BLOOMBERG CHART BOOK

The Coronavirus Visualized

April 6, 2020

Contents

Sections:

Author BIOs
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How To and Disclaimer

- This report was prepared as an example of how G<GO> charts can be used to create chart reports of fundamental and technical information with the Microsoft Office Bloomberg Add-in.

- The G<GO> charts are linked to the PowerPoint through the Add-in creating a chart book with fast and easy updating of financial market charts. To learn more, reach out to your account manager or authors.
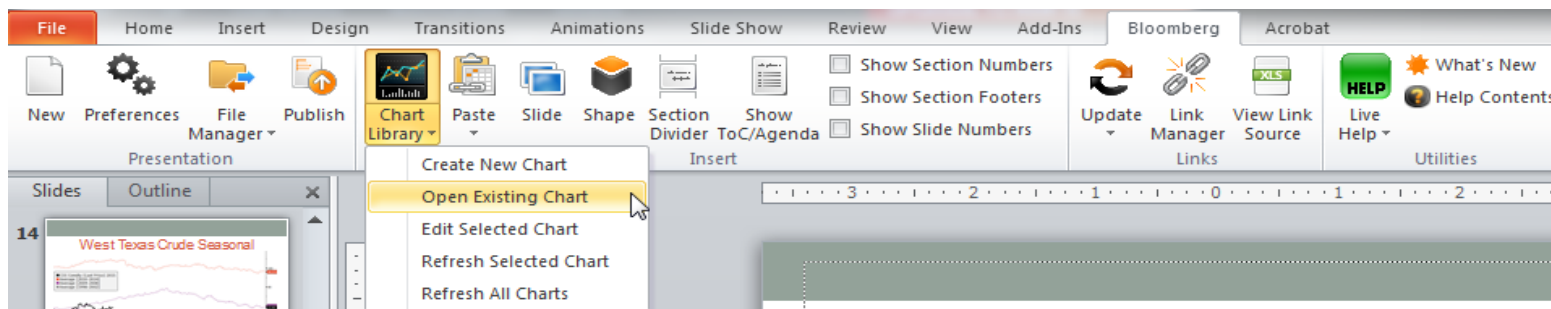
Chart functions used in this report include:
- MAP<GO>
- G<GO>
- W<GO>
- TSIG<GO>
- CCRV<GO>
- VCA<GO>

Other Valuation Tools
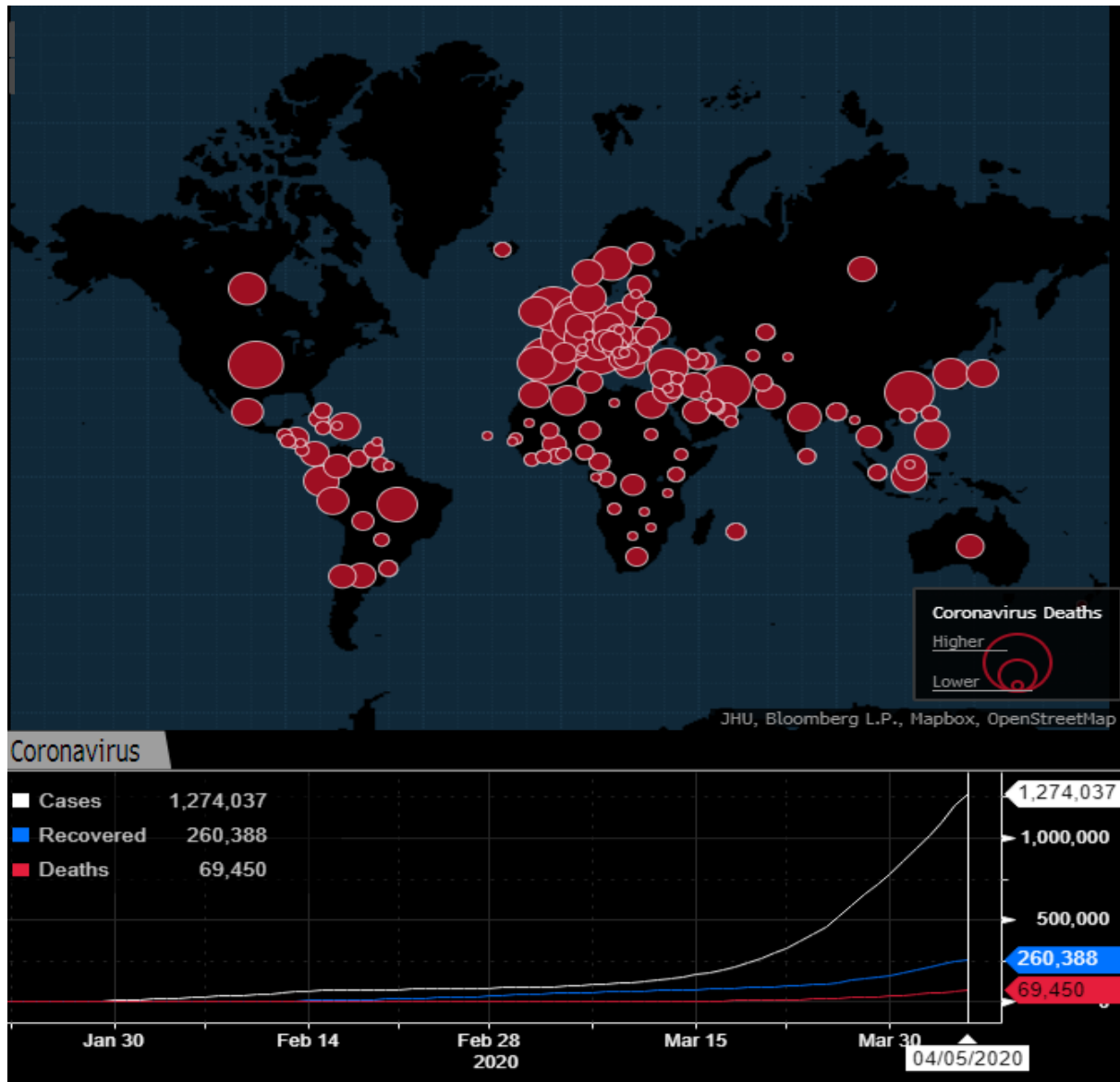GF<GO> Graphing Fundamentals
HRH<GO> Historical Return Histogram
RV<GO> Relative Valuation Analysis
EQRV<GO> Equity Relative Value
GS <GO> Graph Scatter Chart
NT<GO> Chart News Trends
BYFC<GO> Yield Forecasts
HS<GO> Historical Spread Chart

GLOBAL CORONAVIRUS STATISTICS

Map of Global Statistics

As of April 5th, global COVID-19 cases and recoveries are in lockstep, changing week-over-week by 77% and 76% respectively. Global deaths **doubled**, increasing by 106%.

The United States joins Spain in the spotlight as both appear in the top 3 countries across all three categories.

Cases – 1 day net change	
United States	25,198 (8%)
United Kingdom	5,961 (14%)
Spain	5,478 (4%)

Recoveries – 1 day net change	
Spain	3,861 (11%)
United States	2,452 (16%)
Germany	2,300 (9%)

Deaths – 1 day net change	
United States	1137 (13%)
Spain	694 (6%)
United Kingdom	623 (14%)

Relative Analysis of Global Statistics

Global COVID-19 Statistics

- Global Confirmed Cases 1.141M
- Global Death Rate Relative to Cases (R1) 0.0536
- Global Recovery Rate Relative to Cases (L1) 0.2066

NCOVCASE Index (Coronavirus (2019-nCoV) Globally Confirmed Cases) Global Corona   Copyright© 2020 Bloomberg Finance L.P.   04-Apr-2020 14:13:23
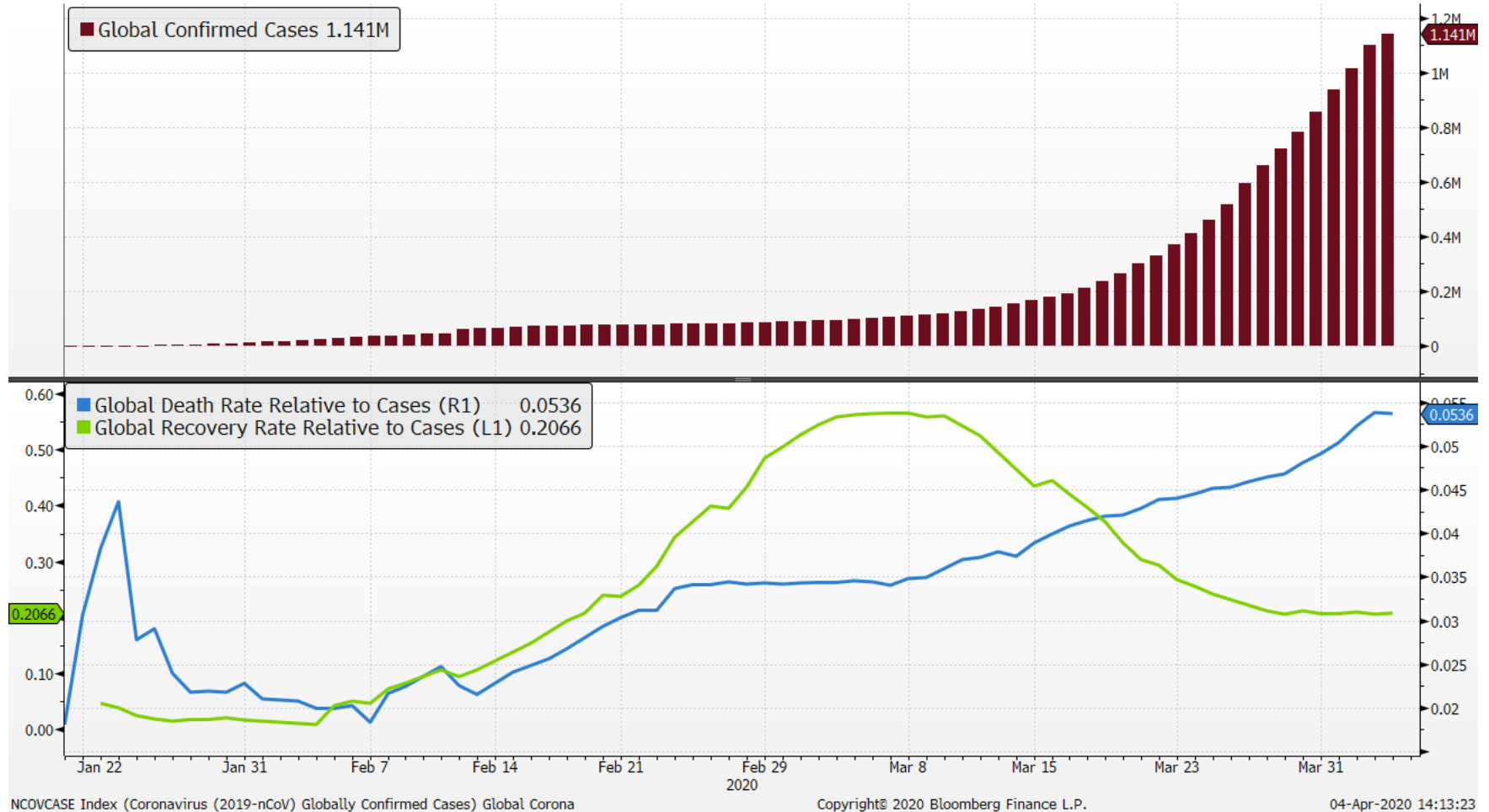
The relative strength line of global deaths to cases may be stalling as the ratio dips down from yesterday's high. Recoveries to cases continues to flatten, pointing to cases and recoveries now pacing each other.

LAUNCH CHART

Areas of Acceleration & Deceleration

Ticker	Dataset	Count T-1	Δ Gr Rt (1D% v. Avg%)	1D% ↓	Avg1D% (5D)	Count T-2
Global Stats (3)						
NCOVDEAT	Globally Confirmed Deaths	59,156	Decelerating	11.5%	12.0%	53,073
NCOVCASE	Globally Confirmed Cases	1,099,397	Decelerating	8.2%	8.8%	1,015,722
NCOVRECO	Globally Released From Hospital or Recovered	226,615	Decelerating	7.1%	8.2%	211,599
Countries to Watch (12)						
NCOVITRE	Italy Released from Hospital or Recovered	19,758	Accelerating	8.1%	7.8%	18,278
NCOVIRRE	Iran Released from Hospital or Recovered	17,935	Accelerating	7.3%	6.6%	16,711
NCOVITDE	Italy Confirmed Deaths	14,681	Decelerating	5.5%	6.1%	13,915
NCOVIRCA	Iran Confirmed Cases	53,183	Decelerating	5.4%	6.4%	50,468
NCOVKRRE	South Korea Released from Hospital or Recovered	6,325	Accelerating	5.0%	4.0%	6,021
NCOVIRDE	Iran Confirmed Deaths	3,294	Decelerating	4.2%	4.6%	3,160
NCOVITCA	Italy Confirmed Cases	119,827	Decelerating	4.0%	4.2%	115,242
NCOVKRDE	South Korea Confirmed Deaths	177	Decelerating	1.7%	2.2%	174
NCOVKRCA	South Korea Confirmed Cases	10,156	Accelerating	.9%	.9%	10,062
NCOVREMC	Mainland China Released from Hospital or Recovered	76,751	Decelerating	.2%	.3%	76,560
NCOVDEMC	Mainland China Confirmed Deaths	3,326	Decelerating	.1%	.2%	3,322
NCOVCAMA	Mainland China Confirmed Cases	81,638	Decelerating	.0%	.0%	81,600
Financial Centers (12)						
NCOVUSDE	U.S. Confirmed Deaths	7,406	Decelerating	23.8%	25.4%	5,983
NCOVGBDE	U.K. Confirmed Deaths	3,611	Decelerating	23.4%	26.5%	2,926
NCOVBRCA	Brazil Confirmed Cases	9,194	Decelerating	14.0%	18.6%	8,066
NCOVUSCA	U.S. Confirmed Cases	277,953	Decelerating	13.4%	14.1%	245,213
NCOVGBCA	U.K. Confirmed Cases	38,690	Decelerating	13.2%	14.6%	34,173
NCOVBRDE	Brazil Confirmed Deaths	363	Decelerating	11.0%	22.1%	327
NCOVJPRE	Japan Released from Hospital or Recovered	514	Accelerating	8.9%	5.1%	472
NCOVGBRE	U.K. Released from Hospital or Recovered	209	Accelerating	8.9%	5.2%	192
NCOVUSRE	U.S. Released from Hospital or Recovered	9,823	Decelerating	8.1%	14.1%	9,090
NCOVBRRE	Brazil Released from Hospital or Recovered	127	No Update	.0%	.0%	127
NCOVJPCA	Japan Confirmed Cases	2,617	No Update	.0%	7.7%	2,617
NCOVJPDE	Japan Confirmed Deaths	63	No Update	.0%	3.1%	63
NCOVHKRE	Hong Kong Released from Hospital or Recovered	173	Accelerating	12.3%	8.8%	154
NCOVHKCA	Hong Kong Confirmed Cases	845	Decelerating	5.4%	5.5%	802
NCOVHKDE	Hong Kong Confirmed Deaths	4	No Update	.0%	.0%	4
Others (285)						
NCOVLURE	Luxembourg Released from Hospital or Recovered	500	Accelerating	525.0%	156.3%	80
NCOVIERE	Ireland Released from Hospital or Recovered	25	Accelerating	400.0%	100.0%	5

As of April 4th, global cases, deaths and recoveries all show signs of deceleration.

Considering these statistics by country, decelerating environments are currently 60% higher than those accelerating:
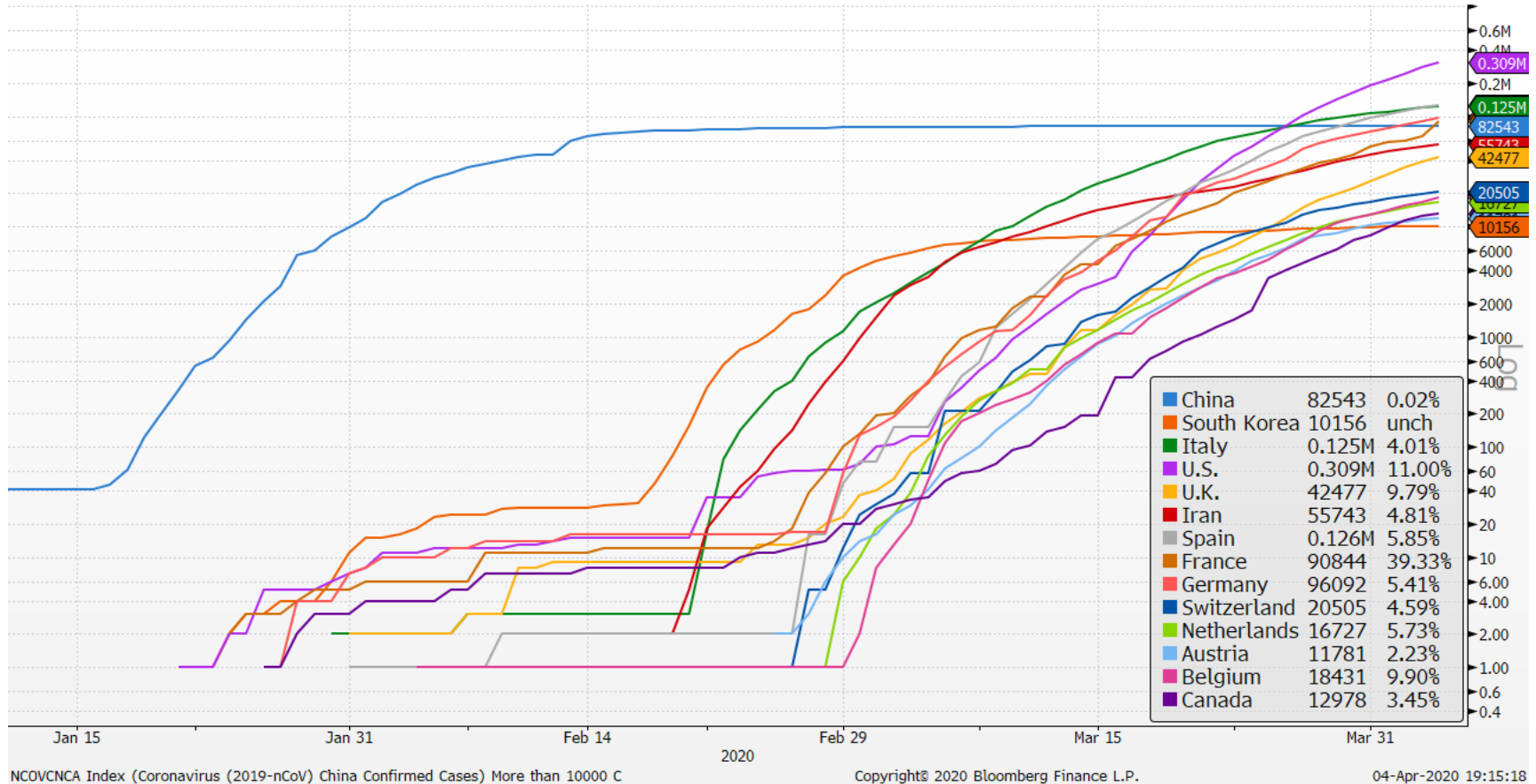- Accelerating: 89
- Decelerating: 152

Of those accelerating, Italy, Iran, South Korea, and France top the list for recoveries.

Cases and deaths across all in the "Countries to Watch" and "Financial Centers" groups are decelerating, except for South Korea cases.

LAUNCH WORKSHEET

Total Cases Comparison

Countries With More Than 10,000 Cases (Log Scaled)

China	82543	0.02%
South Korea	10156	unch
Italy	0.125M	4.01%
U.S.	0.309M	11.00%
U.K.	42477	9.79%
Iran	55743	4.81%
Spain	0.126M	5.85%
France	90844	39.33%
Germany	96092	5.41%
Switzerland	20505	4.59%
Netherlands	16727	5.73%
Austria	11781	2.23%
Belgium	18431	9.90%
Canada	12978	3.45%

NCOVCNCA Index (Coronavirus (2019-nCoV) China Confirmed Cases) More than 10000 C

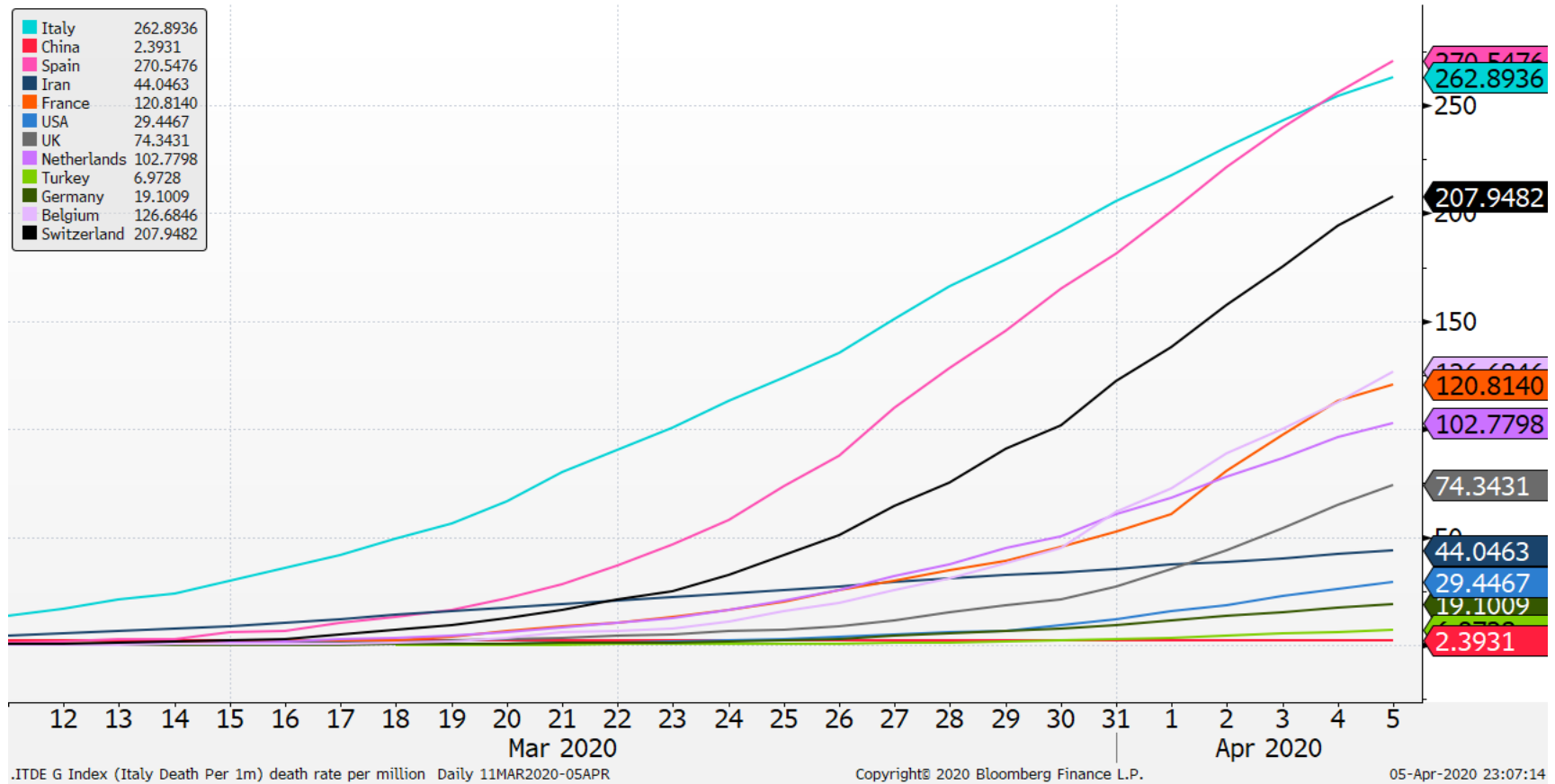Copyright© 2020 Bloomberg Finance L.P.

