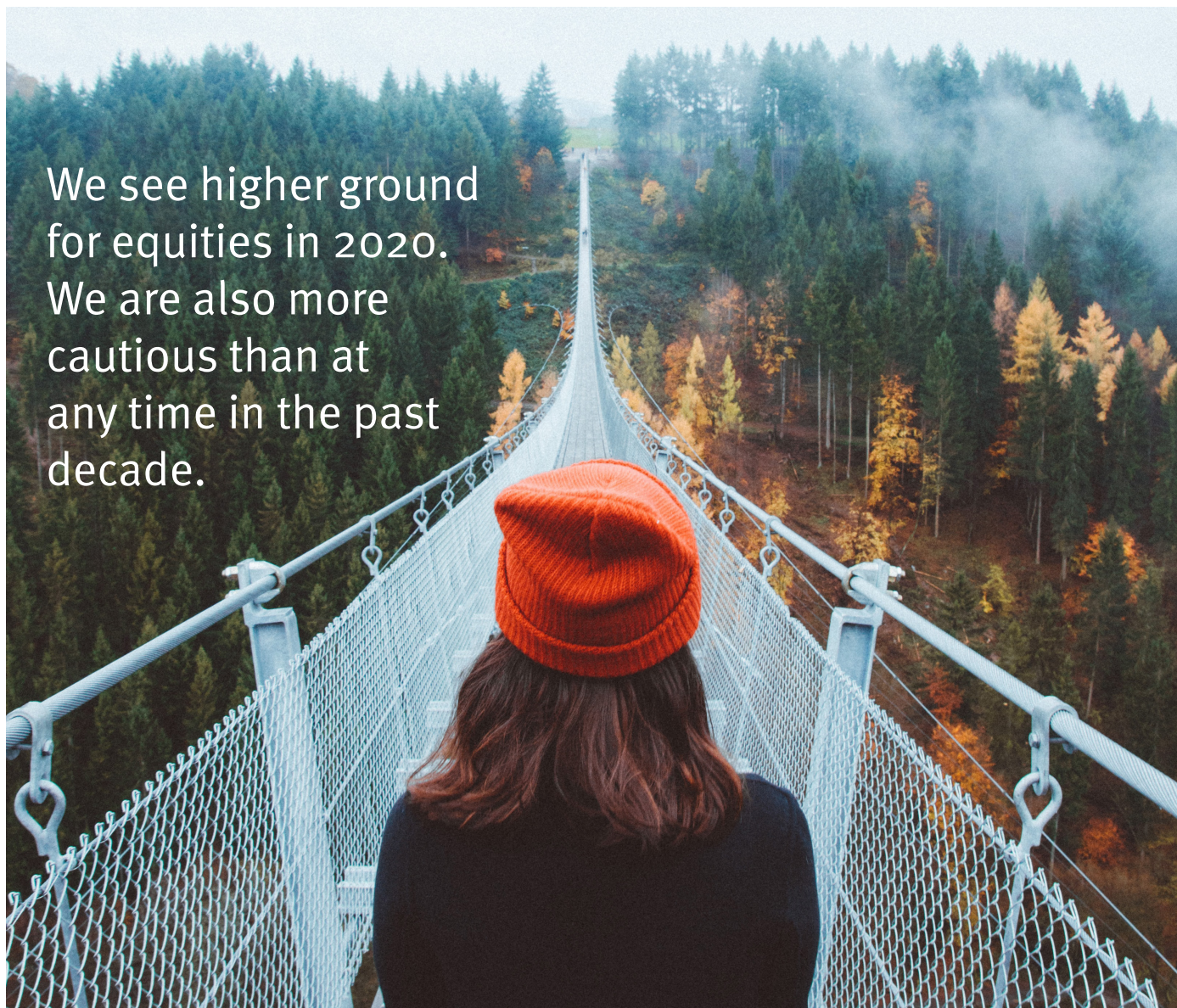


Global Insight

2020 Outlook

We see higher ground for equities in 2020. We are also more cautious than at any time in the past decade.



For important and required non-U.S. analyst disclosures, see page 33.

Disseminated: Nov 19, 2019 15:00ET; Produced: Nov 18, 2019 11:33ET

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**Wealth
Management**

A look ahead

“Uncharted territory” is an overused phrase, but we believe it applies to the current business cycle, which in July 2019 became the longest since World War II. While the economy is in the later stage of this expansion, like the early-cycle and mid-cycle phases before it, this stage could prove to be longer than usual.

We expect central banks’ 2019 accommodative monetary policies, as well as some additional fiscal stimulus, can keep most developed economies growing through 2020 and probably longer. This should engender growth in corporate earnings, dividends, and buybacks. Share prices should follow all these higher, in our view. Nevertheless, with some recessionary indicators flashing caution, we have become less tolerant of portfolios carrying an overweight or above-target commitment to stocks. Investors should not be complacent.

We are also in an “uncharted territory” in another respect. Very low interest rates are likely to persist, with as much as \$17 trillion worth of debt having traded at negative yields in the past few months.

We dedicate two articles to the very low and negative interest rate environment. The first explores how they have come about and what distortions they may bring to financial markets. The second discusses more closely how low and negative interest rates may impact fixed income strategies in your portfolios and your finances.

Our last article is more futuristic in nature. It discusses some of the wide-ranging disruptive innovation trends which, in our view, will loom large over the Industrials sector through the next decade and beyond. We are thinking about opportunities related to those trends as some are already impacting current share valuations in the sector.

We hope you enjoy the *Global Insight 2020 Outlook*.

Global Portfolio Advisory Committee Co-chairs

Jim Allworth
Vancouver, Canada

Kelly Bogdanova
San Francisco, United States

Frédérique Carrier
London, United Kingdom



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10 Eyes wide open

For the past 10 years our mantra “Stay committed to equities as long as no U.S. recession is in sight” has served us well. It is our view that the economic expansion and equity bull market have further to run. But alongside bullishness should come heightened cautiousness. Reliable leading indicators of recession, while still on balance positive, are giving their weakest readings in a decade.

16 Upside down: The impact of negative yields

The world’s cache of government bonds trading at negative yields has soared. Eric Lascelles, chief economist for RBC Global Asset Management, digs into what’s driving this phenomenon and looks at how the persistence of negative rates might change investor behavior and risk exposure.

22 The low rates puzzle: Is the solution to the last problem the source of the next?

As central banks turn to the well-worn accommodative monetary policy playbook in support of economic growth, we ponder the limits to these policies and whether they are sowing the seeds of future problems in the credit market and placing a strain on savers.

27 A new industrial revolution

Next-gen innovations are leaping from the sci-fi drawing board into reality, upending and rejuvenating the industrial landscape. We assess how this new dawn is transforming the investment outlook for the Industrials sector.

All values in U.S. dollars and priced as of market close, Nov. 12, 2019, unless otherwise stated



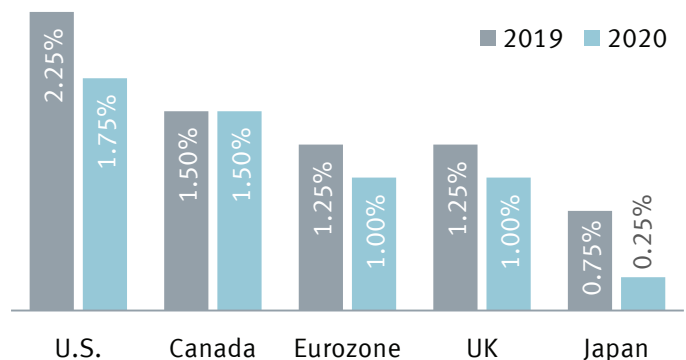
2020 investment stance

Some economic guardrails should keep the expansion from being knocked off course throughout 2020, facilitating moderate growth. For equities, our constructive view runs parallel to a continued need for vigilance. Central banks will remain accommodative as they look to nurture growth, with bond yields holding at ultralow levels.

The global and U.S. economies maneuvered around tariff headwinds and structural challenges in 2019, albeit at a slower pace. Ultra-accommodative monetary policies already on the books, some additional fiscal stimulus, and a confident consumer should keep most developed economies growing moderately through at least 2020. Major central banks seem willing to safeguard the expansion by easing further if necessary; this posture combined with below-average GDP growth should keep sovereign bond yields near historically low levels. As long as U.S. recession risks remain in the distance,

as they are now, we believe portfolios should maintain a Market Weight allocation to equities. Following are our thoughts about fixed income and equity portfolio positioning for 2020 by region, and our forecasts for currencies and commodities.

RBC's annual GDP growth forecasts for developed markets

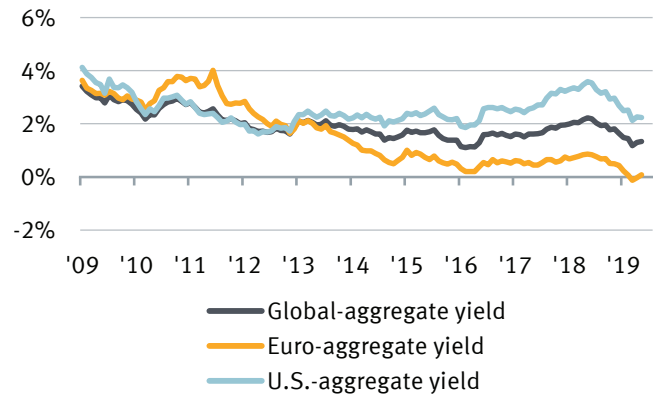


Source - RBC Global Asset Management

Fixed income

Global central banks will look to harvest the fruits of their labor in 2020 after a series of rate cuts and other stimulus measures were planted to close out 2019. While growth and inflation expectations for developed markets are now on the ascent, recession fears and geopolitical concerns are likely to linger. Markets mostly expect central banks to remain on hold for the next year, but the bias will remain toward further easing rather than a return to tightening, anchoring yields across the global landscape near historical lows.

As central banks seek to boost economic growth, will global yields also get a boost?



