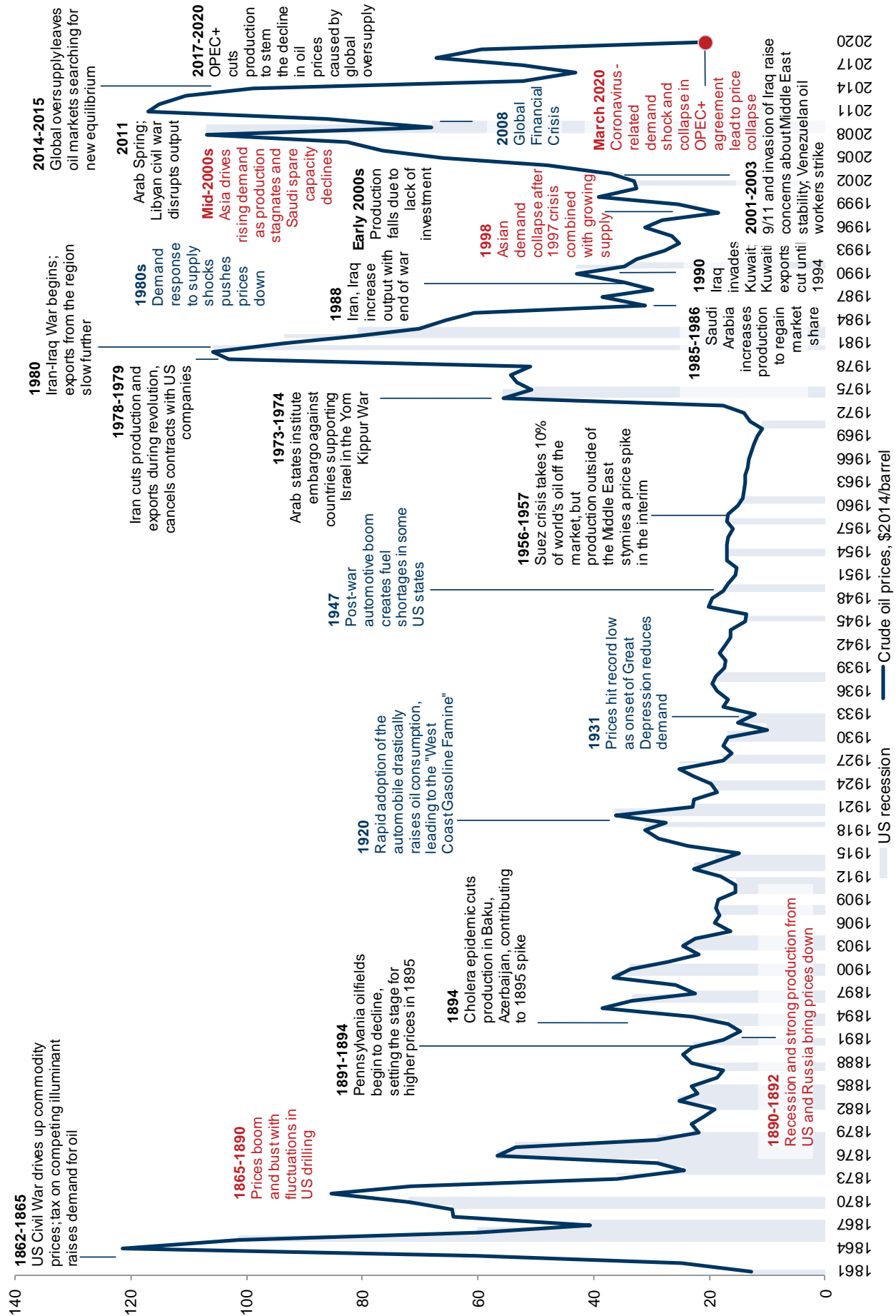
Allison Nathan: So are ESG issues likely to take a step back or forward as a result of these developments?

Jeff Currie: It's unclear. Given the virtual shutdown of key carbon industries, carbon emissions will collapse this year. For example, we estimate that emissions in China will be down more than 20% from their peak. What is interesting about the current shock is that it is decimating the unsustainable industries, and encouraging the sustainable industries. This goes beyond the virtual shutdown of key carbon industries, to, for example, the shutdown of restaurants where red meats are primarily consumed, or the premature slaughtering of livestock herds that cannot access feed in a lockdown, or the suspension of air transport and migrant workers to harvest and deliver fresh fruits and vegetables around the world. People are adapting to a more local existence and living off more sustainable activities, consuming less globally-produced fresh food, producing less waste with a more conservative approach to consumption—all of which may have lasting impacts on demand. But given that cleaner technologies, farming and herding practices, etc., are still nascent, we will likely see reinvestment in carbon-based fuels and less-friendly ESG practices once again, which will divert capital away from the longer-term environmental and sustainability goals. So these events could move us increasingly in the wrong direction, at least over the short-to-medium term.

Allison Nathan: What does this all mean for investors?

Jeff Currie: The wealth destruction in energy over the past decade has been epic. However, recent events will almost certainly reverse this misfortune for those who survive. The industry already had structural underinvestment with capital markets focused on de-carbonization. Now, the oil supply base will likely face large losses combined with massive fiscal stimulus in response to the virus. And don't forget that the Dollar is starting near an all-time high. All are a perfect recipe for exceptional future energy returns. This sounds a lot like early 1999 after oil hit \$8/bbl. But it is still too early to get bullish. The demand losses are unprecedented and only further collapses in price will rebalance this market, which is why we still want to lean short for now. But once the dust settles and some semblance of normalcy reappears, the question will be what to buy? If at that time the world needs 3-5 million b/d of new oil production capacity as we expect, where is the fastest place to source such supply? I hate to say it. Shale.

The long history of oil prices



An earlier version of this chart appeared on pg. 16 of Top of Mind Issue #83: Growth and Geopolitical Risk. Source for data: BP, NBER/Federal Reserve Bank of St. Louis, Haver Analytics. Source for annotations: @James Hamilton, "Historical Oil Shocks," University of California, San Diego, February 2011; various news sources; Goldman Sachs Global Investment Research.

Oil's violent rebalancing benefits shale

Damien Courvalin argues that shale oil is well positioned to benefit from the violent rebalancing of oil markets ahead

The sharp decline in global oil demand is starting to overwhelm local pipeline and storage capacity, leading to collapsing inland US crude oil prices. With saturating logistical infrastructure, we expect production shut-ins will soon be necessary to rebalance the oil markets. Such an abrupt shock to physically re-balance supply with demand is set to generate extreme price volatility in both directions. Paradoxically, while initially challenged by logistical saturation and the Saudi/Russia price war, shale's short-cycle drilling and high pressurized wells leave it well-positioned to benefit from such a violent rebalancing.