04-Apr-2020 19:15:18

The number of countries with over 1,000 cases increased from 37 to 53. Of these, the largest single day percent change to end the week is Serbia with 1,476 confirmed cases, accelerating with a 26% change on day (not shown). This chart has now been updated to reflect the 14 countries with more than 10,000 cases. Of these, Belgium is the only country accelerating, with a one day percent change of 9.9%.

LAUNCH CHART

Population Adjusted Deaths

COVID-19 Deaths Per 1 Million People

Italy	262.8936
China	2.3931
Spain	270.5476
Iran	44.0463
France	120.8140
USA	29.4467
UK	74.3431
Netherlands	102.7798
Turkey	6.9728
Germany	19.1009
Belgium	126.6846
Switzerland	207.9482

.ITDE G Index (Italy Death Per 1m) death rate per million Daily 11MAR2020-05APR   Copyright© 2020 Bloomberg Finance L.P.   05-Apr-2020 23:07:14
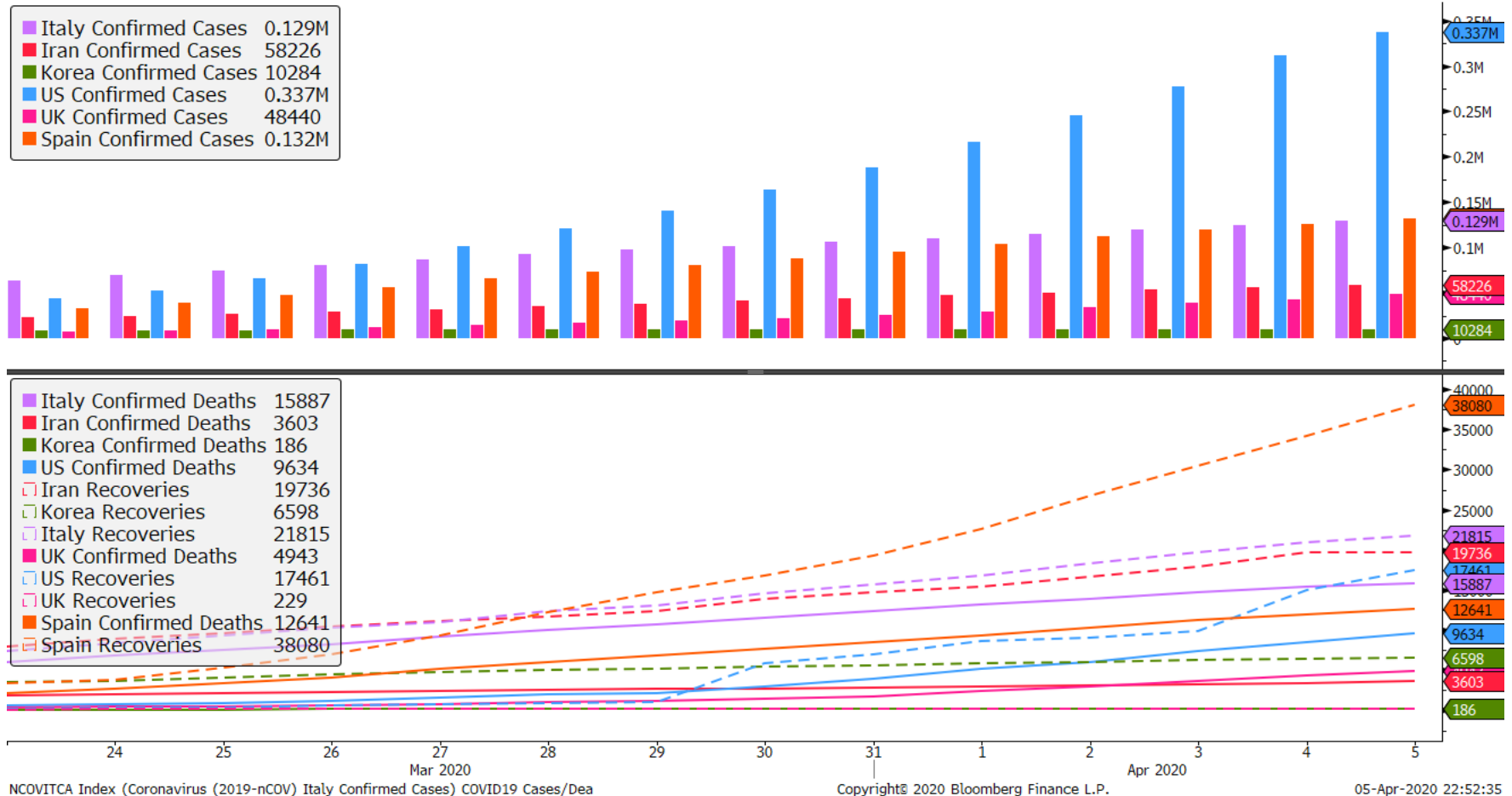
This chart demonstrates on a population adjusted basis the devastation caused by COVID-19 in Spain and Italy. This chart also raises questions regarding the veracity of the official Chinese data with just 2 deaths per million people in China reported, where the virus is believed to have originated.

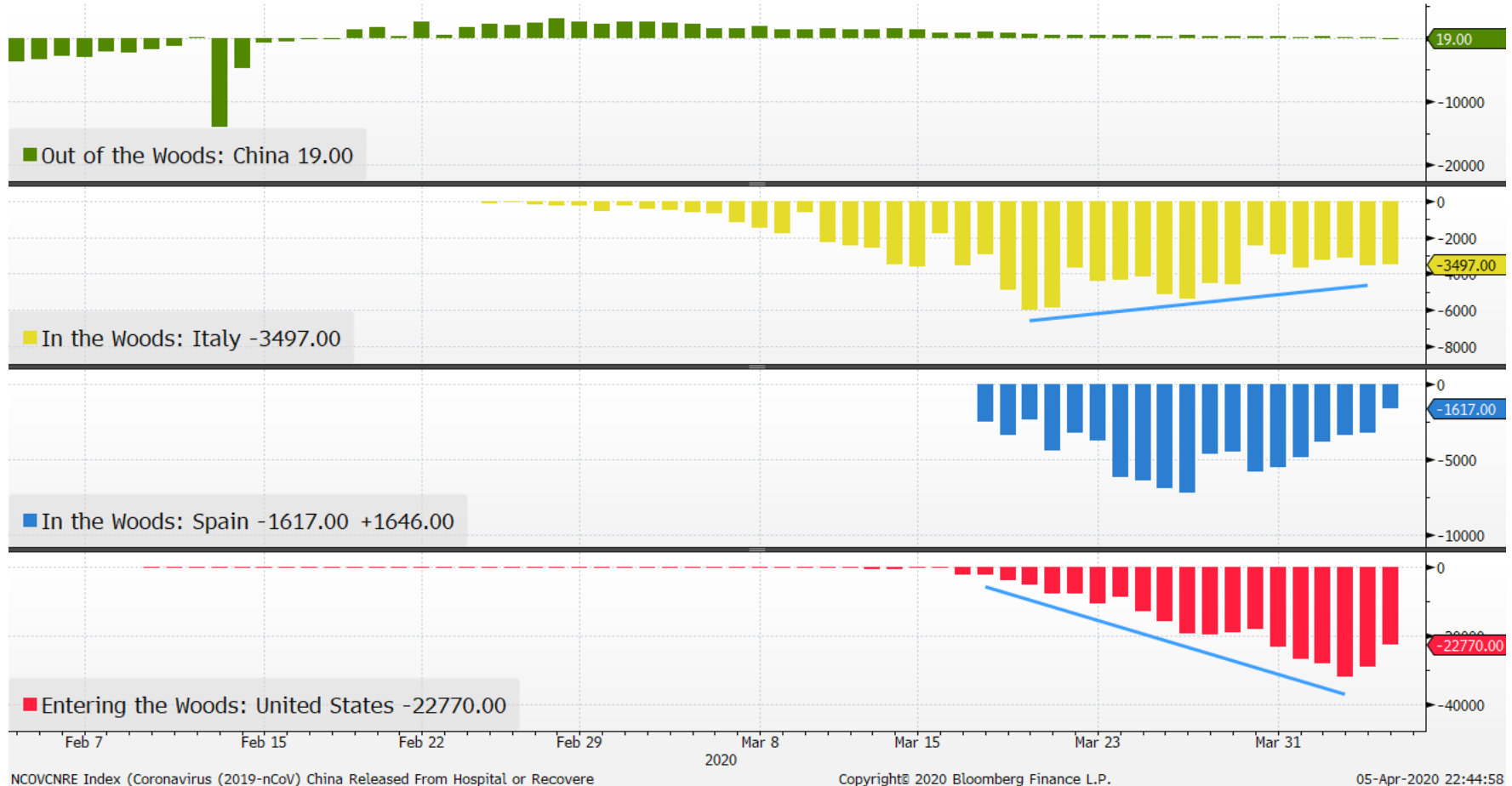LAUNCH CHART

Compare Cases, Deaths & Recoveries

Spain has been added after surpassing Italy in total cases, bumping China down to 4th. After China, Spain leads the world in recoveries. Week over week, total cases in the United States have nearly tripled. Trump warns that deaths in the next few weeks will escalate and could be on par with the number of fatalities seen in world wars.

LAUNCH CHART

The Recovery Case Spread

Daily Change in Recoveries minus Daily Change in Confirmed Cases

- Out of the Woods: China 19.00
- In the Woods: Italy -3497.00
- In the Woods: Spain -1617.00 +1646.00
- Entering the Woods: United States -22770.00

NCOVCNRE Index (Coronavirus (2019-nCoV) China Released From Hospital or Recovere   Copyright© 2020 Bloomberg Finance L.P.   05-Apr-2020 22:44:58
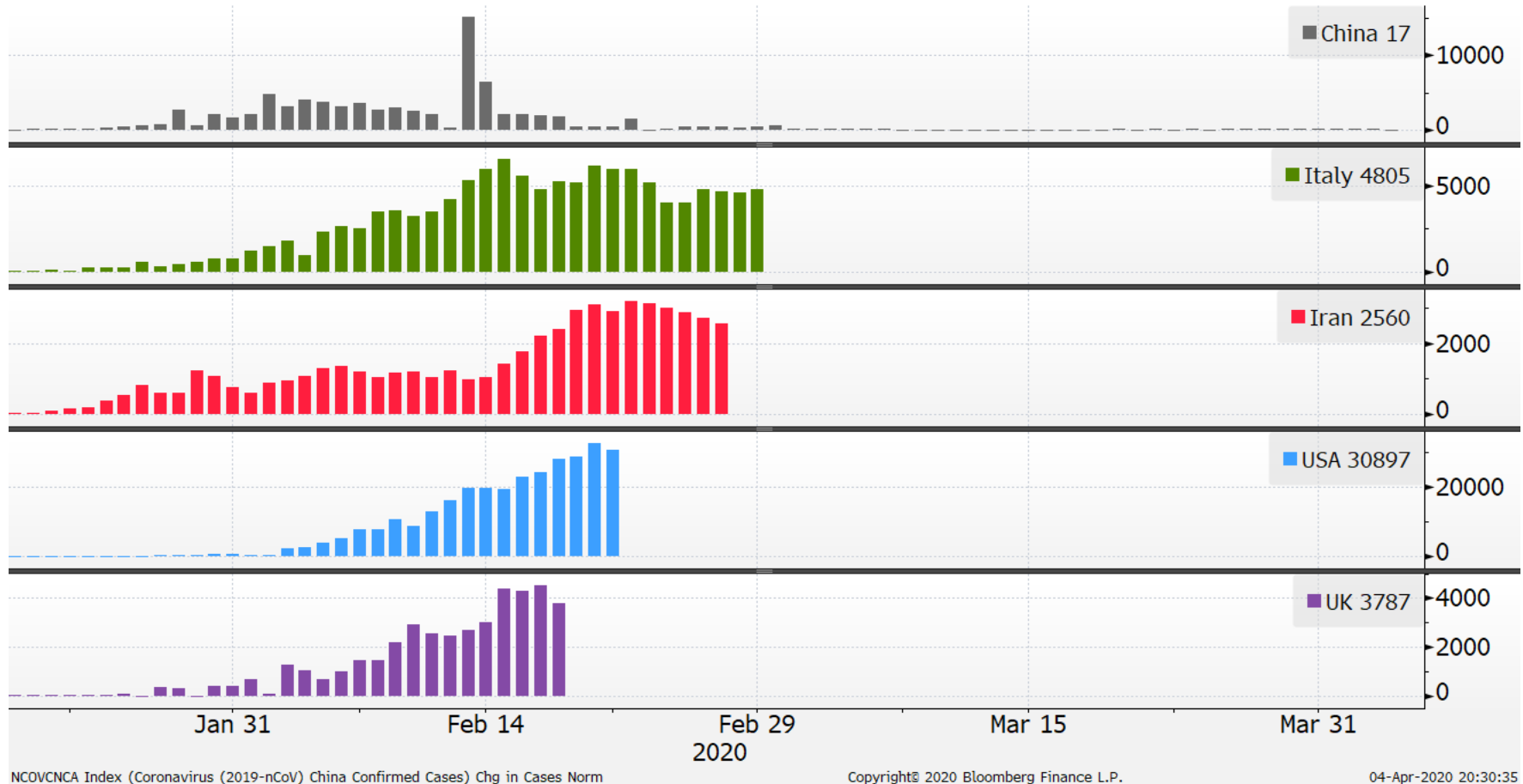
When the change in confirmed recoveries starts to outpace that of newly confirmed cases, the spread charts above will move into positive territory, signaling that the country is over the worst of the outbreak and "out of the woods." Italy and Spain continue to see their spread tightening, suggesting the worst may be over. The US ends the week without making a new low, but watch to see if this trend continues.

LAUNCH CHART

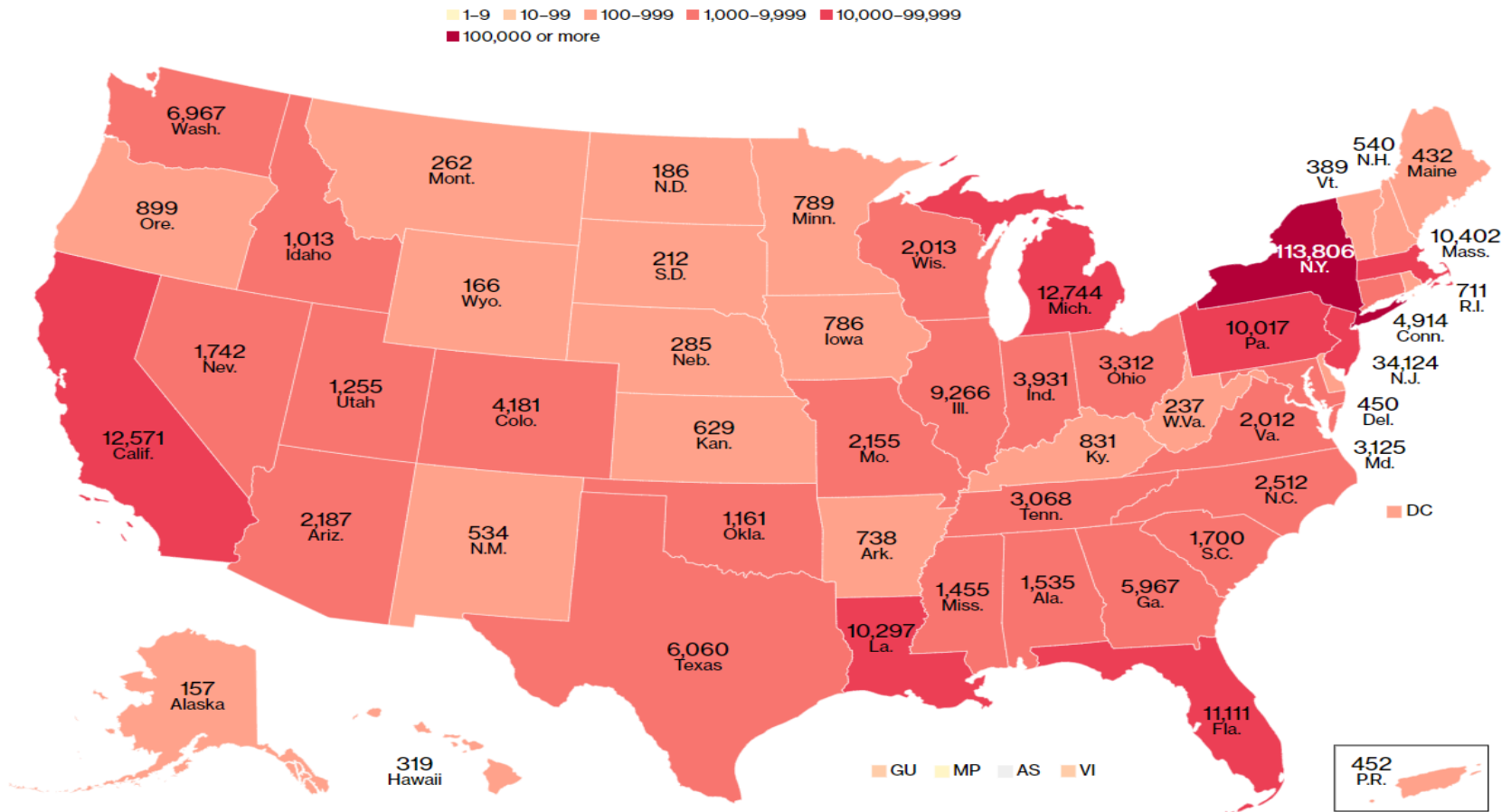# Normalized By Time

Time Normalized Net Change in Cases

China 17 — 10000 / 0
Italy 4805 — 5000 / 0
Iran 2560 — 2000 / 0
USA 30897 — 20000 / 0
UK 3787 — 4000 / 2000 / 0

Jan 31 · Feb 14 · Feb 29 · Mar 15 · Mar 31
2020

NCOVCNCA Index (Coronavirus (2019-nCoV) China Confirmed Cases) Chg in Cases Norm   Copyright© 2020 Bloomberg Finance L.P.   04-Apr-2020 20:30:35

The chart above shows where other countries may be in the lifecycle of this virus spread relative to China's timeline. Each country is lagged appropriately so that they all align on the day when the 100th COVID-19 case was confirmed.

LAUNCH CHART

UNITED STATES BREAKDOWN

Infections by State and Territory

Legend: 1–9 | 10–99 | 100–999 | 1,000–9,999 | 10,000–99,999 | 100,000 or more

6,967 Wash.
262 Mont.
186 N.D.
789 Minn.
540 N.H.
389 Vt.
432 Maine
899 Ore.
1,013 Idaho
2,013 Wis.
10,402 Mass.
166 Wyo.
212 S.D.
12,744 Mich.
113,806 N.Y.
711 R.I.
1,742 Nev.
786 Iowa
285 Neb.
3,931 Ind.
3,312 Ohio
10,017 Pa.
4,914 Conn.
1,255 Utah
4,181 Colo.
9,266 Ill.
237 W.Va.
2,012 Va.
34,124 N.J.
12,571 Calif.
629 Kan.
2,155 Mo.
831 Ky.
450 Del.
3,125 Md.
2,187 Ariz.
534 N.M.
1,161 Okla.
3,068 Tenn.
2,512 N.C.
DC
738 Ark.
1,700 S.C.
1,455 Miss.
1,535 Ala.
5,967 Ga.
6,060 Texas
10,297 La.
157 Alaska
319 Hawaii
11,111 Fla.
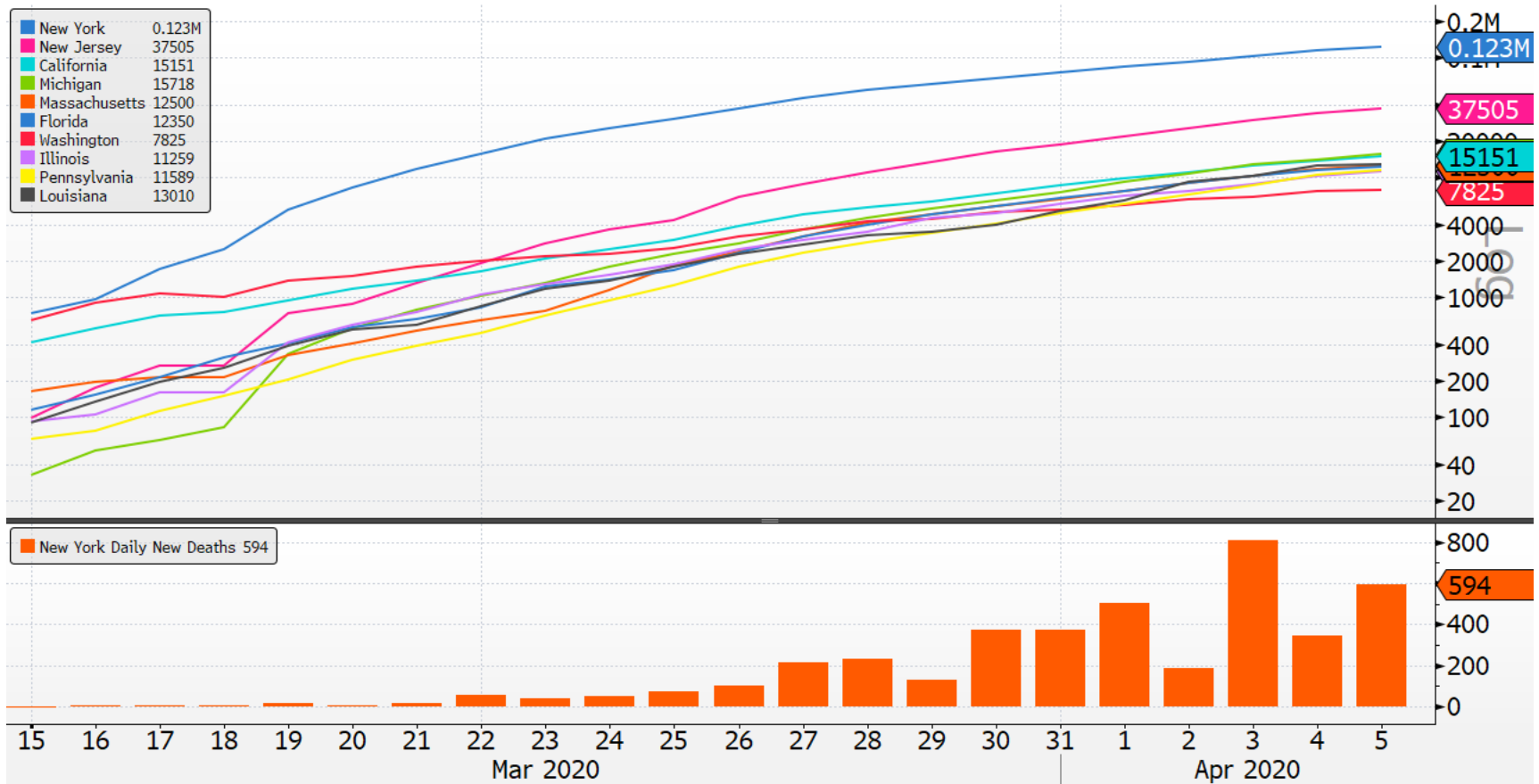GU | MP | AS | VI
452 P.R.

