LGIMA's Multi-asset Market Update

March 2020

Equity market

In our last report, the coronavirus was, to our knowledge, geographically distant but had the same ominous feel as the cloud of dust rising ahead of an approaching enemy. We pointed out that market-turned-virus pundits seemed overly sure that either the situation would quickly resolve as a non-event or result in absolute panic, with very few opinions between. We are not surprised that, at least currently, we remain between the two extremes, although certainly far away from a non-event and with plenty of tail risk lingering. Despite neither extreme fully materializing so far, what we are astounded by is that in the matrix of outcomes we presented as a simplification we are squarely in the fragile market quadrant. It is difficult to nearly impossible to anticipate how long this fragility will last, what other market ripples it will cause, and whether it will conspire with the impact on the real economy that we expect to inhibit an orderly and quick economic recovery.

Market Reaction	Virus: Extremely serious	Virus: No big deal
Resilient	(green)	(green)
Fragile	(red)	(green)

We will leave some of the fascinating detail behind the market fragility to the subsequent sections for each major asset class and associated options markets. We will briefly focus this monthly summary on both our remaining fears and signposts for recovery, both in market function and in the global economy.

With respect to market functioning, it has been widely noted that the speed of the current correction is the fastest ever, and both realized and implied volatility levels that we see now have only been matched by the 2008 crisis. To be clear, the current environment is a new form of dysfunction. However, we should hardly be surprised by it. Since the GFC, technology and markets have evolved to be more responsive and to enable access to more asset classes, instruments and risk premia to a broader population of investors. Information and data availability, as well as the speed of their transmission, has continued to accelerate. One need only to consider the enormous audience and popularity of "FinTwit"—the economics, investing and trading community linked through Twitter. Investors and traders have responded by building strategies to systematically capture alternative risk premia, momentum and sentiment signals and fundamental changes with remarkable accuracy and agility. Trading has adapted to this, as well, moving more to electronic platforms and trading strategically either at discrete times or selectively throughout the day as the strategy dictates. Supported by ample liquidity, fiscal stimulus and strong underlying fundamentals, that market becomes an irresistible force.

Until it meets the immovable object of uncertainty that is a global pandemic—one that is truly unprecedented in our lifetimes and that is infecting both bodies and the economic and political ecosystems in which we live. We have created a fragile market. This was prognosticated, and the results were predicted. It was not universally acknowledged, but I will be floored if the retrospectives to be written on our current situation don't focus on that fact with a thick slathering of hindsight. "Up on an escalator,

down on the elevator" is euphemism too quaint and too polite to fairly represent our (the collective "our"—your, our, our friends', colleagues' and competitors') current experience.

Nevertheless, we write from Chicago, which has pivoted from seeming unawareness of local risks to a nearly complete shutdown in about 48 hours. Meanwhile, our global team is pivoting from bearishness to hopefulness that signs of abating uncertainty regarding the spread and duration of the pandemic will appear. To be clear, we are not anticipating an abatement of damage from the virus imminently, but rather a collective acceptance of doing what is necessary to contain it and the readiness to make repairs.

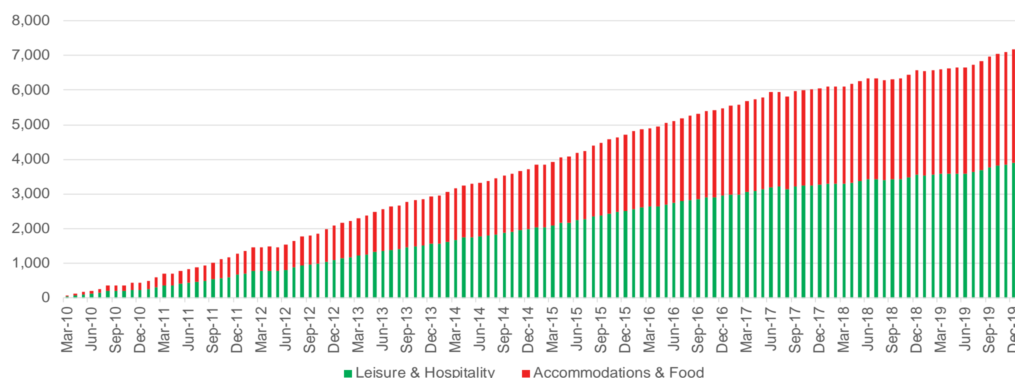
In markets, we remain concerned that parts of the credit market remain vulnerable, and that the speed of this correction may mean that we will experience aftershocks for some time (e.g., most obviously how forward guidance in 1Q20 earnings will be given, if at all). However, the focus on credit vulnerability and our defensive positioning prior to the sell-off are creating potential opportunities for us as previous distortions begin to unwind. We believe at least a mild global recession is already priced in other risk markets, and we are nearing levels where we believe a much deeper recession would be reflected and, contingent upon other mileposts of capitulation, could look to selectively add risk.