Source - RBC Wealth Management, Bloomberg Barclays Bond Indexes; data as of 10/31/19

United States

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- The Fed looks set to take a wait-and-see approach to policy and the economy in 2020 after delivering three rate cuts in 2019. However, we see scope for further cuts absent a stabilization in economic data and a sustained steepening of yield curves. Any chance for a resumption of the rate *hike* cycle is likely a 2021 event, at the earliest.
- There is no doubt U.S. economic growth moderated through 2019; the question for 2020 is whether it rolls over into a recession. Recent yield curve inversions raise the risk of such an event, but the Fed's rate cuts have achieved the goal of re-steepening yield curves and are likely sufficient to extend the economic cycle, in our view.
- As economic risks remain slightly biased to the downside, so too is the outlook for yields. We believe the benchmark 10-year Treasury could establish a new all-time low—which stands at 1.36% from 2016—largely caused by the gravitational pull of negative global yields, slowing growth, and low inflation.
- The global hunt for yield has driven yields on high-yield debt to near the lowest levels on record. With yields below 6% in this sector, and the economic cycle in its later stages, we believe investors simply aren't being adequately compensated for risks. Therefore, we would focus on investment-grade corporates, and bank-issued preferred shares for income—where balance sheets remain pristine.

Canada

Christopher Girdler, CFA, Toronto christopher.girdler@rbc.com

- The Bank of Canada (BoC) has bucked the trend of global central bank easing as the domestic economy has been buoyed by a firm employment backdrop and a resurgent housing market. This helped quell some growth concerns that were reflected in lower bond yields in mid-2019. Current pricing does not fully reflect expectations of a 25 basis point cut in 2020 and suggests Canada will soon have the highest policy rate in the G7.
- Given Canada is a small open economy with heightened sensitivity to global growth, we believe the BoC could shift toward easing to ward off an appreciating Canadian dollar if the Federal Reserve lowered rates further. We see short- and intermediate-term bonds as attractively priced and recommend locking in reasonable yields for the next few years. Inflation-protected bonds are a good way to source longer-term exposure as market expectations for inflation

in Canada are near all-time lows. An accommodative policy stance could revive these muted inflation expectations.

- Corporate bonds only offer modest yield enhancement versus governments. Accordingly, we continue to favour upgrading credit quality and liquidity within bond portfolios. Preferred shares are the one exception to this quality bias as we view it as the most attractively valued category in Canadian credit. Widespread investor pessimism has created an opportunity to lock in materially higher yields than what is available on longer-term corporate bonds from the same issuers. In our view, concerns about the impact of lower yields on the cash flow profile of rate resets are imbedded in current pricing.

Europe/United Kingdom

Alastair Whitfield, London alastair.whitfield@rbc.com

- With a new European Central Bank president, and a substantial stimulus package as a departing gift from outgoing President Mario Draghi, we expect monetary policy will be on pause for a while. Continuing soft economic data may warrant an additional interest rate cut or extension of quantitative easing.
- There is an expectation individual euro area countries may provide a fiscal boost to their domestic economies. This depends on the appetite of each government for stimulus and the budgetary restrictions of the EU Commission. We remain comfortable with our Market Weight stance on government bonds and our Overweight view on corporate credit for Europe.
- The outlook for the UK is largely conditional on the general election results and the subsequent policy of the next government on achieving departure from the EU. We believe a small majority Conservative government would prove to be better for delivering Brexit and for the economy in 2020. This outcome may lead to higher inflation and subsequently to tighter monetary policy. If the outcome is a Labour-led government, we see the risk of a possible second Brexit referendum in 2020, leading to a more uncertain economic outlook.
- We anticipate the Bank of England may cut rates in the coming months. But for now, our Market Weight view for UK government bonds and corporate credit and short-duration positioning remains.

Asia

Chun-Him Tam, Singapore chunhim.tam@rbc.com

- China's economy is expected to continue slowing in 2020, with GDP growth likely to fall below 6%, based on the Bloomberg consensus forecast. We anticipate the policymakers' response will be the same as in the past year: walking the thin line between keeping the country's debt under control and using targeted fiscal and monetary measures to cushion downside risks.
- This scenario extends the valuation case for Asia high-yield in 2020, in our view, and we remain Overweight the sector. Although fundamentals will be of concern and require close monitoring, the valuation case is comparable to 2019, where the yield pick-up over Developed Markets debt is attractive. Investors should, however, be prepared for volatility spikes on headline news or during global risk-off periods.
- We expect idiosyncratic risk to be high for Asia fixed income and would maintain a well-diversified portfolio. Our investment philosophy is not to fight fundamental trends. There are two areas we would lean against. In terms of countries, we are cautious on India due to its challenging growth and fiscal dynamics. In terms of sectors, we are cautious on commodity names due to global growth concerns.
- As we move further into the late stage of the economic cycle, capital preservation is key, and we would stick with quality names. We see the sweet spot in the higher BB-rated credits within Asia high-yield. We are Market Weight Asia investment-grade.

Equity

Our view for 2020 features moderate equity returns and earnings growth. Valuations in North America are not outlandish, while in Europe and Japan they are cheap. Alongside this, we see a continued need for vigilance given that the late-cycle economic phase brings with it particular challenges and often generates market volatility. Absent the prospect of a return to more robust economic and earnings growth, we have become less tolerant of portfolios carrying an overweight or above-benchmark commitment to equities, and recommend maintaining a Market Weight allocation.

Price-to-earnings (P/E) ratios of major equity indexes

	Forward P/E	10-yr Avg.
S&P 500	17.5x	15.1x
S&P Small Cap 600	18.5x	18.0x
S&P/TSX Comp	14.8x	14.7x
STOXX Europe 600	14.6x	13.2x
FTSE All-Share	12.9x	12.7x
Hang Seng	10.3x	11.1x
Shanghai Comp	10.7x	11.4x
TOPIX	13.7x	13.6x

Note: Data represents forward P/E ratios based on Bloomberg consensus earnings forecasts for the next 12 months.
Source - Bloomberg; data as of 11/12/19

United States

Market Weight

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- After coming off of a strong run in 2019, we think patience will be a virtue for investors in 2020. Our key indicators are signaling the domestic economic expansion will persist, although there could be some hiccups as the 10-year-old cycle ages. Also, global growth could face headwinds due to structural economic challenges in China and Europe, and were some trade and tariff issues to go unresolved.
- Anecdotal evidence among institutional investors points to muted expectations for S&P 500 earnings growth in 2020. The optimistic consensus forecasts by industry analysts do not yet fully reflect this view. We anticipate the consensus estimates for growth will come down closer to the mid-single-digit range that RBC Capital Markets is forecasting for S&P 500 profits.
- A modest advance in earnings and revenues, combined with a still-expanding economy, should be “good enough” to provide a foundation for somewhat higher U.S. equity prices in 2020. Valuations are also on the market’s side. They are above average, but not unreasonable considering the ultralow interest rate environment and the more extreme valuation peaks reached in the two previous bull market cycles. We think a Market Weight allocation to U.S. equities remains appropriate.

Canada

Market Weight

Patrick McAllister, CFA, Toronto patrick.mcallister@rbc.com

- We recommend a Market Weight allocation to Canadian equities. Domestic-specific challenges, including elevated household leverage, strained affordability in key housing markets, and insufficient oil & gas pipeline capacity, remain in focus. We view these issues as well documented and reflected in the valuations of the most directly affected industries.
- Canadian banks are trading at a modest discount to their long-term average price-to-earnings valuation, which we believe is appropriate. We expect 2020 earnings growth at the low end of banks’ medium-term targets as weaker economic growth and rising credit provisions serve as headwinds. We are mindful that credit losses could rise materially if the economic outlook darkens as new accounting measures dictate a more forward-looking approach.
- The outlook for the Energy sector continues to be clouded by a muted commodity backdrop and ongoing market access issues. While prospective new pipeline projects remain beset by delays, Canadian energy producers face a diminished investment appetite and the risk of wider

price discounts. Tangible progress in advancing the Line 3 Replacement or Trans Mountain Expansion could help sentiment despite post-2020 in-service dates.

Europe/United Kingdom

Market Weight/Market Weight

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- We are upgrading Europe to Market Weight. The U.S.-China trade tensions-induced slowdown is showing signs of abating, and the economy could be close to bottoming. Political headwinds, such as a populist government in Italy and a hard Brexit have not materialized. A stabilization in global economic momentum would benefit the region, and we note rumblings regarding fiscal stimulus have become more persistent. Valuations are not demanding. We would seek opportunities in well-managed companies with strong business models and balance sheets, and whose prospects are buoyed by secular growth drivers.
- Meanwhile, the upcoming UK general elections may yet alter the course of Brexit. Should the Conservatives gather a majority in Parliament, financial markets would likely react positively in the short term: the UK would leave the EU at the end of January 2020 in an orderly fashion, and the government would likely increase fiscal spending and lower taxes to support the economy. But looking out further, the trade relationship with the EU after the transition period would still have to be worked out in detail. Should a free trade agreement not be in place by December 2020, the UK may well have to fall back on unfavorable World Trade Organization terms, as per the withdrawal agreement.
- At the other extreme, in the case of a Labour-led administration, uncertainty would resume, with the prospect of a second referendum and more left-leaning policies.
- For now, weighing attractive valuations versus this uncertainty, we choose to be Market Weight UK equities. We would adopt a balanced approach to domestic and internationally focused stocks.

Asia ex-Japan/Japan

Market Weight/Overweight

William Pau, Hong Kong

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- 2020 may prove to be another eventful year for Chinese stocks, as market participants will look for clues on whether the country can contain economic downside risks. Beijing may continue to support the economy through: (1) reserve-requirement ratio reductions, (2) tax cuts, (3) trimming borrowing rates, (4) reverse repurchase agreements, (5) propping up sectors most at risk, and (6) focusing on infrastructure projects. Policymakers will likely try to control risks by preventing the base rate for new corporate loans from falling meaningfully, as an over-extension of credit could expose the financial sector to systemic risks, in our view. As for the trade impasse, a full pact may not be reached until the U.S. presidential election draws closer.
- The Hang Seng Index's trajectory will largely depend on: (1) trade progress and (2) whether the unrest in Hong Kong ends soon. The city is now in a technical recession, and upcoming economic data may point to a continued deceleration. Despite the gloom, any alleviation of political tensions may bring about opportunities, particularly as the Hang Seng carries a price-to-book ratio of just 1.19x and an undemanding forward price-to-earnings ratio of 10.3x. Last but not least, Hong Kong's IPO market has been staging a notable comeback and the trend may persist.
- In Japan, we expect modest economic growth in 2020 following the hike in the consumption tax in October 2019. Monetary policy will likely remain accommodative. Further fiscal stimulus is available if private consumption declines more than economists' expectations. Despite decent consensus earnings growth expectations for 2020, Japan remains one of the most undervalued developed markets. We maintain our Overweight stance for investors with 12-month or longer time horizons.