Note: State figures may not reflect repatriated patients from the Diamond Princess cruise ship or those evacuated from Wuhan, China.

As of April 4th, total infected in New York has grown 155% to 113,806 cases. This epicenter is over 3 times larger than the next state with the most infections, New Jersey, which ended the week at 34,124 cases.

LAUNCH LINK

US States With Most Infections
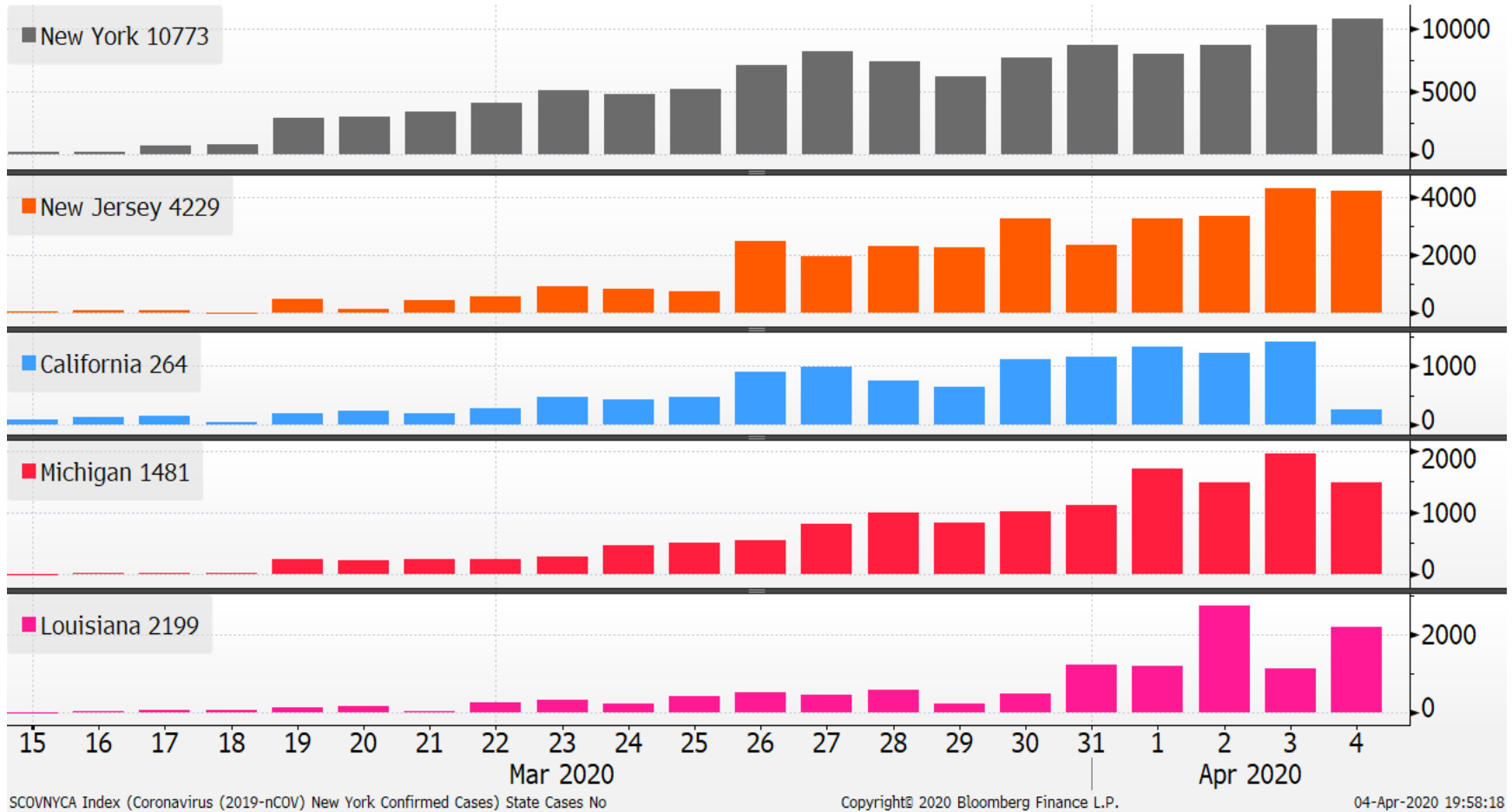

10 US States With Highest Confirmed Cases

New York	0.123M
New Jersey	37505
California	15151
Michigan	15718
Massachusetts	12500
Florida	12350
Washington	7825
Illinois	11259
Pennsylvania	11589
Louisiana	13010

New York Daily New Deaths 594

Source: JHU & Bloomberg News
SCOVNYCA Index (Coronavirus (2019-nCOV) New York Confirmed Cases) 10 US States C   Copyright© 2020 Bloomberg Finance L.P.   05-Apr-2020 23:17:00

The chart shows the 10 US States with the highest cases. New York dwarfs all the other states, with cases increasing daily by more than 10k now and daily deaths in NY moving above 800 on Friday.

LAUNCH CHART

US States With Most Infections

Daily Change in Cases of US States With Most Infections

New York 10773
New Jersey 4229
California 264
Michigan 1481
Louisiana 2199

SCOVNYCA Index (Coronavirus (2019-nCOV) New York Confirmed Cases) State Cases No   Copyright© 2020 Bloomberg Finance L.P.   04-Apr-2020 19:58:18
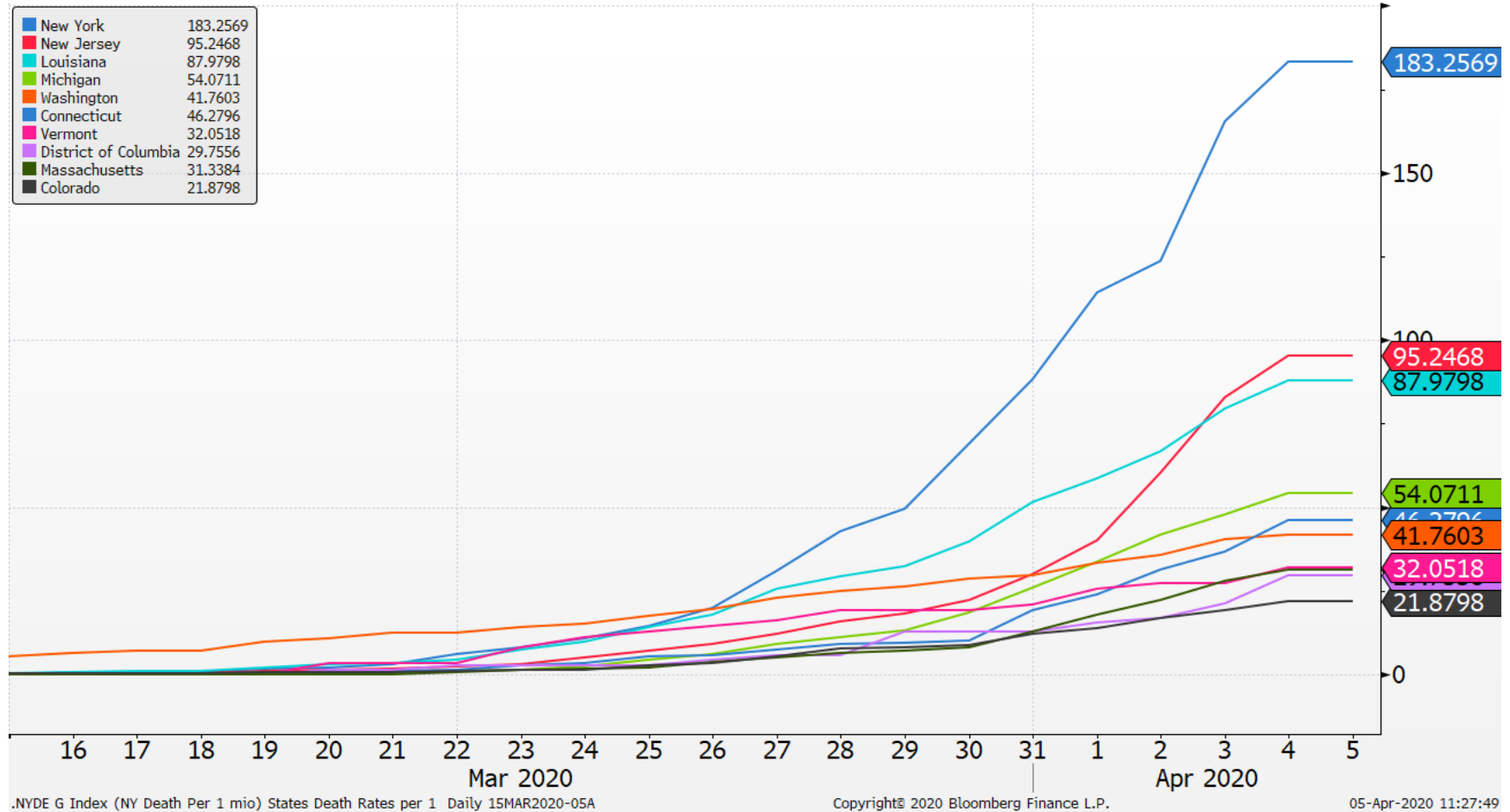
This chart shows daily new confirmed cases (net change) in the US States with the most infections currently in New York, New Jersey, California, Michigan, and Louisiana.

LAUNCH CHART

US State Deaths Per 1 million

US State Deaths per 1 million

New York	183.2569
New Jersey	95.2468
Louisiana	87.9798
Michigan	54.0711
Washington	41.7603
Connecticut	46.2796
Vermont	32.0518
District of Columbia	29.7556
Massachusetts	31.3384
Colorado	21.8798

.NYDE G Index (NY Death Per 1 mio) States Death Rates per 1 Daily 15MAR2020-05A   Copyright© 2020 Bloomberg Finance L.P.   05-Apr-2020 11:27:49

This chart shows the 10 states with the highest deaths on a population adjusted basis

LAUNCH CHART

Top 10 U.S. States by Number of Tests

March 26th values

	Mar 4	Mar 26	Tests	Population	
New York			122,104	○	20M
California			77,786	○	40M
Washington			34,292	○	8M
Florida			27,539	○	20M
Massachusetts			23,621	○	7M
Texas			21,424	○	30M
New Jersey			20,537	○	9M
Pennsylvania			18,128	○	10M
Louisiana			18,029	○	5M
Ohio			17,316	○	10M

April 2nd values

	Mar 4	Apr 2	Tests	Population	
New York			238,965	○	20M
California			92,500	○	40M
Florida			78,581	○	20M
Washington			74,798	○	8M
New Jersey			59,110	○	9M
Massachusetts			56,608	○	7M
Pennsylvania			54,714	○	10M
Louisiana			51,086	○	5M
Texas			50,679	○	30M
Illinois			43,656	○	10M

Florida increased the number of tests performed week over week by 185%, climbing into the top 3 states for COVID-19 testing. New Jersey has nearly tripled the number of tests. Illinois bumps Ohio off the top 10.

LAUNCH LINK

Hospitality Impact
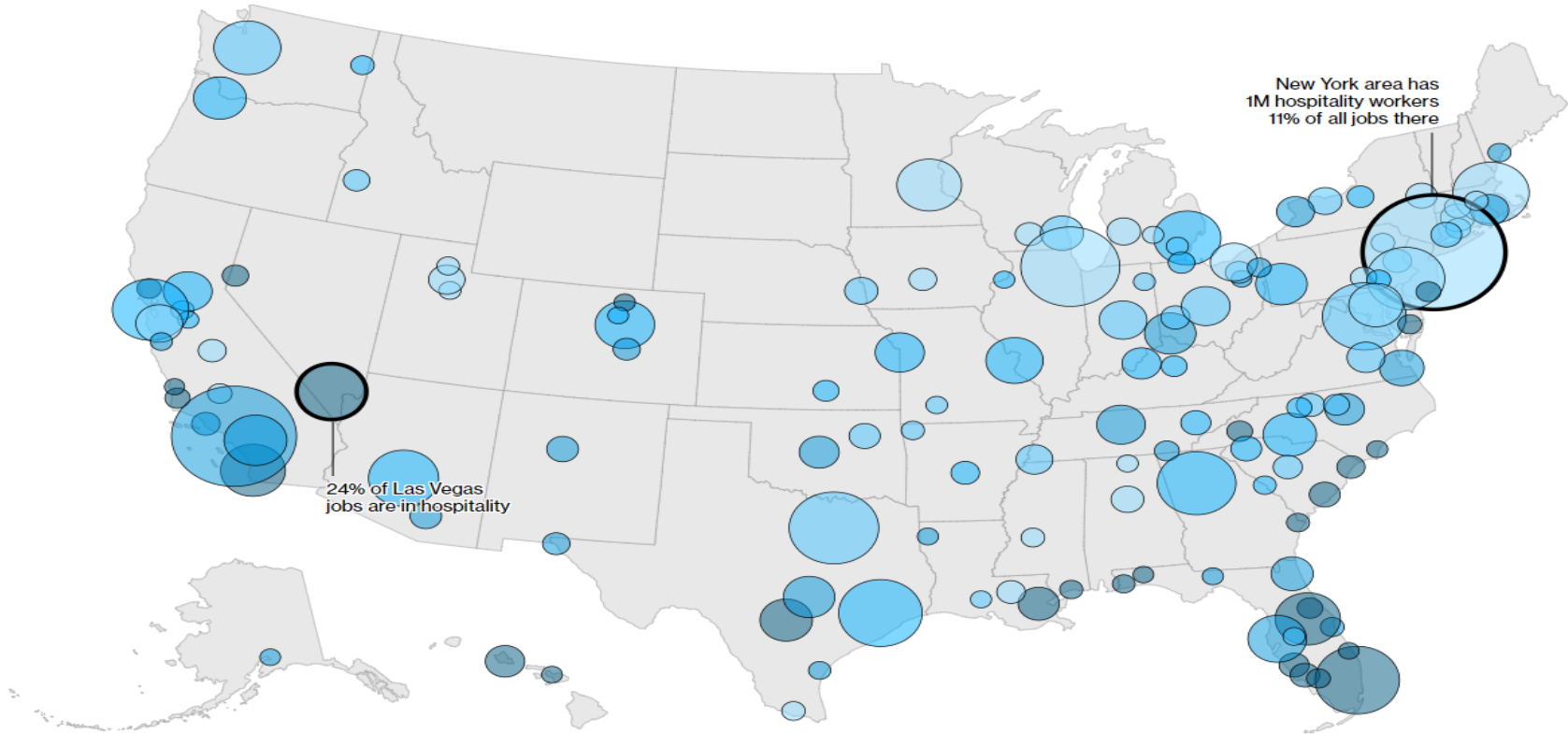
"More than 15 million hospitality jobs in U.S. cities are at risk from restrictions being put in place to deal with the spread of Covid-19," Andre Tartar writes in his recent analysis based on the latest available U.S. Bureau of Labor Statistics, which covers 40 occupations critical to America's hospitality and gaming industries. The map above shows hospitality workers as a share of each metro area's workforce (circles sized by total hospitality jobs).

LAUNCH LINK

Travel Insights

TSA Traveler Throughput March 2019/2020 Comparison

Legend:
- TSA Traveler Throughput 2020 0.124M
- TSA Traveler Throughput 2019 2.412M

TSATTPCY Index (US TSA Checkpoint Numbers Total Traveler Throughput) TSA Travele   Copyright© 2020 Bloomberg Finance L.P.   03-Apr-2020 15:03:34
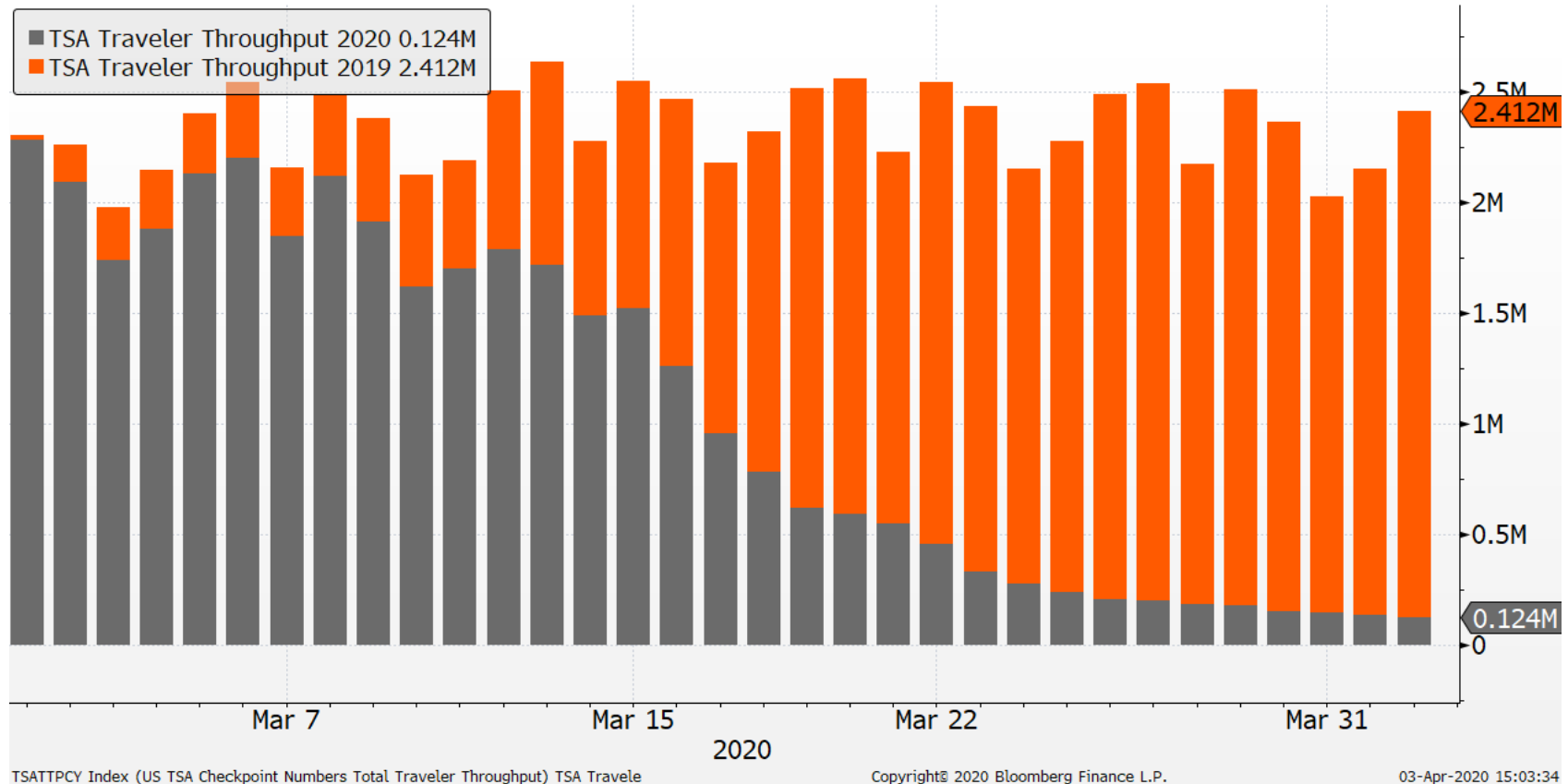
US Transportation Security Administration checkpoint has seen a remarkable collapse in passenger traffic in March. On Thursday 04/02 there were 2.41 million less passengers versus the same date in 2019, demonstrating the industry is now operating at just 5% of its level at the same time in 2019. For more charts on the impact of the coronavirus on the aviation industry click here for the BNEF report.

LAUNCH CHART

ECONOMIC & POLITICAL INDICATORS

Global Growth

Bloomberg Economics Global GDP Tracker Suggests Sharp Downturn

Legend:
- Bloomberg Economics Global GDP Tracker   -0.50
- Global GDP Growth (PPP-weighted) on 12/31/19 2.90

BCMPGLGE Index (Bloomberg Economics Global GDP Tracker QoQ SAAR) Global Growth   Copyright© 2020 Bloomberg Finance L.P.   04-Apr-2020 20:13:30
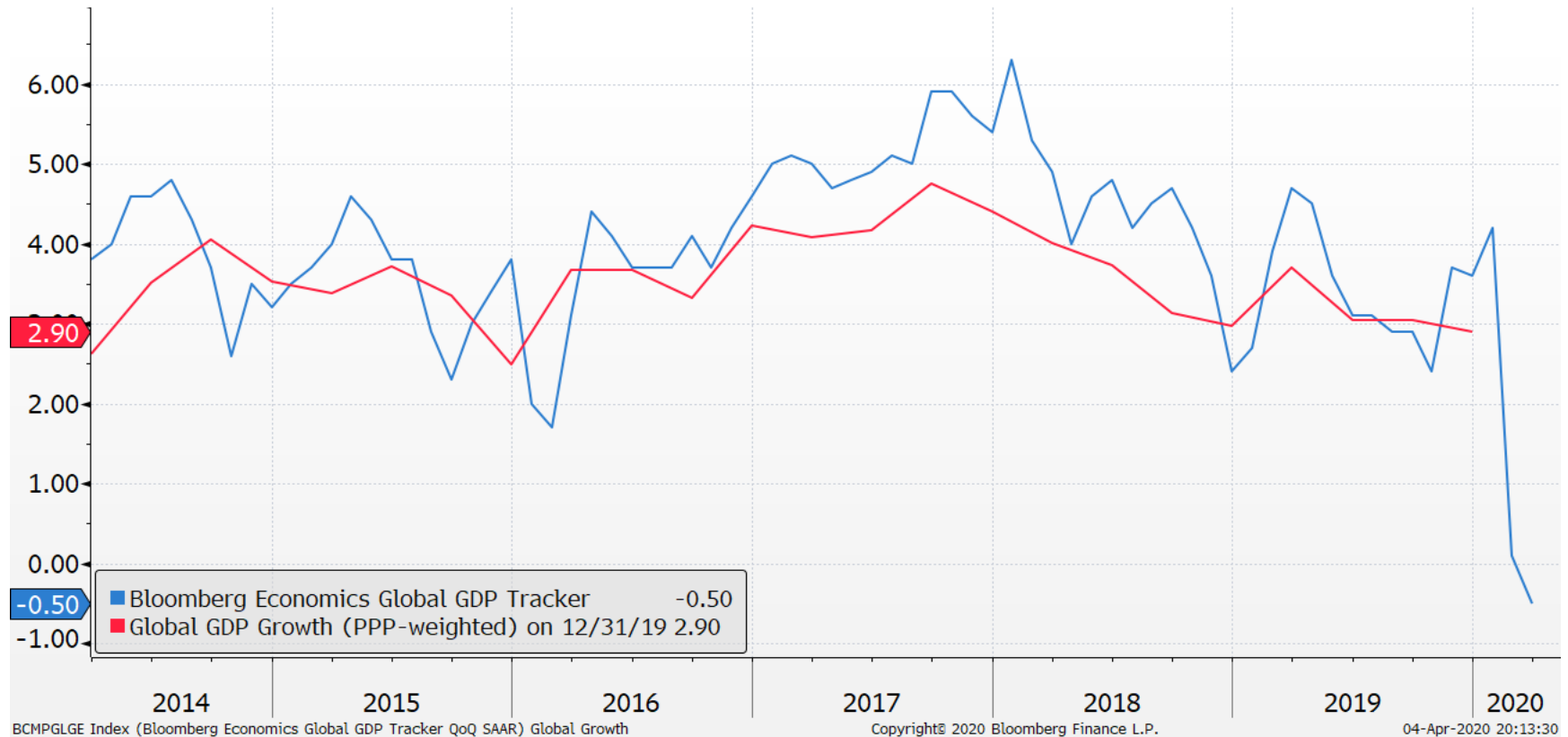
Bloomberg Economics' new Global GDP Tracker, based on business surveys for the U.S., the Euro-area and China as well as indexes of global equity and metal prices is already contracting at an annual rate of 0.5%.Over the last 15 years, the quarterly readings have explained 75% of the variation in GDP.

