

Vexing volatility

Kelly Bogdanova – San Francisco

This is indeed a unique period with peculiar challenges that are well outside the scope of a normal business cycle. Equity markets are having a tough time gauging the impact of these pressures and how long they will last. We look at what markets are facing and why we believe equities can deliver worthwhile gains over the next 12 months.

The specter of doggedly persistent inflation and skepticism about central banks' abilities to effectively cope with it—without pushing major economies into recession—have pressured the global equity market lately.

The S&P 500 is on track for the sixth straight week of losses and other major markets have sold off as well. While roughly one-third of the U.S. market's outsized gains since the March 2020 COVID-19 low have eroded away, the chart illustrates that the S&P 500 is still up 22 percent since before the pandemic began and has widely outpaced the MSCI EAFE Index, which mostly includes European stocks.

Despite the current challenges, we believe the U.S. market has the potential to deliver worthwhile gains over the next 12 months:

- Our economists anticipate domestic inflation pressures will recede somewhat in the second half of the year, and historically, the market has rallied within 12 months after a peak in inflation;
- Recession risks are still no worse than moderate according to a range of our indicators;
- We think the Fed has some room to raise interest rates without breaking the economic expansion, and will assess the impact of its rate hikes along the way;

Performance of select equity indexes since January 2020, just before COVID-19 hit



Source - RBC Wealth Management, Bloomberg; data range 1/1/20–5/11/22

- Earnings trends are still generally good at a time when the S&P 500's price-to-earnings valuation has become cheaper at 17.3x the 2022 consensus forecast; and
- Investor sentiment is quite bearish, and this is typically a contrary indicator for the market.

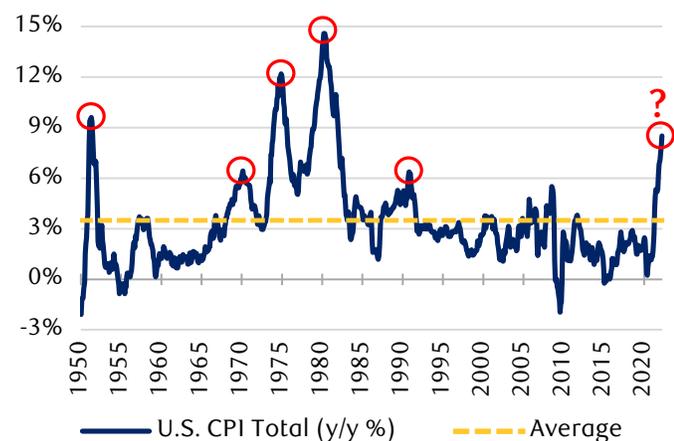
For perspectives on the week from our regional analysts, please see [pages 4–5](#).

Investment and insurance products offered through RBC Wealth Management are not insured by the FDIC or any other federal government agency, are not deposits or other obligations of, or guaranteed by, a bank or any bank affiliate, and are subject to investment risks, including possible loss of the principal amount invested.

Priced (in USD) as of 5/11/22 market close (unless otherwise stated). Produced: May 12, 2022 2:44 pm ET; Disseminated: May 12, 2022 2:48 pm ET
For important disclosures, required non-U.S. analyst disclosures, and authors' contact information, see page 7

Peaks in the U.S. inflation rate of 6% or more since 1950

Consumer Price Index (year-over-year % change)



Source - RBC Wealth Management, FactSet; monthly data through April 2022

S&P 500 performance following peaks in inflation

Date	3 mos.	6 mos.	12 mos.	24 mos.
5/31/51	8.2%	6.3%	10.9%	14.0%
2/28/70	-14.5%	-8.9%	8.1%	19.1%
12/31/74	21.6%	38.8%	31.5%	56.7%
5/31/80	10.0%	26.3%	20.0%	0.6%
12/31/90	13.6%	12.4%	26.3%	31.9%
Average	7.8%	15.0%	19.4%	24.5%

Source - RBC Wealth Management, FactSet; returns are cumulative

As long as conditions point more toward a U.S. economic “growth score” instead of a full-blown recession, and geopolitical risks don’t worsen, we think any further downside for North American equity markets should be limited.

It’s important for investors to recognize this is indeed a unique period with peculiar challenges that are well outside the scope of a normal business cycle. Supply chains have not fully recovered from the previous COVID-19 disruptions, and new supply chain pressures have accumulated due to China’s renewed lockdowns and

the crisis in Ukraine along with the related sanctions on Russia. These factors make it more challenging for central banks to tame inflation, particularly since the Fed began hiking rates late into the inflation surge.

We think equity markets are having difficulty gauging the lingering impact of these unique pressures on economic and corporate earnings growth and how long they will last—thus the volatility and lengthy selloff. At this stage, it’s worth considering historical performance trends surrounding previous high-inflation episodes, and during “growth scare” and recession scenarios.