Economically, our current downside scenario is grim, and currently contemplated revisions are, sadly, downward. Whether any of that transpires, in our view, depends on:

- The magnitude of the consumer pull-back,
- Scale of job losses,
- Bank lending standards (e.g., bridge loans, forbearance programs, and other actions that can provide temporary protection or relief to consumers)
- The scale of the policy response, and whether it is deemed sufficient

We are very focused on the consumer, naturally, in a consumer-driven economy. But to put the importance of that in perspective we chart the source of job growth during the bull market run. Cumulatively, over 30% of new jobs in the last 10 years are in "Leisure & Hospitality", which includes the beer vendors at all of the sporting events recently cancelled, as well as "Accommodations & Food", which includes the hotel staff that dutifully support our business travel. Over half the jobs come from other service sectors that include professional and financial services that grow as bull markets grow. And the balance is in manufacturing and non-service jobs that grind to a halt due to the demand shock. Service sector employees depend on patronage which is now limited by social isolation and likely have limited health coverage.

Cumulative change in non-farm payrolls, seasonally adjusted (000s)



Source: Bureau of Labor Statistics, LGIMA; data as of March 13, 2020.

For now, though, the most important thing to do is protect the health and safety of ourselves, our families and each other by heeding the advice of virus experts. The most important people are those around us—our family and neighbors who will require each other's diligence, care and support. And, as always, the most important time is now—to act decisively and carefully to help prevent the spread of the virus.[1] Eat your meals at home now, save your money now, and please tip extravagantly later.

Be safe and be well.

Equity volatility

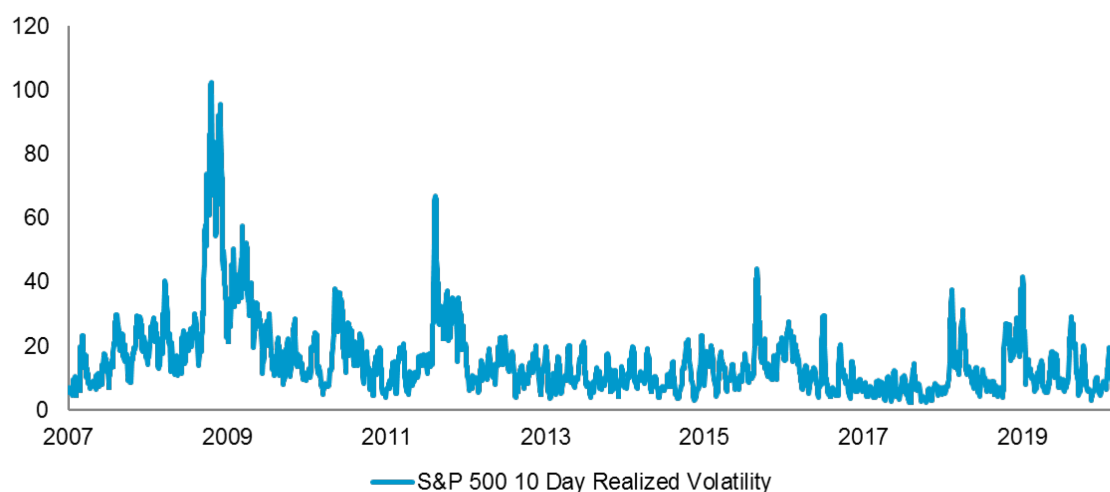
The only precedents for volatility conditions in the last three weeks are those in 1929, 1987, and 2008. Last month we highlighted that the option market had been repricing exacerbated risk more rapidly. Indeed, current conditions partly exceed those moments (see below chart of short-term S&P 500 realized volatility).