LAUNCH CHART

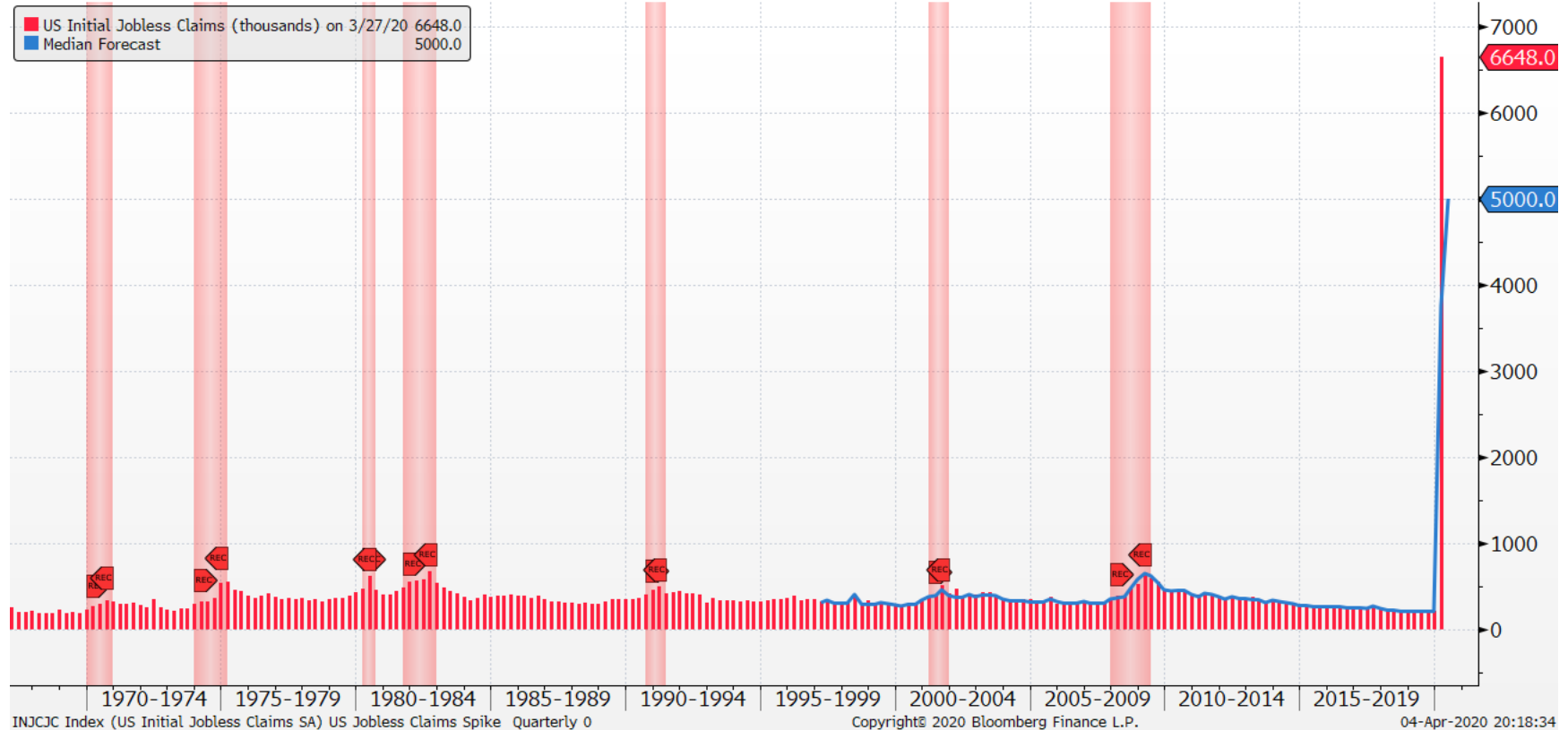# US March Nonfarm Payrolls

US Bureau of Labor March Statistics

US Nonfarm Payrolls MoM Net Change, SA -701
Median Estimate -100

US Unemployment Rate (R1) 4.40
US Participation Rate (L1) 62.7
Deutsche Bank US Unemployment Rate 2020Q2 Forecast (R1) 11.62

NFP TCH Index (US Employees on Nonfarm Payrolls Total MoM Net Change SA) Bureau
Copyright© 2020 Bloomberg Finance L.P.
04-Apr-2020 20:16:22
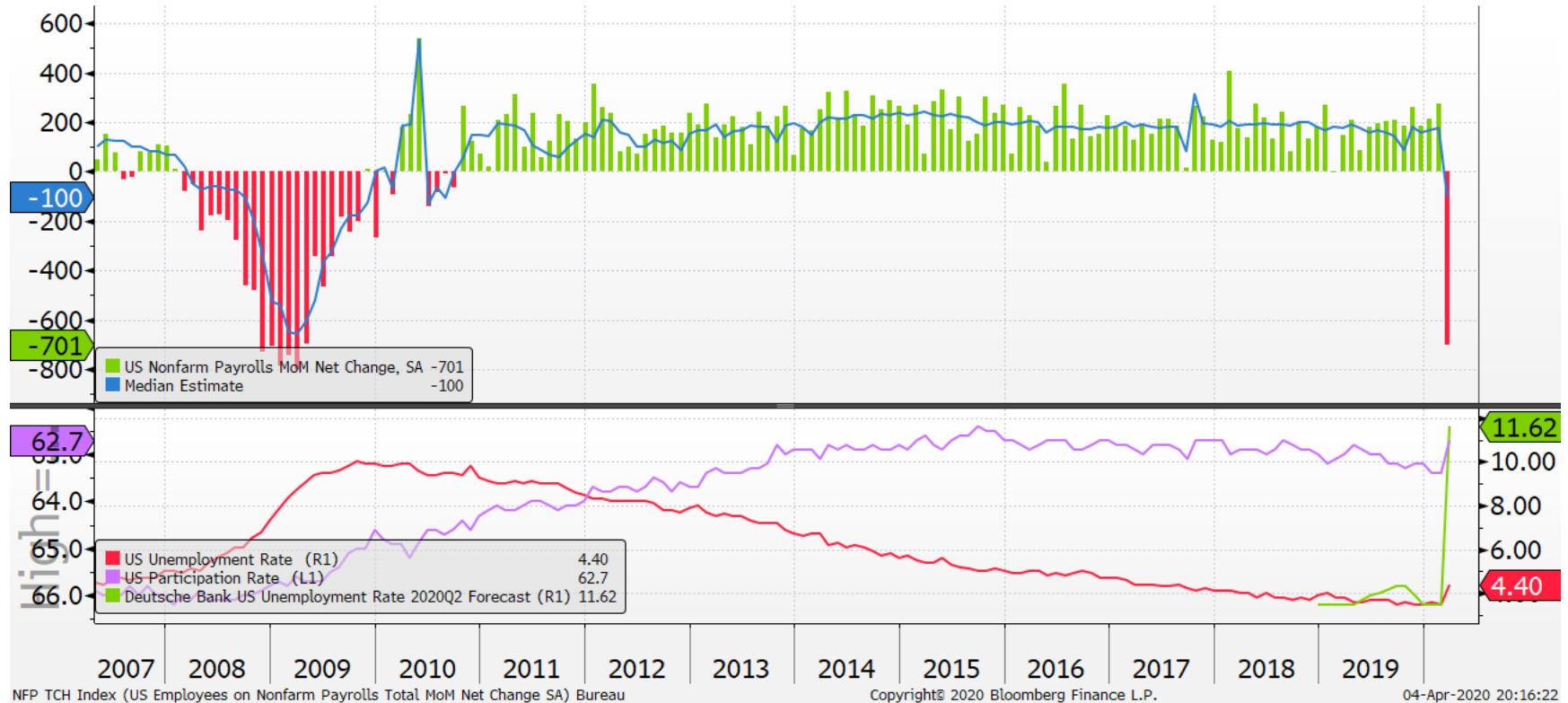
Last Friday nonfarm payrolls fell 701k, significantly worse than the median expectation of -100k . The unemployment rate rose to 4.4% and the participation rate dropped to 62.7%. Note the revision in Deutsch Bank's Q2 2020 Unemployment forecast to 11.6%. UBS's Q2 2020 forecast is 14.4%, while Bloomberg Economics's Q2 2020 forecast is for 15% unemployment.

LAUNCH CHART   WEEK AHEAD & FORECASTS

US Jobless Claims

Spike in US Jobless Claims As Virus Infects Economy

Legend:
- US Initial Jobless Claims (thousands) on 3/27/20 6648.0
- Median Forecast 5000.0

INJCJC Index (US Initial Jobless Claims SA) US Jobless Claims Spike Quarterly 0   Copyright© 2020 Bloomberg Finance L.P.   04-Apr-2020 20:18:34
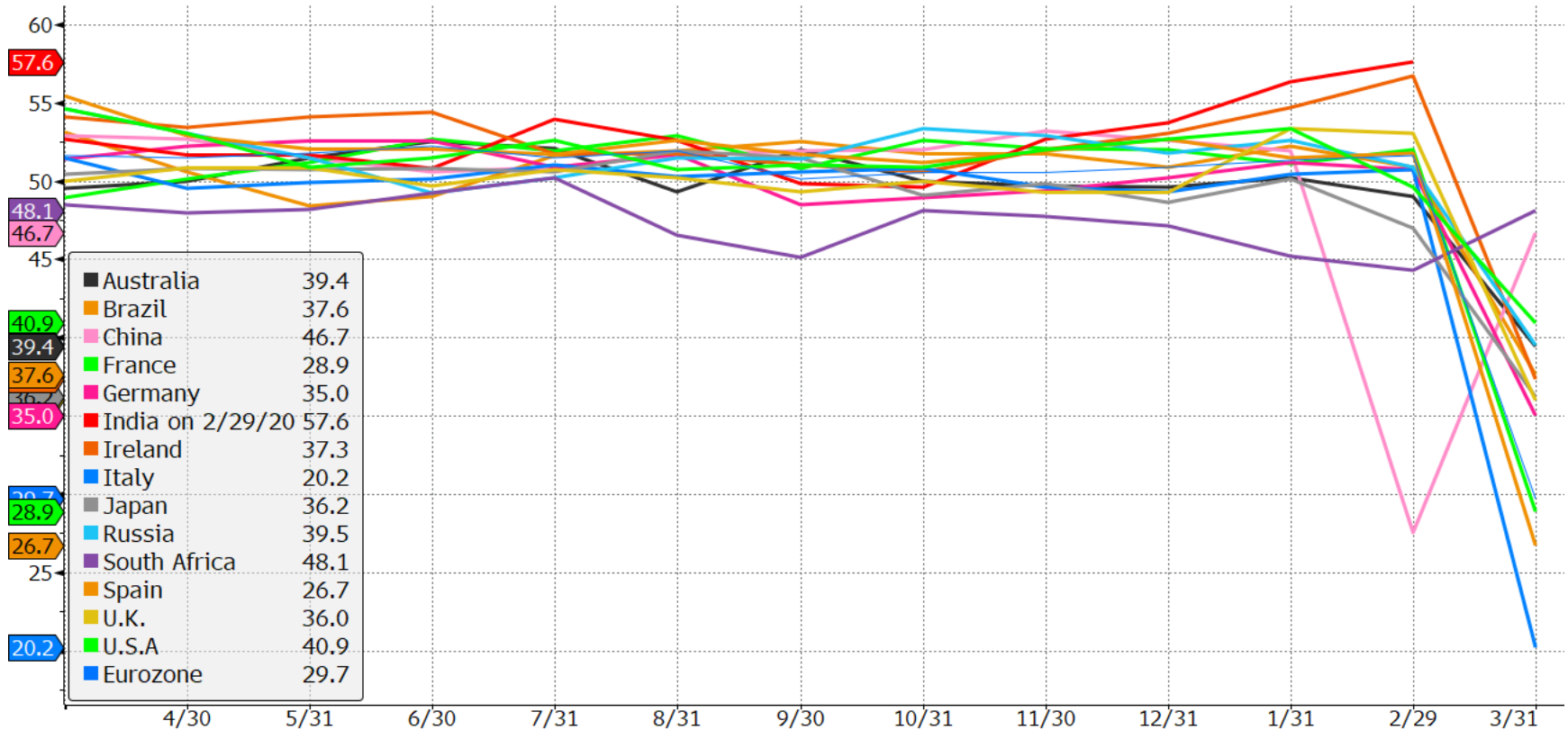
If you thought the record jobless claims number from last week couldn't get worse, this week showed it could with 6.648 mio new jobless claims again significantly higher than the median forecast of 5mio. Comparing these last two weekly numbers versus history back to 1966 is extremely sobering.

LAUNCH CHART

PMI Surveys

March Composite PMIs (Markit)

Country	Value
Australia	39.4
Brazil	37.6
China	46.7
France	28.9
Germany	35.0
India on 2/29/20	57.6
Ireland	37.3
Italy	20.2
Japan	36.2
Russia	39.5
South Africa	48.1
Spain	26.7
U.K.	36.0
U.S.A	40.9
Eurozone	29.7

Source: Markit

MPMIAUCA Index (Commonwealth Bank Australia Composite PMI Output SA) March Compo

Copyright© 2020 Bloomberg Finance L.P.

04-Apr-2020 20:19:07

Markit Composite PMI is a monthly summary report concerning the changes in the working conditions of private companies in the manufacturing and service sectors. Readings below 50 mean worsening of business conditions and often provides a leading indicator for subsequent official economic releases like GDP. Last week we saw major drops in this data across the board except for China which bounced back after a shocking February number.

LAUNCH CHART

US Presidential Candidates

Who Will Win The Presidency

Legend:
- Joe Biden — 42
- Donald Trump — 48
- Bernie Sanders — 3
- Real Clear Politics Trump Approval on 4/3/20 46.9
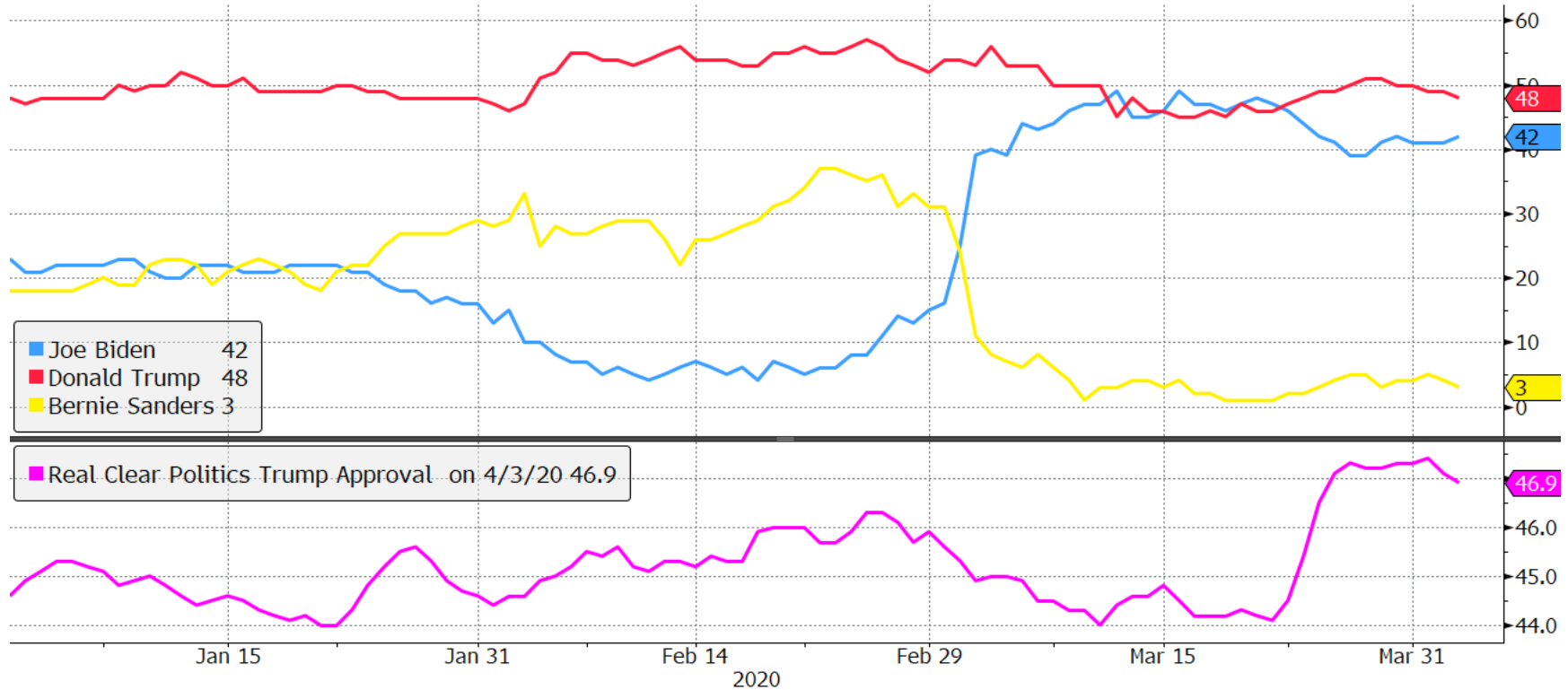
Source: PredictIt, Real Clear Politics
PRITUS2D Index (US PredictIt 2020 Who will win the US Presidential Election Joe
Copyright© 2020 Bloomberg Finance L.P.
04-Apr-2020 20:26:07

According to PredictIt, the top panel shows that Trump's odds for being elected to a second term are improving as the crisis deepens, which ties out with the bottom panel of a Real Clear Politics Poll showing that Trump's approval rating has moved a few points higher since the middle of March

LAUNCH CHART

Follow the Fed
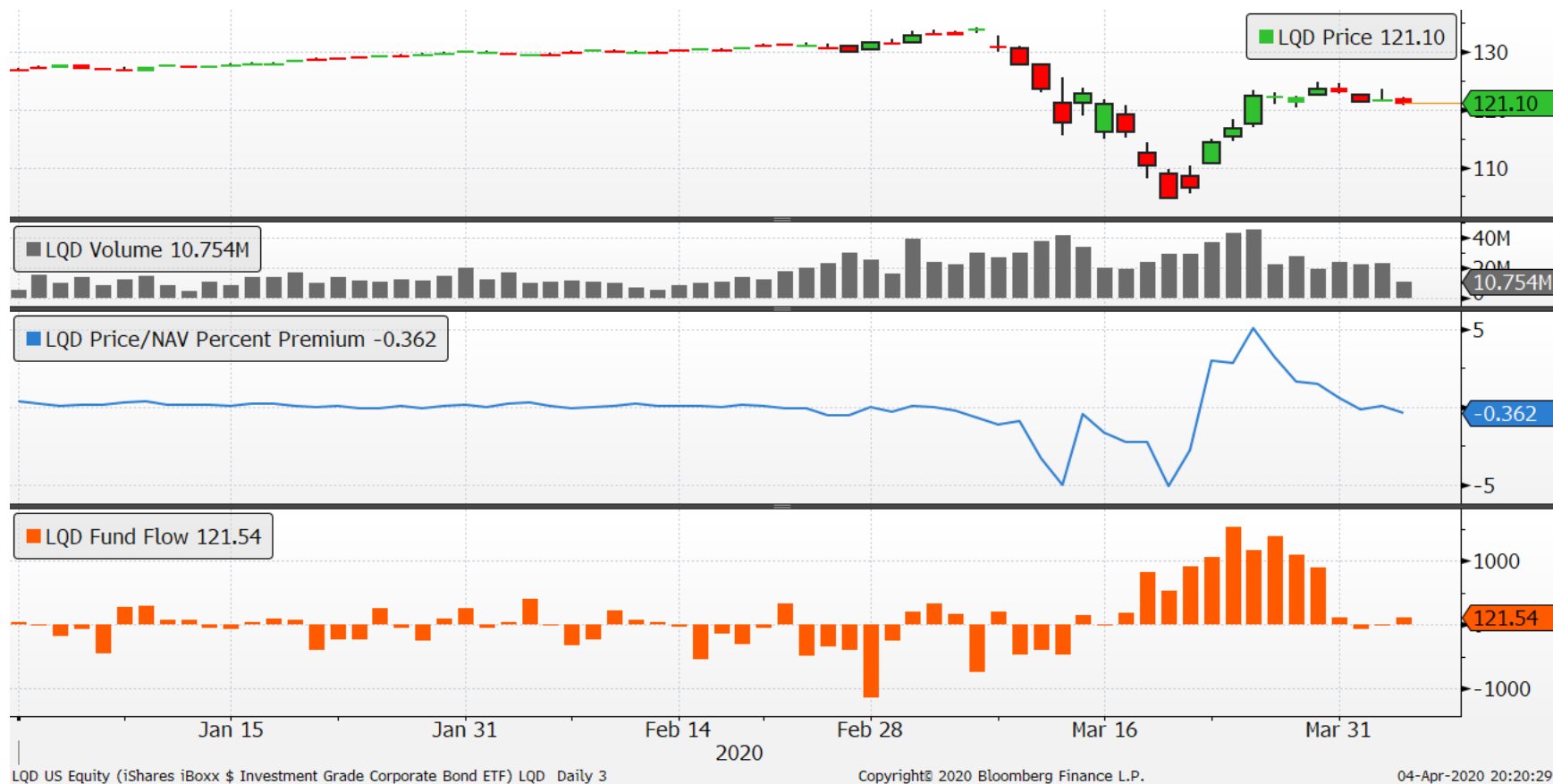
As the largest and most liquid corporate bond ETFs, LQD as well as potentially VCIT, VCSH, & VSCH will likely be targeted for purchase by the Fed as it's new facilities extend to investment-grade bonds. Note the increase in fund flow after the Fed's announcement on 03/23.
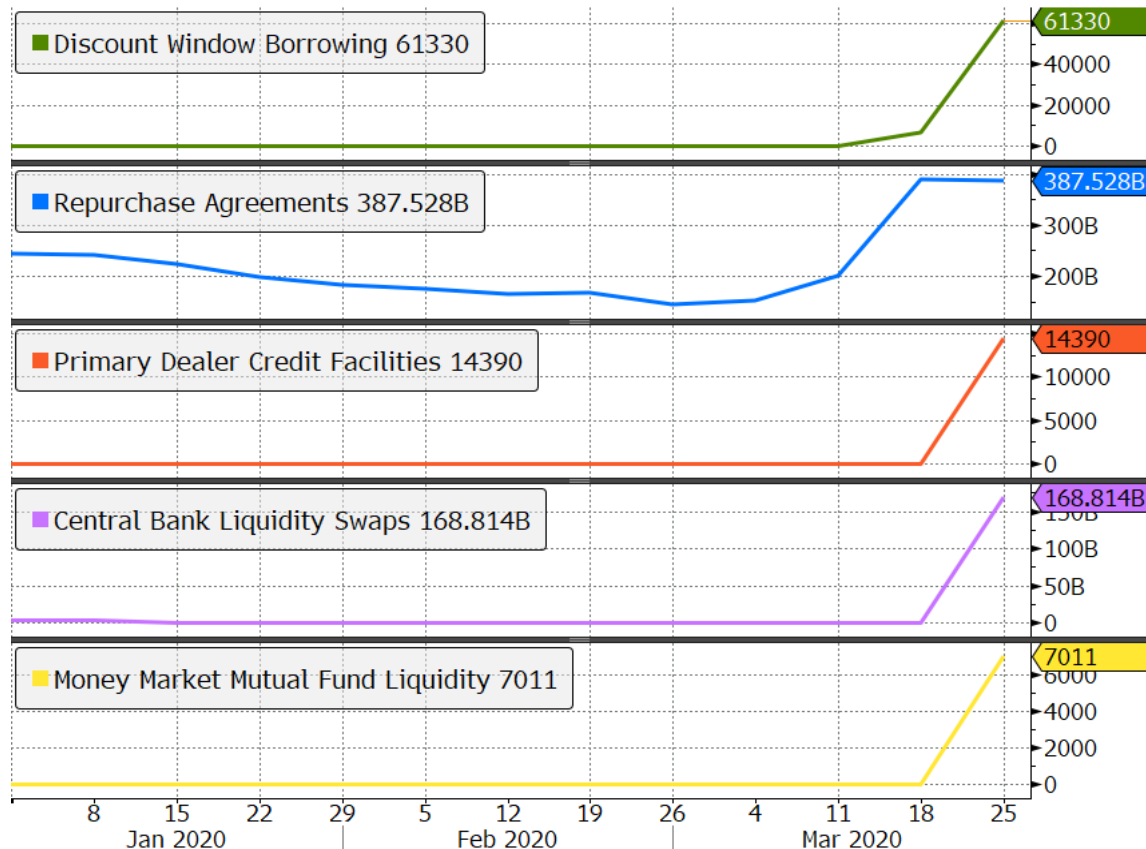
LAUNCH CHART

The Fed's Balance Sheet

The Federal Reserve Balance Sheet total assets have now spiked up above 5 trillion dollars after the most recent liquidity measures. The single week jump was the largest on record.