Inflation’s shadow

On Wednesday, when the Bureau of Labor Statistics reported that U.S. consumer inflation retreated slightly to 8.3 percent year-over-year in April from 8.5 percent in March, it didn’t provide much comfort for market participants, nor did the pullback in the core rate (excludes food and energy) to 6.2 percent from 6.5 percent. The consensus forecast of economists was looking for these measures to ease more.

While services prices (includes utilities, airfares, hotels, and rents) accelerated as we expected in April, goods prices unexpectedly ticked higher as well. Furthermore, a pullback from March’s runaway energy prices was offset by surging food prices in a number of categories.

It’s not yet clear if the peak rate of inflation has already occurred for this cycle, but our economists don’t see much scope for inflation to jump much higher over the near term. [There are reasons to believe](#) it will ease by the end of the year, albeit to a still “uncomfortably high” level, according to RBC Global Asset Management.

Another silver lining is that when the peak rate of inflation has occurred in previous periods, the stock market has historically mounted meaningful rallies in subsequent months—even during periods when overall economic conditions were subpar and uneven. Since 1950, following the five previous times that inflation peaked at a rate of six percent or higher, the S&P 500 had climbed an average of 19.4 percent in the 12 months following, as the table to the left illustrates.

continued on page 3

S&P 500 pullbacks during post-financial crisis “growth scares”

Event	Decline details			Cumulative return after the bottom		
	Market peak date	Days to bottom	Decline %	6 mos.	9 mos.	12 mos.
European debt crisis	4/23/10	70	-16.0%	23.0%	30.3%	31.0%
U.S. debt downgrade	4/29/11	157	-19.4%	28.6%	23.2%	28.7%
Industrial recession	5/21/15	266	-14.2%	19.5%	18.5%	26.6%
QT & U.S./China trade dispute*	9/20/18	95	-19.8%	18.2%	20.0%	32.0%
Average		147	-17.3%	22.3%	23.0%	29.6%

* “QT” stands for the Fed’s quantitative tightening

Source - RBC Capital Markets U.S. Equity Strategy, Haver Analytics

Growth scare jitters

In addition to inflation, much will depend on what happens to economic growth. Currently, our economic indicators are signaling that the U.S. economy is in the midst of a “growth scare” rather than staring a recession in the face.

A “growth scare” occurs when economic growth is at risk, and stokes very real fears of either slow and uneven growth or recession, but in the end a recession is avoided and economic growth resumes at a normal pace over time. Growth scare episodes are common each and every economic expansion cycle, and often cause meaningful market pullbacks.

The table on the bottom of page 2 shows how the S&P 500 was impacted surrounding four previous growth scares since 2009. The S&P 500 declined 17.3 percent, on average, and the declines ranged from about 14 percent to almost 20 percent. By comparison, the S&P 500 has declined 18 percent so far this period—within the “growth scare” zone. What’s notable is that after the S&P 500 bottomed in each of the four previous periods, the market built on its gains and was higher by almost 30 percent 12 months later, on average.

Recession signals are still flashing green

Markets usually experience deeper and longer downturns when recessions unfold. Surrounding 13 U.S. recessions since 1937, the S&P 500 declined 31.8 percent and the market took over a year to bottom, on average. But on

all but one occasion, the market bottomed before the recession officially ended.

Our key leading indicators are currently not signaling that a recession is a high risk in the next 12 months. In fact, they are all signaling the expansion will persist; the indicators are currently positioned like they were in April, when we last provided an [update of our recession scorecard](#). And this is despite the -1.4 percent Q1 GDP reading that was largely caused by an aberration in net export data due to lingering supply chain challenges. But we are cognizant the indicators could change and there are unique risks facing the U.S. and global economies, so we can’t rule out that recession risks could increase later this year or next.

Ride through the turbulence

We think the S&P 500’s path in the coming months primarily will depend on inflation trends, the effectiveness of the Fed’s policy decisions, and, importantly, the response of the domestic economy and corporate earnings to both. In our view, the range of potential outcomes—both negative and positive—is still rather wide and it will likely take the market some time to work through the uncertainties. There could be additional market volatility and downside between now and a shift to sustainably higher levels in major indexes. But if a “growth scare” scenario plays out and a recession is avoided, as our economic indicators are currently suggesting, we think the magnitude of market downside and duration of further volatility will be limited.

S&P 500 corrections surrounding recessions

Recession dates	Decline details			Recession-related details		
	Market peak date	Days to bottom	Decline %	Recession length (months)	Did the market bottom before the recession ended?	No. of months from market bottom to end of recession
May 1937 – June 1938	3/10/37	386	-54%	14	Yes	3.0
Nov. 1948 – Oct. 1949	6/15/48	363	-21%	12	Yes	5.1
July 1953 – May 1954	1/5/53	252	-15%	11	Yes	9.1
Aug. 1957 – April 1958	7/15/57	99	-21%	9	Yes	5.0
April 1960 – Feb. 1961	8/3/59	449	-14%	11	Yes	4.0
Dec. 1969 – Nov. 1970	11/29/68	543	-36%	12	Yes	6.1
Nov. 1973 – March 1975	1/11/73	630	-48%	17	Yes	6.1
Jan. 1980 – July 1980	2/13/80	43	-17%	7	Yes	4.1
July 1981 – Nov. 1982	11/28/80	622	-27%	17	Yes	4.1
July 1990 – March 1991	7/16/90	87	-20%	9	Yes	6.1
March 2001 – Nov. 2001	3/24/00	929*	-49%	9	No	N/A**
Dec. 2007 – June 2009	10/9/07	517	-57%	19	Yes	4.1
Feb. 2020 – April 2020	2/19/20	33	-34%	3	Yes	1.0
Average		381	-31.8%	11.5	—	4.8