Currencies

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2020 forecasts

U.S. Dollar Index	97.34
EUR/USD	1.12
USD/CAD	1.33
GBP/USD	1.30
USD/JPY	109

Source - RBC Capital Markets, Bloomberg

■ **USD – Carry on.** The U.S. dollar continued to grind higher in 2019 despite a dovish Fed, thanks to safe-haven demand emanating from trade tensions and a resilient domestic economy against a backdrop of slowing global growth. Although U.S. economic growth could slow in 2020, so long as this does not derail the broad economic expansion narrative, the dollar should remain supported, in our view.

■ **EUR – Growing pains.** Euro weakness prevailed through 2019 as economic activity slowed and continued to disappoint. After delivering a comprehensive stimulus package, the European Central Bank could remain on hold through most of 2020, limiting downward pressure on the euro. But the challenging growth outlook points to little impetus for a material euro recovery for now, and we maintain a neutral outlook.

■ **CAD – Fading support.** The Bank of Canada hinted at an easing bias for the first time since 2015, flagging slowing global growth and trade concerns. While this could tee up a rate cut, it is not yet priced into the market. In the absence of support from positive rate dynamics, the Canadian dollar could trend moderately lower.

■ **GBP – Brexit?** The pound is still below its pre-referendum level and will remain hostage to Brexit developments, both in terms of the UK's exit from the EU and of their future trading relationship, of which details are yet to be negotiated. With multiple outcomes possible, economic momentum weak, and the Bank of England on hold for now, we remain neutral.

■ **JPY – Looking abroad.** Concerns about the slowing global economy prompted the Bank of Japan to deliver dovish forward guidance, and ultraloose policy could persist through 2020. However, external factors could be key drivers for the yen. Notably, Japanese investors' appetite for unhedged higher-yielding assets abroad could cap gains from safe-haven demand.

Commodities

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2020 forecasts

Oil (WTI \$/bbl)	\$58
Natural gas (\$/mmBtu)	\$2.45
Copper (\$/lb)	\$3.00
Gold (\$/oz)	\$1,500
Soybean (\$/bu)	\$9.13
Wheat (\$/bu)	\$4.73

Source - RBC Capital Markets forecasts (oil, natural gas, copper and gold), Bloomberg consensus forecasts (soybean and wheat)

■ **WTI – Range-bound.** Despite turbulent intraday swings in 2019, RBC Capital Markets expects WTI crude oil to trade between \$50 and \$60 per barrel over the next 12–18 months, capped by excess global supply and slowing demand growth. The International Maritime Organization's 2020 regulations are scheduled to take effect at the beginning of January, and aim to reduce maritime sulphur emissions by over 80%.

■ **Natural gas – Inventory builds.** Demand for cleaner energy continues to paint a favourable backdrop for natural gas over the longer term. However, we believe near-term upside remains limited due to larger-than-average inventory build-ups. RBC Capital Markets forecasts production to outpace demand through 2021. In addition, future demand growth may be more tepid if China slows further.

■ **Copper – Supply surplus.** U.S.-China trade uncertainty and a further deceleration in global manufacturing would impede any significant rally in copper, in our view. We also believe China's monetary and fiscal packages are more likely to stabilize demand rather than spark a new growth phase. Supply and demand fundamentals are pointing towards a surplus position until 2021.

■ **Gold – Consolidation.** Gold rallied in 2019 as central banks eased monetary policies further. We expect less accommodation going forward. The outcomes of the U.S.-China trade dispute and Brexit, and the timing of these events, should be key drivers of gold in 2020. The impeachment process in the U.S. and investors' risk appetites could also play a role.

■ **Soybeans – Phase one.** Soybean pricing has been volatile since the emergence of the U.S.-China trade dispute in mid-2018. The market is anticipating a "phase one" trade deal whereby China is expected to ramp up purchases of U.S. agricultural goods. U.S. exports remain below pre-trade war levels but should increase going into 2020.

■ **Wheat – Record high.** The U.S. Department of Agriculture is lowering its 2019/2020 global production forecast, driven by unfavourable weather conditions and reduced consumption rates. Global ending stocks hit a record high of 288 million tonnes in October 2019, with approximately half within China's storage.



Eyes wide open



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For the past 10 years our mantra “Stay committed to equities as long as no U.S. recession is in sight” has served us well. It is our view that the economic expansion and equity bull market have further to run. But alongside bullishness should come heightened cautiousness. Reliable leading indicators of recession, while still on balance positive, are giving their weakest readings in a decade.



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We have a constructive outlook for stocks for 2020. The economic expansion should have further to run, in our view, underpinned by accommodative credit conditions everywhere, the robust good health of the American consumer, easing U.S.-China trade tensions, and the likelihood most developed economies will deliver some fiscal stimulus. Corporate earnings will likely increase, as should dividends and stock buybacks, pushing share prices higher.

All of this should transform the gloom of 2019 around trade and recession talk into a less fraught outlook for the economy. What it shouldn't change is the investor's commitment to vigilance.



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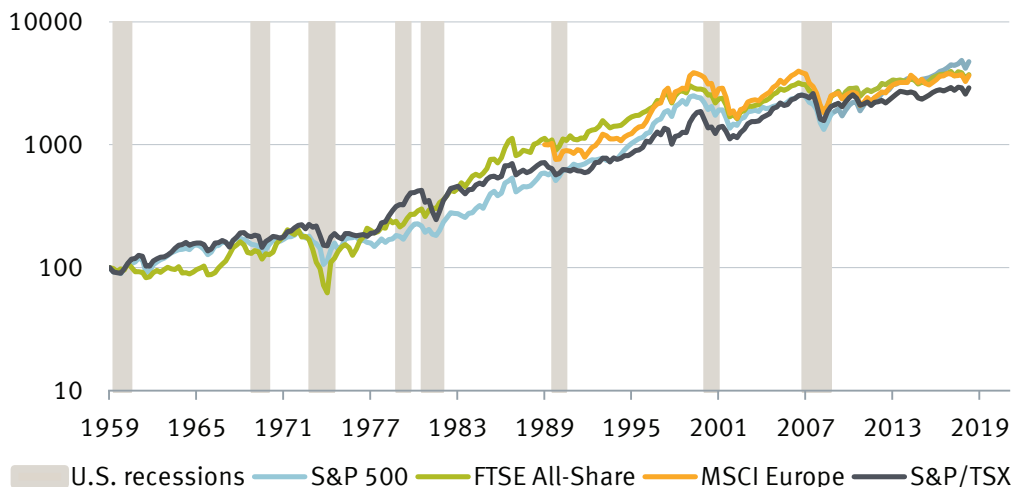
U.S. recessions have historically been associated with equity bear markets in all the developed economies, but the start of the next U.S. recession looks to us to be a year or more away. However, there are at least two complicating factors facing investors.

First, while renewed monetary/fiscal stimulus is breathing some extra life into the longest-ever U.S. economic expansion, in our view, this is unlikely to kick GDP growth into a higher gear that would offer the prospect of several successive years of above-average earnings growth.

Eyes wide open

Beware of U.S. recessions

Bull markets don't die of old age, they are killed off by U.S. recessions



Source - RBC Wealth Management, U.S. Department of Commerce, Federal Reserve; monthly data through April 2019, indexed to Jan. 1960 = 100 (S&P 500, S&P/TSX, FTSE All-Share), Jan. 1970 = 1000 (MSCI Europe)

Second, bull markets have usually peaked before a recession starts—sometimes as much as a year in advance. So, even conviction that the next recession won't arrive before 2021 still leaves open the possibility the market may set its peak for this cycle in the coming 12 months.

Our view has a bullish bias with new highs and moderate returns forecast for the coming year. But right alongside this is a heightened need for caution acknowledging that the late cycle carries particular challenges for both the economy and the stock market.

There are reasons to be bullish

1. The next recession still looks some ways off

Monetary conditions remain extremely accommodative. The arrival of “tight money” (i.e., prohibitively high interest rates simultaneous with a sharply reduced willingness of banks to lend) has preceded every U.S. recession but one since the 1930s.

Money is not tight. Borrowing rates are very low and could go lower. The Fed has cut three times and is committed to buying \$60 billion of Treasury bills each month until at least June. The European Central Bank (ECB) has cut its base rate to minus 70 basis points and reinstated its large bond purchase programme (i.e., quantitative easing, or QE). The Bank of Canada has struck a dovish tone indicating it might cut. The Bank of Japan remains in full-on QE.

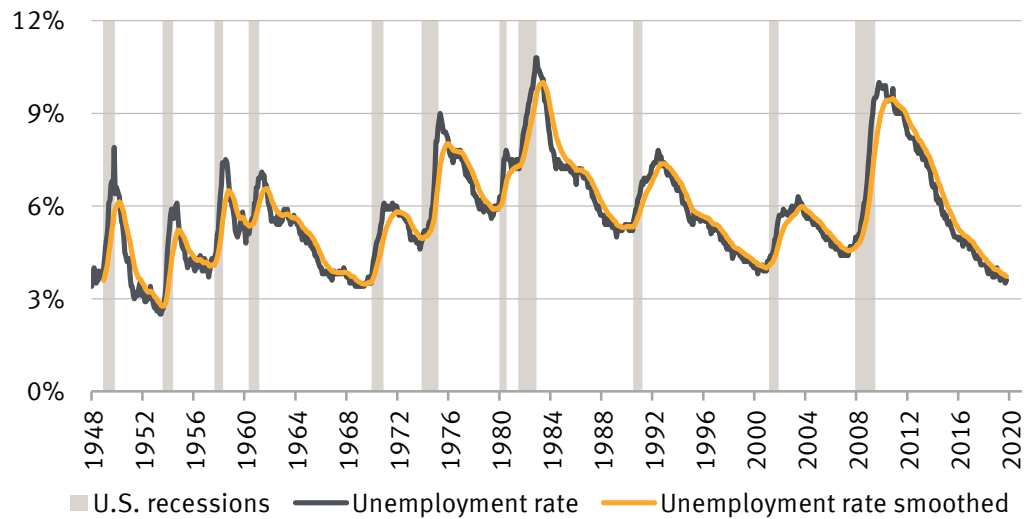
Not only is policy set at “very accommodative,” but both lenders and borrowers report credit is plentiful and easy to access. And policy is likely to remain supportive. In Europe, just-retired ECB President Mario Draghi's parting gift of a rate cut and stepped-up QE gives incoming President Christine Lagarde some policy breathing room, while in the U.S., the Fed is thought to prefer keeping policy moves to a minimum after February in a presidential election year.