LAUNCH CHART

The Fed's Liquidity Program

Fed 2020 Liquidity Programs

- Discount Window Borrowing 61330 — 61330
- Repurchase Agreements 387.528B — 387.528B
- Primary Dealer Credit Facilities 14390 — 14390
- Central Bank Liquidity Swaps 168.814B — 168.814B
- Money Market Mutual Fund Liquidity 7011 — 7011

FARBWNDW Index (US Factors Supplying Reserve Funds Discount Window Borrowing) FE   Copyright® 2020 Bloomberg Finance L.P.   04-Apr-2020 20:25:27

The chart displays the quantitative easing programs the Fed has begun, along with the following additional programs also set up:

- **CPFF** (Commercial Paper Funding Facility) – buying commercial paper from the issuer.

- **PMCCF** (Primary Market Corporate Credit Facility) – buying corporate bonds from the issuer.

- **TALF** (Term Asset-Backed Securities Loan Facility) – funding backstop for asset-backed securities.

- **SMCCF** (Secondary Market Corporate Credit Facility) – buying corporate bonds and bond ETFs in the secondary market.

- **MSBLP** (Main Street Business Lending Program) – Details are to come, but it will lend to eligible small and medium-size businesses, complementing efforts by the Small Business Association.

LAUNCH CHART   FIND DATASETS

Sahm's Rule In Sight

SAHMRLRT Index (United States Sahm Rule Recession Indicator Real Time) Sahm Rule   Copyright© 2020 Bloomberg Finance L.P.   05-Apr-2020 23:48:20
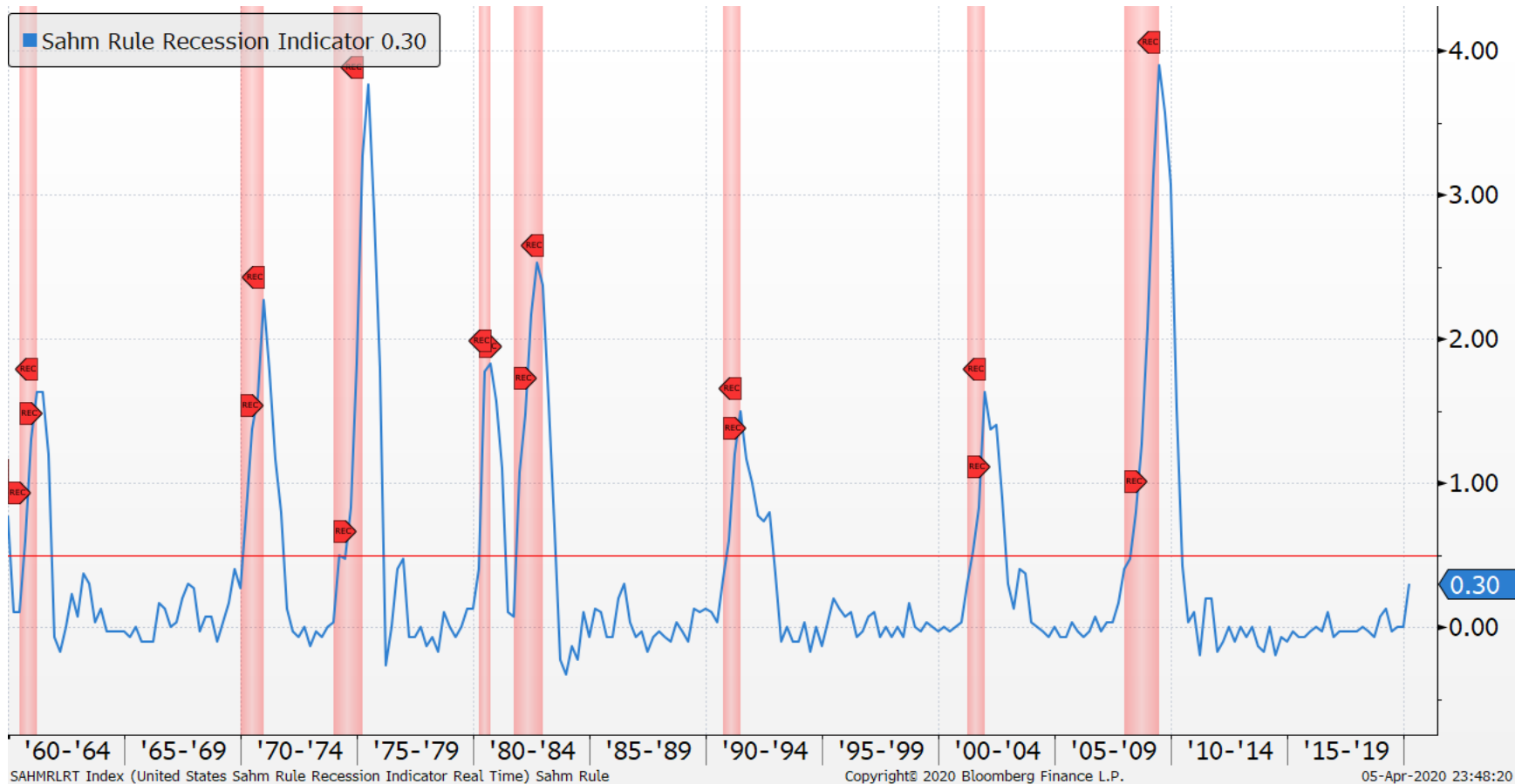
Social distancing measures show that the US is accelerating towards Sahm's Rule. Sahm's Rule states that the US has always entered a recession when the 3 month moving average of unemployment rate rises 0.5% from it's 12-month low.
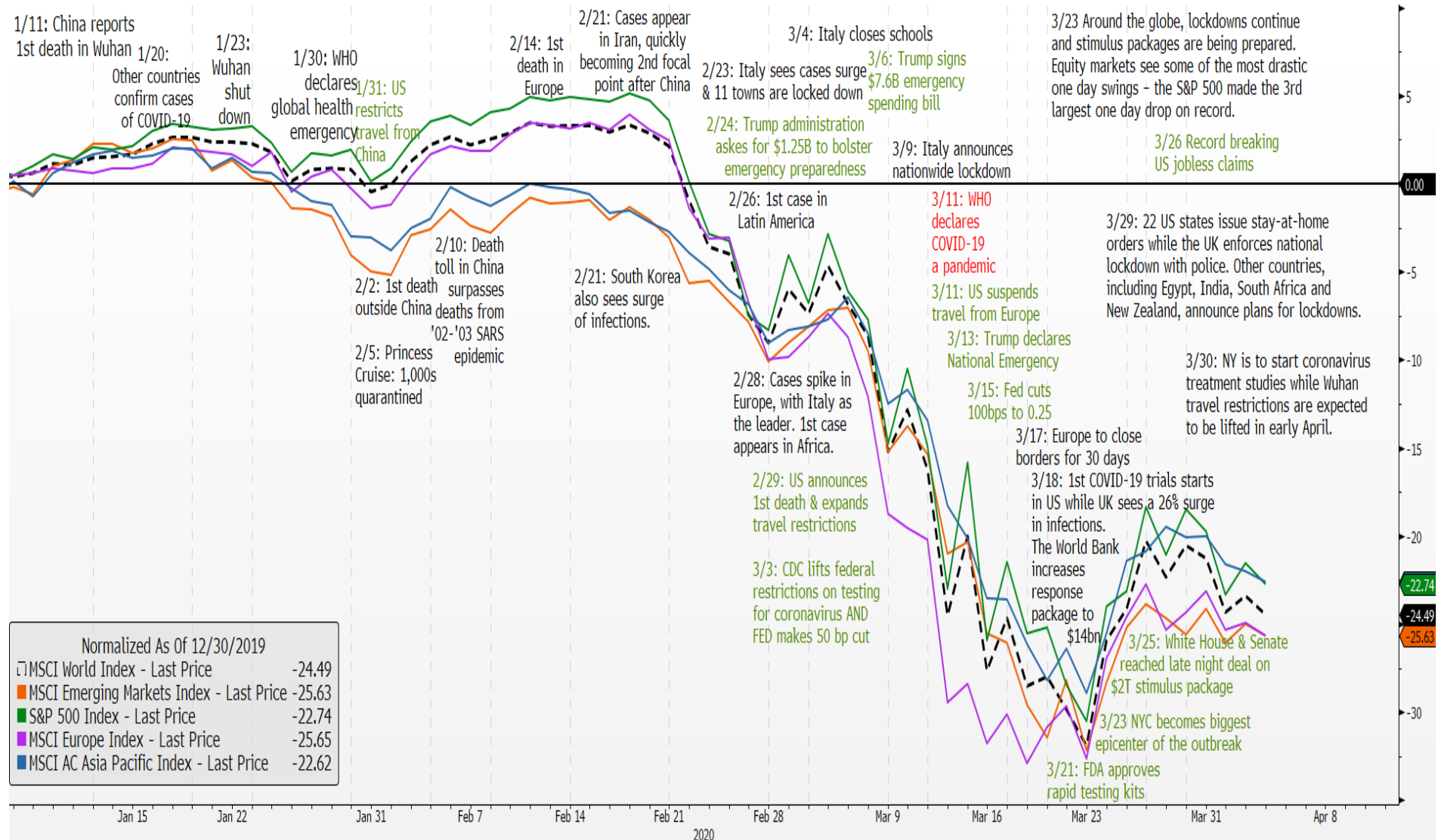
LAUNCH CHART

EQUITY MARKET
IMPACT

Equity Market Impact & COVID-19 Timeline

COVID19 Timeline & YTD performance

1/11: China reports 1st death in Wuhan

1/20: Other countries confirm cases of COVID-19

1/23: Wuhan shut down

1/30: WHO declares global health emergency

1/31: US restricts travel from China

2/2: 1st death outside China

2/5: Princess Cruise: 1,000s quarantined

2/10: Death toll in China surpasses deaths from '02-'03 SARS epidemic

2/14: 1st death in Europe

2/21: Cases appear in Iran, quickly becoming 2nd focal point after China

2/21: South Korea also sees surge of infections.

2/23: Italy sees cases surge & 11 towns are locked down

2/24: Trump administration askes for $1.25B to bolster emergency preparedness

2/26: 1st case in Latin America

2/28: Cases spike in Europe, with Italy as the leader. 1st case appears in Africa.

2/29: US announces 1st death & expands travel restrictions

3/3: CDC lifts federal restrictions on testing for coronavirus AND FED makes 50 bp cut

3/4: Italy closes schools

3/6: Trump signs $7.6B emergency spending bill

3/9: Italy announces nationwide lockdown

3/11: WHO declares COVID-19 a pandemic

3/11: US suspends travel from Europe

3/13: Trump declares National Emergency

3/15: Fed cuts 100bps to 0.25

3/17: Europe to close borders for 30 days

3/18: 1st COVID-19 trials starts in US while UK sees a 26% surge in infections. The World Bank increases response package to $14bn

3/21: FDA approves rapid testing kits

3/23 Around the globe, lockdowns continue and stimulus packages are being prepared. Equity markets see some of the most drastic one day swings – the S&P 500 made the 3rd largest one day drop on record.

3/26 Record breaking US jobless claims

3/29: 22 US states issue stay-at-home orders while the UK enforces national lockdown with police. Other countries, including Egypt, India, South Africa and New Zealand, announce plans for lockdowns.

3/30: NY is to start coronavirus treatment studies while Wuhan travel restrictions are expected to be lifted in early April.

3/25: White House & Senate reached late night deal on $2T stimulus package

3/23 NYC becomes biggest epicenter of the outbreak

Normalized As Of 12/30/2019	
MSCI World Index - Last Price	-24.49
MSCI Emerging Markets Index - Last Price	-25.63
S&P 500 Index - Last Price	-22.74
MSCI Europe Index - Last Price	-25.65
MSCI AC Asia Pacific Index - Last Price	-22.62

-22.74
-24.49
-25.63

Jan 15   Jan 22   Jan 31   Feb 7   Feb 14   Feb 21   Feb 28   Mar 9   Mar 16   Mar 23   Mar 31   Apr 8

2020

LAUNCH CHART

Yield Comparison

It is a rare event that the S&P 500's dividend yield crosses above the US 30yr Treasury's yield. This has happened in late February and appears to be widening. The spread between the two is the widest it's ever been in over 40 years (including in 2008) and is diverging.
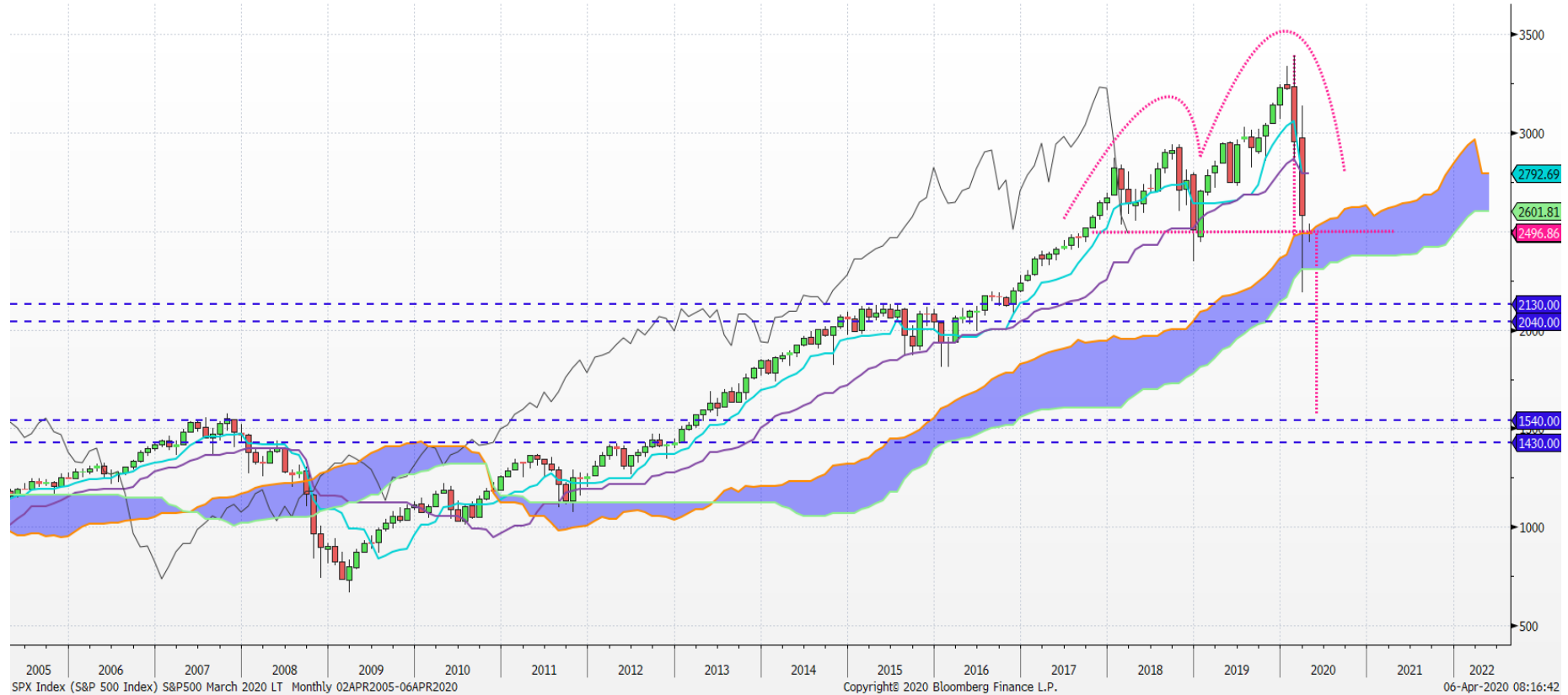
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S&P 500: Comparison to 2008
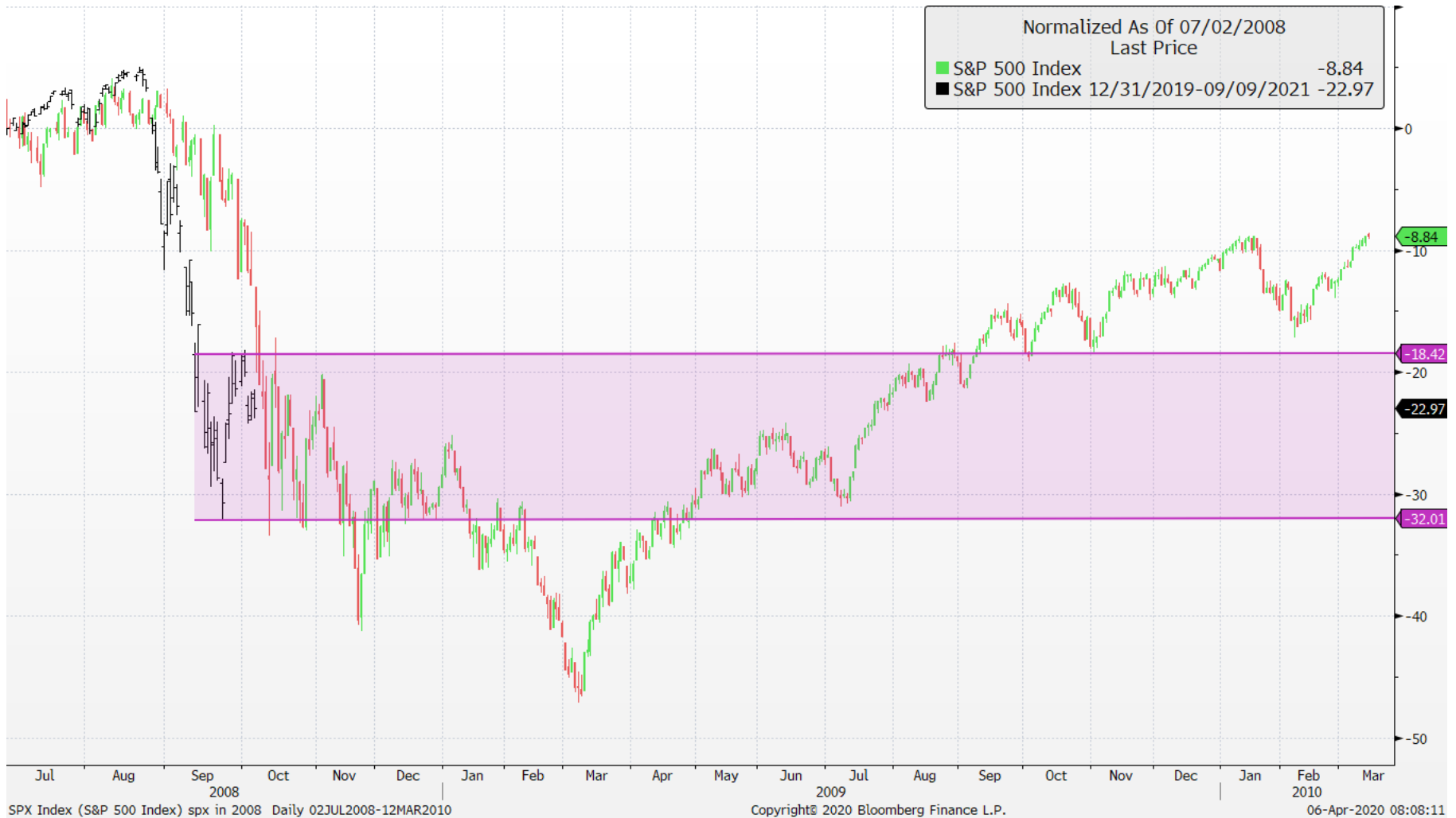
The mirroring of the financial crisis of 2008 continues as the S&P 500's current sideways movement pans out. Continue to watch for retests of this high and low range.

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S&P 500 – Techncials Long Term

S&P 500 - Watch the Monthly

SPX Index (S&P 500 Index) S&P500 March 2020 LT Monthly 02APR2005-06APR2020   Copyright© 2020 Bloomberg Finance L.P.   06-Apr-2020 08:16:42

This month, prices gather at the level we are watching for long support with a very small bodied candle, currently symbolizing uncertainty. Watch with caution as the conversion (blue) and base lines (purple) are now equal and a topping pattern may be forming. A break below the support (dotted pink horizontal line) and ultimately below the Ichimoku cloud could result in a pause near 2015 levels (top set of dashed blue lines) before extending to a target that could align with 2007 highs (second set of blue lines).

LAUNCH CHART

S&P 500 – Techncials Medium Term

Meeting Resistance

On the weekly, the 200-week moving average has provided significant support for the S&P 500's uptrend, bouncing off this level multiple times. Price recently broke below this line for the first time in a decade, finding support at the 50% Fibonacci retracement level. Price now tests the 200-week average from the angle of resistance while resting on the 38.2% level. This tight zone is setting price up for a break – watch the direction of the break for a high likelihood that price will continue a mid-term move in that direction.