Notes: The 1945 recession is excluded as there was no clear stock market pullback around it. * Surrounding the recession in March 2001 – Nov. 2001, the pullback statistics are based on a March 2000 peak and Oct. 2002 low; the market hit an initial low in Nov. 2001, which was retested and surpassed in 2002. ** The market didn’t bottom until 10 months after the recession ended; this data is not included in the average calculated for this column.

UNITED STATES

Michael Roedl – Minneapolis

■ Following the Federal Reserve's interest rate hike last week, and Fed Chair Jerome Powell's statement that additional 50 basis points (bps) rate hikes will be on the table for the next two meetings of the Federal Open Market Committee (FOMC), **the fed funds rate appears likely to exceed the Fed's estimated neutral rate of 2.5% by Q4 2022**. Officially, the FOMC is not actively considering larger rate hikes. However, we believe a 75 bps increase is not out of question in 2022—and some committee members have said as much. Such a move may be more likely, in our view, if inflationary pressures don't begin to wane in coming months, or if supply shocks worsen.

■ The high-yield corporate bond market has recorded a string of losses this year, with the Bloomberg U.S. Corporate High Yield Bond Index finishing lower for four consecutive months to mark its longest losing streak since September 2015. **High-yield corporate spreads over Treasuries are now wider than at any time since November 2020 amid growing concerns that higher interest rates will drive more defaults**. In addition, borrowers have been mostly sidelined this year by rising yields and the increasing expectation that Fed policy will not contain inflation without creating a recession. New issue volume stands at about \$55 billion year to date vs. \$216 billion at the same point last year, a 74% drop.

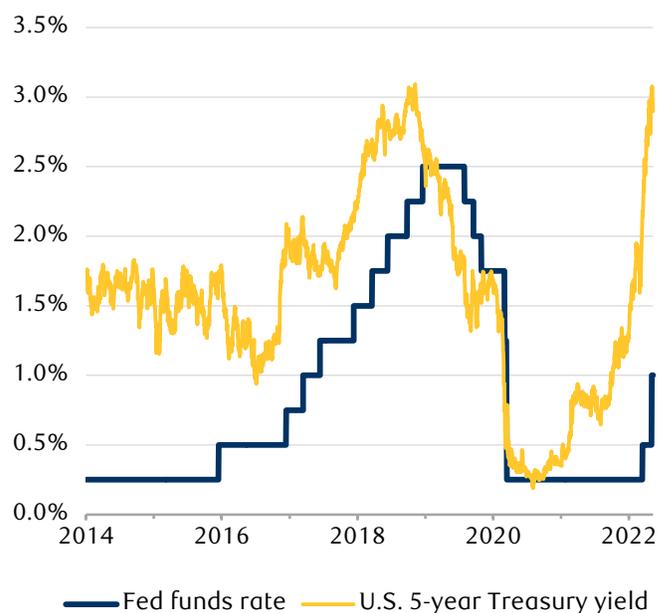
■ **Like the majority of fixed income sectors this year, the muni market continues to face elevated selling pressure**. Municipal bond mutual funds have seen net outflows for 16 weeks in a row as investors have moved to the sidelines amid fears of higher interest rates and tighter monetary policy, withdrawing \$57.4 billion from muni funds so far this year according to Bloomberg. As of May 10, the Bloomberg Municipal Bond Index is down 9.73% in 2022, its worst performance to start a year since the early 1980s. That said, considering current valuations, we believe the muni market is presenting appealing entry points, particularly in the 10-year to 15-year range of the yield curve with coupons of 4% and higher.

CANADA

Luis Castillo & Simon Jones – Toronto

■ **Labour market tightness showed no signs of abating in April as job growth data came in softer than expected**. Employers added 15,300 jobs during the period, helping to reduce the unemployment rate to 5.2%, its lowest level since comparable data was made available. Although high-contact service sectors have the most

5-year Treasury yield surging on the back of Fed rate hikes



Source - RBC Wealth Management, Bloomberg; daily data through 5/11/22

ground to make up relative to pre-pandemic levels, job growth in these hard-hit service sectors was relatively subdued, even as public health restrictions continued to ease. While the economy continues to move past the pandemic, COVID-19's fingerprints are nevertheless visible in the employment data with nearly 1 in 10 people missing work due to illness-related absences during the month. On the whole, considering the sustained inflationary pressures and limited labour supply, we think the jobs report is unlikely to dissuade the Bank of Canada (BoC) from delivering another 50 basis points (bps) hike in June.