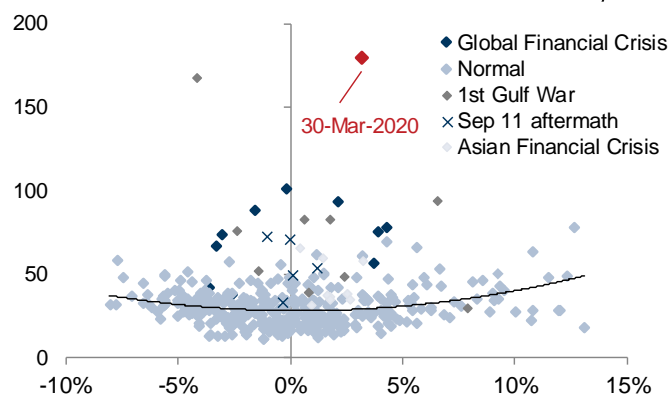
Breaking down volatility

Driving the surge in oil price volatility is the constraint on the ability to accommodate a large energy surplus, which doesn't exist in other non-energy commodities. Once the oil market locally breaches storage capacity, prices need to fall below cash costs to immediately re-balance supply with demand. In practice, the fixed costs associated with the shut-in and restart processes often require much lower prices before producers shut in producing assets. This explains why crude oil prices can go negative and why the most volatile commodity is electricity since it simply cannot be stored given current technology.

Specifically, volatility surges as inventory levels near tank tops because downward price spikes are needed to take supply out of the market and bring it back in line with demand. Each time the market brushes up against infrastructure constraints, oil prices spike to the downside to make oil supplies back off, but once there is new room for storage again, prices will likely pop to the upside, creating violent price moves.

Price volatility spikes as oil nears inventory constraints

WTI front mo. vol. (1m, ann.) vs. US oil stock util. rate, % 5yr av.



Source: EIA, Goldman Sachs Global Investment Research.

This relationship between oil price volatility and inventory levels also suggests that the current high level of price volatility is not an anomaly and likely has some room to move higher as the market tries to fill the dwindling storage capacity. Ultimately, Cushing's landlocked location should also lead WTI price volatility to exceed that of Brent's (a waterborne crude). In fact, high-cost waterborne crude oil that can reach a hip (storage we

have historically never depleted), are better positioned than landlocked crude oil sitting behind thousands of miles of pipe, illustrating why shut-ins are driven by local logistics rather than cost of production.

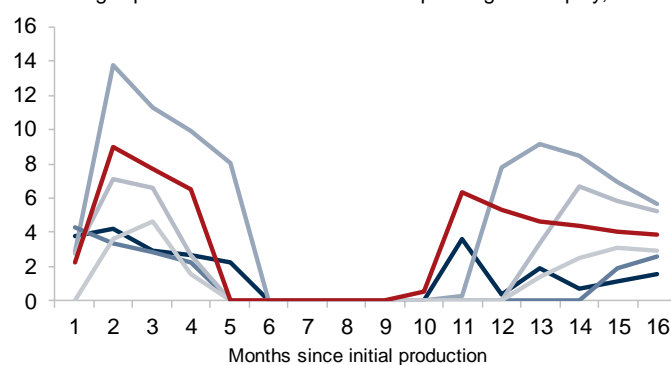
Oil and gas fields are organic deposits with natural decline rates and shutting an older well may leave it uneconomic—or impossible—to bring back online once prices recover. With shut-ins most likely to occur at onshore, mature, depleted oil reservoirs, we see growing risks that a prolonged shut-in would leave the oil market operating at curtailed production capacity once demand starts to recover. This suggests that the oil market could shift to a substantial deficit if shut-in capacity is not able to normalize quickly, or at all.

Shale well-positioned

While initially challenged by localized US logistical and storage saturation, shale increasingly appears poised to benefit from such a violent rebalancing. Geologically, shale stands apart, with the industry already accustomed to briefly shutting in its high-pressured wells to complete nearby wells. This suggests that there is a strong likelihood that oil shale wells will be able to shut in and restart promptly with limited lost capacity, as already evidenced in shale gas wells in recent years. Such output flexibility and the short drilling time of unconventional wells suggests that shale's flexibility is likely to be finally monetized by producers once demand starts to recover to fill any global supply gap.

Natural gas wells already demonstrate shale's flexibility

Av. mon. gas production for shut-in wells in Alipine High shale play, mmmcf/d



Source: IHS, Goldman Sachs Global Investment Research.

Importantly, such output flexibility is unique to shale, Saudi and the UAE. This implies that the coronavirus-led demand collapse may ultimately benefit shale and low-cost producers alike, turning on its head once again the just started [Revenge of the New Oil Order](#). Importantly, Russia may be initially left lagging behind given the potential lasting effect of production shut-ins of its older fields. Despite this silver lining for shale oil, key to the sustainability of such a potential shale resurgence will be how producers and providers of capital harvest shale's flexibility and not lose sight of the rationalization that the shale sector still requires to become a more efficient and profitable industry.

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Goldman Sachs and Co. LLC

Interview with Gary Ross

Dr. Gary Ross is CEO of Black Gold Investors and Founder of the PIRA Energy Group. He is a renowned expert on energy markets and policy issues. Below, he discusses how OPEC+ got into the current price war, and argues that we are likely in for a prolonged period of very low oil prices.

The views stated herein are those of the interviewee and do not necessarily reflect those of Goldman Sachs.



Allison Nathan: Oil markets are clearly dealing with a seismic shock between the virus-related collapse in demand and a renewed war for market share. What's the long and short story of how we got here?

Gary Ross: OPEC has been trying to manage the market for a long time—nearly 60 years—which has become more and more difficult as non-OPEC production has grown. The three core members of OPEC are really Saudi Arabia, which produces about 10 Mb/d on average, the UAE, which produces about 3 Mb/d, and Kuwait, which produces about 2.5 Mb/d—a total of roughly 15.5 Mb/d. Compared to the world's crude oil run of around 85 Mb/d and total global oil demand of slightly over 100 Mb/d, you can see how difficult it is for OPEC to steer the world oil market and control prices. For this reason, they sought to embrace as many producers as possible, and invited Russia to join them. From the perspective of Russia and every other oil exporter, it makes sense to cooperate on volume because the demand for oil is relatively price inelastic. So they all gain revenue from a small reduction in supply.

That was the original game plan, and the Saudis were successful in bringing in the Russians. That was no small feat because Russia had historically held the view that it was more in OPEC's interest to cut than in Russia's interest, and if OPEC was going to cut anyway, Russia might as well just freeride off of those cuts. But Putin nevertheless decided to get involved with OPEC in 2016, perhaps seeing political gains beyond oil gains as he looked to broaden his role on the global stage, and in the Middle East in particular, given his growing involvement in Syria and Libya, and with Iran.

But the reality is the Russians haven't really cooperated, and haven't cut much. In fact, Russia was recently allowed to exclude its growing condensate production from its commitment to OPEC, but has never broken out condensate in its official output numbers, so it has been almost impossible to determine if they are complying with the cuts. When the cuts originally started in 2017, they were allowed to phase in the cuts for several months and, more recently, they were clearly fudging the numbers. So Russia has not been much of a partner, and Saudi alone has cut over half of the 1.7 Mb/d cut that OPEC+ officially agreed to in 2016.

Now, all of a sudden, there is a crisis situation with global oil demand taking a huge hit from virus-related fears and mitigation efforts. Saudi Arabia was looking to get in front of a massively oversupplied situation by cutting production substantially. But the Russians hemmed and hawed given their historical aversion to cutting, with Russian oil producers in particular strongly opposed to further cuts and convincing Putin to not agree to them, at least for the time being. So, today, we

oddly find ourselves in the midst of a global pandemic, a historic collapse in oil demand and a surge in oil production.