Trading conditions are such that markets are nearly untradeable. As one dealer highlighted, volume does not equal liquidity. Every facet of the equity option market faced delayed pricing and execution, restricted capacity due to inaccurate mids and intractable bid-ask width, and tragicomically absent electronic market-makers. Typical transaction costs are 10-20x normal in S&P 500 options and tailor made in greater size or other underliers. Tread lightly.

Thankfully, despite the precarious position we collectively find ourselves in, most of our client calls last week had the luxury of calmly taking stock of hedging overlays. We have consistently advocated the consideration of certain hedges that align well with pension objectives, and many clients thankfully heeded our more strongly worded advice late last year. For those clients who stuck to the discipline of their long-term debates about upside versus downside and tail risk exposure, today brings time to consider more palatable alternatives like deploying future capital, rebalancing, and most importantly, safely delivering their organizational objectives.

As a final anecdotal offering, we note that the one-year at-the-money puts and calls cost about 14% of notional each, or an implied 28% breakeven move for a straddle. The same structure one month ago cost half as much.

S&P 500 10-day realized volatility



Source: Bloomberg, data as of March 13, 2020.

1 Paraphrased from "The Three Questions" by Jon J. Muth, based on a short story by Leo Tolstoy.

Rates market

Well… that escalated quickly. As the Corona virus spreads in the U.S. and abroad, governments and central banks are taking drastic actions to keep the economy going and prevent the spreading of the disease. It is still way too early to tell how many people will be infected and how much impact this will have on growth, leading to a violent risk-off move.

Source: Bloomberg, data as of March 13, 2020.

Fears had already pushed the U.S. 30-year Treasury rate to 1.68 to close out February. At that point, the markets were pricing in a 25-50 basis point cut by the Fed at their March meeting. By Tuesday, March 3 the Fed announced an emergency 50 basis point cut - the first non-meeting rate change since the financial crisis. Even after that move, the markets started pricing in an additional 25-50 basis points of cuts at the March meeting. The February employment report remained strong, with 273k new jobs created, the unemployment rate dropping to 3.5%, and hourly earnings up 0.3%. But a failure by the OPEC+ meeting to produce an agreement on a coordinated effort to cut production led to a 10% drop in crude oil prices overnight which, combined with the rampant disease spread in Italy, led to a drop in the stock market and the 30-year Treasury rate closed out the first week of March at 1.28. The situation only got worse over the weekend. In an aggressive move, Saudi Arabia cut prices on oil, sending crude plummeting 30%. In the overnight trading session the 30-year Treasury traded just below 70 basis points, which as of this writing, is the all-time low, before selling off in the NY session to end the day at a more respectable 99.5 basis points. On Thursday, the Fed stepped in by expanding their overnight and term repo programs with an additional $200bln in funding. Meanwhile, the ECB kept their benchmark rates unchanged but attempt to bring economic relief by expanding their LTRO program with more favorable lending terms, increasing their asset purchase program by 120€ bln, and continuing to reinvest maturing security proceeds. The market reacted poorly to Lagarde's press conference when she stated that the ECB is "not here to narrow spreads," sending BTP spreads 60bps wider to Bunds. On Friday, the Fed announced they were purchasing $37bln of USTs across the curve in an attempt to fix the broken markets in treasuries where bid/offer had skyrocketed. By the time President Trump gave his late day press conference officially declaring a national emergency, the 30-year Treasury rate had sold off to 1.78.