■ **Recently, investors have pared back expectations of future inflation on the back of increasingly aggressive rate hike guidance by central banks**. The Canada 5-year inflation breakeven rate (a bond market implied measure of inflation expectations over the next five years) has taken a sharp step back, dropping by nearly 40 bps over the past week alone, moving towards the 2.40% mark. Stabilizing inflation has become the primary goal of global central banks, which they will likely attempt to accomplish by lifting policy rates multiple times in 2022. RBC Economics recently updated its rate hike forecasts, incorporating these assumptions. RBC Economics expects a hike at four of the BoC's remaining five meetings of 2022—50 bps hikes in June and July and two 25 bps hikes thereafter. This would lift the BoC policy rate to 2.50% by year's end, an additional 150 bps from the current level.

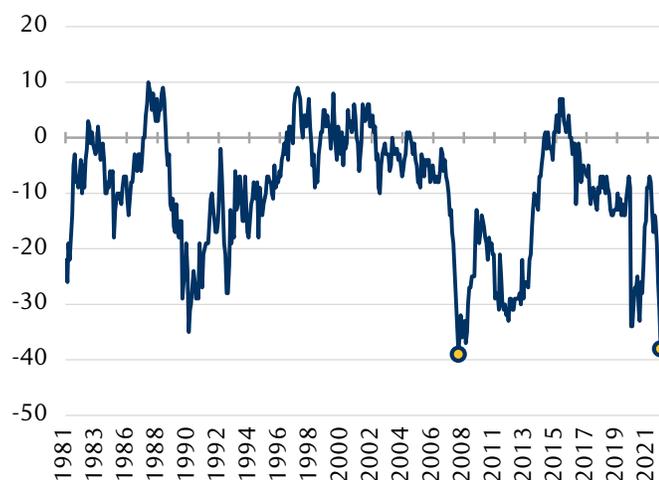
EUROPE

Thomas McGarrity, CFA & Rufaro Chiriseri, CFA – London

- We are more than 75% of the way through the European results season. **Around 74% of STOXX Europe 600 ex-UK Index constituents have reported sales above consensus expectations, while 64% have beaten earnings estimates.** Forward guidance has seemingly also met market expectations, so far. The robust results have helped European earnings estimates at the aggregate level see their first net upgrade in two months.
- **Under the surface, the picture is not so rosy despite earnings expectations holding up well at the headline level.** Earnings upgrades for commodities-linked sectors, particularly Energy, have helped offset notable downgrades in consumer cyclicals, such as retail and leisure, on the dimming prospects for consumer spending due to inflationary pressures, as well as banks owing to higher provisions reflecting a weaker economic outlook in the months ahead.
- With the risks to corporate margins growing, **we believe current consensus earnings expectations of high single digits year over year in 2022 appear too high given the economy's trajectory.** We expect downgrades to build over the coming months. The market's recent weakness has arguably begun to reflect the prospect of this happening, in our view. Hence, the European equity market's forward 12-month price-to-earnings ratio of around 13x appears artificially low, given consensus earnings expectations are likely to be cut.

Consumer confidence near record lows

GfK UK Consumer Confidence indicator



Source - RBC Wealth Management, Bloomberg; monthly data through 4/30/22

- **The Bank of England (BoE) delivered a gloomy outlook at its policy meeting last week,** with expectations for the economy to contract by 1% in Q4 2022. However, this economic slowdown has likely come sooner than the BoE expected as the UK economy contracted by 0.1% in March versus a no-growth consensus estimate. In addition, UK consumer confidence dropped to near all-time lows, indicating cost of living increases are putting a squeeze on households. The risk-off sentiment over the past few days, coupled with the growth miss, drove yields on UK 10-year government bonds lower by nearly 15 basis points—in just one day.

ASIA PACIFIC

Emily Li – Hong Kong

- **China's COVID-19 lockdowns have weighed on operations at the world's largest port in Shanghai** and stalled activity in major cities, worsening the supply chain woes of businesses from Tesla to Apple. China export growth in April slowed to 3.9% y/y, the weakest pace since June 2020, and down from March's 14.7%. Imports were unchanged in April after sliding 0.1% in March, Reuters reported, compared to an expected 3% decline based on its poll of 18 economists. The government is trying to get production back on track, and we expect the numbers to see a gradual pickup in H2 2022.
- **Hong Kong intervened to defend its currency peg to the U.S. dollar for the first time since 2019.** The move has put further upward pressure on interest rates in an economy already beset with strict pandemic restrictions and a softening property market. Capital outflows, fueled by rising interest rates in the U.S., sent the Hong Kong dollar (HK\$) to the lower end of its HK\$7.75–7.85 trading range against the greenback. The Hong Kong Monetary Authority bought about HK\$1.59 billion to support the currency. Economists believe further intervention will drain liquidity from the financial system and drive up borrowing costs at a time when the local economy is contracting.
- **China and Hong Kong equities gained as declining COVID-19 cases on the mainland boosted investors' sentiment and triggered bargain hunters to buy the dip.** The CSI 300 Index closed up 1.4% on Wednesday. Stocks also climbed in Hong Kong, where a gauge of Chinese tech firms (Hang Seng TECH Index) jumped 2.9% to snap a five-day losing streak. The advance was driven by signs that China's COVID-19 outbreak may have peaked. Shanghai reported a 51% drop in new infections on Tuesday from a day earlier. We expect the markets to remain range-bound in the near term.