2. The dominant U.S. consumer can sustain spending

The other tailwind for the U.S. economy (and the global economy) is the robust good health of the American consumer who shows no signs of running out of steam. The unemployment rate is sitting at a half-century low. The U.S. Labor Department reports seven million jobs are currently unfilled (versus six million unemployed). Unemployment claims continue to trend lower—companies are reluctant to lay anyone off, even an unsatisfactory employee, because hiring a replacement is extremely difficult. Labour tightness has pushed average hourly earnings gains up to 3.5 percent from just two percent two years ago.

The lowest unemployment rate in almost 50 years has produced a confident consumer

U.S. unemployment rate



Source - RBC Wealth Management, U.S. Department of Labor, Federal Reserve

High savings, house prices comfortably back near their pre-crisis peaks, as well as the tight employment picture have boosted confidence. The consumer continues to spend at a rate sufficient to offset any weakness from other sectors.

Consumers elsewhere are also reasonably upbeat. And they are likely to remain so through 2020 at least. The recently elected government in Canada has indicated another middle-class tax cut will be quickly forthcoming. The UK's Labour Party has included an election plank that promises to mandate a 32-hour work week within a decade, and entailing no loss of income. The U.S. election season is almost certain to be rife with middle-income tax cut and spending promises.

In order for the U.S. to slip into recession something has to seriously dent the condition of the consumer. Historically, there have only been two “brakes” robust enough to effect this. One would be a tax increase—possible if Congress becomes more decidedly Democratic, but probably not sufficient to trigger a recession if conjoined with a middle-income tax cut and new spending. That leaves the eventual arrival of tighter credit conditions as the most plausible route to recession from here.

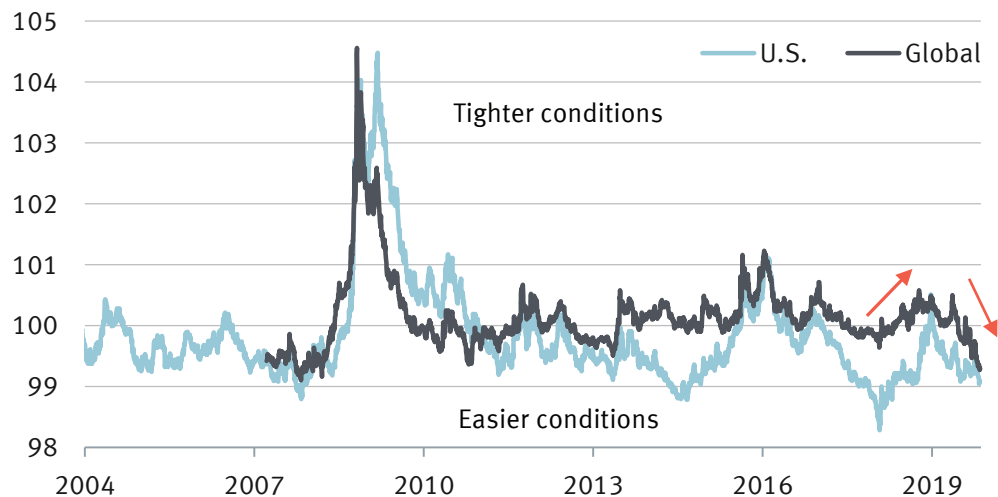
As discussed above, money is not “tight” nor are central banks showing any desire to head in that direction. If the Fed were to change its mind, we believe it would take some considerable rate-hiking before the economy succumbed. Since the federal

Eyes wide open

Since the fed funds rate came into existence in the early 1950s there has never been a recession before the fed funds rate has exceeded the “nominal” growth rate of the economy (i.e., the growth rate before adjusting for inflation), which today is 3.75 percent year-over-year. That is the equivalent of eight quarter-point rate increases above the current fed funds rate, which sits at 1.75 percent.

Global financial conditions continue to ease

Goldman Sachs Financial Conditions Index



Source - RBC Wealth Management, Goldman Sachs, Bloomberg, RBC Global Asset Management; data through 11/7/19

3. The market has displayed few signs of vulnerability

The stock market’s “internals” still look good to us. Consensus earnings estimates are now more reasonable and look likely to stabilize soon. Valuations in North America are not outlandish, while they are cheap in Europe and Japan.

Importantly, the breadth readings of the market are confirming what the indexes have been doing. In other words, as the broad averages have been moving to new highs, so too have the majority of stocks. For a number of months prior to most bull-market peaks that relationship breaks down: the index gets carried higher by a dwindling number of high-performing, large-cap favourites while a growing majority of issues are either treading water or moving into outright downtrends. No such divergence has appeared, lending confidence to the idea that this market advance has further to go.

There are reasons to be cautious

1. The yield curve inverted

Last summer, short-term interest rates finished above long-term rates. Normally the opposite is true. The previous time such an “inversion” occurred was January 2006, 23 months before the start of the recession in December 2007. Since World War II, the yield curve has inverted 10 times (not counting the latest instance). On nine of those occasions, a recession followed on average 14 months later.

RBC Capital Markets, LLC Chief U.S. Economist Tom Porcelli points out the yield curve usually inverts because the Fed is rapidly raising short-term interest rates to cool off an overheated, inflation-prone economy. This time, instead, collapsing long-term yields

Eyes wide open

did the deed—the 10-year Treasury yield fell from 2.60 percent all the way down to 1.45 percent in just four-and-a-half months, plunging below the fed funds rate in the process.

Long-term yields fell because Japanese and European investors were barreling into U.S. Treasuries rather than accepting deepening negative yields at home. So, unlike past inversions, this one was not signalling a painful tightening of credit conditions in the U.S. As noted above, credit remains plentiful and inexpensive.

While it’s hard not to agree with this interpretation, we would note that compelling, persuasive arguments that “this time it is different” usually appeared after previous inversions—and typically recessions arrived nonetheless. Some economy watchers are taking comfort from the fact the yield curve de-inverted in October. However, we do not think this constitutes an “all-clear.” Such reversals have almost always occurred before the associated recession has begun.

Cracks are appearing for the first time in a decade

RBC Wealth Management U.S. economic recession scorecard

Indicator	Status		
	Green	Yellow	Red
Yield curve (10-year to 1-year Treasuries)	–	–	✓
Unemployment claims	✓	–	–
Unemployment rate	✓	–	–
Conference Board Leading Economic Index	✓	–	–
ISM New Orders minus Inventories	–	✓	–
Fed funds rate vs. nominal GDP growth	✓	–	–
<div style="display: flex; justify-content: space-around;"> Expansion Neutral Recessionary </div>			

Source - RBC Wealth Management, Bloomberg, St. Louis Federal Reserve FRED Economic Data

For our part, we are treating this occurrence as a “shot across the bow” for equity investors—one that should provoke a heightened degree of vigilance.

2. Recession probabilities are increasing

The shape of the yield curve is just one of six indicators we use to gauge the probability of the arrival of a U.S. recession. Four of the six (unemployment insurance claims, the unemployment rate, the Conference Board Leading Economic Index, and the gap between the fed funds rate and the nominal GDP rate) are all still giving the economy a “green light.” That said, they are all much closer to flashing red than they were a year ago. **However, it’s not a foregone conclusion they will turn negative; instances of close calls followed by a rebound are common enough.**

Eyes wide open

But if more indicator pins were to topple in the coming months, our caution would intensify and defensive inclinations grow. Virtually all bear markets have been associated with U.S. recessions, and usually the stock market has set its final peak for the cycle some months before the recession begins. So, the inverting of the yield curve in August can be seen as opening the door to the potential arrival of a bull-market peak for the first time in 10 years.

3. Slow growth makes for a challenging investment environment

Our estimate for U.S. GDP growth next year is 1.75 percent, much closer to zero than the 2.5 percent to 3.5 percent run-rate of prior cycles. Occasional negative quarters inducing more frequent bouts of market volatility can't be ruled out. The growth rates in Europe and Japan, if anything, will be weaker, in our estimation. It's unlikely that corporate guidance will put investor angst about slow growth to rest.

Valuations are full enough, at least in the North American markets, that they don't leave much room to absorb either GDP growth or earnings disappointments.

Invested but not asleep

For 10 years we have been well served by the idea that portfolios should maintain at least a full, target-weight exposure to equities as long as there was no U.S. recession in sight. We continue to be of that view.

Accommodative monetary policy, some additional fiscal stimulus, and a confident consumer should keep the U.S. and most other developed economies growing through next year and probably longer. That should engender growth in corporate earnings, dividends, and stock buybacks. Share prices should follow all these higher.

We recommend portfolios carry equities at a predetermined, long-term target weight. However, without the prospect of a return to more robust economic and earnings growth, we have become less tolerant of portfolios carrying an overweight or above-target commitment to stocks whether by design or as a result of strong markets.

If and when the weight of the evidence eventually moves the probabilities of a recession/bear market to unacceptably high levels it will be tempting to rationalize away the bad news. When that time arrives, that temptation should be resisted.



Upside down

The impact of negative yields

Global economic growth has been slowing, uncertainty growing. Investors looking for safety and reduced volatility have been big buyers of the highest-quality debt, driving yields ever lower. As a consequence, the world's cache of government bonds trading at negative yields has soared. Eric Lascelles, chief economist for RBC Global Asset Management Inc., digs into what's driving this phenomenon and looks at how the persistence of negative rates might change investor behaviour and risk exposure.

Q. How pervasive are negative interest rates and why are interest rates so low?



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A. As much as \$17 trillion of global debt has traded at a negative interest rate in 2019.

Eurozone and Japanese central bank policy rates are now themselves negative. This means that negative yields aren't just a distortion of the market but something that is sanctioned by the highest-level policymakers.

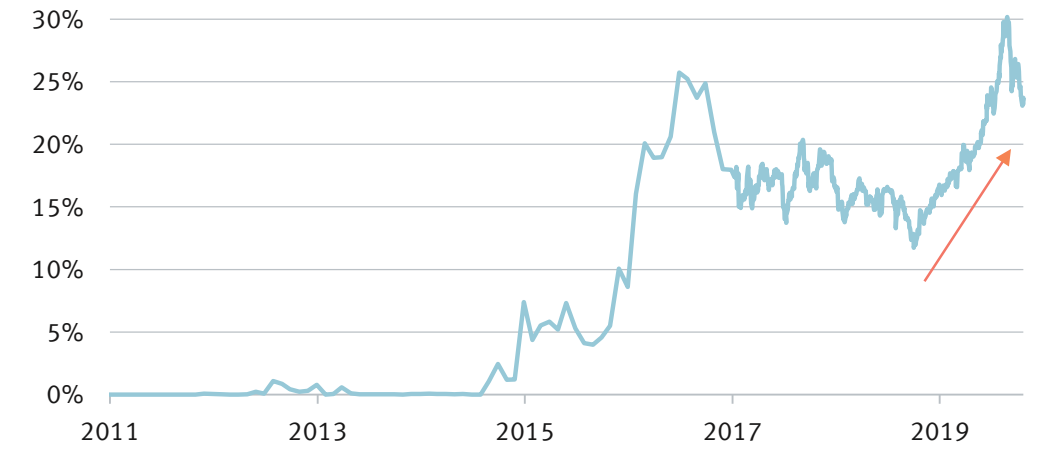
Very low and negative interest rates principally reflect a slow real growth environment, and low, relatively stable inflation due to an aging population as well as the pervasive forces of globalization and automation.