It's easy to draw parallels between the markets over the past week and the 2008 financial crisis. There has not been a day this month where the high and low 30-year Treasury prints have been within a 15-basis point range. And 5 of the ten trading days have seen the rate move trade over 30 basis points from high to low. The past week alone, the 30-year Treasury rate moved in a 108-basis point range. For comparison, the rate stayed in a 123-basis point range in all of the trade war ravaged 2019, a 113 basis point range in the 2016 Brexit/U.S. election year, and a 230 basis point range in 2008 (although the 30-year Treasury was starting at a much higher rate of 4.80 in 2008). As real money sold Treasuries to raise cash and replaced the duration with swaps, long end swap spreads went from -33 to -65 and back to -52, with overnight screens showing -87 at one point (although it's debatable if anything actually transacted at this point). In a two-week period, the 2s30s Treasury curve went from 75 to 100 to 60 and back to 103.

Market liquidity certainly felt just as bad, if not worse, than 2008. Off the run bonds went bidless in the screens for hours at a time – Treasury bonds, not credit bonds. On the run bonds were trading more than 18 ticks wide at times. Block trades in WNs traded 3 points below the bid in the screens just to have the

certainty of execution. Any thought of an RV trade became essentially impossible due to the exorbitant bid/offer spreads one would need to cross. As dealer inventories hit record levels as their holdings spiked 10% in one week, it became clear the break in the system was coming from a lack of balance sheet rather than funding concerns like we had seen in September 2019, as evidenced by the Fed's repo facility being undersubscribed. Although bid/offers remained extremely wide after the Fed announced their purchase program on Friday, it did help restore some semblance of order to the Treasury market. One could make the argument that in 2008 the fear was if the market would ever recover, while now it seems to be more of a matter of when will the markets recover and the damage form the virus is contained/ended (although it should be noted that the 1987 release "It's The End Of The World As We Know It (And I Feel Fine)" came in at number 72 on the iTunes weekly song charts). The situation seems to be changing rapidly day-to-day and country-to-country. As long as the uncertainty remains the difficult trading in the markets will likely continue. Since this was written on Friday, the Fed moved their meeting up 3 days and announced a 100-basis point rate cut along with a $700bln purchase program on Sunday night. Multiple U.S. cities have closed schools, cancelled large events, forced closures of bars and restaurants, and taken other measures to help lessen the spreading of the Corona virus. Despite the "Relax, we're doing great" message from the White House, NIH Immunologist Dr. Anthony Fauci warned that "the worst is yet to come." It will be interesting to see how the markets react to the Fed and government actions this week to say the least.

U.S. Rate environment

Index	3/13/2020	1-month ago	3-months ago	1-year ago
Fed Funds Rate	0.0 - 0.25%*	1.75%	1.75%	2.50%
2-year	0.49	1.43	1.60	2.46
5-year	0.72	1.42	1.65	2.43
10-year	0.96	1.58	1.82	2.63
30-year	1.53	2.04	2.25	3.05

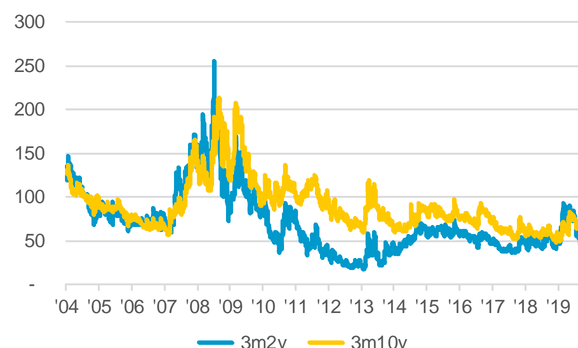
Source: Bloomberg, data as of March 13, 2020.
* Data as of March 15, 2020.