MARKET Scorecard

Data as of May 11, 2022

Equities (local currency)	Level	MTD	YTD	1 yr	2 yr
S&P 500	3,935.18	-4.8%	-17.4%	-5.2%	34.3%
Dow Industrials (DJIA)	31,834.11	-3.5%	-12.4%	-7.1%	31.4%
Nasdaq	11,364.24	-7.9%	-27.4%	-15.1%	23.6%
Russell 2000	1,718.14	-7.8%	-23.5%	-22.1%	30.0%
S&P/TSX Comp	19,837.25	-4.5%	-6.5%	2.9%	31.3%
FTSE All-Share	4,058.67	-3.0%	-3.5%	2.4%	24.0%
STOXX Europe 600	427.59	-5.1%	-12.3%	-2.1%	25.9%
EURO STOXX 50	3,647.87	-4.1%	-15.1%	-7.6%	26.5%
Hang Seng	19,824.57	-6.0%	-15.3%	-29.2%	-19.4%
Shanghai Comp	3,058.70	0.4%	-16.0%	-11.1%	5.7%
Nikkei 225	26,213.64	-2.4%	-9.0%	-8.4%	28.6%
India Sensex	54,088.39	-5.2%	-7.2%	10.0%	71.4%
Singapore Straits Times	3,226.07	-3.9%	3.3%	2.6%	23.5%
Brazil Ibovespa	104,396.90	-3.2%	-0.4%	-15.1%	32.0%
Mexican Bolsa IPC	49,276.23	-4.2%	-7.5%	-0.8%	30.9%
Gov't bonds (bps change)	Yield	MTD	YTD	1 yr	2 yr
U.S. 10-Yr Treasury	2.923%	-1.1	141.3	130.1	221.3
Canada 10-Yr	3.003%	13.7	157.7	146.3	241.3
UK 10-Yr	1.826%	-7.9	85.5	99.3	155.7
Germany 10-Yr	0.986%	4.8	116.3	114.7	149.8
Fixed income (returns)	Yield	MTD	YTD	1 yr	2 yr
U.S. Aggregate	-0.4%	-9.9%	-8.8%	-8.5%	-7.6%
U.S. Investment-Grade Corp	-0.7%	-13.4%	-11.0%	-5.3%	-4.8%
U.S. High-Yield Corp	-2.0%	-10.1%	-7.3%	10.4%	15.4%
Commodities (USD)	Price	MTD	YTD	1 yr	2 yr
Gold (spot \$/oz)	1,852.46	-2.3%	1.3%	0.8%	9.1%
Silver (spot \$/oz)	21.57	-5.3%	-7.4%	-21.9%	39.3%
Copper (\$/metric ton)	9,235.75	-5.5%	-5.2%	-11.6%	76.8%
Oil (WTI spot/bbl)	105.71	1.0%	37.3%	61.9%	337.9%
Oil (Brent spot/bbl)	107.34	-1.8%	38.0%	56.6%	262.3%
Natural Gas (\$/mmBtu)	7.64	5.4%	104.7%	158.4%	318.2%
Currencies	Rate	MTD	YTD	1 yr	2 yr
U.S. Dollar Index	104.0430	1.1%	8.8%	15.4%	3.8%
CAD/USD	0.7696	-1.0%	-2.7%	-6.9%	7.8%
USD/CAD	1.2994	1.1%	2.8%	7.4%	-7.2%
EUR/USD	1.0513	-0.3%	-7.5%	-13.5%	-2.7%
GBP/USD	1.2247	-2.6%	-9.5%	-13.4%	-0.7%
AUD/USD	0.6941	-1.7%	-4.4%	-11.5%	7.0%
USD/JPY	130.0000	0.2%	13.0%	19.7%	20.8%
EUR/JPY	136.6800	-0.2%	4.4%	3.6%	17.5%
EUR/GBP	0.8585	2.3%	2.0%	-0.1%	-2.0%
EUR/CHF	1.0448	1.8%	0.7%	-4.8%	-0.6%
USD/SGD	1.3902	0.5%	3.1%	4.9%	-1.9%
USD/CNY	6.7217	1.7%	5.8%	4.5%	-5.3%
USD/MXN	20.3114	-0.6%	-1.1%	1.8%	-15.0%
USD/BRL	5.1392	3.4%	-7.8%	-1.6%	-11.7%

Equity returns do not include dividends, except for the Brazilian Ibovespa. Bond yields in local currencies. Copper Index data and U.S. fixed income returns as of Wednesday's close. Dollar Index measures USD vs. six major currencies. Currency rates reflect market convention (CAD/USD is the exception). Currency returns quoted in terms of the first currency in each pairing.