But there are other reasons as well. Despite elevated government debt loads, there is arguably a shortage of "safe" debt in the world. As the pool of emerging market

Impact of negative yields

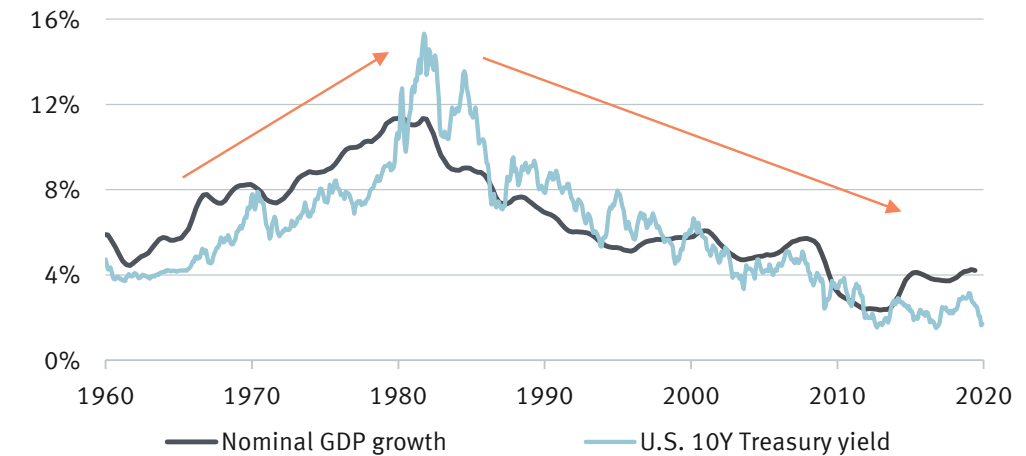
The share of bonds with negative yields has surged

Percentage of bonds in Bloomberg Barclays Global Aggregate Bond Index trading at negative yields



Source - RBC Global Asset Management, Bloomberg; data through 10/25/19

U.S. nominal GDP and 10-year yield in tandem



Source - RBC Global Asset Management, Bureau of Economic Analysis (BEA), Federal Reserve Board, Macrobond; five-year moving average of year-over-year nominal GDP growth through Q2 2019; yield data through 9/30/19

wealth expands, savers are crowding into the same developed world debt markets as everyone else since there are few AAA- or AA-rated investment opportunities in their own markets.

Central banks also artificially restrain short-term rates to keep borrowing costs affordable for heavily indebted economies. This is counterintuitive as one would naturally assume that high debt levels would push borrowing costs higher as a risk premium is embedded.

Lastly, in addition to this long list of structural depressants, there are also some downward cyclical pressures on bond yields given the lateness of the business cycle and easing central banks. This isn't a permanent condition, but it is helping to keep yields toward the lower end of their new normal range.

Q. How do savers, both individuals and corporations, change their behaviour in a world of low and negative interest rates?

A. Basically, the way individuals and corporations invest, use cash, and save are all likely to be modified by this environment.

Low interest rates can push savers outside of their comfort zones and into taking larger investment risks in an effort to secure some sort of return, or at least to avoid locking in guaranteed (albeit small) losses. Accordingly, they can become more vulnerable to periods of financial market volatility. Larger investment risks bring not only the possibility of substantial unanticipated losses, but also of diminished liquidity. This reduces the resilience of corporations and retirees alike to economic shocks.

Negative interest rates also encourage individuals and businesses to rely upon cash to a greater extent, rather than suffer losses in a bank account or the bond market. This, in turn, threatens to reduce tax compliance, compromise government tax revenues, and increase the incidence of loss through theft.

Other than using cash more, businesses and individuals who are confronted with negative rates are also incented to prepay invoices so that the negative return becomes the problem of the vendor they are buying from, and to prepay their income tax bill as a means of getting a guaranteed zero percent rate of return from the government, or even to overpay credit cards. All of these actions distort the economic system in various ways.

Perversely, households may also feel compelled to save more rather than less if they are to achieve their retirement objectives in a low-return world. This runs counter to central banks' attempts to stimulate growth by cutting interest rates to encourage less saving and more spending. Households under pressure to save more is probably not sufficient to completely undermine the stimulative effects of low rates, but it is at least partially offsetting central bank efforts.

Q. How about investors and pension funds in particular?

A. Among investors, pension funds are set to be particularly affected to the extent they have traditionally maintained low-risk, fixed-income-heavy portfolios that are designed to match the stable stream of payouts expected by their retirees. Those that stick with this approach are increasingly having to accept the prospect of diminished future returns and accordingly increasing contribution rates and/or cutting retiree benefits. Others are opting to venture further out the risk spectrum, achieving better returns but at the expense of greater volatility and risk.

Q. And what of borrowers' behaviour?

A. When borrowing costs are zero or even negative, then the necessary expected return on a new business project doesn't have to be high. In fact, it can be as little as zero percent. As a result, some bad ideas are able to attract capital and be put into practice. This can eventually damage an economy's productivity growth.

Impact of negative yields

Borrowing naturally rises when the cost of servicing debt is extremely low. All of this extra leverage can eventually create problems, particularly were interest rates ever to rebound.

Q. We often hear that the banking system is stressed by negative rates—how so?

A. Banks are classically hurt by negative interest rates as their excess reserves no longer earn a return, and their net interest margins (basically how much they earn on loans minus how much they pay out to depositors) shrink. Having said that, the health of the banking system is generally better than during the last recession, with higher levels of capitalization in particular.

Q. Are low and negative rates good for the economy overall?

A. Central banks are cutting rates with the intent of boosting growth via the inducement to save less and spend more. But structurally low interest rates also limit the ability of monetary stimulus to further rescue economies when they run into trouble. In turn, recessions could become more frequent or more severe.

Moreover, the aforementioned behavioural distortions for savers and borrowers alike can create fragility within the economic system, and increase the risk of a financial crisis.

Q. And what are the implications on financial markets of low and negative rates?

A. Returns in the fixed income market are unavoidably low in this environment, though rates continuing to edge lower can at least provide some capital gains along the way.

As the search for yield carries on, the valuations of other asset classes increase. This means that credit spreads should be unusually narrow and the price-to-earnings ratios that equities trade at should—in theory, at least—be unusually high.

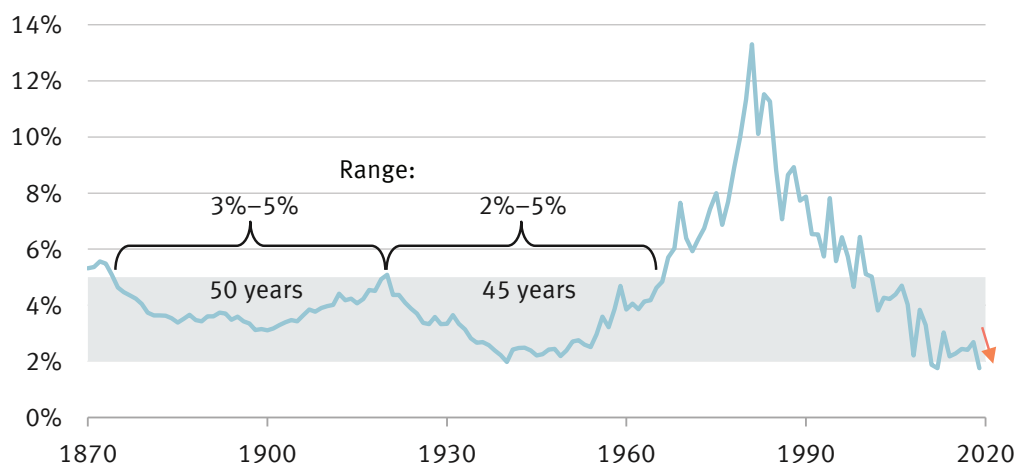
This might initially be a profitable experience for those asset classes as they seek out their new levels, but ultimately the steady-state rate of return should diminish once the situation is fully priced in.

Q. How long can we expect these very low rates?

A. History shows that the 1970s and 1980s were an extreme outlier to the topside for rates, and furthermore that there are multi-decade periods of time over which very low interest rates can persist. The current episode is particularly extreme in its depth, but not yet in its length. The bond market is not necessarily overdue to rebound to significantly higher levels.

Impact of negative yields

Historical 10-year U.S. Treasury yields



Source - RBC Capital Markets, RBC Global Asset Management; data through 10/16/19

Q. Who would buy a negative-yielding bond?

A. A surprising variety of investors are willing to tolerate a negative nominal interest rate. This shouldn't be such a surprise since many have long put up with a negative return once inflation has been subtracted from the rate they are receiving, and for even longer when also adjusted for taxes paid.

Those are the thresholds that truly matter for people making investment decisions—in comparison, a negative nominal yield like we are seeing today is a fairly arbitrary development.

Some tactical investors expect bond yields to fall further, and so they seek to profit from the appreciation of the bond's price to an extent that outweighs the steady drag of a negative coupon.

Others are able to convert a negative-yielding bond in a foreign market into a positive return in domestic terms by hedging out the currency risk under certain conditions. (One's home market must have the higher short-term interest rate of the two, and the foreign market must have the steeper yield curve of the two. These conditions are presently fulfilled for North American investors buying negative-yielding European bonds, meaning that a positive return on these products is still achievable.)

Keep in mind that not all investors are sensitive to the expected return of a bond. The European Central Bank has purchased many European sovereign bonds with the intent of helping to depress interest rates as opposed to profit from them, and is unlikely to sell given the challenging economic environment. Commercial banks are generally obliged to keep much of their capital in safe and liquid investments like government bonds; if the return on these bonds is negative, it is unfortunate but can't be helped. Foreign reserve managers are similarly obliged to hold safe, liquid, and usually short-term debt of foreign nations with an eye toward managing their exchange rate, not achieving a positive return.