Allison Nathan: Given that context, is it fair to say you weren't surprised by Russia's refusal to cut this time, even in the face of the collapse in oil demand?

Gary Ross: Yes, and no. I was surprised because I would've thought that it was in Russia's broad interest to continue to cooperate since they haven't been cutting much in any event. But, on the other hand, I wasn't all that surprised given their skepticism about cutting, even during a crisis. I was part of the effort to try to convince Russia to cooperate with OPEC post 9/11 and in 2009, and got a very strong negative reaction from the Russian oil producers on both occasions.

I also think Putin is quite angry about US sanctions, and sympathetic to the Russian oil companies' view that US production has been taking market share from Russia. To the extent that US shale oil and associated natural gas production decline as a result of all of this, Russian producers benefit. And Russia is well-prepared to weather a period of low prices. Their energy cost structure is low. The fact that the Ruble is now a free-floating currency will help protect the industry because a weaker Ruble will reduce the domestic cost of production, but Russia will still export in Dollar terms. And they've built up a sizable war chest of foreign currency reserves, totaling around \$500 billion.

Allison Nathan: How well prepared is Saudi Arabia to weather a sustained period of low prices, and will they be better off as a result of them?

Gary Ross: Saudi Arabia also has a substantial amount of reserves to help see them through a period of low prices. And they make the same revenue at \$25/bbl Brent crude prices as they do at \$50/bbl prices given their ability to meaningfully increase exports. Under the deal they were contemplating, Saudi exports would have been 6.5 Mb/d in Q2. They're now planning to export 9.2 Mb/d in April—a 40% increase—which will reportedly rise to 10.6 Mb/d in May. They may not be better off in the short-term, but I think there's an argument to be made that they will be better off two years from now, because they will drive out higher cost production and expand the share of oil in the energy complex.

Allison Nathan: More broadly, does it make sense for OPEC+ to pursue a strategy that sharply depresses prices?

Gary Ross: Yes. If you're a major low-cost oil exporter eyeing a massive decline in oil demand, a loss in market share to higher-cost producers, and future additional supplies from other major exporters like Iran, Libya, and Venezuela that are temporarily on the sidelines owing largely to sanctions—not to mention the forces of renewables and ESG bearing down on the fossil fuel market—you feel a need to grow this market. And the best way

to do that is through competitive oil prices to increase oil's relative market share in the global energy balance.

We saw a somewhat similar scenario back in the 1980s, when OPEC tried to maintain prices by cutting production. Initially, their efforts were helped by the loss of Iran/Iraq output during the Iran Revolution and subsequent Iraq/Iran War. But in the early 1980s Iran/Iraq output started coming back just as the expansion of nuclear energy and natural gas increasingly stole demand away from oil, and North Sea and Alaskan oil production rose. Saudi Arabia was forced to cut production dramatically to try and balance the market, with production falling from 10 Mb/d in 1979 to as low as 2.5 Mb/d in June 1985. I remember that period quite vividly because Prince Abdulaziz, the current Saudi Arabian energy minister, was in my office in New York in June 1985, and we discussed what to do given that the demand for oil had dropped so dramatically. It was clear that the only solution was to allow prices to fall. And, indeed, in 1986, Saudi Arabia adopted a market share strategy via a netback crude oil pricing policy, and prices declined dramatically. Over time, the demand for oil picked up quite a bit as oil prices became more competitive, non-OPEC supply slowed, and OPEC's market share started rising again.

So when you step back, recent developments are a similar culmination of an unsustainable supply management strategy that is coinciding with an enormous demand shock, and the answer has to be low prices. The policy makes sense, and leads to the conclusion that this may not end all that quickly.

Allison Nathan: So how long will very low prices last?

Gary Ross: I think it's likely to be a prolonged period of very low prices. With the demand loss and supply increase we're facing, the inventory build in the first half of this year is going to be huge, completely filling up all onshore storage capacity and even floating storage. Virus mitigation measures have been getting more restrictive by the day, resulting in an ever-larger hit to oil demand. And with the Saudis already selling crude oil on the basis of their official sales prices for April, which won't arrive in the US until June, the die on the supply side is cast for the second quarter, at least.

So prices are going to be under tremendous pressure, and will fall below breakeven costs for some production as storage capacity is filled, which will lead to production shut-ins around the world, especially in the United States but also in Canada and South America. You can make the theoretical argument that we need a forward, say 18 month-out, WTI price of \$30 to \$35/bbl to drive down shale volume in two years' time and make room for additional OPEC volume. And if we fill up the tankers, we could have a \$15-20 contango or more, so the front end of the market could be in the teens or even single digits. It already is in the teens for various grades in the United States, and even single digits in Canada. This theory only works if you have available storage capacity, which I'm afraid will not be the case, resulting in massive production shut-ins. I worry how financial markets will react to this.

Looking ahead, how this surplus gets resolved and how long oil prices remain at these very depressed levels has much less to

do with OPEC+ actions than with the trajectory of the pandemic and the associated mitigation efforts and behavioral shifts in response to it given the enormity of the current virus-related demand loss. If efforts to control the pandemic are successful within the next 3-4 months, and we start to rebound in the summer, then we could see a huge surge in demand growth in 2021. The demand growth could shock everyone, because my feeling is that there's pent-up demand for oil, and all you've done is postpone it. But, of course, if the pandemic drags on, so will the oil market's oversupplied situation and very low prices. There is also an issue of how much demand has been permanently lost by behavior change, e.g. more people working from home, etc.

Allison Nathan: Does the fact that we're back to the 1986 market share maximization strategy suggest that OPEC's efforts to manage supply just won't work anymore?

Gary Ross: I don't think so. The core group of OPEC countries has been able to manage prices effectively as long as the demand for their oil has remained within a relatively narrow band. The problems start when there's a huge imbalance like there is today, which they don't have a prayer of managing alone given the small share of crude oil they're responsible for relative to the much larger overall market. So, right now, we've lost the price anchor that OPEC typically provides. Our only anchor is what price the market needs two years from now to make room for all this spare capacity sitting on the sidelines. But, over time, OPEC's market share will grow, their ability to affect prices will increase, and they will have a greater ability to re-establish an anchor and manage the market.

“The core group of OPEC countries has been able to manage prices effectively as long as the demand for their oil has remained within a relatively narrow band. The problems start when there's a huge imbalance like there is today, which they don't have a prayer of managing alone.”

Allison Nathan: Given all of the above, what's your advice for oil investors today?

Gary Ross: Oil equities are a difficult investment vehicle at this time, because we likely have not seen the oil price lows yet, massive shut-ins are coming, and we are going to have a prolonged period of very weak prices that will challenge the industry. A huge change in the industry is coming and, unfortunately, it will be a painful one for those currently in it. Nothing will be clear until we have the virus under control. Regrettably, containment has failed and now we are in a more drawn-out phase of mitigation, which is doing a lot of economic damage. We need this damage to stop and then reassess.