LAUNCH FUNCTION

S&P 500 – Techncials Short Term

S&P Retest Required
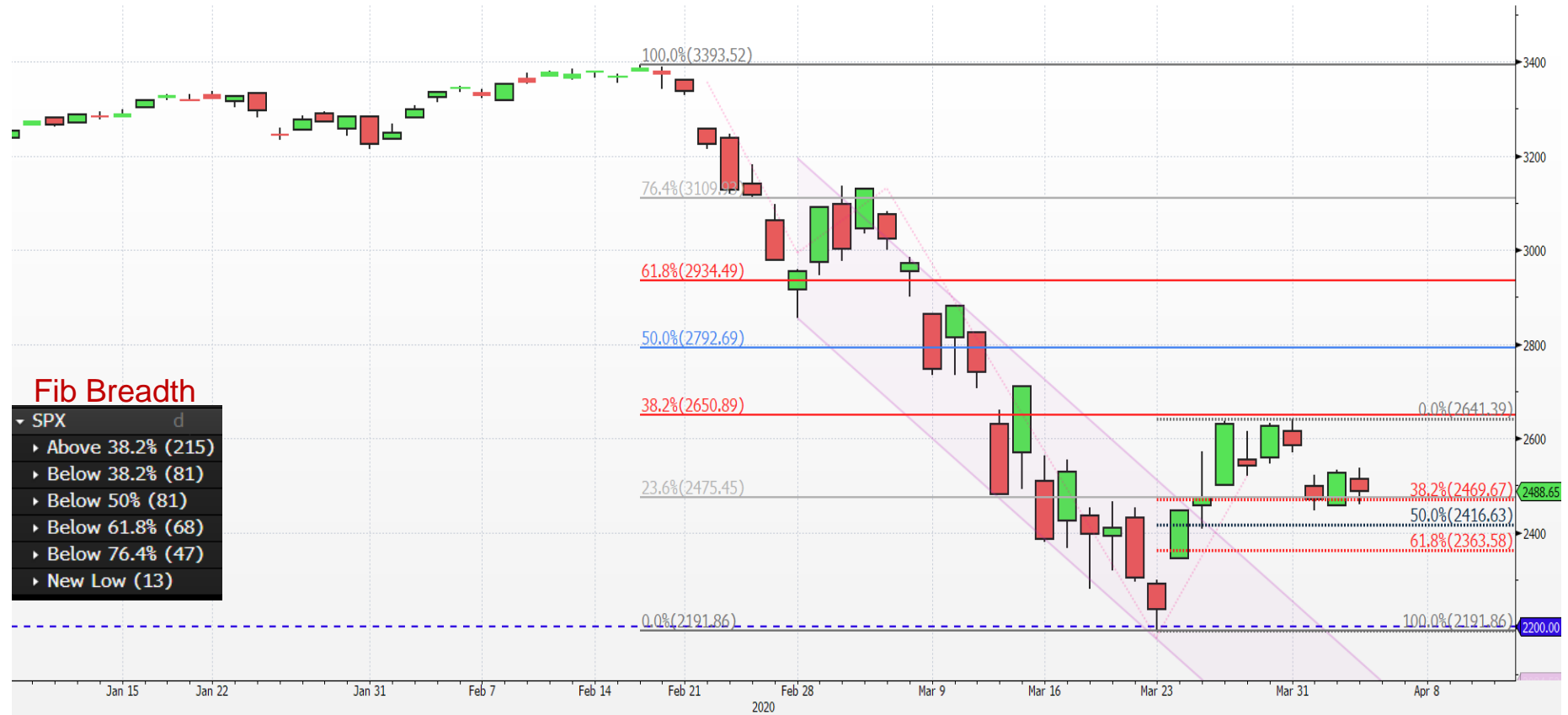
On the year-to-date short term daily chart, Fibonacci analysis shows price finding significant support. The 23.6% level of the retracement drawn from the February high to the March low aligns with the 38.2% line of the recent bounce off the March 23rd low. From a Fibonacci breadth perspective, 43% of the S&P 500 members have not moved below their 38.2% level off the March lows, showing that the constituents support this short tem bullish rally.

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Market Breadth
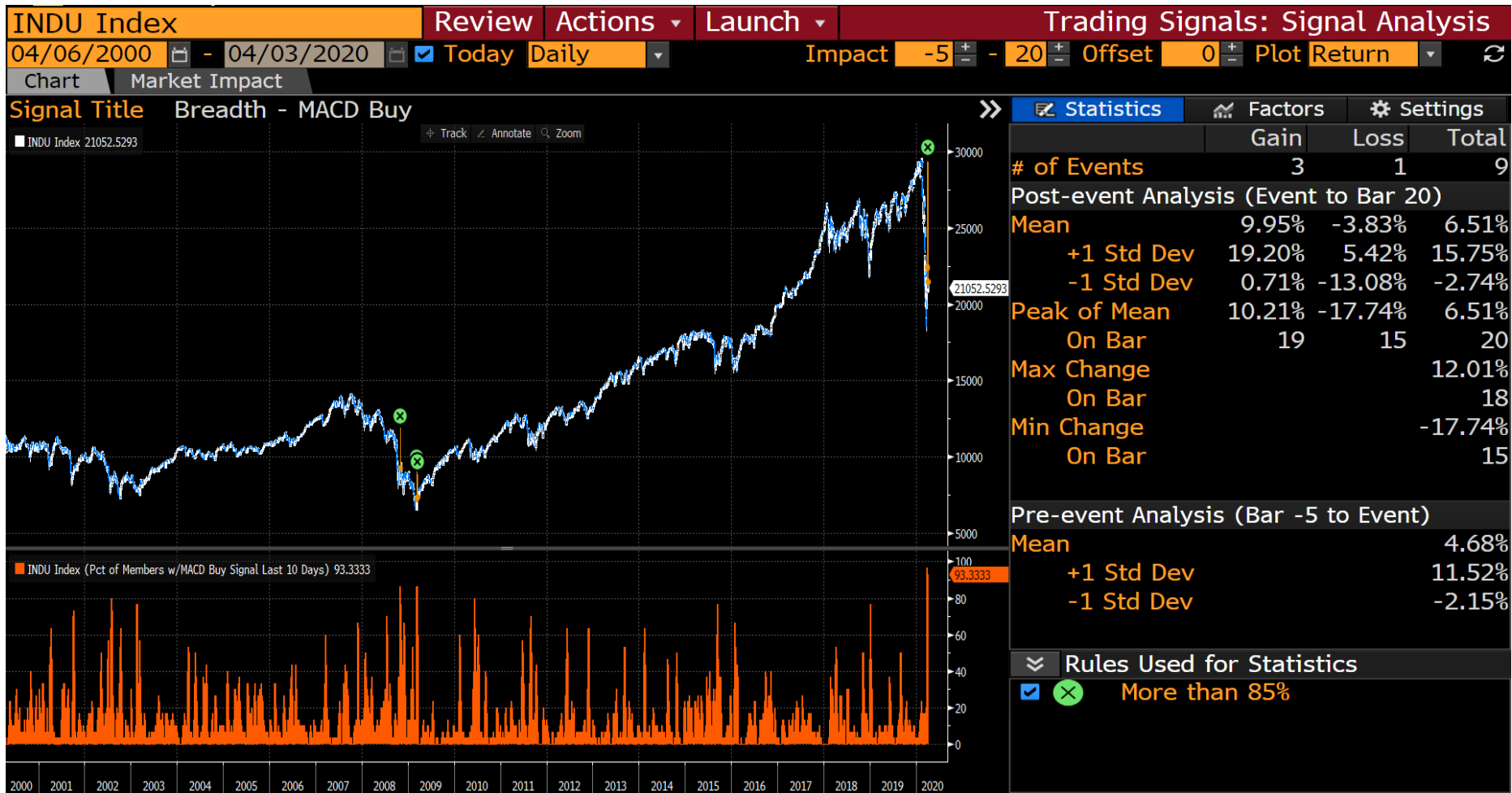
Considering the Dow Jones, the percent of members that are currently generating a MACD buy signal has hit a 20 year high. Similar extended levels have only been reached 4 times before this recent clustering of alerts, and those were clustered near the bottom of the '08 financial crisis. Looking twenty days out from the signals averaged a 6.5% price appreciation.

LAUNCH CHART   LAUNCH BREADTH FUNCTION

Sector Rotation

From a relative strength perspective, comparing to the S&P 500, Consumer Staples and Health Care continue full steam ahead while Utilities has started to lose some momentum this week in the leading quadrant.

Energy is the largest lagger, depicted off the grid in the bottom left. Momentum may be starting to turn for this sector, as the rate of decline flattens a bit this week.

This relative rotation graph give insights into relative outperformance (x-axis >100) or under performance (x-axis <100) as well as momentum (y-axis > 100, ticker is picking up speed).

LAUNCH FUNCTION

Sector Performance

S&P 500 Monthly Sector Performance
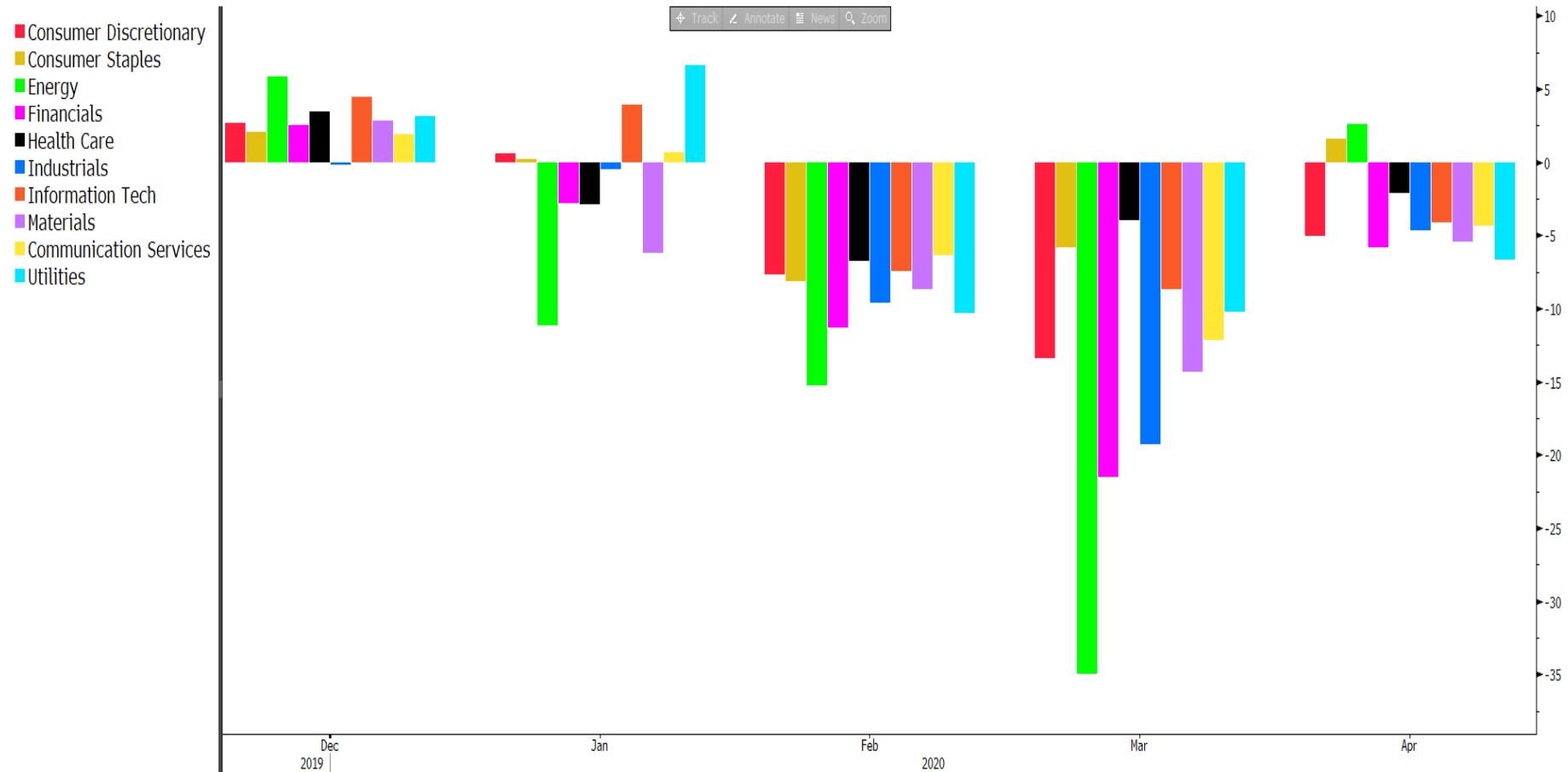
Only a few days into April, Energy is followed by Consumer Staples with both sectors leading the month-on-month change with positive figures, +2.6% and +1.6% respectively. As a defensive sector, it's not surprising to see consumer staples leading, but watch energy to see if this push is sustained for a potential early sign of a bottom.

LAUNCH CHART

Strong Vs Weak Balance Sheets
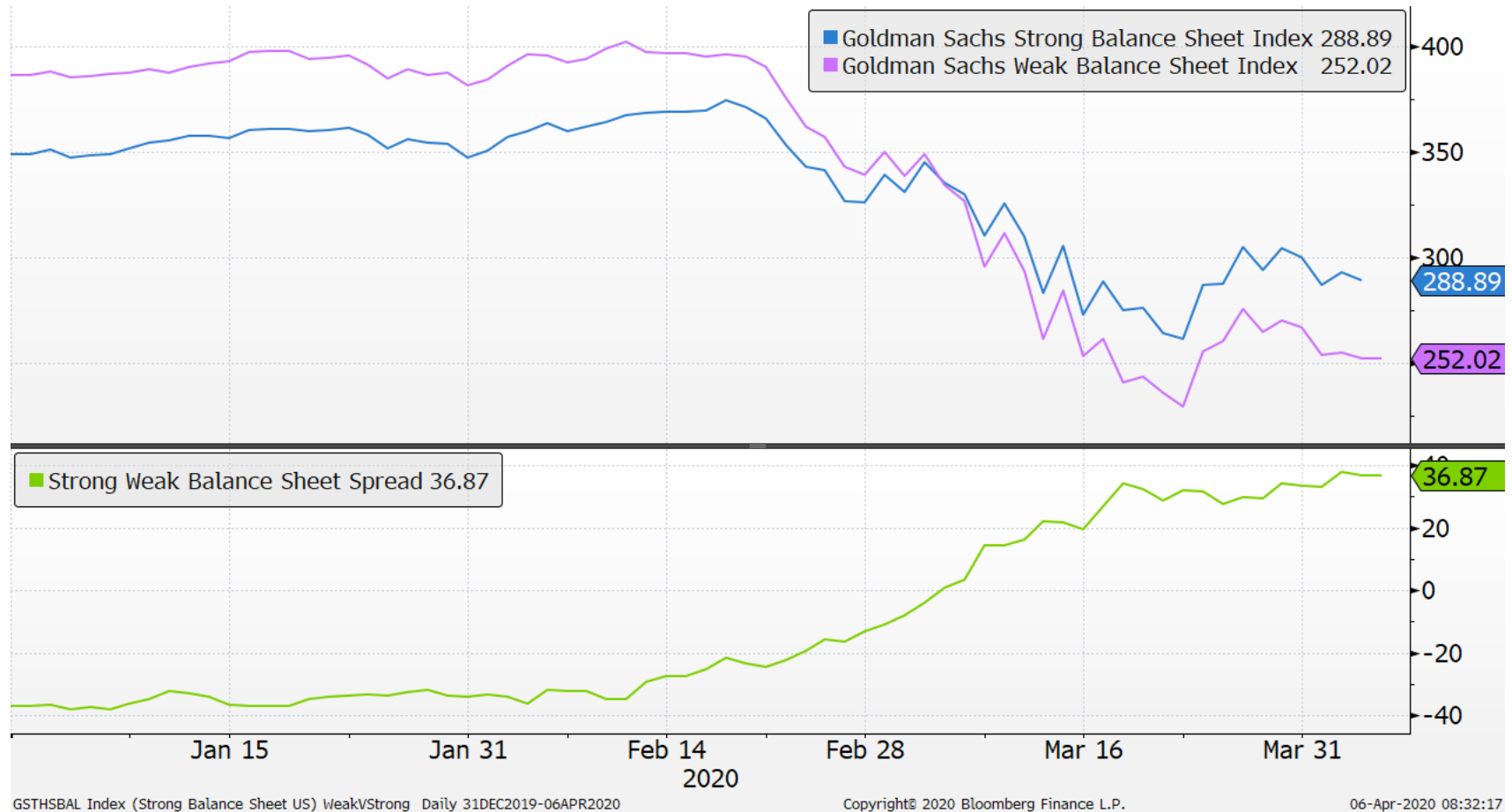
After underperforming at the beginning of the year, the corporations in the Goldman Sachs Strong Balance Sheet Index continues to out perform those names in the Weak Balance Sheet index.

LAUNCH CHART

Liquidity In S&P Mini Futures
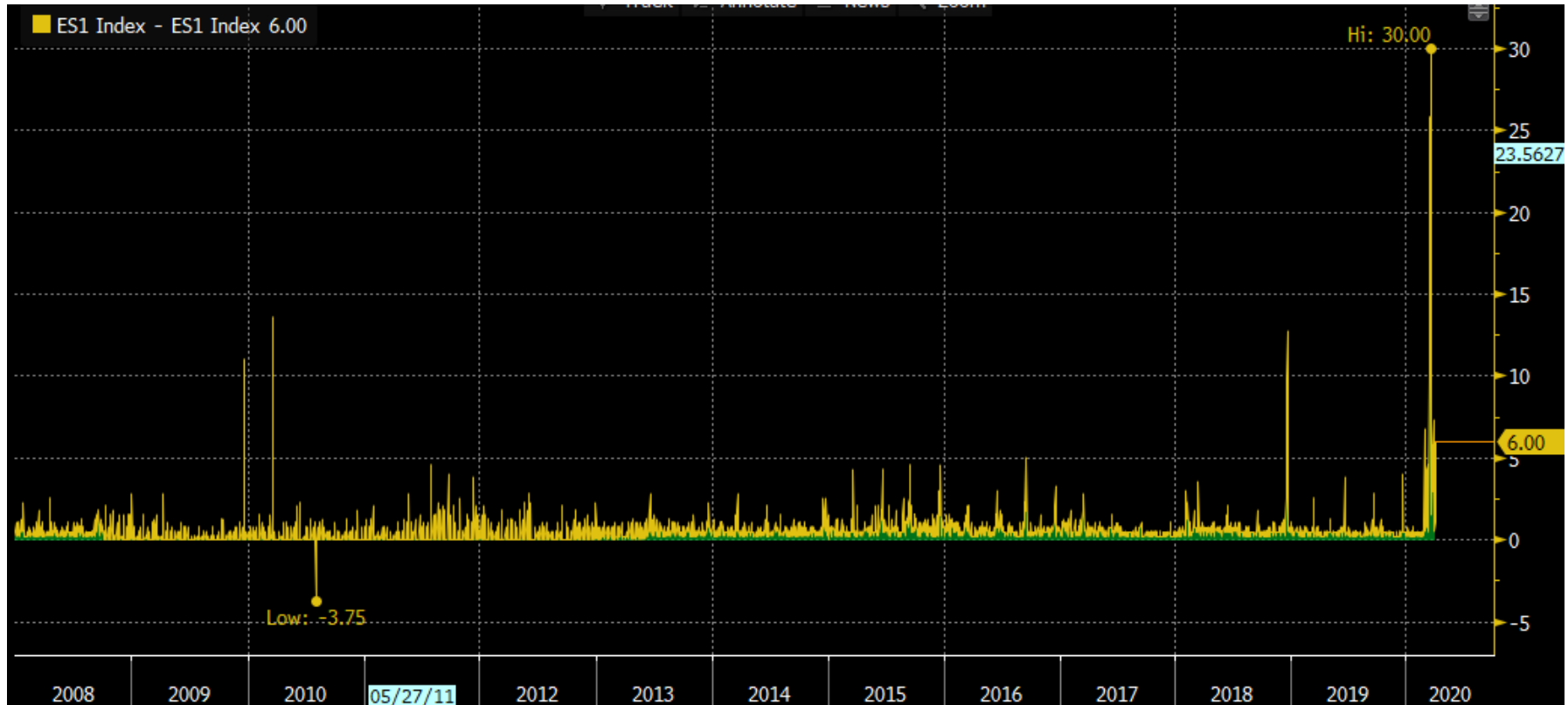
The bid-ask spread of the mini S&P futures exploded and while a retrenchment has been seen, it remains very elevated.

LAUNCH CHART

The Fear Index

VIX with Standard Deviation Bands (1Y Daily)

VIX Index (Chicago Board Options Exchange Volatility Index) VIX Daily 29MAR2019   Copyright© 2020 Bloomberg Finance L.P.   05-Apr-2020 11:31:28

The Vix is now more than 35 points off it's 3/16 closing high but remains 2.5 times above it's long-run average level and is pricing in ~3% move a day for the SPX.

LAUNCH CHART

VIX Curve Comparison
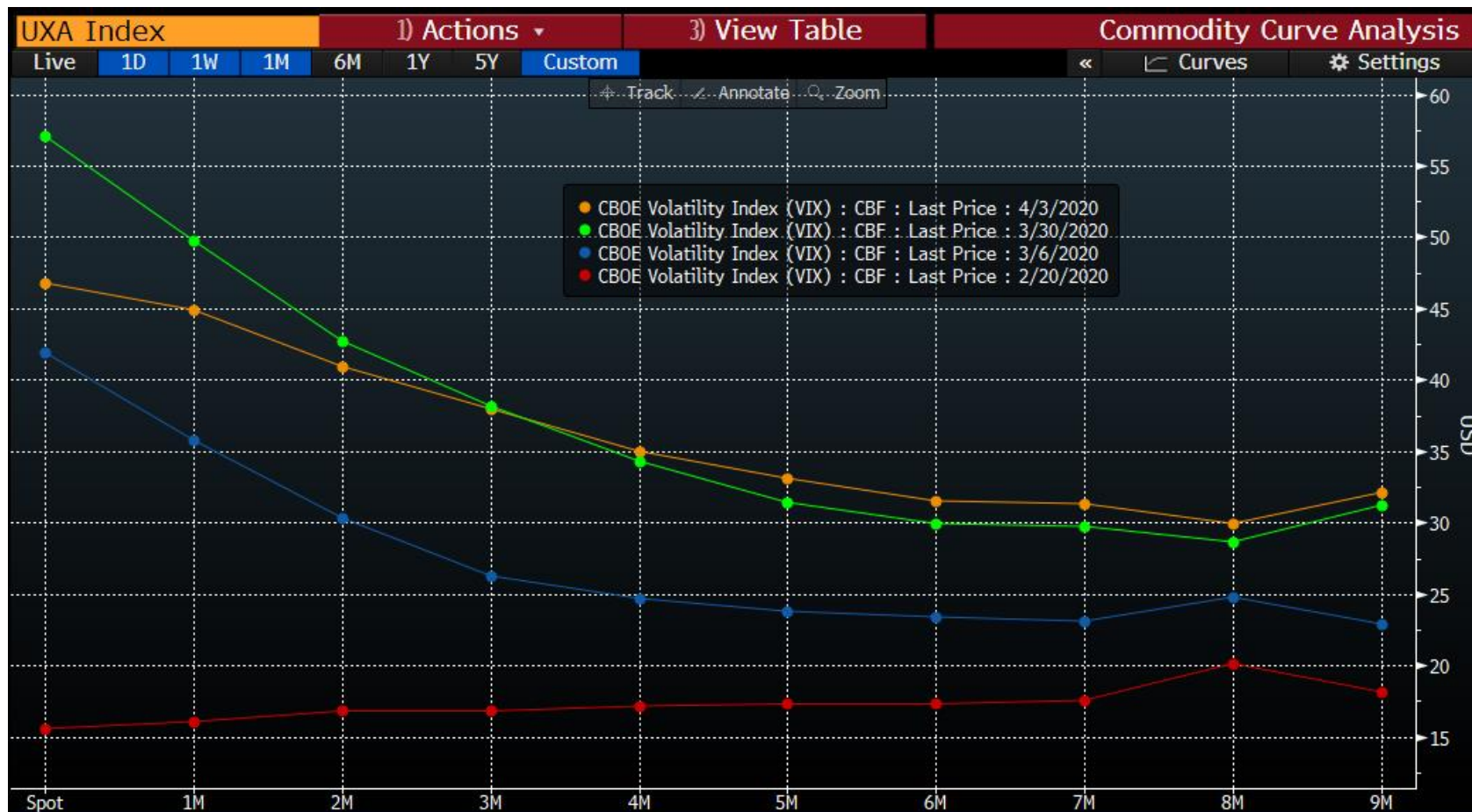
The VIX curve is still firmly in backwardation and while the degree of this in the front months has flattened this week, long term volatility expectations have increased at the long end.