Examples of how to interpret currency data: CAD/USD 0.76 means 1 Canadian dollar will buy 0.76 U.S. dollar. CAD/USD -2.7% return means the Canadian dollar fell 2.7% vs. the U.S. dollar year to date. USD/JPY 130.00 means 1 U.S. dollar will buy 130.00 yen. USD/JPY 13.0% return means the U.S. dollar rose 13.0% vs. the yen year to date.

Source - Bloomberg; data as of 5/11/22 market close

Authors

Kelly Bogdanova – San Francisco, United States

kelly.bogdanova@rbc.com; RBC Capital Markets, LLC

Michael Roedl – Minneapolis, United States

michael.roedl@rbc.com; RBC Capital Markets, LLC

Luis Castillo – Toronto, Canada

luis.castillo@rbccm.com; RBC Dominion Securities Inc.

Simon Jones – Toronto, Canada

simon.jones@rbccm.com; RBC Dominion Securities Inc.

Thomas McGarrity, CFA – London, United Kingdom

thomas.mcgarritty@rbc.com; RBC Europe Limited

Rufaro Chiriseri, CFA – London, United Kingdom

rufaro.chiriseri@rbc.com; RBC Europe Limited

Emily Li – Hong Kong, China

emily.c.li@rbc.com; RBC Investment Services (Asia) Limited

Disclosures and Disclaimer

Analyst Certification

All of the views expressed in this report accurately reflect the personal views of the responsible analyst(s) about any and all of the subject securities or issuers. No part of the compensation of the responsible analyst(s) named herein is, or will be, directly or indirectly, related to the specific recommendations or views expressed by the responsible analyst(s) in this report.

Important Disclosures

In the U.S., RBC Wealth Management operates as a division of RBC Capital Markets, LLC. In Canada, RBC Wealth Management includes, without limitation, RBC Dominion Securities Inc., which is a foreign affiliate of RBC Capital Markets, LLC. This report has been prepared by RBC Capital Markets, LLC which is an indirect wholly-owned subsidiary of the Royal Bank of Canada and, as such, is a related issuer of Royal Bank of Canada.

Non-U.S. Analyst Disclosure

One or more research analysts involved in the preparation of this report (i) may not be registered/qualified as research analysts with the NYSE and/or FINRA and (ii) may not be associated persons of the RBC Wealth Management and therefore may not be subject to FINRA Rule 2241 restrictions on communications with a subject company, public appearances and trading securities held by a research analyst account.

In the event that this is a compendium report (covers six or more companies), RBC Wealth Management may choose to provide important disclosure information by reference. To access current disclosures, clients should refer to <https://www.rbccm.com/GLDisclosure/PublicWeb/DisclosureLookup.aspx?EntityID=2> to view disclosures regarding RBC Wealth Management and its affiliated firms. Such information is also available upon request to RBC Wealth Management Publishing, 250 Nicollet Mall, Suite 1800, Minneapolis, MN 55401-1931.

RBC Capital Markets Distribution of Ratings

For the purpose of ratings distributions, regulatory rules require member firms to assign ratings to one of three rating categories – Buy, Hold/Neutral, or Sell – regardless of a firm’s own rating categories. Although RBC Capital Markets’ ratings of Outperform (O), Sector Perform (SP), and Underperform (U) most closely correspond to Buy, Hold/Neutral and Sell, respectively, the meanings are not the same because RBC Capital Markets ratings are determined on a relative basis.

Distribution of ratings – RBC Capital Markets Equity Research

As of March 31, 2022

Rating	Count	Percent	Investment Banking Services Provided During Past 12 Months	
			Count	Percent
Buy [Outperform]	841	57.68	330	39.24
Hold [Sector Perform]	569	39.03	172	30.23
Sell [Underperform]	48	3.29	3	6.25

Explanation of RBC Capital Markets Equity Rating System

An analyst’s “sector” is the universe of companies for which the analyst provides research coverage. Accordingly, the rating assigned to a particular stock represents solely the analyst’s view of how that stock will perform over the next 12 months relative to the analyst’s sector average.

Ratings: Outperform (O): Expected to materially outperform sector average over 12 months. **Sector Perform (SP):** Returns expected to be in line with sector average over 12 months. **Underperform (U):** Returns expected to be materially below sector average over 12 months. **Restricted (R):** RBC policy precludes certain types of communications, including an investment recommendation, when RBC is acting as an advisor in certain merger or other strategic transactions and in certain other circumstances. **Not Rated (NR):** The rating, price targets and estimates have been removed due to applicable legal, regulatory or policy constraints which may include when RBC Capital Markets is acting in an advisory capacity involving the company.