Rates volatility

Rate volatility exploded higher in March as fear and illiquidity gripped the market. Implied volatility on short dated options on 30-year tails doubled in less than a month. 3m10y implied volatility went from 65abpv at the end of 2019, to 72abpv at the end of Jan, to 90abpv at the Feb, and got as high as 136abpv on March 12. These moves aren't surprising given that rates continue to shatter the previous all-time lows seemingly on a daily basis. Realized 1-month trailing volatility reached 150 basis points, a level not seen since the QE2 selloff in December of 2010. To put this in perspective, 3m10y is currently at 127apbv. In December 2010 it reached 137apbv, in the wake of Bear Sterns it reached 164abpv, and the highest level on record is 214abpv shortly after the Lehman Brothers bankruptcy in 2008 (data goes back to 2005).

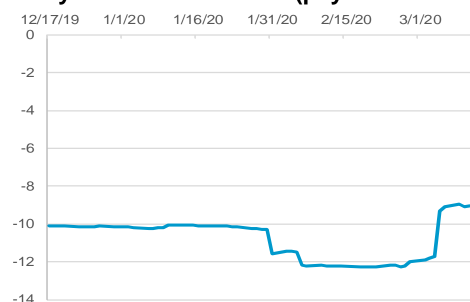
Much like Treasuries, volatility markets were trading extremely wide, at least ten times wider than normal bid/offer. Interestingly, the only part of the volatility surface that is not up massively and is in fact

3m2y and 3m10y implied volatility



Source: Citibank, data as of March 13, 2020.

3m2y +/- 25 risk reversal (payer vol – rcvr vol)



Source: Citibank, data as of March 13, 2020.

trading lower than it was a month ago is intermediate volatility (1-year to 3-year expiries) on short (1y and 2y) tails. Many are interpreting this as a bet the Fed will not cut rates below 0 and cutting to 0 is currently priced into the market. Additionally, receiver skew has been plummeting (although still trading rich to payers), indicating some fears of how low rates can go have been placated. Dealer longs in gamma from systematic sellers is at its lowest point in years (not surprisingly, no one wants to try to call a top when rates are moving 20-30bps a day in illiquid markets), which means realized volatility should stay elevated, particularly in the long end which still has a ways to go before hitting the lower bound.

Current implied volatility levels and change over one month

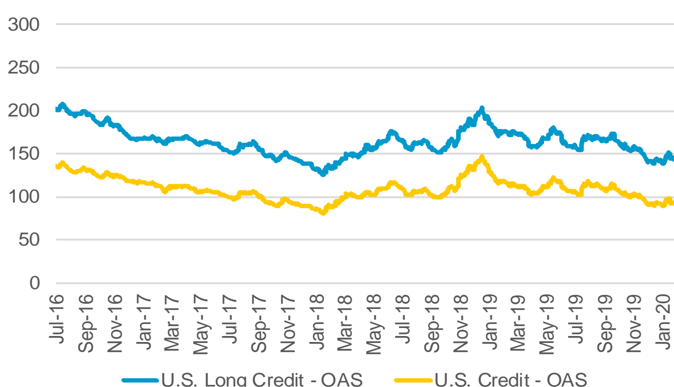
P/TAIL	1Y	CHANGE	2Y	CHANGE	5Y	CHANGE	10Y	CHANGE	30Y	CHANGE
1M	78.8	*37.6*	87.9	*28.7*	110.6	*43.7*	147.8	*79.6*	173.7	*107*
3M	58.1	*10.6*	66.6	*8.1*	92.9	*28.8*	121.1	*55.3*	136.7	*73.2*
6M	49.9	*-2.8*	58.2	*-2.6*	83.4	*19*	103.2	*38*	111.4	*49*
1Y	48.1	*-10.5*	54	*-8.4*	72.3	*7.1*	87.8	*22.7*	92.1	*30.4*
2Y	52.1	*-11.2*	51.4	*-12.7*	71.5	*6.3*	80.2	*15.5*	82.9	*22.5*
3Y	58.9	*-6.8*	61.5	*-3.9*	69.6	*4.5*	75.9	*11.7*	75.9	*16.6*
4Y	62.1	*-3.6*	63.4	*-2.3*	68.4	*3.2*	73.2	*9.2*	71.6	*13.3*
5Y	65.4	*-0.7*	65.1	*-0.6*	67.6	*2.4*	70.8	*7.3*	68.6	*11.1*
7Y	67.6	*2*	67.7	*2.7*	67.4	*3.2*	68.2	*5.9*	64.7	*9.2*
10Y	67.4	*3.8*	67	*3.8*	65.1	*2.7*	64.6	*4.4*	61.3	*7.6*

Source: Citibank, data as of March 13, 2020.