LAUNCH FUNCTION

Vix Backwardation In Front Two Months

The degree of backwardation in the first two months of the VIX futures' curve while very steep, is flattening.

LAUNCH CHART

1M Volatility for Global Indices

Index ▾   %Money 100% ▾ Term 1 Month ▾ Range 3 Years ▾

5) Impl Vol   6) Impl/Realized Vol   7) Skew   8) Term   9) Impl Corr   10) Impl/Realized Corr

1M 100% Implied Volatility

Underlying	Vol	Chg	Low	Range	High	Avg	+/-	PCTL	StdDev	#SD
1) North/Latin America				Now ◆ Avg						
11) DOW JONES INDU AVG	52.36	-2.59	6.92		81.90	14.10	38.25	97.55	9.37	4.08
12) S&P 500 INDEX	46.36	-.28	6.34		78.66	13.15	33.20	97.55	8.44	3.93
13) NASDAQ 100 STOCK INDX	41.65	-3.04	9.17		78.26	17.73	23.92	97.28	7.92	3.02
14) RUSSELL 2000 INDEX	47.62	-.87	10.00		93.70	16.84	30.78	97.55	8.26	3.73
16) CBOE Volatility Index	153.77	-4.60	67.53		203.51	94.83	58.94	96.88	19.62	3.00
2) Europe/Africa/Middle East										
21) Euro Stoxx 50 Pr	41.50	-3.26	8.72		78.44	14.27	27.23	97.32	7.80	3.49
22) FTSE 100 INDEX	39.59	-2.47	6.88		74.35	12.45	27.14	97.30	7.40	3.67
23) CAC 40 INDEX	42.71	-2.25	8.65		77.54	14.43	28.28	97.32	7.78	3.63
24) DAX INDEX	42.96	-2.77	9.00		79.82	15.30	27.66	97.28	7.85	3.53
25) AEX-Index	42.94	-3.20	7.85		81.64	13.24	29.70	97.32	8.24	3.61
26) OMX STOCKHOLM 30 INDEX	40.38	-2.71	9.26		70.48	14.83	25.54	97.27	7.06	3.62
27) SWISS MARKET INDEX	35.12	-2.96	7.33		69.88	12.59	22.53	97.26	7.10	3.18
28) FTSE/JSE TOP 40 Jun20	40.37	.25	10.92		54.39	16.72	23.65	97.66	5.75	4.12
29) ESTX Banks (EUR) Pr	56.97	-4.89	14.03		103.38	23.70	33.27	97.32	9.97	3.34
3) Asia/Pacific Rim										
31) NIKKEI 225	40.41	-5.32	9.11		74.20	16.43	23.98	97.20	7.41	3.24
32) HANG SENG INDEX	28.66	-3.47	10.44		61.87	17.15	11.51	96.96	5.80	1.98
33) S&P/ASX 200 INDEX	43.16	-5.40	7.70		86.16	12.57	30.59	97.56	8.26	3.70
34) KOSPI 200 INDEX	37.68	-4.48	8.85		72.83	14.46	23.22	97.48	6.96	3.33
35) Nifty 50	55.97	-3.67	8.89		90.51	14.94	41.03	98.03	8.96	4.58

US Major indices continue to lead the way as the geographic area with the highest implied volatility. In standard deviation terms, the difference has increased this week.

LAUNCH FUNCTION

S&P 500: Implied & Historical Vol
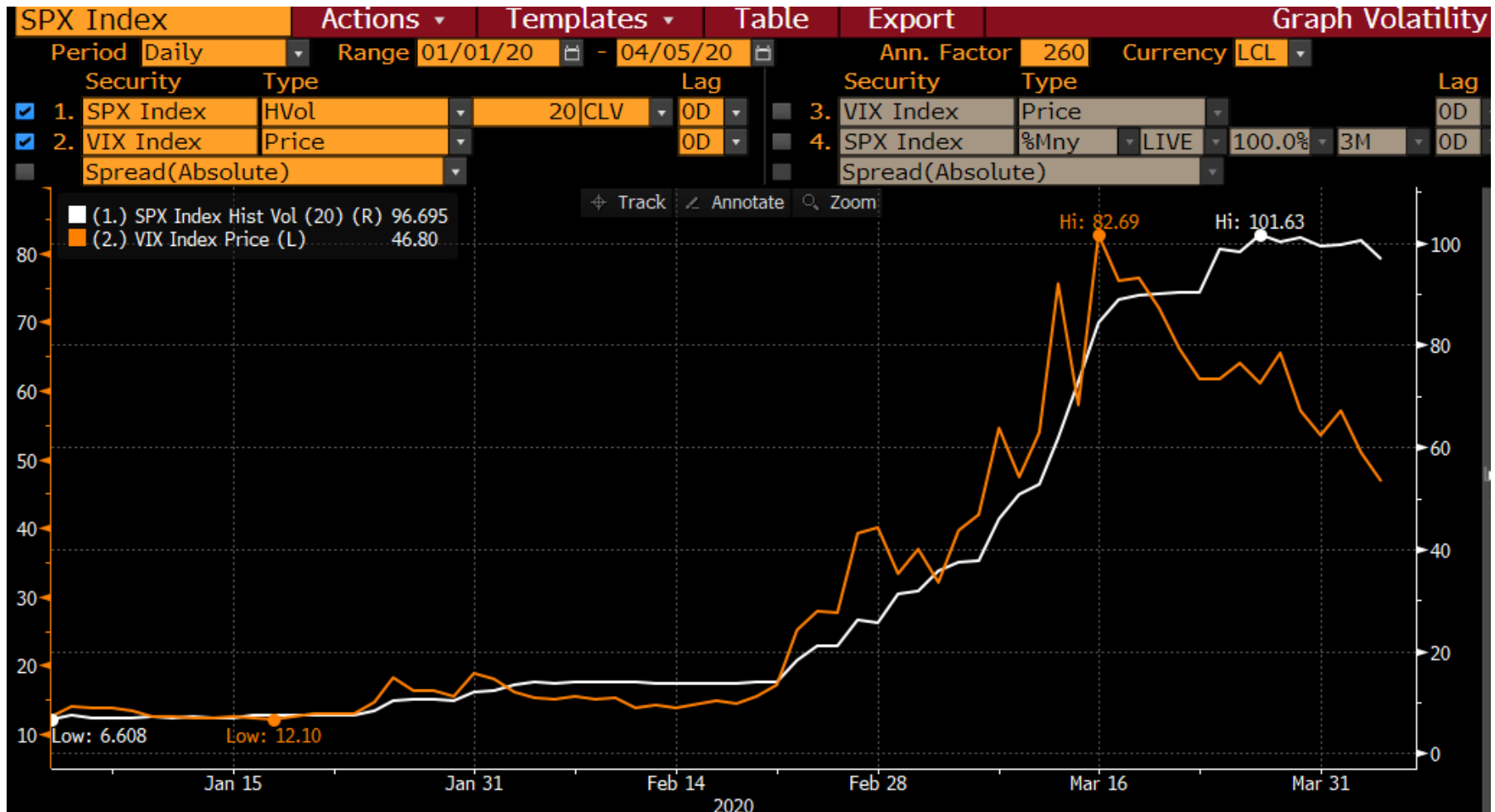
This week has seen an acceleration in the widening of the spread between one month realized volatility of the SPX relative to the VIX.
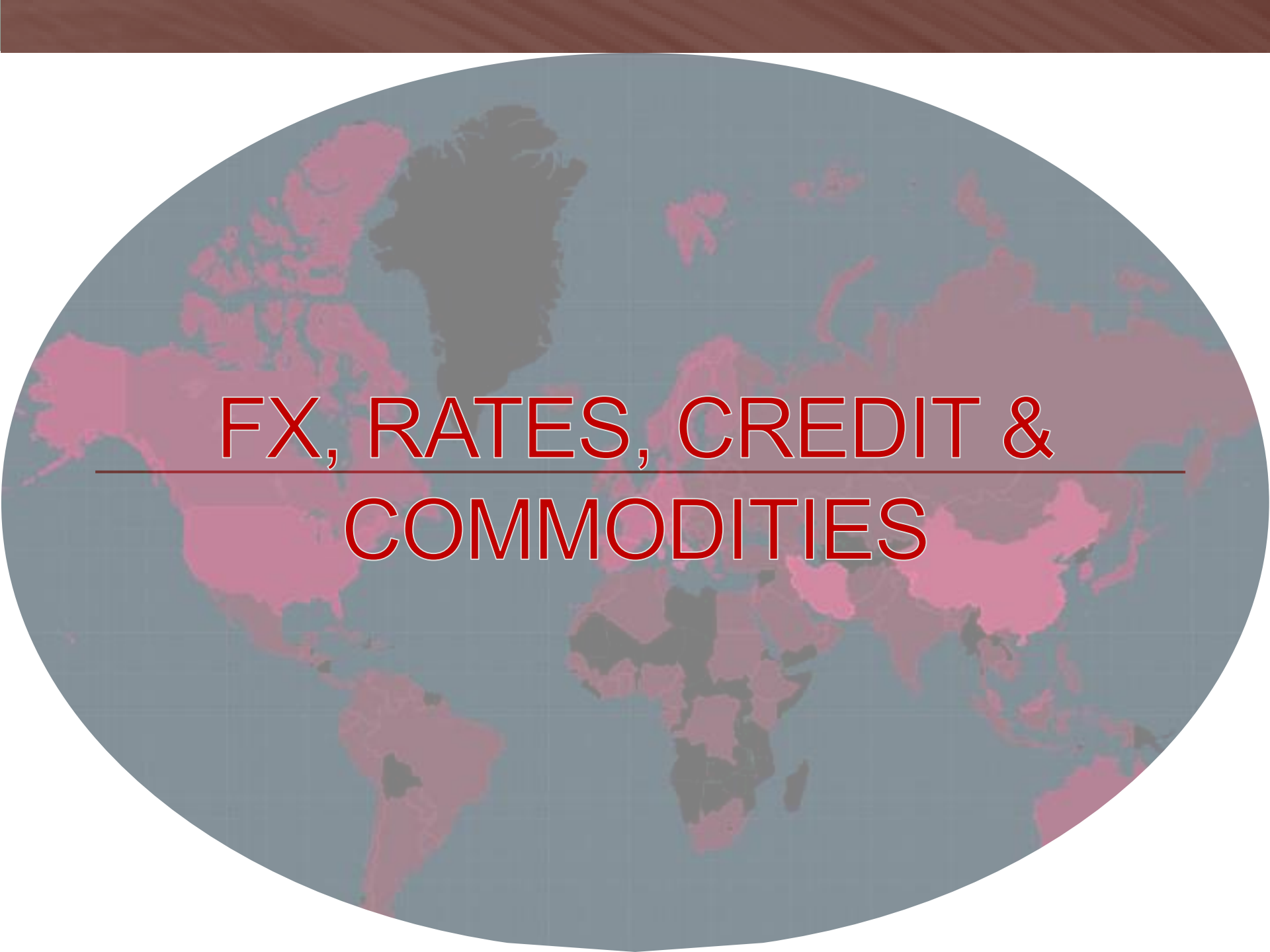
LAUNCH FUNCTION

S&P500 Implied Correlation Remains High

The KCJ index shows correlation has spiked and remains very elevated, showing that movement down and up has tended to be together for the constituents.
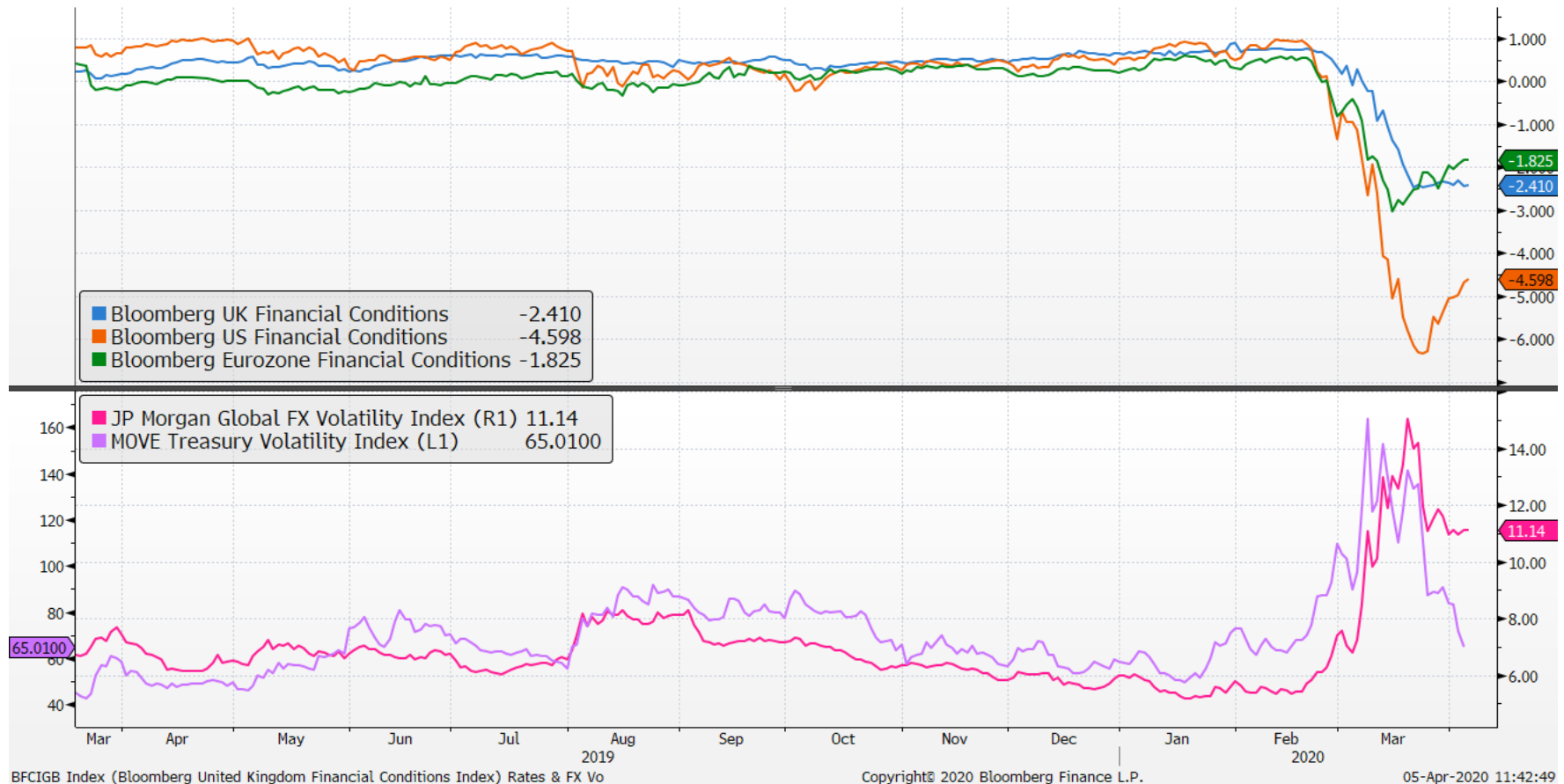
LAUNCH CHART

FX, RATES, CREDIT & COMMODITIES

FX & Rates Volatility

The top panel indicates the Bloomberg US Financial Conditions Index continued to climb off the lows now from 03/23. With that, both FX and rates implied volatility are now well off the highs.

LAUNCH CHART

FX Reaction to Virus Outbreak
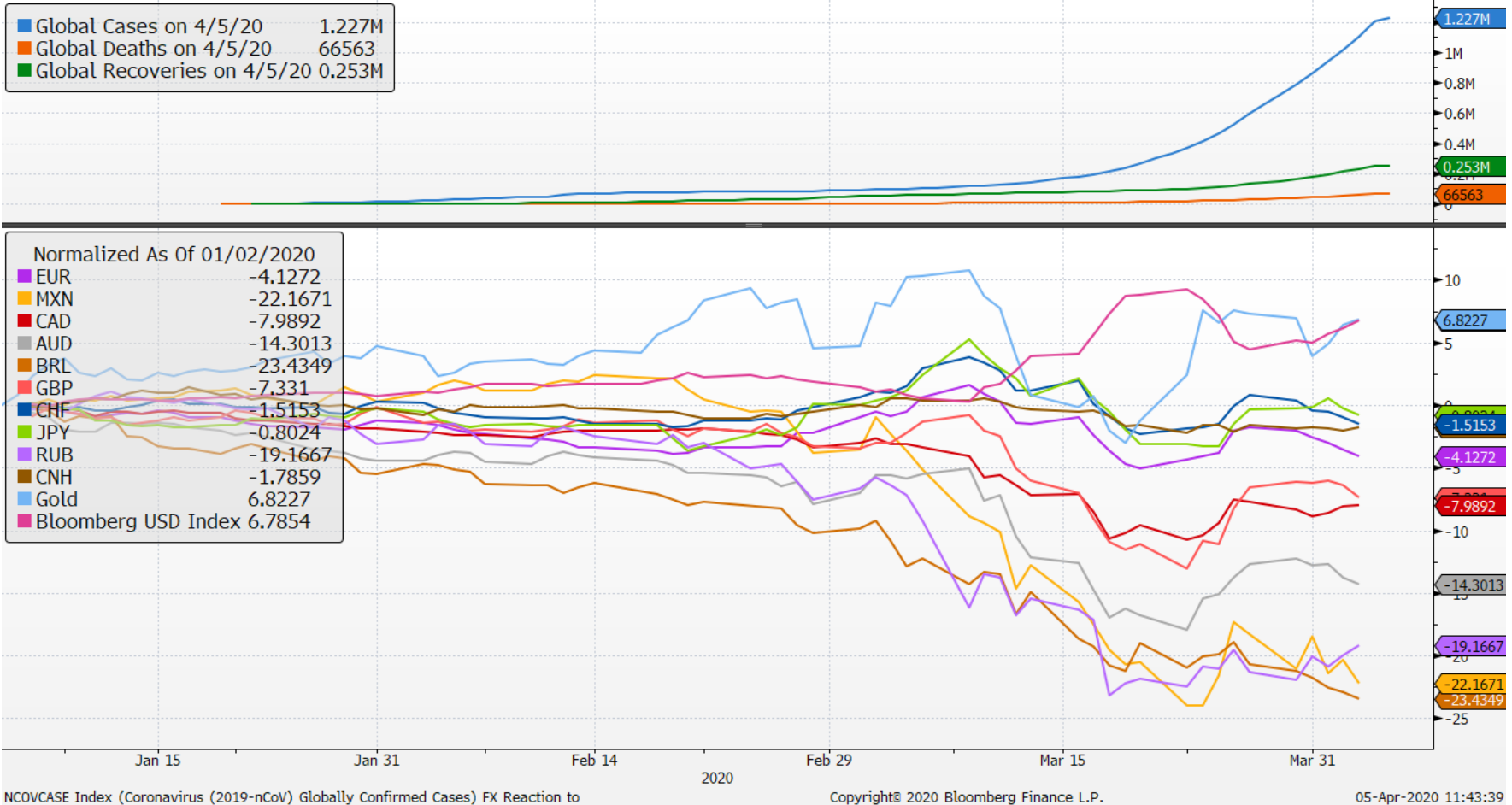
YTD the USD and Gold have unsurprisingly performed best while high-yielding currencies, particularly commodity net exporters have suffered with MXN, BRL,RUB, and AUD depreciating the most versus the USD. Perhaps surprisingly, on a total return basis, the CHF and JPY are slightly down versus the USD.

LAUNCH CHART

Fixed Income Flight to Quality

US Treasuries / Credit Performance

Bloomberg Barclays US Treasury Index Monthly Returns 0.73

Bloomberg Barclays US Corporate Bond Index Monthly Returns -0.28

Bloomberg Barclays US Corporate High Yield Bond Index Monthly Returns -2.05

LUATTRUU Index (Bloomberg Barclays US Treasury Total Return Unhedged USD) Rates   Copyright© 2020 Bloomberg Finance L.P.   05-Apr-2020 11:41:12
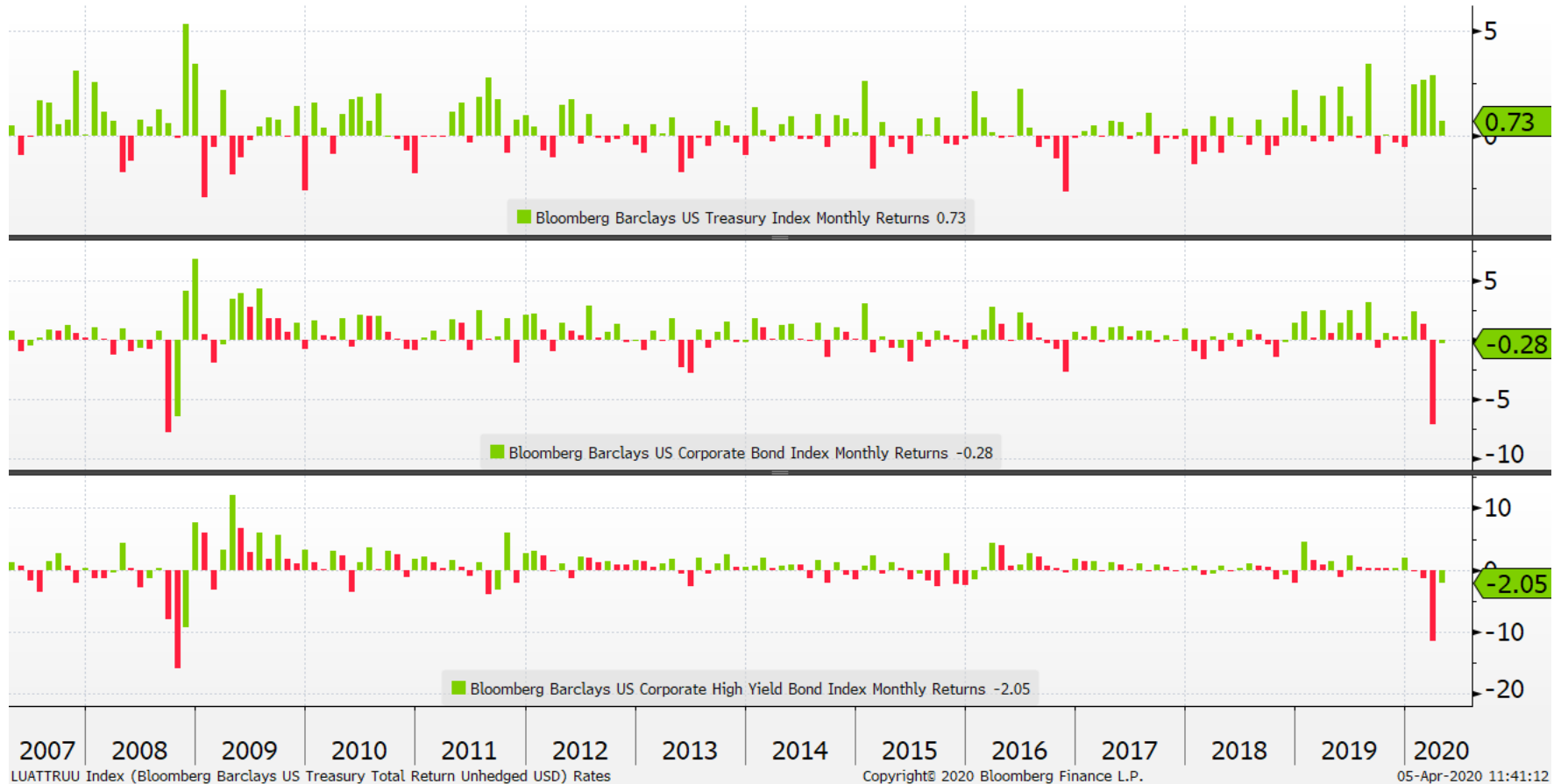
This chart demonstrates the flight to quality in last couple of months in fixed income with US treasuries strong performance in March while investment grade and high yield bond performance suffered. These indices and many more can be found at IN <GO>.