As of March 31, 2020, RBC Capital Markets discontinued its Top Pick rating. Top Pick rated securities represented an analyst’s best idea in the sector; expected to provide significant absolute returns over 12 months with a favorable risk-reward ratio. Top Pick rated securities have been reassigned to RBC Capital Markets’ Outperform rated securities category, which are securities expected to materially outperform sector average over 12 months.

Risk Rating: The **Speculative** risk rating reflects a security’s lower level of financial or operating predictability, illiquid share trading volumes, high balance sheet leverage, or limited operating history that result in a higher expectation of financial and/or stock price volatility.

Valuation and Risks to Rating and Price Target

When RBC Capital Markets assigns a value to a company in a research report, FINRA Rules and NYSE Rules (as incorporated into the FINRA Rulebook) require that the

basis for the valuation and the impediments to obtaining that valuation be described. Where applicable, this information is included in the text of our research in the sections entitled “Valuation” and “Risks to Rating and Price Target”, respectively.

The analyst(s) responsible for preparing this research report have received (or will receive) compensation that is based upon various factors, including total revenues of RBC Capital Markets, and its affiliates, a portion of which are or have been generated by investment banking activities of RBC Capital Markets and its affiliates.

Other Disclosures

Prepared with the assistance of our national research sources. RBC Wealth Management prepared this report and takes sole responsibility for its content and distribution. The content may have been based, at least in part, on material provided by our third-party correspondent research services. Our third-party correspondent has given RBC Wealth Management general permission to use its research reports as source materials, but has not reviewed or approved this report, nor has it been informed of its publication. Our third-party correspondent may from time to time have long or short positions in, effect transactions in, and make markets in securities referred to herein. Our third-party correspondent may from time to time perform investment banking or other services for, or solicit investment banking or other business from, any company mentioned in this report.

RBC Wealth Management endeavors to make all reasonable efforts to provide research simultaneously to all eligible clients, having regard to local time zones in overseas jurisdictions. In certain investment advisory accounts, RBC Wealth Management or a designated third party will act as overlay manager for our clients and will initiate transactions in the securities referenced herein for those accounts upon receipt of this report. These transactions may occur before or after your receipt of this report and may have a short-term impact on the market price of the securities in which transactions occur. RBC Wealth Management research is posted to our proprietary Web sites to ensure eligible clients receive coverage initiations and changes in rating, targets, and opinions in a timely manner. Additional distribution may be done by sales personnel via e-mail, fax, or regular mail. Clients may also receive our research via third-party vendors. Please contact your RBC Wealth Management Financial Advisor for more information regarding RBC Wealth Management research.

Conflicts Disclosure: RBC Wealth Management is registered with the Securities and Exchange Commission as a broker/dealer and an investment adviser, offering both brokerage and investment advisory services. RBC Wealth Management’s Policy for Managing Conflicts of Interest in Relation to Investment Research is available from us on our website at <https://www.rbccm.com/GLDisclosure/PublicWeb/DisclosureLookup.aspx?EntityID=2>. Conflicts of interests related to our investment advisory business can be found in Part 2A Appendix 1 of the Firm’s Form ADV or the RBC Advisory Programs Disclosure Document. Copies of any of these documents are available upon request through your Financial Advisor. We reserve the right to amend or

supplement this policy, Part 2A Appendix 1 of the Form ADV, or the RBC Advisory Programs Disclosure Document at any time.

The authors are employed by one of the following entities: RBC Wealth Management USA, a division of RBC Capital Markets, LLC, a securities broker-dealer with principal offices located in Minnesota and New York, USA; by RBC Dominion Securities Inc., a securities broker-dealer with principal offices located in Toronto, Canada; by RBC Investment Services (Asia) Limited, a subsidiary of RBC Dominion Securities Inc., a securities broker-dealer with principal offices located in Hong Kong, China; by Royal Bank of Canada, Singapore Branch, a licensed wholesale bank with its principal office located in Singapore; and by RBC Europe Limited, a licensed bank with principal offices located in London, United Kingdom.

Research Resources

This document is produced by the Global Portfolio Advisory Committee within RBC Wealth Management’s Portfolio Advisory Group. The RBC WM Portfolio Advisory Group provides support related to asset allocation and portfolio construction for the firm’s Investment Advisors / Financial Advisors who are engaged in assembling portfolios incorporating individual marketable securities. The Committee leverages the broad market outlook as developed by the RBC Investment Strategy Committee, providing additional tactical and thematic support utilizing research from the RBC Investment Strategy Committee, RBC Capital Markets, and third-party resources.

Third-party Disclaimers

The Global Industry Classification Standard (“GICS”) was developed by and is the exclusive property and a service mark of MSCI Inc. (“MSCI”) and Standard & Poor’s Financial Services LLC (“S&P”) and is licensed for use by RBC. Neither MSCI, S&P, nor any other party involved in making or compiling the GICS or any GICS classifications makes any express or implied warranties or representations with respect to such standard or classification (or the results to be obtained by the use thereof), and all such parties hereby expressly disclaim all warranties of originality, accuracy, completeness, merchantability and fitness for a particular purpose with respect to any of such standard or classification. Without limiting any of the foregoing, in no event shall MSCI, S&P, any of their affiliates or any third party involved in making or compiling the GICS or any GICS classifications have any liability for any direct, indirect, special, punitive, consequential or any other damages (including lost profits) even if notified of the possibility of such damages.