Impact of negative yields

Other investors are sensitive to their expected return, but cannot adjust quickly or at all. As an example, an institutional investor might be mandated to hold only AAA-rated European securities in a portfolio. Something else cannot be bought unless the mandate changes—an involved process. Similarly, a pension fund may be unwilling to tolerate the risk necessary to buy higher-yielding bonds, and so it is stuck with a negative return.

Q. Why wouldn't investors grappling with the prospect of a negative return simply keep their money in cash, or put it in a chequing account?

A. Those are not risk-free propositions, unlike a sovereign bond. Cash can be lost, destroyed, or stolen. A chequing account in developed countries is generally quite safe and provides deposit insurance, but this may not be sufficient, say, for a European corporation with far more money than deposit insurance can cover, and given the degree of upheaval in the European banking sector over the past 11 years.

Q. So it sounds like the “lower-for-longer” interest rate environment could be here for some time, that the behaviours of individuals and businesses are adapting to this new environment and that some distortions in the economic landscape may start to appear as a result ...

A. That is right. The current economic cycle may be extended thanks to central banks' actions, but it may also eventually become marginally more fragile as a result of these policies. We have been pointing out for some time that we are firmly in the late stage of the business cycle, and this argues for a degree of vigilance while recognizing that there are still opportunities in financial markets.

Eric Lascelles is the Chief Economist for RBC Global Asset Management Inc. He maintains the firm's global economic forecast and advises its portfolio managers on key themes and risks. He is also a frequent media commentator on global economic and financial trends, appearing regularly on CNBC, Bloomberg, and other networks.



The low rates puzzle

Is the solution to the last problem the source of the next?

As central banks turn to the well-worn accommodative monetary policy playbook in support of economic growth, we ponder the limits to these policies and whether they are sowing the seeds of future problems in the credit market and placing a strain on savers.



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After several years that saw central banks on a path back to normality—some raising rates gradually, others holding steady—in 2019 global central banks shifted back into easing mode by cutting interest rates and/or restarting asset purchase programs. And with that, the “hunt for yield” from earlier in the decade is back on.



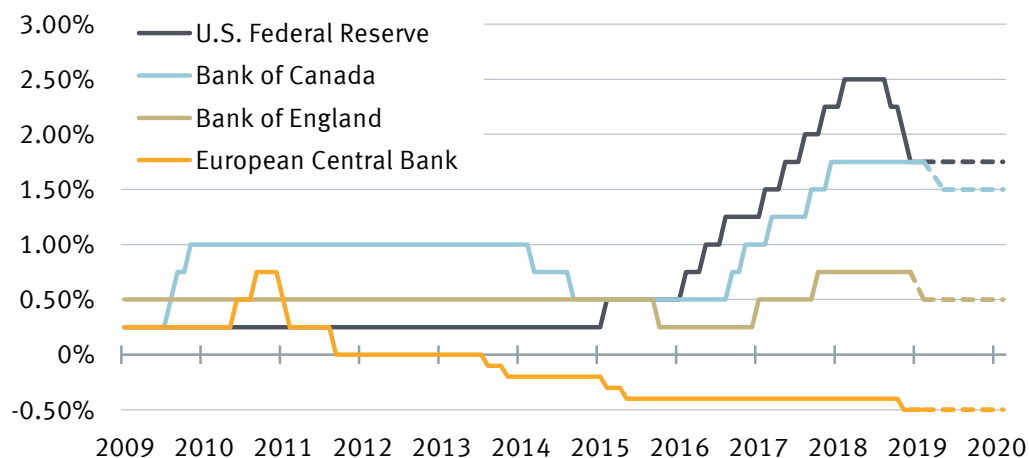
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While central banks are again taking pains to shore up economic growth, one should also accept that the current expansion is likely in the later stages. And as we cast our eye across the global yield landscape, we see that investors have rarely been paid less to take on more risks. It was a banner year for fixed income performance in 2019. But a far more challenging environment is likely waiting in the wings in 2020.

So, given the state of play in fixed income markets, what should be on the minds of investors in the coming year? In a wide-ranging conversation, two of our U.S. and Canadian fixed income strategists break down the market dynamics that are likely to shape fixed income investment strategy—many of which are also considerations at the broader asset allocation level.

The low rates puzzle

Will central banks' 2019 rate cuts support growth in 2020?



Source - RBC Wealth Management, Bloomberg; dashed lines denote RBC Capital Markets 2020 expectations; data as of 10/30/19

Mikhail Pasic: The current level of interest rates is a good place to start the discussion. There are some extraordinary things happening on this front which permeate the investment decision-making process across all asset classes. Virtually every investor domiciled in a developed market is facing the lowest rates they've ever seen—and that statement has rung true for the better part of a decade. The apparent permanence of the trend may have desensitized people to the risks and the potential side effects of low rates.

Thomas Garretson: Right, but global yields have been declining for the better part of 40 years—largely a reflection of well-discussed reasons such as maturing developed economies, low inflation, aging demographics, and increased levels of saving. One could argue that the permanence of the trend is just that, permanent, and investors awaiting a return to some higher level of yields may be making suboptimal investment decisions by failing to acknowledge that reality.

MP: Rates don't have to reverse higher tomorrow, but there are ramifications of an extended period of low and even negative interest rates. In business cycles it's often the case that the solution for one problem becomes the source of the next. Low rates and quantitative easing were part of the solution to the debt problems of 2008. Higher asset prices and a reduced interest burden helped to stabilize a precarious situation. But for every borrower there is a saver, and low rates are challenging for savers. The "fix" for the debt problems of the last decade has created a new set of challenges for savers.

TG: I think there's a misconception that central banks are the source of low interest rates when in fact they are simply reacting to market forces. For the reasons stated previously, the "natural" rates of interest globally are historically low, and likely to remain there. For central banks to provide stimulus to economies, rates have to be below those levels. As former Fed Chair Ben Bernanke made the case in the aftermath of the Fed's zero interest rate policy that was in place from 2008 to 2015 amid worries about the harm being done to savers: raising rates for the sake of savers would only make everyone worse off as it would likely spark a recession and put the economy right back where it started.

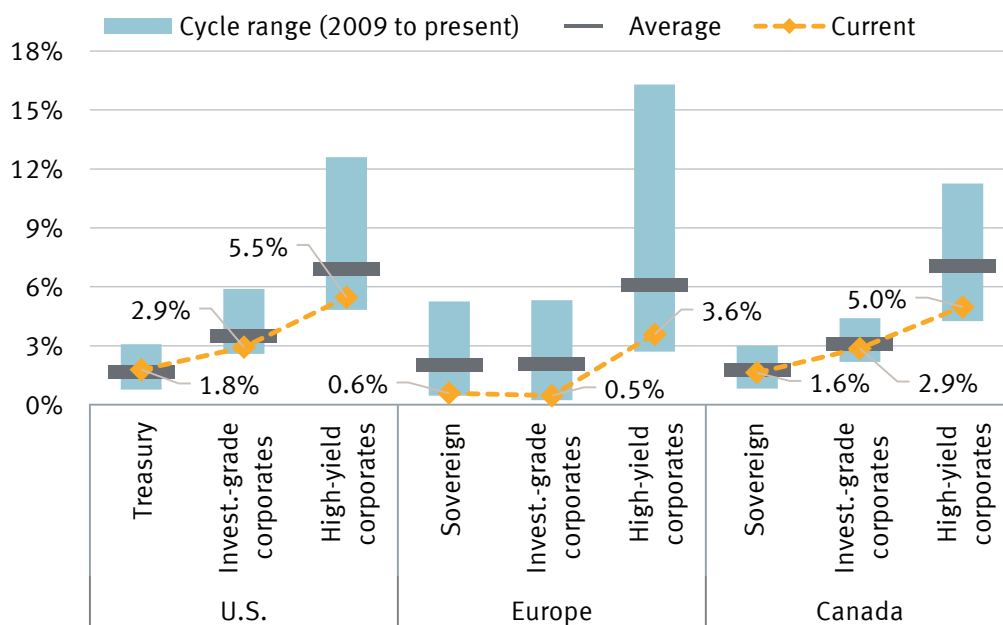
The low rates puzzle

MP: It's tough to debate the merits of this policy with one of its architects, but it is worthwhile to try and ascertain the limits of these policies. Ultimately, it seems that the plight of the saver rolls up into a bigger institutional challenge when pension obligations are taken into account. Additionally, there are already signs that we are seeing a diminished impact from additional rate cuts from both an inflation and GDP growth perspective.

Moreover, what started as an elegant solution to a debt problem has actually incentivized more borrowing—as evidenced by debt-to-GDP ratios approaching the post-war peak for developed world governments and near-all-time high debt-to-cash flow ratios for both U.S. investment-grade-rated corporations and Canadian households. Low rates enable borrowers to carry more debt without increased interest costs.

TG: If corporate debt levels are elevated at a time when so too are recession risks—why aren't we seeing that reflected in credit markets? Investors have rarely been paid less to take on more credit risk, with yields near the lowest levels since the financial crisis more than 10 years ago. Are rich valuations in credit markets purely a function of central banks' efforts to encourage risk-taking?

Ten years into an economic expansion, global yields remain near post-financial crisis lows



Source - RBC Wealth Management, Bloomberg; data range: 6/30/09–10/25/19

MP: Both all-in bond yields as well as the yield differential between lower-rated and higher-rated bonds are below their historical averages. However, income needs for investors have not reciprocally come down. This leaves the saver with two choices: save more money, or assume more investment risk. This is true at both the individual level and the institutional level.

A retiree in Ontario needs to have approximately CA\$2 million invested to earn a minimum-wage-equivalent income stream from a Government of Canada bond that

The low rates puzzle

yields 1.5 percent. Twenty years ago, when the minimum wage was approximately half the current amount and Government of Canada bonds yielded nearly six percent, only around CA\$250,000 of savings was needed to earn minimum-wage-equivalent income. In today's market, an investor in search of a six percent yield needs to opt for a high-yield bond, a preferred share, or a stock.

Pensions face the same challenge, and there are a number of notably underfunded public and private plans despite a decade of strong financial market returns. This is partly because return targets remain in the seven percent area, necessitating plan sponsors to either make additional contributions or accept more investment risk. The latter has been the more palatable choice and allocations to high-yield bonds, exotic credit structures, and both public and private equity have increased.

TG: Let's turn to the economic outlook as recession risks are likely to remain front and center for investors in 2020. When investors think recession, they think credit downgrades and defaults. What do you think about those risks at this stage?

MP: In the midst of an economic expansion that has lasted over a decade and in today's world of ultralow rates, even highly indebted companies are able to comfortably service their debts. But in a recession, corporate revenues, profits, and cash flows available for debt service shrink. Corporate borrowing rates often move sharply higher in such periods—especially for the lowest-quality borrowers, a much larger fraction of the total today—making refinancing of maturing debt difficult or even impossible for some.