Credit market

While credit markets have significantly sold off in lock step with broader risk assets, it's unclear to the degree of the widening due to inaccurate index marking from underlying illiquid bonds not being adequately re-priced in line with more liquid bonds. As of Friday, March 13th, the Bloomberg Barclays Long Duration Credit index closed at 248 basis points. Last week, long credit widened 58 basis points, marking the second largest weekly widening on record after the week ended October 10th, 2008. To put current valuations in perspective, U.S. credit spreads are at the 98th percentile (202 basis points) over the past ten years and trading at recessionary levels. While spreads got to over 600 basis points in 2008-09, in the other three instances – the 2001 recession, 2011 European banking crisis, and the 2016 energy sell-off -- they peaked at 200-250 basis points. One theme that has emerged from this selloff is the underperformance of single-A rated versus BBB-rated credit. The relationship of non-financial U.S. corporates at the 10-year part of the curve has moved from the 95th to the 5th percentile on a spread ratio basis. Non-financial BBB credits outside of energy have outperformed on a risk-adjusted basis thus far. The underperformance of single-A rated credit can partially be attributed to the collapse in interest rates as all-in yield sensitive buyers, mostly from Asia, have remained on the sidelines and have been net sellers.

U.S. Credit spreads



Source: Bloomberg, data as of March 13, 2020.

While Covid-19 remains front-and-center for risk markets, the decision by Saudi Arabia to increase oil output after a breakdown in relations with Russia is a significant negative development for credit markets