Disclaimer

The information contained in this report has been compiled by RBC Wealth Management, a division of RBC Capital Markets, LLC, from sources believed to be reliable, but no representation or warranty, express or implied, is made by Royal Bank of Canada, RBC Wealth Management, its affiliates or any other person as to its accuracy, completeness or correctness. All opinions and estimates contained in this report constitute RBC Wealth Management’s judgment as of the date of this report, are subject to change without notice and are provided in good faith but without legal responsibility. Past performance is not a guide to future performance, future returns are not guaranteed, and a loss of original capital may occur. Every province in Canada, state in the U.S., and most countries throughout the world have their own laws regulating the types of securities and other investment products which may be offered to

their residents, as well as the process for doing so. As a result, the securities discussed in this report may not be eligible for sale in some jurisdictions. This report is not, and under no circumstances should be construed as, a solicitation to act as securities broker or dealer in any jurisdiction by any person or company that is not legally permitted to carry on the business of a securities broker or dealer in that jurisdiction. Nothing in this report constitutes legal, accounting or tax advice or individually tailored investment advice. This material is prepared for general circulation to clients, including clients who are affiliates of Royal Bank of Canada, and does not have regard to the particular circumstances or needs of any specific person who may read it. The investments or services contained in this report may not be suitable for you and it is recommended that you consult an independent investment advisor if you are in doubt about the suitability of such investments or services. To the full extent permitted by law neither Royal Bank of Canada nor any of its affiliates, nor any other person, accepts any liability whatsoever for any direct, indirect or consequential loss arising from, or in connection with, any use of this report or the information contained herein. No matter contained in this document may be reproduced or copied by any means without the prior written consent of Royal Bank of Canada in each instance. Additional information is available upon request.

To U.S. Residents: This publication has been approved by RBC Capital Markets, LLC, Member NYSE/FINRA/SIPC, which is a U.S. registered broker-dealer and which accepts responsibility for this report and its dissemination in the United States. RBC Capital Markets, LLC, is an indirect wholly-owned subsidiary of the Royal Bank of Canada and, as such, is a related issuer of Royal Bank of Canada. Any U.S. recipient of this report that is not a registered broker-dealer or a bank acting in a broker or dealer capacity and that wishes further information regarding, or to effect any transaction in, any of the securities discussed in this report, should contact and place orders with RBC Capital Markets, LLC. International investing involves risks not typically associated with U.S. investing, including currency fluctuation, foreign taxation, political instability and different accounting standards.

To Canadian Residents: This publication has been approved by RBC Dominion Securities Inc. RBC Dominion Securities Inc.* and Royal Bank of Canada are separate corporate entities which are affiliated. * Member-Canadian Investor Protection Fund.

©Registered trademark of Royal Bank of Canada. Used under license. RBC Wealth Management is a registered trademark of Royal Bank of Canada. Used under license.

RBC Wealth Management (British Isles): This publication is distributed by RBC Europe Limited and Royal Bank of Canada (Channel Islands) Limited. RBC Europe Limited is authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority (FCA registration number: 124543). Registered office: 100 Bishopsgate, London, EC2N 4AA, UK. Royal Bank of Canada (Channel Islands) Limited is regulated by the Jersey Financial Services Commission in the conduct of investment business in Jersey. Registered office: Gaspé House, 66-72 Esplanade, St Helier, Jersey JE2 3QT, Channel Islands.

To Hong Kong Residents: This publication is distributed in Hong Kong by Royal Bank of Canada, Hong Kong Branch which is regulated by the Hong Kong Monetary Authority and the Securities and Futures Commission ('SFC'), and RBC Investment Services (Asia) Limited, which is regulated by the SFC.

To Singapore Residents: This publication is distributed in Singapore by the Royal Bank of Canada, Singapore Branch, a registered entity licensed by the Monetary Authority of Singapore. This material has been prepared for general circulation and does not take into account the objectives, financial situation, or needs of any recipient. You are advised to seek independent advice from a financial adviser before purchasing any product. If you do not obtain independent advice, you should consider whether the product is suitable for you. Past performance is not indicative of future performance. If you have any questions related to this publication, please contact the Royal Bank of Canada, Singapore Branch. Royal Bank of Canada, Singapore Branch accepts responsibility for this report and its dissemination in Singapore.

© 2022 RBC Capital Markets, LLC – Member NYSE/FINRA/SIPC
© 2022 RBC Dominion Securities Inc. – Member Canadian Investor Protection Fund
© 2022 RBC Europe Limited
© 2022 Royal Bank of Canada
All rights reserved
RBC1253



Wealth
Management