Another element of this story to watch is market liquidity, as there has been a push into illiquid categories like private equity and structured credit. This often amounts to both debt and equity investments that are tied to a leveraged company, in a deal structure that can be difficult to trade. The challenge of trading these bonds can be compounded by the ongoing retreat of market makers including banks. Dealers now only hold one bond for every 40+ bonds held by the mutual fund industry, down massively from one bond for every two bonds held by funds 12 years ago.

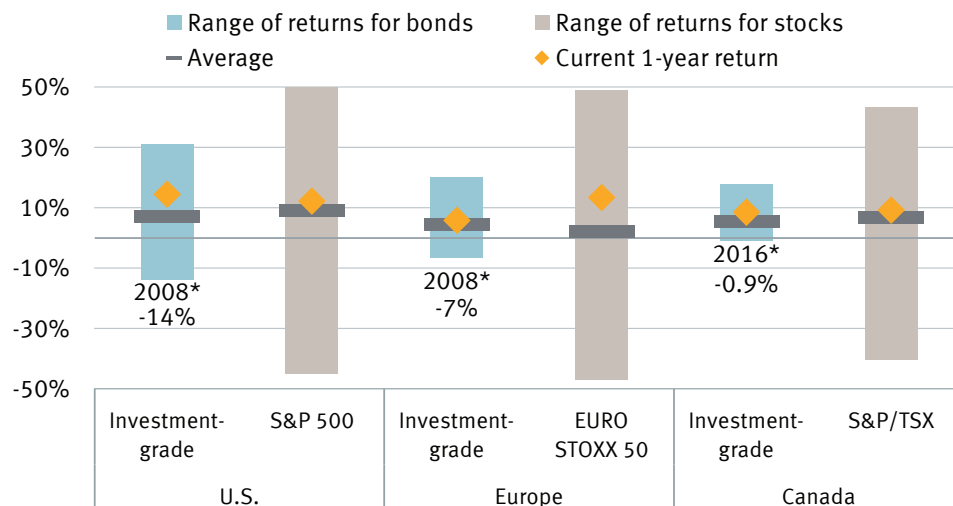
Poor liquidity conditions appear to be accentuating some price moves to the upside right now as investors reach for yield, but that could reverse if the tone sours and credit downgrades prompt forced selling. Nearly 15 percent of the investment-grade market is rated BBB-, and approximately 30 percent of the leveraged loan market is rated B-. In each of these instances, meaningful gaps lower in prices could occur if a 1-notch downgrade were to happen because those ratings buckets represent the minimum rating for key investors in both categories.

TG: But beyond income, the appeal of having a fixed income allocation is simply for the lower volatility and the preservation of capital it provides. Despite starting from a base of historically low yields, having a fixed income component of safety in a portfolio to balance against the volatility inherent in stocks is likely to remain valuable. Even at the depths of the financial crisis, the decline in investment-grade corporate bonds over any one-year span was just -14 percent, while defaults peaked at only 0.42 percent, compared to a maximum decline of nearly 50 percent in stocks—the same held true globally.

The low rates puzzle

Despite low yields, bonds will continue to provide lower volatility and capital protection

Bars show maximum rolling one-year gains and losses based on historical data



* The largest losses for U.S. and Europe corporates were in 2008, and in 2016 for Canada.

Source - RBC Wealth Management, Bloomberg Barclays bond indexes; rolling 1-year total returns through 10/31/19 from 1988 for U.S. and Europe, 2002 for Canada

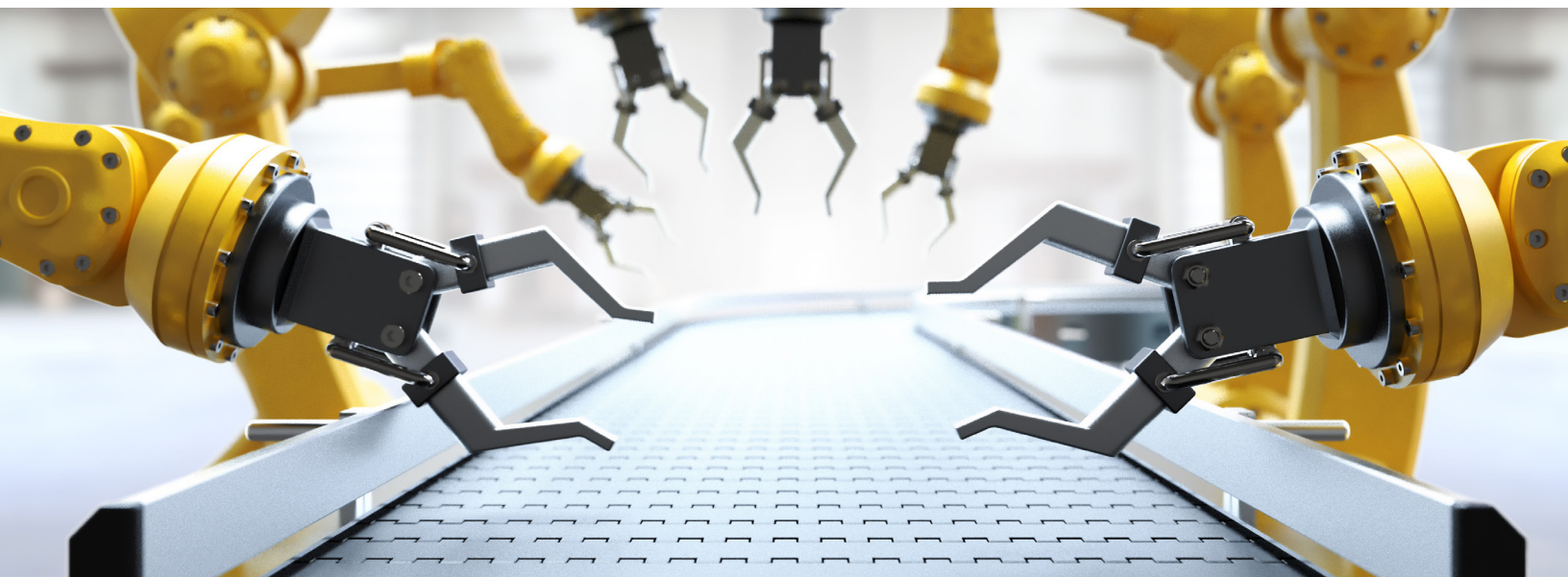
So sure, there are plenty of risks on the credit landscape in 2020, but there are always risks. Though recession risks are becoming elevated, it remains our expectation that any downturn—when it arrives—is likely to be comparatively shallow. We favor upgrading quality in corporate bonds, but largely because the yield available in speculative-grade corporates is exceedingly low relative to the risks.

MP: Thinking ahead to 2020 in Canada, we see short- and intermediate-term bonds as attractively priced given we believe the risk of Bank of Canada rate cuts is greater than implied by current market pricing. We view inflation-protected bonds as a good way to source longer-term exposure, as market expectations for inflation in Canada are near all-time lows. Preferred shares appear to be the most attractively valued category in credit, and we believe the downbeat sentiment that lingers over the space brings opportunity for investors who are skeptical of the widespread pessimism.

TG: The seven percent return of the Bloomberg Barclays Global Aggregate Index in 2019 will be hard to match in 2020, and we expect a return to coupon-like returns for most fixed income sectors globally. Amid lingering concerns that global growth will remain lower, we see limited scope for sovereign bond yields to move materially higher, while credit spreads could widen if market volatility or recession risks materialize over the course of the year. On balance, we would continue to favor interest rate risk over credit quality risk.

Step inside your comfort zone

The salient point for global fixed income investors is that they should not let a low yield environment push them out of their comfort zones and into making decisions that could put portfolios and long-term investment objectives in jeopardy.



A new industrial revolution

Next-gen innovations are leaping from the sci-fi drawing board into reality, upending and rejuvenating the industrial landscape. As these breakthroughs disrupt the status quo in the coming years, investors should zoom out and look at things through a long-term lens. The change forces are already impacting current valuations, and we assess how this new dawn is transforming the investment outlook for the Industrials sector.

Conventional financial analysis often involves formulating projections and forecasting future returns, and then assigning a valuation based on those estimates. This usually assumes no major structural changes in the external forces that shape the economic and business landscapes. In 2017, in a challenge to that approach, RBC Capital Markets embarked on a six-month study of the global drivers of extreme transformative change. A fairly large number of “change forces” were identified that RBC Capital Markets’ analysis suggested would catalyze a metamorphosis of the world around us. These were laid out in some detail in a subsequent report entitled [Imagine 2025](#).



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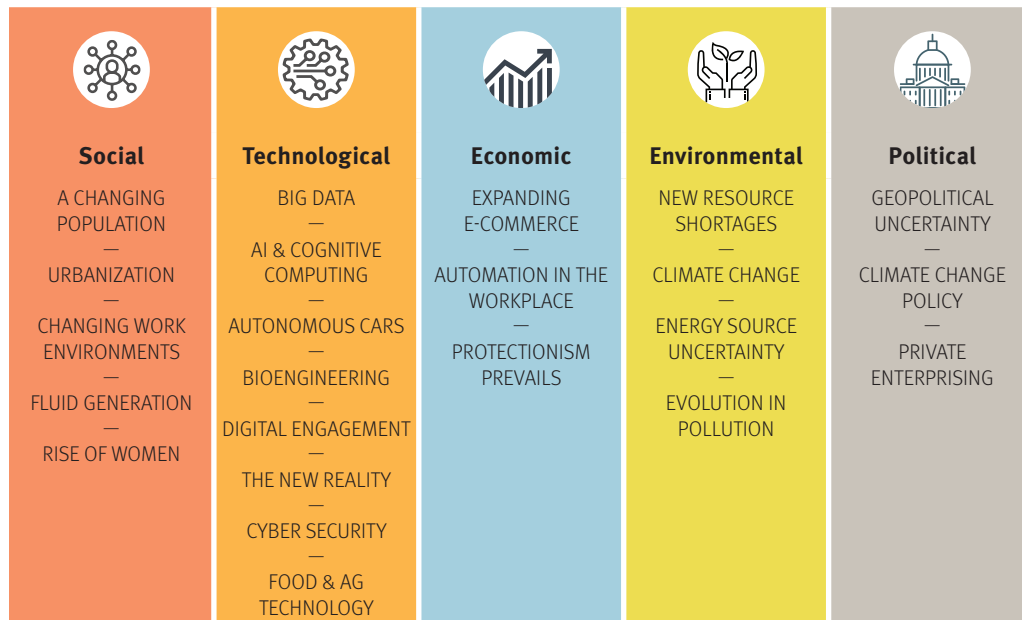
Following up on that work, the Global Industrials Research team provided a roadmap in a recent report, [Gearing up for the next Industrial Revolution](#), to help investors navigate the change forces that are reshaping the global industrial landscape.