Russia: keeping the fortress safe

Clemens Grafe argues that Russia faces the shock to global oil prices from a position of strength, but the test will be domestic trust in the macro framework in place since 2014

Since relations with the West sharply deteriorated in 2014, Russia's policy has been geared towards what we've coined building "fortress Russia." Raising the walls meant forgoing short-term economic benefits in order to build up economic buffers and adjust the domestic macro policy framework in ways that would make it more difficult to force the country into abandoning its geopolitical priorities.

While President Putin in early 2018 proclaimed that the walls had been raised high enough, and the focus should shift towards promoting growth—implying some loosening of policy—this recalibration was still very much its infancy when oil prices started to fall sharply in recent weeks.

As a result, cyclical buffers such as low inflation and a high current account surplus, as well as financial buffers such as a robust oil fund and substantial foreign exchange reserves, remain intact. That means Russia is facing the current double whammy of an oil shock and a global recession from a position of relative strength.

In our view, the extent to which these shocks will ultimately affect the Russian economy is largely a function of the trust and confidence that Russian households and corporates have in the recently adopted macro framework. As long as trust is maintained, the financial balances available should easily be sufficient to buffer these shocks better than in the past, and leave Russia more resilient to them than most other economies.

Building a fortress

In recent years, Russia has followed a two-pronged approach to insulating its economy against external shocks. It changed its fiscal and monetary policy framework and raised the country's savings rates to operate the economy as if oil prices were close to \$40/bbl, while also accumulating financial buffers. More specifically, it fully floated the Ruble in 2014, moved to inflation targeting with an inflation target of 4%, and cleaned up its banking sector, shutting about half of its domestic banks in the process.

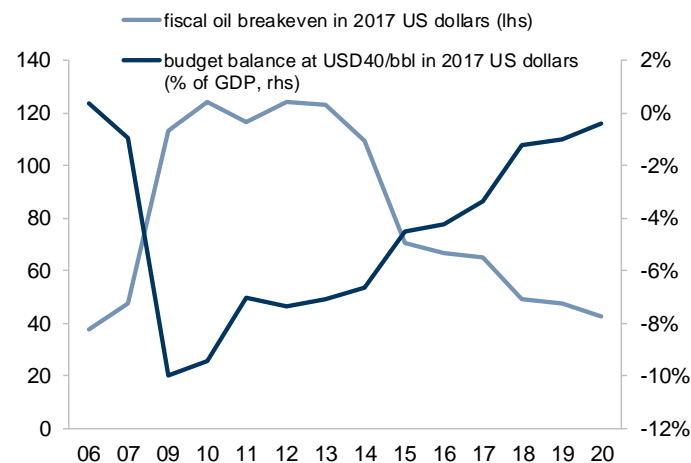
On the fiscal side, it imposed 5 years of severe austerity, cutting the non-oil budget deficit by half to slightly more than 5% of GDP in 2019. In the process, it reduced the fiscal breakeven price (the oil price needed to balance the budget) to below \$50/bbl for Brent in 2019. This allowed the authorities to adopt a fiscal rule in 2017 that caps oil revenues available for funding the budget at those accruing at a Brent crude oil price of \$40/bbl, with the rest going into a designated oil fund.

With oil prices above that level in recent years, the Ministry of Finance has been able to grow its oil fund by \$110bn to \$170bn (~10% of GDP). Under the fiscal rule, the Ministry of Finance will be insulated from falling oil revenue stemming from the recent collapse in oil prices through compensation from this oil fund at levels on par with those that would accrue at a \$40/bbl

oil price, indexed by 2%. This will remain the case as long as there are sufficient resources in the fund. In practice, this means that even if oil prices fall to as low as \$15/bbl, it would take at least 2 years before the Ministry of Finance would need to adjust its budget lower due to oil revenue shortfalls.

Russia's budget breakeven has fallen sharply below \$50/bbl

Fiscal breakeven, '17 USD (lhs); budget balance at \$40/bbl, % of GDP (rhs)



Source: Haver Analytics, Goldman Sachs Global Investment Research.

External risks, internal discipline

The resilience of Russia's budget is not new, though it is now codified in a fiscal rule. Since the Russian financial crisis in 1998, Russia's Achilles' heel during oil shocks has not been its fiscal accounts, but rather external vulnerabilities. The key culprit of this has not been the fall in oil revenues itself, but instead capital outflows triggered by falling oil prices, with locals fleeing the Ruble accounting for the largest share of those outflows. In the past, the flight to Dollars by locals was at least partially driven by the CBR intervening and preventing a front-loaded depreciation of the currency, allowing households and corporates to dollarize at advantageous exchange rates.

As a result, the Ruble would ultimately overshoot and inflation expectations would be de-anchored. The risk of this dynamic is now smaller given that the CBR has allowed a front-loaded Ruble adjustment and inflation targeting has helped anchor price expectations. Nevertheless, we believe that the biggest risk of a more discontinuous impact of oil prices on the Russian economy is the potential for locals to once again lose confidence in the CBR.

Encouragingly, the CBR does not take the public's trust for granted today. Evidence of this is its decision to keep rates on hold at its last meeting when almost all other central banks globally cut rates, despite the fact that Russia's inflation rate remains well-below target at 2.3% and Russian real rates remain much higher than elsewhere. Keeping the "fortress" safe is still the number one priority. While this will likely reduce growth in the near term—and we indeed forecast a recession in the Russian economy in H2 2020—it is also a key reason why we expect the Russian recession to be quite shallow.

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Saudi: how long can it stay the course?

Farouk Soussa argues that political viability will be key to determining whether the Kingdom can stay the course on its current oil policy

Saudi Arabia's reluctance to bear the burden of balancing global oil markets alone has taken oil markets by surprise twice in this past decade: in 2014 and again on March 7, when the Kingdom slashed its prices and announced a planned increase in oil production. Today, as in 2014, Saudi is pursuing a market share policy, which it considers the most viable alternative to a comprehensive burden-sharing agreement with other major oil producers in OPEC and beyond. The trigger came on March 6, when Russia declined to accommodate Saudi demands for deeper production cuts in response to sharply slowing global demand. For Saudi, it seems, the choice is a binary one: oil producers either stand together, or they go it alone.

Analysts have, however, questioned whether such a stance is sustainable. The precipitous drop in oil prices in recent weeks is likely to deal a big blow to the Saudi economy, now also reeling from the impact of the COVID-19 pandemic. Government revenues will drop sharply and will force spending cuts at a time when the economy is in need of more fiscal stimulus. And some analysts have raised concerns that the Riyal peg to the Dollar could come under pressure if the country's FX reserves come under too much pressure. So how much pain is coming Saudi's way, and how long can they bear it?

Three scenarios point to a difficult 2020

We have carried out an impact study on the Saudi economy under three oil price scenarios, all of which assume the Kingdom continues to pursue a market share strategy and pump more oil. The base case assumes Brent oil prices gradually begin to recover from the end of this year, stabilizing at \$60/bbl by end 2021. The downside scenario assumes a slightly weaker recovery, to \$50/bbl by end 2021. And the worst case assumes Brent stays put at around \$30/bbl for the foreseeable future.

Under all three scenarios, 2020 is going to be a difficult year: the budget deficit could blow out to as much as 18% of GDP, much of it financed by government fiscal reserves. This, along with the expected deterioration in the trade balance, could see FX reserves fall from around \$500bn today, to under \$400bn by the end of the year, a move which is likely to increase speculation around the Riyal peg.