LAUNCH CHART

Bullish Divergence for Crude

WTI Crude found significant support near the 161.8% Fibonacci level, projected off the 2018 decline. 14-day RSI shows bullish divergence levels it set higher lows despite price moving sideways. Given this clue, this recent bounce may be more significant. Watch for Crude to hold above the 150% for confirmation.

Reach out to authors for enablement to custom study in lower panel.
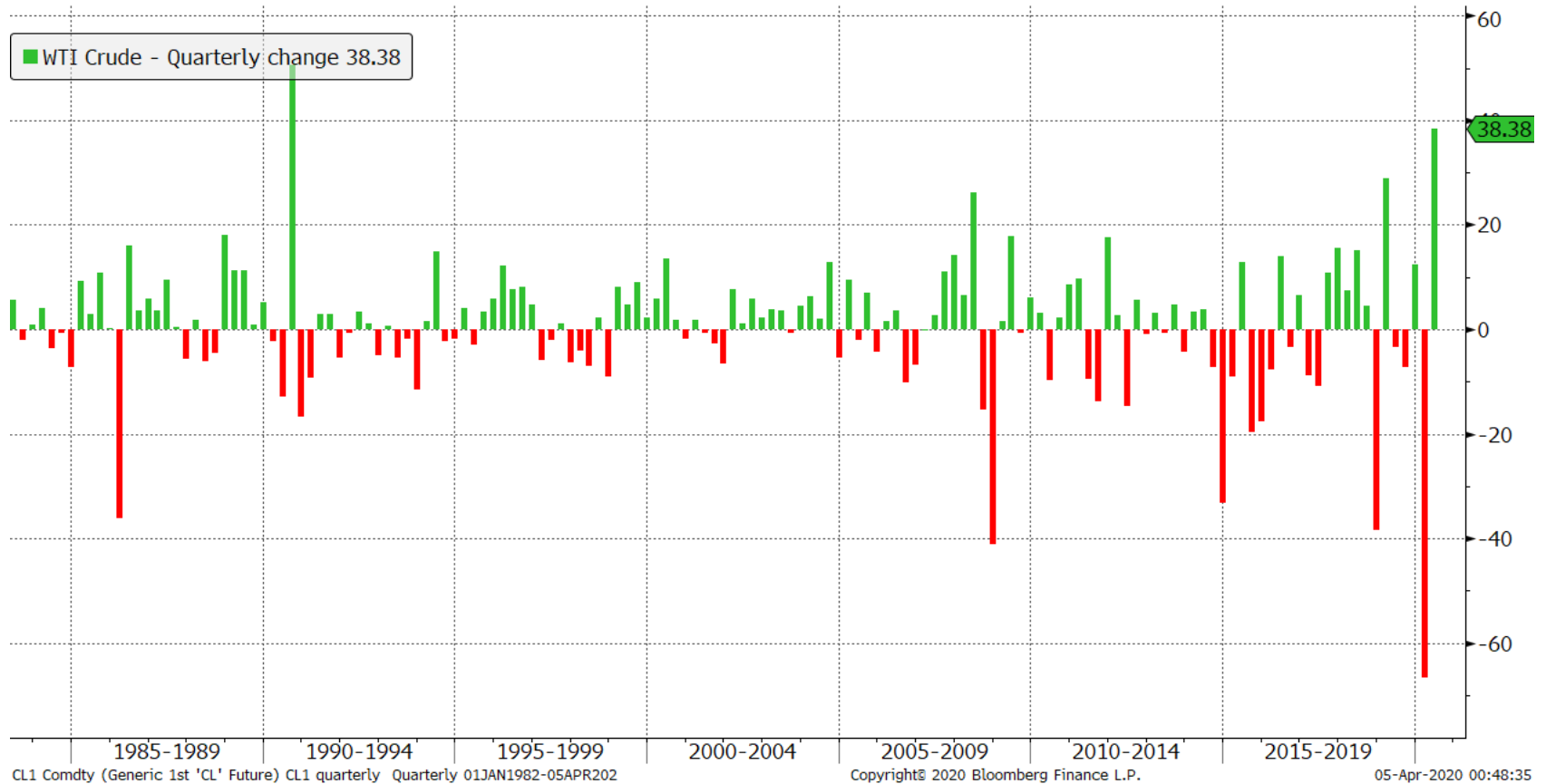
LAUNCH CHART

WTI Crude Oil Performance 30 Year Comparison
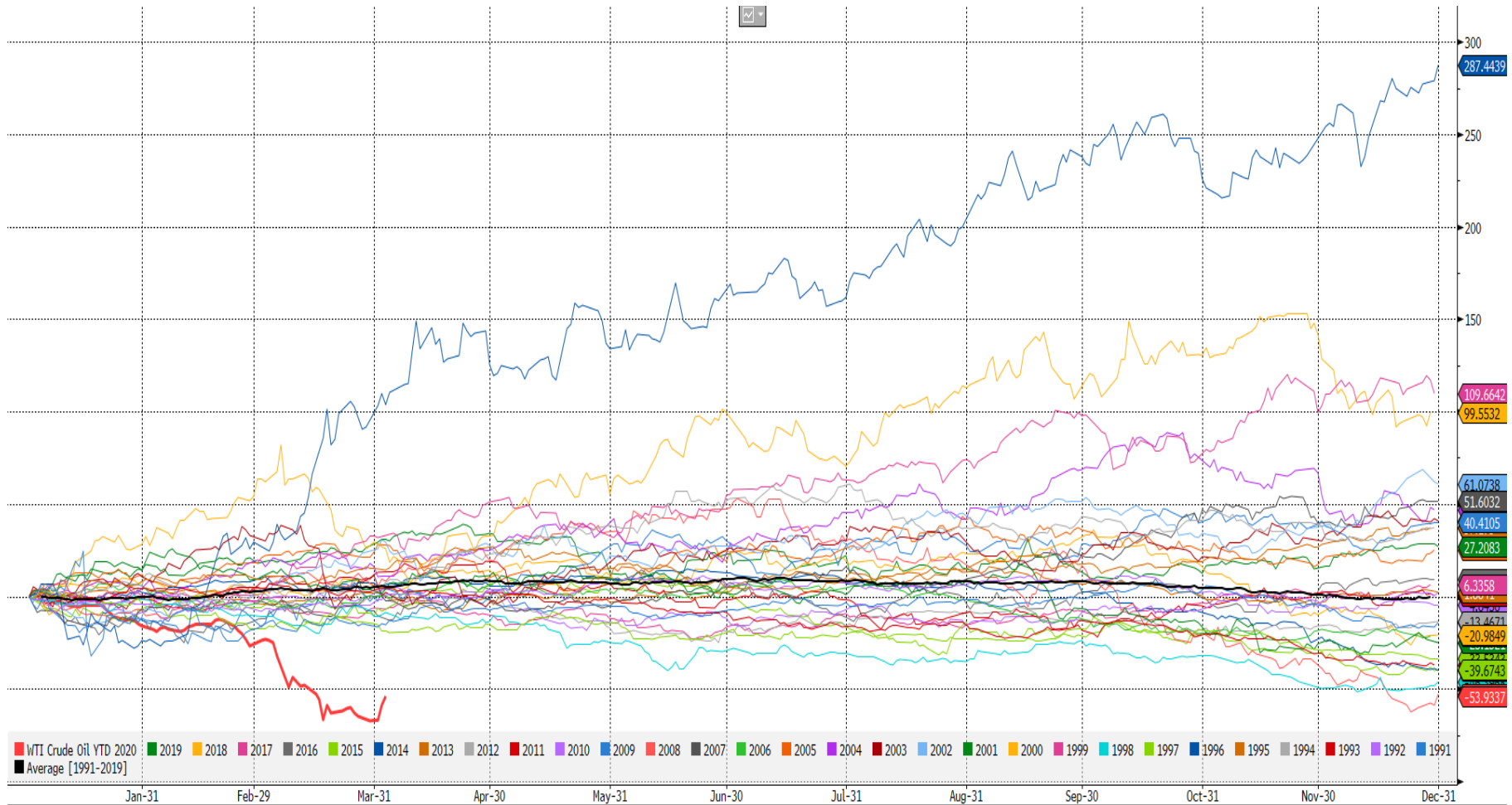
Despite a strong week for WTI crude oil, up around 50% from the lows of $19.27, oil is still down over 50% ytd. This is the worst performance of WTI in the last 30 years. Oil bounced this week on speculation that a meeting of OPEC+ members now scheduled for 04/09 will result in cuts in global production.

LAUNCH FUNCTION

WTI Crude Oil Quarterly Performance

The first quarter 2020 decline of -66.5% in WTI was the largest quarterly decline on record.

LAUNCH CHART

Brent Crude Super Contango

Last week saw a Super Contango in the May-November Brent crude futures. This was more pronounced than the one seen in 2008 and suggests that an historic glut is on the horizon.
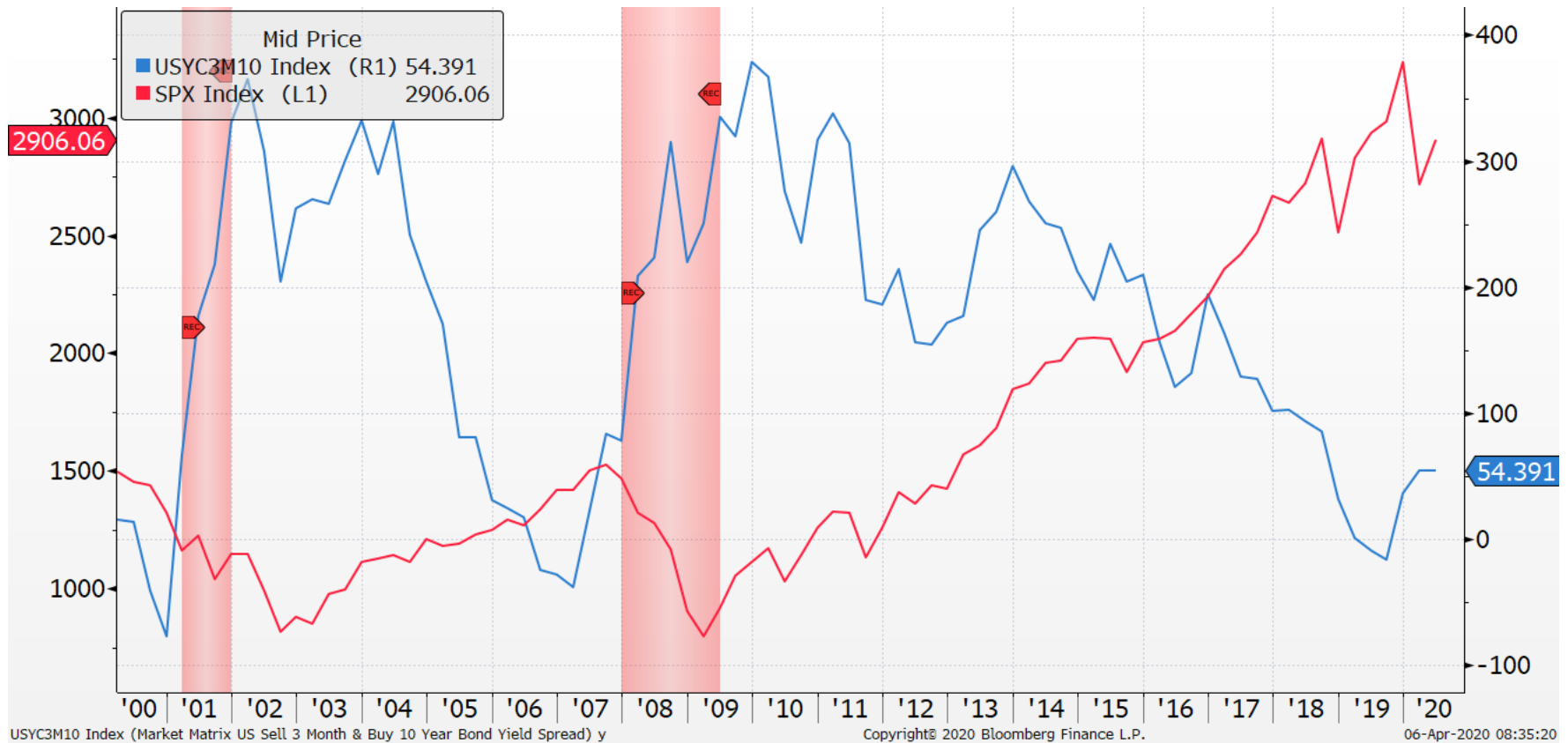
LAUNCH CHART

TED Spread vs VIX

The TED spread had been relatively calm and falling but has jumped alarmingly with credit risk now outperforming equity volatility substantially.
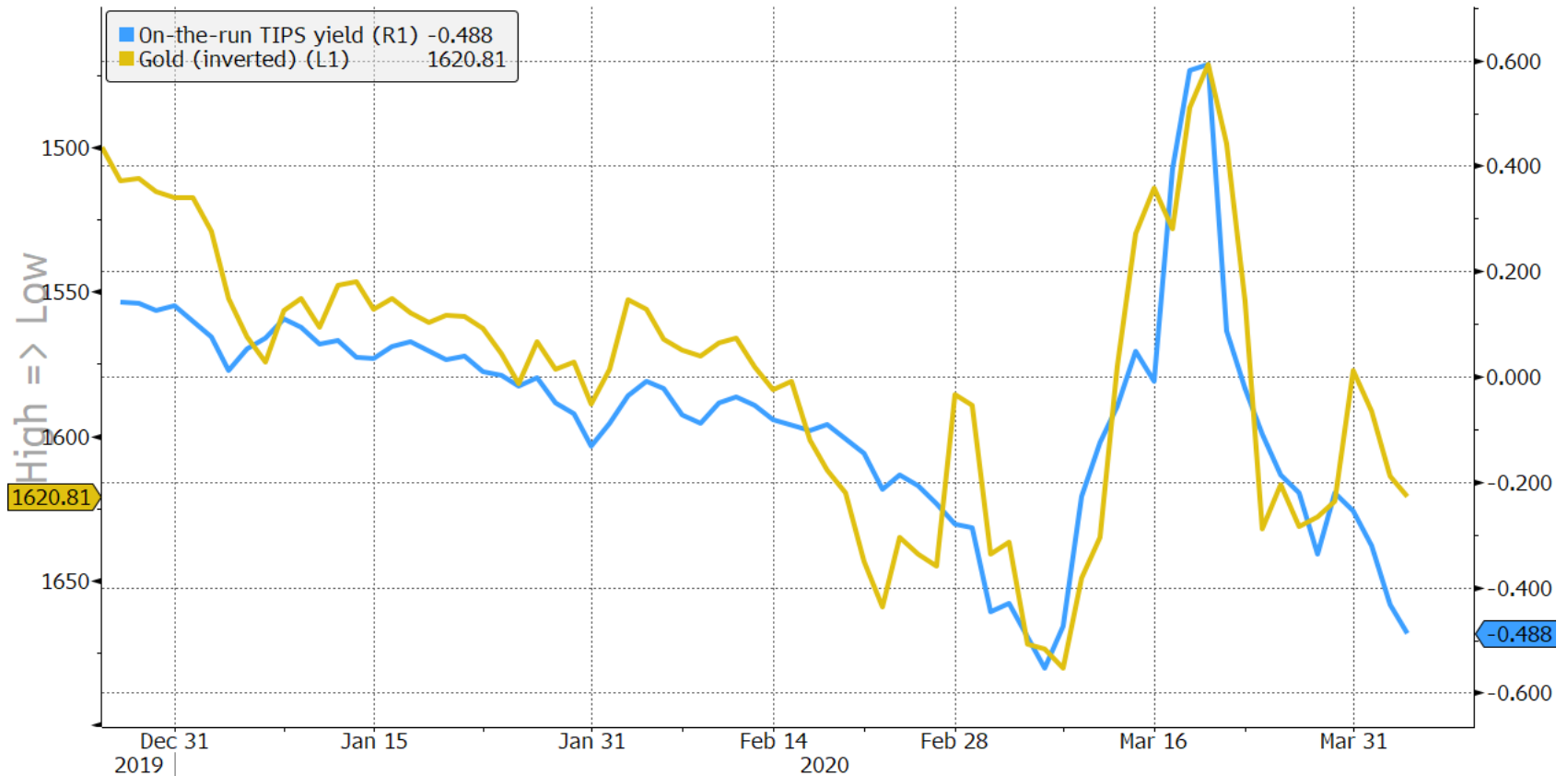
LAUNCH CHART

Yield Curve Leading Stocks

The spread between the 3 month Treasury yield and the yield seen on the 10-Year has historically lead the stock market and after steepening is flattening slightly.

LAUNCH CHART

Gold vs Real Yield

Gold is tracking US real yields very closely (inversely) as it should. The opportunity cost of buying gold decreases as nominal rates decline and gold is notoriously a store of value and thus will increase when inflation expectations increase. Gold struggled at the beginning of the week largely due to quarter end risk parity flows most likely but recovered those losses towards the end of the week. Potential for further monetary and fiscal stimulus should keep gold supported.

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Copper
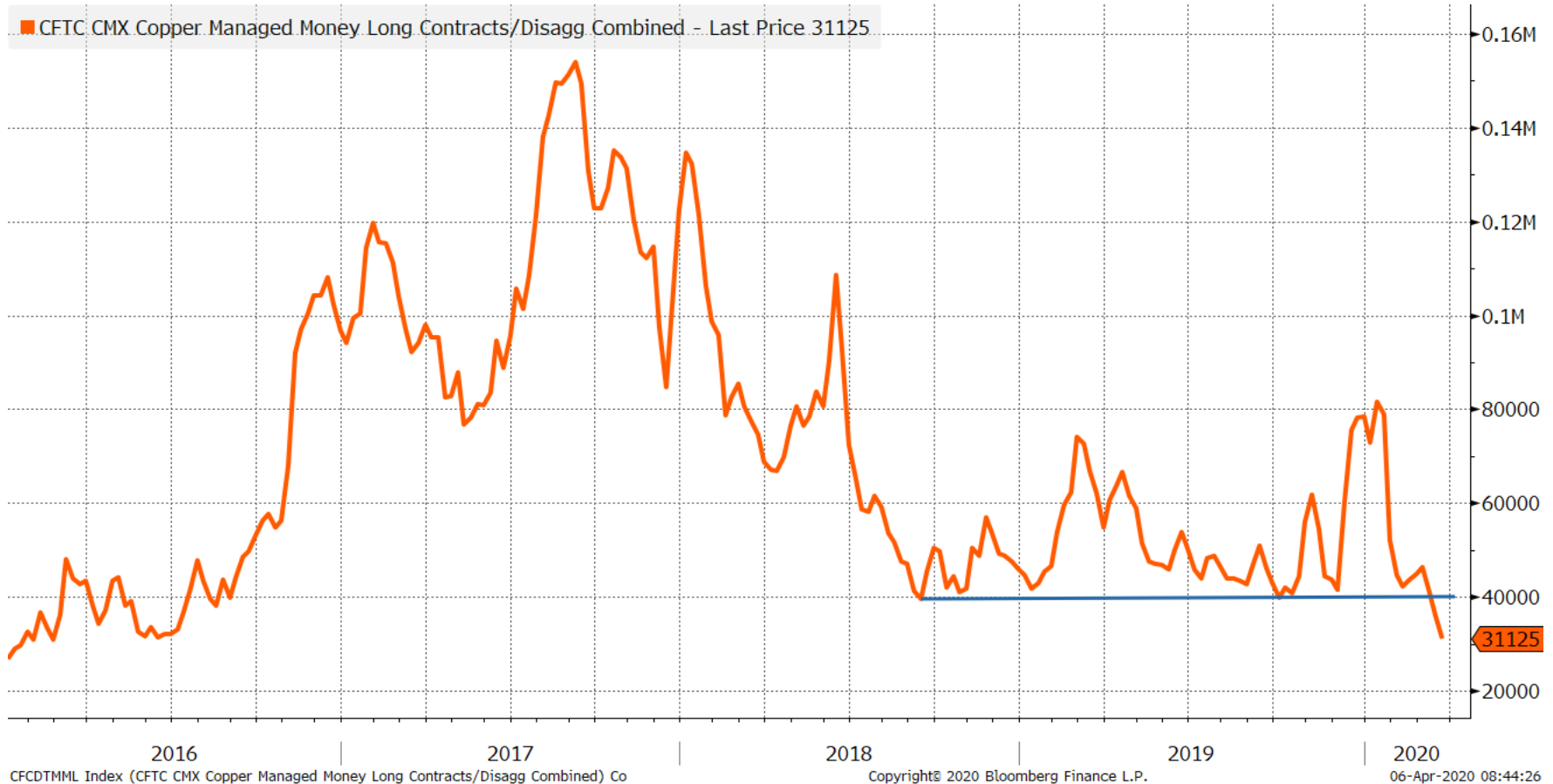
With copper's role as a leading indicator of economic growth, continued bearish signs are seen as money mangers' long-only futures positions continue to fall to the lowest in four years, breaking beneath support.

LAUNCH CHART

Orange Juice

As consumer stock pile food and drink, the price of vitamin C-rich orange juice has risen sharply. Projecting Fibonacci levels off the recent channel, considering the August peak, March highs failed at the 300% level before resting on the current 200%. Watch for potential continued support.

LAUNCH CHART

Resources

- Run [DOCS BQL COVID<GO>](#) for an excel workbook to help analyze the Coronavirus across countries.

- [NI CHARTBOOK<GO>](#) to see all weekly coronavirus visualized publications and more

- [NI TECHBAI<GO>](#) for recent technical signals that have statistical substance

- Search [SMNR<GO>](#) for quick insights!

  Keyword: **BITESIZE** – for quick 5-10 minute sessions
  Keyword: **FLASH** – for webinars averaging 20 minutes in length

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Upcoming Webinars

Charting Series

Month	Date/Time EST	Topic	Link
April	Weds 4/8 11AM	Creating Your Strategy Pt1	SMNR 862619 <GO>
May	Weds 5/6 11AM	Testing Your Strategy Pt2	SMNR 862620 <GO>
June	Weds 6/17 11AM	Technical Screening	SMNR 862621 <GO>