Ultimately, RBC Capital Markets argues, a new industrial revolution may be upon us. Advances in artificial intelligence (AI), big data, and digitization, among others, set against an uncertain geopolitical and environmental backdrop, are forcing industrial players to increase their agility in order to survive.

A new industrial revolution

Change forces

These change forces will catalyze a metamorphosis of the industrial landscape



Source - RBC Capital Markets

Transformation is afoot

RBC Capital Markets believes cutting-edge innovations, such as AI, autonomous transportation, and cloud technology, could completely upend the industrial marketplace within the next 5–10 years and for the foreseeable future. With this in mind, we argue that investors should increasingly focus beyond the next few quarters and into the years ahead.

Below we highlight the long-term effects of some of these change forces on three areas of the industrial complex, namely automation, smart water systems, and 3D printing. These forces are already having a growing impact on *current* stock valuations.

We also lay out why today’s heavily discounted valuations within the Industrials sector make this an especially opportune time to seek out the groups and companies that are likely to establish competitive advantages in this transforming industrial world.

Automation: Manufacturing the future

Advances in factory automation could be reaching the point where “lights-out” manufacturing plants become widely feasible. Such facilities would be fully autonomous, with no human interaction on site. At the extreme, companies could save on energy costs (e.g., no lighting, no heating, and lower ventilation and air conditioning costs), labor and scrap costs, and achieve higher-quality production. They would enjoy smaller and more cost-effective factory footprints, and achieve better asset utilization.

We are years away from the fully automated plant and robots have been on the factory floor for about 50 years. But today we are seeing a deluge of new applications for robotics and automation. RBC Capital Markets believes it is only a matter of time before lights-out manufacturing becomes not only practical but also widely adopted.

A new industrial revolution

A related theme is warehouse automation, where advances are improving throughput and limiting downtime, while helping control labor costs. Uptake of warehouse automation should track that of e-commerce, in our view. Growth in this large and often ignored subsector could reach 10 percent to 15 percent annually over the medium term, according to RBC Capital Markets.

Smart water systems: Waste not, want not

Smart water systems represent one of the biggest growth opportunities, in RBC Capital Markets' view. These encompass all sensors and connected devices such as pumps and meters, as well as the information technology and analytics to help water utilities automate and optimize their water treatment.

One of the biggest pain points for water utilities today is rampant water leakage in the aging infrastructure, both in the developed and developing world. Smart water systems can be deployed to detect leaks using sophisticated acoustic devices that can listen for the audible signature of a leak, or to identify small changes in pressure that could predict a water main break, allowing water utilities to pre-emptively maintain and optimize their infrastructure.

Meanwhile, global water crises are escalating as water shortages threaten over a quarter of the human population. This dire situation has been exacerbated by climate change, which is making rainfall more erratic and the planet warmer overall, causing water to evaporate from reservoirs and threatening global water supplies. In addition, water consumption has tripled over the past 50 years, largely due to agricultural and industrial usage.

Apart from better water resource management and conservation, the two most popular and sustainable solutions to expand the world's supply of freshwater are desalination and water reuse/recycling. By 2025, we expect these two proven solutions to be increasingly adopted by cities.

Water desalination (creating freshwater from salt water) is a drought-proof solution, and technological advances have made it much more cost effective.

Water reuse (also known as water reclamation or recycled water) is the process of converting wastewater back into potable water that can be used for agriculture, environmental and aquifer restoration, commercial and industrial applications, or even drinking. The water is treated and refined until it can meet stringent quality standards and is deemed hygienically safe and free of bacteria and other contaminants. For now, most of the recycled water globally is being used for irrigation and commercial applications, but there are some cities that have integrated water reuse into their drinking water supplies, such as Singapore. Recycled water is roughly half as costly to produce as desalinated water.

Despite the attractive economics and proven technologies, the biggest hurdle to the mass adoption of water reuse in the U.S. as a source of potable water remains public acceptance. We expect that water reuse in the U.S. will be mostly limited to agricultural and industrial/commercial applications for the time being. That said, indirect potable reuse—whereby the recycled water is injected into the environment or natural bodies of water, rather than directly into a municipality's drinking water supply—has been received more openly by the U.S. population.

A new industrial revolution

3D printing: Layer by layer of opportunity

3D printing technology, also known as additive manufacturing, lays several layers of materials, ranging from metallic to polymeric materials, over each other to create an object. The versatility of this technology offers opportunities denied by traditional methods. In particular, it can increase geometric freedom compared to traditional welding and machining methods.

3D printing thus speeds up the design-build-test cycle and enables the production of customized components on a small scale, while reducing the manufacturing footprint and waste. It can also lower transport costs while making low-volume production economically viable.

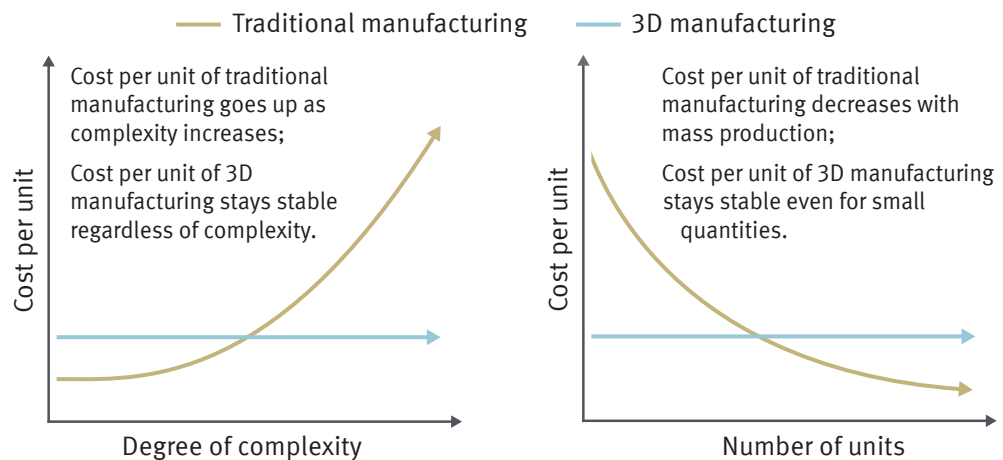
RBC Capital Markets calculates that eight engineers with a single digital file can use 3D printing to build what may have involved 60 engineers and 300 parts via conventional processes.

The power of this technology is best illustrated by a recent example. General Electric needed to completely redesign a new fuel nozzle tip for its next-gen LEAP aircraft engine. The earlier-generation design was overly complex, requiring 20 different parts that had to be welded together, a task difficult to scale up efficiently in traditional manufacturing. GE turned to 3D printing to solve this challenge, and the company has produced 30,000 fuel nozzle tips for its state-of-the-art LEAP engine. GE utilizes more than 40 3D printers to make parts from metal powders at one facility in Alabama.

RBC Capital Markets expects to see many more examples of additive manufacturing applications over the next decade.

Difference between traditional manufacturing and 3D printing

3D printing resets supply-chain cost equation

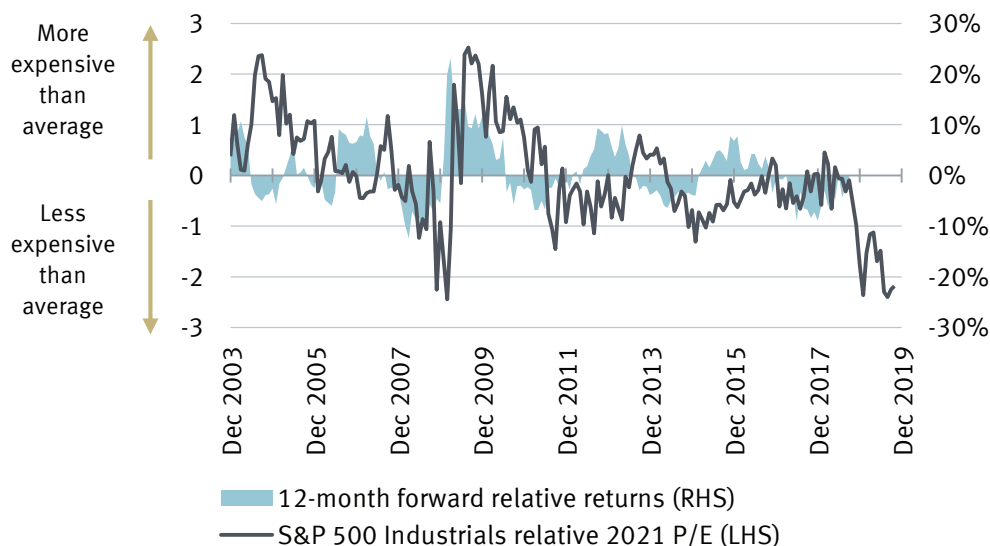


Source - RBC Wealth Management

A new industrial revolution

S&P 500 Industrials relative valuations

Industrials valuations are distressed



Source - RBC Capital Markets; relative valuations based on the Z score, or how far two-year forward price-to-earnings ratios are from the historical average since 2004

Intriguing Industrials

Traditionally, the Industrials sector has not been the focus of investors at such a late stage in the economic cycle. Indeed, this time around, trade war anxiety and tariff pressures have amplified the sector's woes. There has been an epidemic of operating misses since Q2 2019, and this may well continue in the short term with manufacturing momentum still quavering. Sector CEOs are particularly cautious.

But therein may lie an opportunity. Lori Calvasina, RBC Capital Markets' LLC's head of U.S. Equity Strategy, points to the sector's deeply compelling valuations relative to the S&P 500, which are near the lows seen during the financial crisis. Moreover, the Industrials sector tends to outperform when value beats growth. It is less vulnerable to fears of a potential Democratic sweep in 2020 than other cyclical sectors. Industrials companies are also actively buying back stocks and could benefit should the U.S. and China reach a *détente* in their trade war ahead of the U.S. presidential election in November 2020.

We would focus on the highest-quality, defensive companies in the Industrials sector, particularly those that can derive a competitive advantage from the transformational changes that RBC Capital Markets has identified in [Gearing up for the next Industrial Revolution](#).

Research resources

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			Count	Percent
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