In the base case, however, things get better quickly. The budget deficit narrows sharply as oil prices recover and the Kingdom pumps more oil. Indeed, the combination of higher oil production and a recovery in oil prices by end 2021 could see Saudi Arabia in a stronger position fiscally, externally and maybe even economically than it had been anticipating prior to the shift in production policy on March 6.

In the less benign scenarios, however, the outlook looks decidedly less encouraging. In our worst case scenario, without a significant tightening in the current fiscal stance government debt would rise sharply, fiscal reserves could run out within

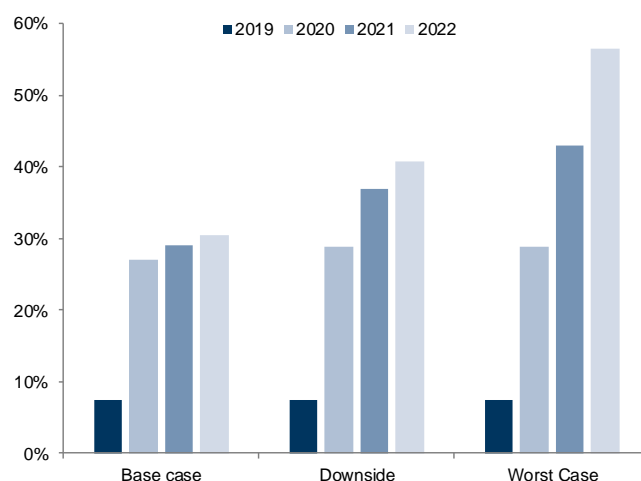
two to three years, and the trade deficit would continue to erode FX reserves at a rate of almost \$70bn per year. To protect itself against this sort of balance sheet deterioration, the Kingdom would need to cut spending drastically and undergo a sharp internal economic adjustment.

Political viability will be key

In the longer term, progress on ongoing structural reforms aimed at diversifying the economy away from oil and reducing the role of government in driving economic growth would help the Kingdom recover and would improve its resilience to future shocks. In the meantime, however, economic losses could be significant, and would be felt by the population as a whole. Ultimately, we think the extent to which this is politically viable will be the primary factor in determining whether Saudi Arabia stays the current course on oil policy.

Net debt will rise sharply under the worst case scenario...

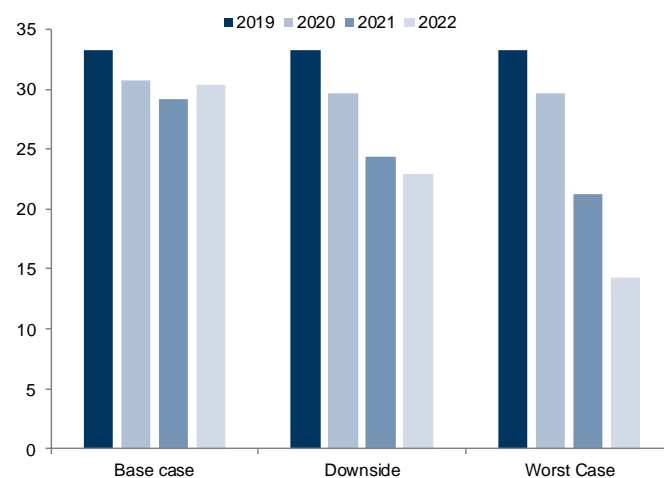
Net debt/GDP, %



Source: Goldman Sachs Global Investment Research.

...and reserves will fall rapidly

Months of imports



Source: Goldman Sachs Global Investment Research.

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Goldman Sachs International

US shale: down but not out

Brian Singer argues that despite significant shale scaleback ahead, the industry should survive in a more consolidated, healthier form

The sharp downturn in global oil demand driven by shutdowns in economic activity in response to the coronavirus, combined with OPEC and Russia's recent decision to increase production and production capacity, is likely to continue to put substantial financial pressure on US Exploration and Production firms (E&Ps)—and on oil producers broadly—until a better market balance is achieved. While global demand shocks have happened before, last seen in 2008-09, and OPEC supply surges have also occurred, for example in 2014-16, the simultaneous shock to global oil markets is unprecedented.

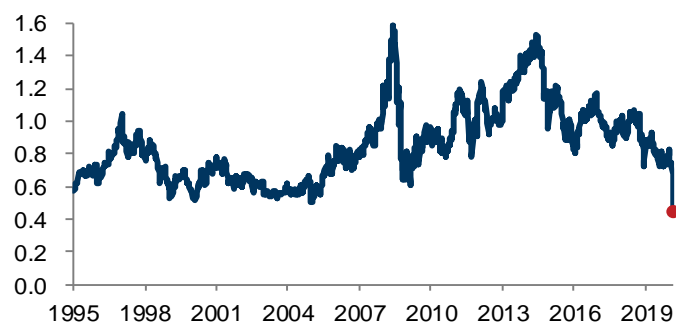
The shale scaleback

Our commodities team expects these simultaneous supply and demand shocks to push oil prices to or below cash costs of \$20/bbl for Brent crude oil as inventory capacity is breached in 2Q. While the independent producers we cover have hedges that mitigate downside risk on more than 40% of their 2020 oil production, we nevertheless expect to see a swift scaleback in US shale production—last seen in 2015-16—in the near term.

For context, during 2012-19, US oil production grew at a 10% compound annual growth rate (CAGR), and US oil and natural gas liquids production growth represented more than 120% of global demand growth. If we were to see a complete absence of any drilling or completion activity as a result of the recent oil price collapse, we estimate that US shale production would decline from 8 Mb/d in 2019 to roughly 5 Mb/d. For now, we expect to see a 50% decline in US drilling rigs, or a 35% yoy cut in oil capex this year, which we believe will lead to a nearly 1.5 Mb/d yoy decline in US oil production over five quarters starting 3Q20.

Upstream valuations have moved to levels of historical pre-shale troughs — around 50 cents per Dollar invested

EV/gross cash invested adj. for shifts in 5-yr avg. cash return on cash inv.



Source: FactSet, Company data, Goldman Sachs Global Investment Research.

Looking ahead, the ultimate recovery in oil demand will be an important determinant of the long-term cash flow potential for companies in multiple Energy subsectors either directly (Refiners), indirectly via longer-term supply growth (E&P, Oil Services) or both (Integrated Oils, Midstream). Assuming a V-shaped recovery in global demand, we see a return to mid-

cycle oil prices around \$60/bbl for Brent before the end of 2021. In our view, this should lead to an improvement in drilling starting in early 2021. But producers are minimally hedged for 2021. As a result, the potential for a slower and longer recovery poses risks to the financial health of US producers as well as to the timing of a rebound in US supply, which we currently expect to start growing again on a year-over-year basis in 2022.

A smaller, healthier shale industry

While this downcycle is unlikely to lead to the demise of the US shale industry, it will likely reduce the number of companies driving growth across key Energy subsectors. We see three key areas of medium- to longer-term impact on US oil producers:

- (1) Further bifurcation between larger-scale shale producers with stronger balance sheets, and producers with less scalable asset positions and weaker balance sheets.
- (2) Acceleration of management focus on generating corporate returns/FCF after years of focusing on growth.
- (3) Increasing industry consolidation.