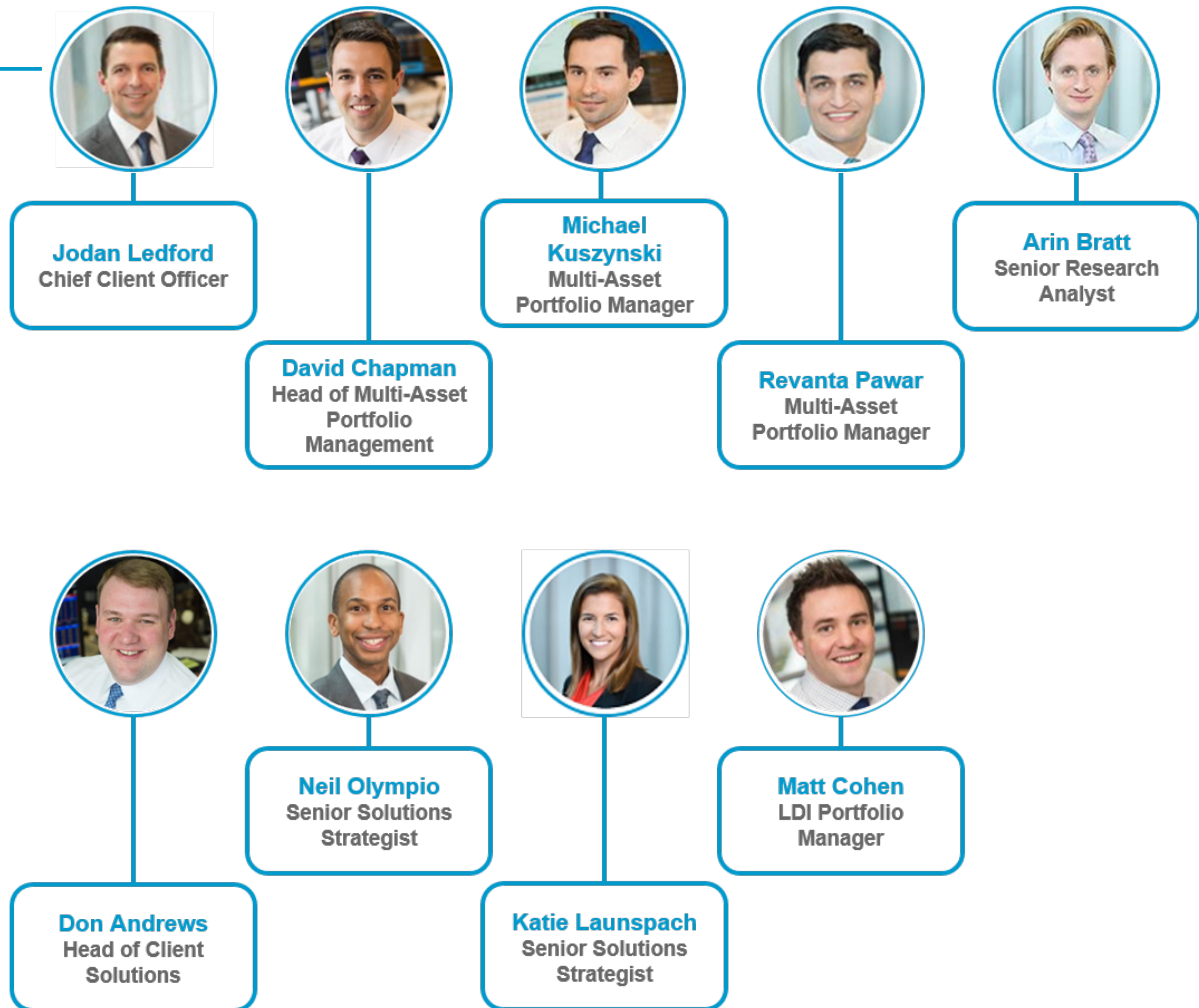
that will contribute to an increase in downgrades and defaults within the energy sector. While we believe it unlikely that WTI remains below $40 long-term, oil prices could remain depressed for much of 2020. Over the past week ending Friday the 13th, investment-grade energy spreads have widened to almost the same levels as seen during the energy crisis in 2015/2016. At the long-end of the curve, independent exploration & production companies are 300 basis points wider this month alone while midstream companies are 180 basis points wider. Away from energy, the performance of the investment grade credit market is not likely to improve until investors are confident that monetary and fiscal policy action will be sufficient to prevent lasting damage to the global economy.

Scenario Based Asset Allocation

SCENARIO SUMMARIES

Name	Description	Risk Assets	Inflation	Rates	USD	Probability (last month)
Deep Global Recession	• Dominated by fears of imminent recession on the back of mass coronavirus outbreak and worldwide lockdowns • US & UK rates firmly through 0 and with extended QE • Commodities drop, in particular oil, leading to lower inflation	▼	▼	▼	▲ / —	30% (0%)
Mild Global Recession	• Pain in the economy caused by the virus is short and sharp, followed by a period spanning a quarter where markets recover roughly half of the total loss. • Fed cut to 0 • Inflation remains below target	—	▼ / —	— / ▼	—	25% (0%)
Rapid Rebound	• Virus concerns rapidly diminish and outlooks turn more positive • Recovery of some of the lost output as activity exceeds pre virus expected levels… • Due in part to lower policy rates • Inflation starts to pick up	▲	▲ / —	▲	—	25% (0%)
Global Growth	• Economies shrug off virus concerns, with abandonment of quarantines and the virus dying out as the temperature improves • Economic impact minimal (although not necessarily true for social impacts) • Huge recovery of lost output • Rates start to pick up	▲	▲	▲	▼ / —	5% (10%)
Inflation Burst	• Inelastic demand and major supply shock drive inflation higher • Global government bond yields rise fuelled by inflation pickup • Equity markets sell off on the back of higher yields and loss in output	▼	▲	▲	▲	5% (0%)
Trumpilocks	• Growth improves • Inflation continues to disappoint on the downside, so little prospect of central bank hikes and limited response from long-term yields	▲	▼ / —	▲	▼ / —	10% (15%)

Contributors



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