These three factors should concentrate longer-term growth among a smaller group of producers consisting of the Majors and large independents with strong balance sheets, contiguous acreage positions, and the ability to use scale to differentiate their supply costs. When we do see normalization, a new industry landscape will emerge with greater differentiation among the companies with sustainable LEADership – **L**everage, **E**arnings, **A**sset longevity and **D**ecarbonization.

Investing in this shale cycle

This transformation of the US shale industry will create both challenges and opportunities for energy equity investors. We see five unique phases of the cycle:

- Phase 1 (Now): Move to cash costs
- Phase 2 (2Q20): Bottoming out
- Phase 3 (2H20): Recovery
- Phase 4 (2021): Healing/consolidation
- Phase 5 (2022): Sustainability debate

In Phase 1, we recommend avoiding companies with weaker balance sheets and debt coming due. But we note that valuations are at or below 25-year troughs on the basis of EV/gross cash invested (cents on the Dollar per Dollar invested), and so in Phases 2-4, we focus on owning the more secularly well-positioned companies.

We also see two secular themes that we believe will outlive the current downcycle. The first is continued rapid growth in renewables in the US and globally. The second theme is low-cost oil growth from Guyana, an area that we think has attractive economics sub-\$40/bbl Brent prices and will grow from no production a year ago to more than 1.5 Mb/d by the early 2030s.

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Goldman Sachs and Co. LLC

Oil: another headwind to credit markets

Amanda Lynam argues that the collapse in oil prices will weigh on IG and HY credit markets, but won't pose a systemic risk

Unsurprisingly, the recent collapse in oil prices [has weighed heavily](#) on the performance of the IG and HY Energy sectors. The Bloomberg Barclays IG Energy index has generated a -29.8% YTD excess return, compared to -14.2% for the broader IG market. The underperformance in HY has been even more pronounced. HY Energy has lost -44.2% so far this year, compared to a -17.6% total return for the broader HY market. Even at these depressed valuations, [we remain cautious on the sector](#) as we struggle to see upside in Energy.

Limited capital and demand

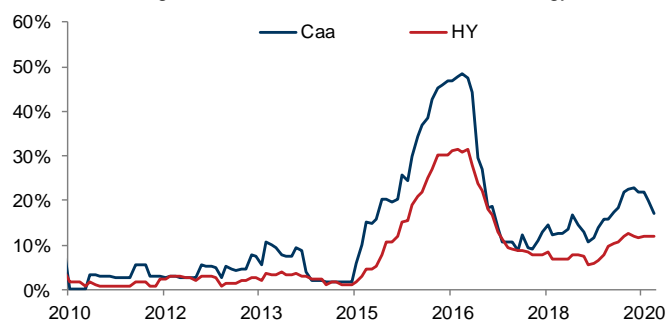
Like the onset of the New Oil Order in 2014-16, when a surge in US shale oil production led to a sharp oil price decline, constrained access to capital markets—coupled with a sharp decline in profitability—will likely fuel more financial distress among Energy issuers. Capital markets access remains constrained for all but the highest quality IG Energy issuers. And generating cash flow organically will be challenging, at least in the near-term. Our commodities team now [forecasts](#) WTI crude oil will average just \$20/bbl in 2Q20. This is well below the average HY E&P breakeven level estimated by our Energy analysts (\$47/bbl). These earnings and cash flow headwinds will add to the pressure from the [upcoming debt maturity wall](#), which remains heavy for the HY Energy sector.

But unlike in 2014-16, which was a pure oil supply shock, the current episode also has a strong demand component. Our economists [now believe](#) coronavirus mitigation measures have pushed us into a recession, which is already weighing strongly on oil demand. And even beyond these recent negative developments, investors have shown less interest in owning HY Energy in recent years, in response to (1) operational missteps and (2) the growing importance of ESG mandates.

Given the strong headwinds posed by the simultaneous supply and demand shock, [we believe](#) it is possible for HY Energy default and downgrade rates to surpass the levels from the 2015 peak. Within IG, we also expect continued broad-based ratings pressure—especially among the sizable BBB cohort, some of which have already become “fallen angels.” With more than \$291 bn of market value outstanding, Energy represents nearly 10.9% of the Bloomberg Barclays BBB Corporate index.

HY Energy default rates may surpass 2015 peak

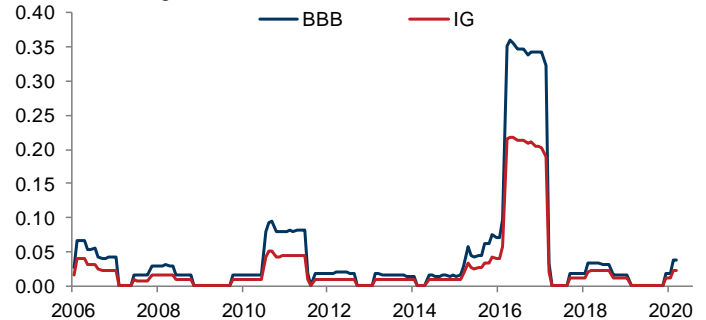
12-month trailing default rate for CCC and HY-rated Energy issuers, %



Source: Moody's, Goldman Sachs Global Investment Research.

Fallen angel downgrade risk skewed to the upside relative to 2015-16

12-month trailing transition rate to HY for the Oil & Gas sector, %



Source: Moody's, Goldman Sachs Global Investment Research.

A broader impact

More broadly, the pressure on the Energy sector will continue to weigh on the wider IG and HY markets, as it did in 2014-16. While lower relative to mid-2014, the share of Energy in the IG and HY markets still remains significant. Energy currently represents 8.3% (\$92 bn) of the Bloomberg Barclays USD HY index and 7.6% (\$415 bn) of the IG Index. These sizeable exposures, coupled with a material earnings shock, will remain an overhang on spreads at the index level.

And these commodity and virus-related earnings pressures are occurring against a backdrop of broader [deterioration in fundamentals](#) for IG and HY borrowers. One of the key differentiators of this cycle has been the much less conservative stance of [non-financial corporations vs. households](#) in deploying debt on balance sheets. While the mindset of non-financial corporations, especially BBB-rated ones, has turned somewhat more conservative over the past few quarters, [sluggish earnings](#) growth has delayed progress on debt reduction plans, fueling more “passive” balance sheet re-leveraging. Put another way, the ability of non-financial corporations to withstand negative exogenous shocks had been greatly diminished—even prior to the recent market volatility. Indeed, the average net leverage (equal weighted) for 45 of the largest BBB-rated non-financial issuers – representing \$1 trn of index-eligible debt across some of the most acquisitive IG sectors – [has deteriorated by 0.61x since 2017](#).

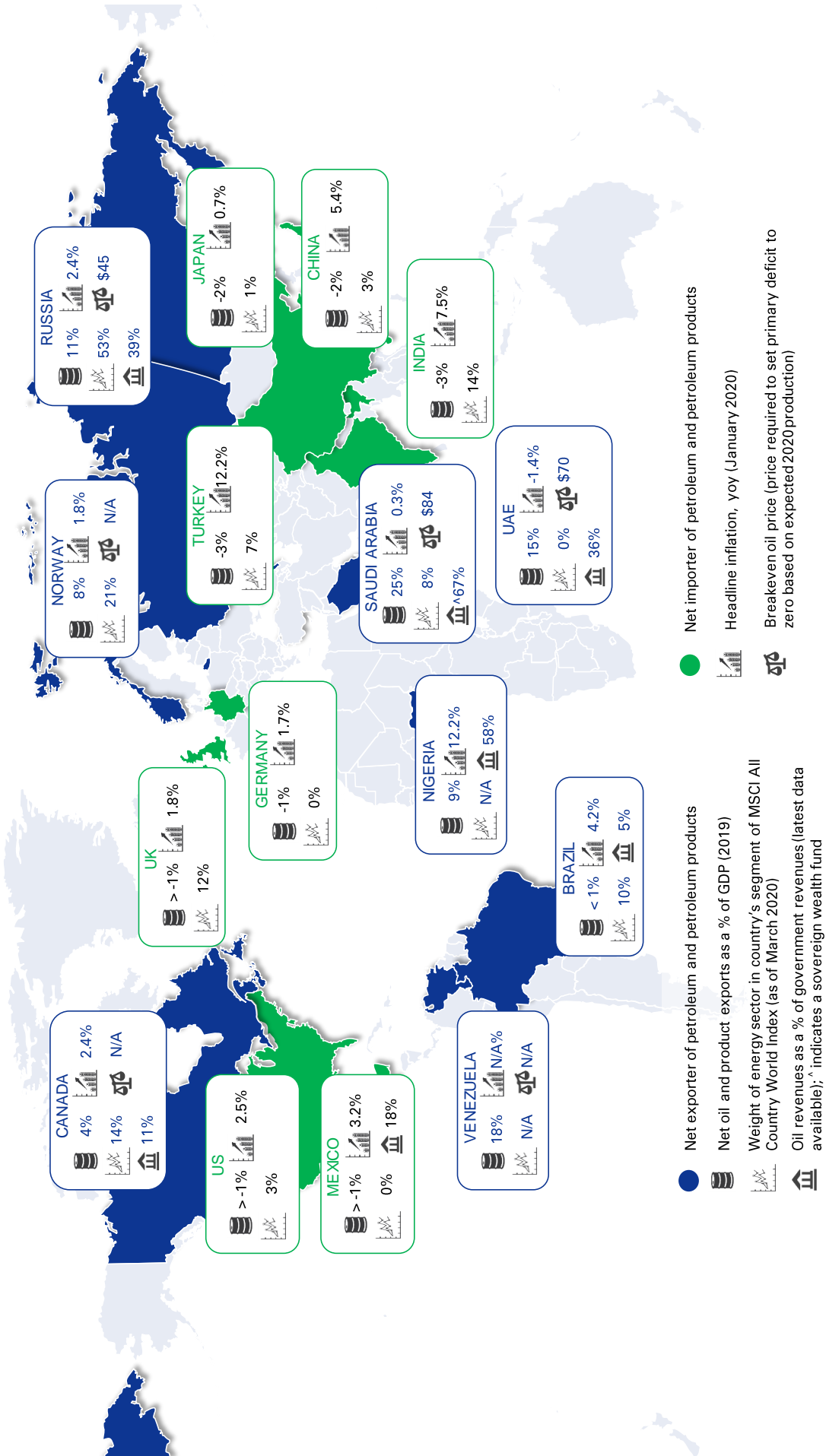
That said, these pressures are unlikely to pose systemic risk to the broader financial markets, as recent policy responses have [reduced a major source of tail risk](#). By directly intervening in the corporate bond market, the Fed has implicitly embraced a role of “market liquidity” provider of last resort, which substantially reduces the tail risk of further impairment of the price discovery process that would lead to a freeze of the new issue market and a severe contraction in credit availability for otherwise creditworthy firms.

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Oil exposure: the facts



Note: Net exports as a percent of GDP calculated by taking 2019 supply minus demand times a \$60 bbl price assumption divided by GDP.

Sources: Net exports/imports as a share of GDP – Goldman Sachs Global Investment Research; FX – Haver Analytics; Energy sector weights in MSCI All World Index – MSCI, FactSet; Breakeven prices and oil revenues as a share of government revenues – IMF.

Summary of our key forecasts

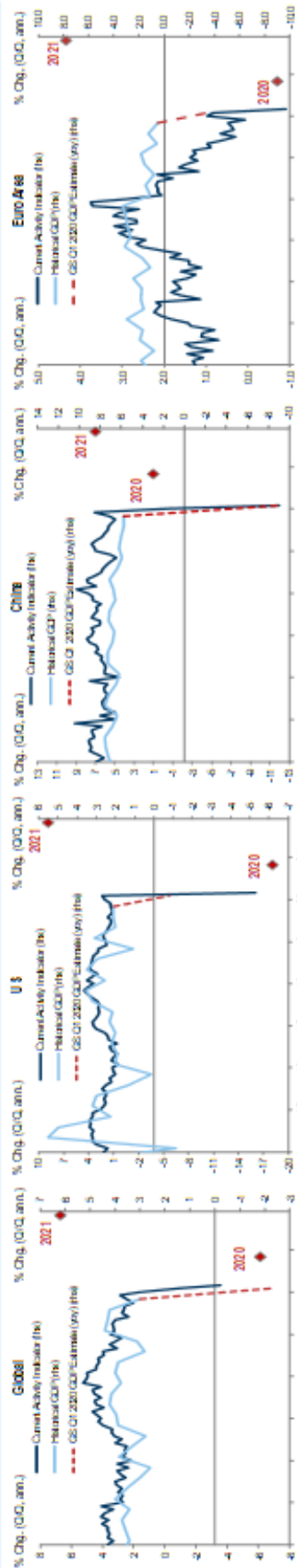
GS GIR: Macro at a glance

Watching

- Globally, we now think the coronavirus crisis has pushed the economy into a deep recession. We expect global real GDP to contract by 1.8% this year, making 2020 weaker than the year following the Global Financial Crisis. We expect the global recession to be front-loaded, with a recovery in H2, assuming that the physical constraints on economic activity gradually loosen towards the end of Q2. But the risks to our forecasts are skewed to the downside, mainly because it may take longer than we expect to slow new infections.
- In the US, we now expect that sharper-than-anticipated hits to services consumption, manufacturing activity, and construction, as well as significant labor market effects, are leading to an exceptionally significant near-term contraction in economic activity. We now forecast US growth to decline by -3.4% qoq ann. in Q2 with a stronger recovery in H2, resulting in a 6.2% yoy decline in 2020, although there is substantial uncertainty around the path of the recovery.
- In addition to returning rates down to zero and starting asset purchases, the Fed brought back several crisis-era facilities to provide corporates with funding amid significant market pressures, relaxed capital buffers and reserve requirements, and activated FX swap lines with other central banks. Especially given that the Phase 3 fiscal legislation provided \$454bn (2.2% of GDP) in funds to the Exchange Stabilization Fund (ESF), which could be used to backstop Fed facilities, we believe these measures will go a long way toward reducing the risk of systematic damage during the downturn.
- In the Euro area, we expect that the coronavirus outbreak will lead to a 9% yoy decline in real GDP in 2020, owing to a large H1 contraction. Looking across countries, we expect larger contractions and slower normalizations of activity in Italy and Spain than in northern Europe.
- We expect the ECB's pandemic emergency purchase program (PEPP) to contribute to debt sustainability by containing bond yields in southern Europe. We expect Euro area countries to agree to a European Stability Mechanism (ESM) credit line with limited conditionality which, together with the ECB's Outright Monetary Transactions (OMT) program, would provide an effective backstop for the Euro area.
- In China, we expect real GDP to contract by 8% yoy in Q1 owing to the virus outbreak before rebounding strongly in subsequent quarters, assuming the virus broadly comes under control worldwide by Q3 and accommodative monetary and fiscal policies generate positive growth impulses globally. On net, we forecast 3% yoy GDP growth in 2020, though this assumes the pandemic comes under control over the next few months.
- WATCH CORONAVIRUS. While the severity of the economic impact from the coronavirus remains highly uncertain, our base case assumes that the lockdowns and other measures will succeed in slowing new infections within a few months of their initial adoption, as they seem to have done in China. However, the risks to our global growth forecasts remain on the downside, especially if it takes longer than we expect to slow new infections.

Goldman Sachs Global Investment Research

Growth



Source: Haver Analytics and Goldman Sachs Global Investment Research.
 Note: GS CAI is a measure of current growth. For more information on the methodology of the CAI please see ["Tracking All Over the World - Our New Global CAI"](#), Global Economics Analyst, February 26, 2017.

Forecasts

Economic	2020				2021				Markets				Equities			
	G.I.	Mkt.	G.I.	Mkt.	2020	2021	2020	2021	FX	12m	12m	12m	12m	YTD	E20 20 PE	
GDP growth (%)	-1.8	2.5	6.2	3.3	0.70	0.75	1.35	1.35	EUR/USD	1.10	1.08	1.15	1.15	18.0	-19.0	15.9x
Global	-1.8	2.5	6.2	3.3	0.70	0.75	1.35	1.35	GBP/USD	1.24	1.23	1.34	1.34	18.0	-19.0	11.9x
US	-3.4	1.2	5.5	2.0	0.00	-0.15	0.05	0.05	USD/JPY	108	102	105	105	4.0	-16.0	13.5x
China	3.0	4.0	8.5	6.2	0.19	0.45	0.85	0.85	Commodities	7.08	7.15	6.90	6.90	18.0	-26.0	12.3x
Euro area	-9.0	-1.0	7.8	1.5	0.19	0.45	0.85	0.85	Crude Oil Brent (\$/bbl)	23	20	45	45	3.0	3.3	3.2
Policy rates (%)	0.13	0.12	0.13	0.18	0.13	0.18	0.18	0.18	Crude Oil WTI (\$/bbl)	17	1.6	3.5	3.5	2.4	2.2	2.4
US	-0.50	-0.58	-0.60	-0.58	1.7	1.6	3.5	3.5	Nat Gas (\$/mmbtu)	4.76	4.90	6.00	6.00	7.0	7.0	7.0
Euro area	1.90	1.97	2.25	2.13	1.618	1.600	1.800	1.800	Copper (\$/lb)	3.6	3.6	3.6	3.6	7.0	7.0	7.0
China	-0.10	-0.06	-0.10	-0.06	1.618	1.600	1.800	1.800	Gold (\$/toz)	1.618	1.600	1.800	1.800	7.0	7.0	7.0
Japan	-0.10	-0.06	-0.10	-0.06	1.618	1.600	1.800	1.800	Wage Tracker 2018 (%)	1.6	1.6	1.6	1.6	7.0	7.0	7.0

Source: Bloomberg, Goldman Sachs Global Investment Research. For important disclosures, see the Disclosure Appendix or go to www.gs.com/research/note.htm.

Market pricing as of March 30, 2020.

Glossary of GS proprietary indices

Current Activity Indicator (CAI)

GS CAIs measure the growth signal in a broad range of weekly and monthly indicators, offering an alternative to Gross Domestic Product (GDP). GDP is an imperfect guide to current activity: In most countries, it is only available quarterly and is released with a substantial delay, and its initial estimates are often heavily revised. GDP also ignores important measures of real activity, such as employment and the purchasing managers' indexes (PMIs). All of these problems reduce the effectiveness of GDP for investment and policy decisions. Our CAIs aim to address GDP's shortcomings and provide a timelier read on the pace of growth.

For more, see our [CAI page](#) and [Global Economics Analyst: Trackin' All Over the World – Our New Global CAI, 25 February 2017](#).

Dynamic Equilibrium Exchange Rates (DEER)

The GSDEER framework establishes an equilibrium (or "fair") value of the real exchange rate based on relative productivity and terms-of-trade differentials.

For more, see our [GSDEER page](#), [Global Economics Paper No. 227: Finding Fair Value in EM FX, 26 January 2016](#), and [Global Markets Analyst: A Look at Valuation Across G10 FX, 29 June 2017](#).

Financial Conditions Index (FCI)

GS FCIs gauge the "looseness" or "tightness" of financial conditions across the world's major economies, incorporating variables that directly affect spending on domestically produced goods and services. FCIs can provide valuable information about the economic growth outlook and the direct and indirect effects of monetary policy on real economic activity.

FCIs for the G10 economies are calculated as a weighted average of a policy rate, a long-term risk-free bond yield, a corporate credit spread, an equity price variable, and a trade-weighted exchange rate; the Euro area FCI also includes a sovereign credit spread. The weights mirror the effects of the financial variables on real GDP growth in our models over a one-year horizon. FCIs for emerging markets are calculated as a weighted average of a short-term interest rate, a long-term swap rate, a CDS spread, an equity price variable, a trade-weighted exchange rate, and—in economies with large foreign-currency-denominated debt stocks—a debt-weighted exchange rate index.

For more, see our [FCI page](#), [Global Economics Analyst: Our New G10 Financial Conditions Indices, 20 April 2017](#), and [Global Economics Analyst: Tracking EM Financial Conditions – Our New FCIs, 6 October 2017](#).

Goldman Sachs Analyst Index (GSAI)

The US GSAI is based on a monthly survey of GS equity analysts to obtain their assessments of business conditions in the industries they follow. The results provide timely "bottom-up" information about US economic activity to supplement and cross-check our analysis of "top-down" data. Based on analysts' responses, we create a diffusion index for economic activity comparable to the ISM's indexes for activity in the manufacturing and nonmanufacturing sectors.

Macro-Data Assessment Platform (MAP)

GS MAP scores facilitate rapid interpretation of new data releases for economic indicators worldwide. MAP summarizes the importance of a specific data release (i.e., its historical correlation with GDP) and the degree of surprise relative to the consensus forecast. The sign on the degree of surprise characterizes underperformance with a negative number and outperformance with a positive number. Each of these two components is ranked on a scale from 0 to 5, with the MAP score being the product of the two, i.e., from -25 to +25. For example, a MAP score of +20 (5; +4) would indicate that the data has a very high correlation to GDP (5) and that it came out well above consensus expectations (+4), for a total MAP value of +20.

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