T. Rowe Price
REPORT
INSIGHTS ON INVESTING AND FINANCIAL TOPICS

The 2020 Global Market Outlook: "Comfortable With the Uncomfortable"

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Heading into 2020, T. Rowe Price investment leaders believe global capital markets should be supported by continued economic growth and low but stable inflation rates. However, they also caution that a number of risks could trigger market volatility, including political uncertainties, slow earnings growth, and potential valuation excesses.

Investors will need to be "comfortable with the uncomfortable" to take advantage of potentially attractive opportunities, says Justin Thomson, chief investment officer (CIO), equity.

David Giroux, CIO, equity and multi-asset, thinks much will depend on whether the economic reacceleration that equity markets appear to expect in 2020 actually happens. "If it doesn't materialize, or if it's not powerful, I think the equity markets have a lot of room for the downside," he warns.

In a time of widespread disruption, careful stock selection backed by fundamental research will remain critical, Mr. Giroux adds. "Companies that are at the epicenter of technological obsolescence continue to be negatively impacted," he says.

Following a stellar 2019, debt markets could prove more challenging going forward, according to Mark Vaselkiv, CIO, fixed income. Central bank easing has helped drive bond yields back toward historic lows, which means even a modest backup in yields in 2020 could negatively impact returns.

In a low- or even negative-yield environment, Mr. Vaselkiv says, "we think the right blend of bank loans, high yield bonds, and emerging markets [EM] corporate bonds still makes sense."

While economic headwinds were strongest in non-U.S. markets in 2019, signs of stabilization are visible there as well, according to Mr. Thomson. As a result, non-U.S. equities are most in need of an economic upturn in 2020 to deliver positive returns.

EM equities appear to be best positioned to benefit from global reflation, Mr. Thomson adds. "Emerging markets are a cyclical asset class and should do better in that environment."

Growth challenges

Renewed efforts by the U.S. Federal Reserve and other key central banks to support the global economy with monetary easing appeared to be working as 2019 drew to a close, potentially setting the stage for a reacceleration in economic growth in 2020.

"I think we now have a reasonable understanding that growth and inflation expectations are bottoming," Mr. Thomson says. Some of the signs:

- As of December, manufacturing and export indicators appeared to be stabilizing. (See Figure 1.)
- Copper prices—traditionally a key signal of global industrial activity—also rebounded.
- The U.S. Treasury yield curve, which briefly inverted across the 2- to 10-year segment in August, returned to a positive slope.

These signals do not mean the global economy is entirely on solid footing, Mr. Vaselkiv warns. A major political or financial shock potentially could trigger a

continued on page 2 >

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renewed downturn. "We may be at an inflection point, where some sort of catalyst or crisis could tip the world economy into recession."

United States: As of late 2019, the U.S. economy remained in an expansion, largely sustained by consumer spending. But the slowdown in capital spending had put the brakes on earnings momentum, with 2019 per-share earnings growth for companies in the S&P 500 Index expected to fall into the low single digits.

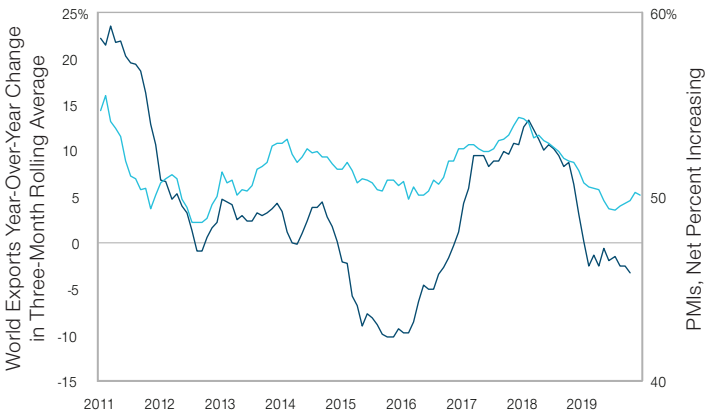
As of the end of 2019, forward-looking multiples for the S&P 500 appeared somewhat high, although not exceptionally extended in historical terms, Mr. Giroux says. However, those valuations were predicated on consensus estimates of 10% earnings growth in 2020. That might be overly optimistic, he cautions.

While economic headwinds were strongest in non-U.S. markets in 2019, signs of stabilization are visible there as well, according to Mr. Thomson. As a result, non-U.S. equities are most in need of an economic upturn in 2020 to deliver positive returns.

Europe: European economic and earnings growth were weak in 2019, as the slowdown in global trade hurt Germany's export-dependent manufacturing sector. Although European economies started to see "green shoots" of recovery late in the year, longer-term factors—such as declining populations and weak productivity—could limit growth to 1% in 2020, Mr. Vaselkiv says, citing recent forecasts from the International Monetary Fund.

Figure 1 Global Trade, Manufacturing Appear Stabilizing

World Exports* and Global PMIs**



*World exports include the U.S., China, South Korea, Japan, the European Union, Canada, and Mexico. **PMIs refer to purchasing managers' indexes. PMI readings below and above 50 typically indicate contraction or expansion, respectively. Sources: J.P. Morgan Chase and Haver Analytics; all data analysis by T. Rowe Price. Additional disclosures on page 12.

David Giroux

Justin Thomson

Mark Vaselkiv

The European equity outlook also will depend on earnings in Europe's financials sector, which has a heavy weight in regional indexes. But low interest rates and flat or inverted yield curves are major obstacles. "We need to see banks be able to start making positive spreads on new lending," Mr. Thomson says.

Japan: Japanese equities—and Japan's economy—remain vulnerable to the global economic cycle. As a result, Japanese equities lagged other major developed markets in early 2019.

However, by the same token, Japanese equities have benefited disproportionately from an improved global outlook. Whether that relative trend persists in 2020 will depend on a continued global reflation, Mr. Thomson says.

China: China's growth slowed sharply in 2019, and is likely to continue decelerating in 2020, Mr. Vaselkiv says. This slowdown is only partially due to the trade war. High debt levels and declining demographics also have imposed structural constraints.

Chinese policymakers appear less inclined than in past slowdowns to stimulate credit and spending, as curbing debt growth among highly leveraged financial institutions appears to be a higher priority.

On the positive side, China's consumer market continues to expand, driven by real (after-inflation) gains in wages and household disposable income, Mr. Thomson notes.

Emerging Markets: Like Japan, the EM economies as a group are highly leveraged to the global economy. This led to volatile equity returns in 2019.

With currency values adjusted on a purchasing power parity basis, EM equities appear inexpensively priced, particularly compared with the U.S. market, Mr. Thomson says. Currency effects could add to their appeal if the dollar weakens in 2020.

Attractive valuations and potential currency gains also could benefit developed non-U.S. equities in 2020, Mr. Thomson adds. On a cyclically adjusted basis, relative price/earnings ratios favor non-U.S. equities by the widest margin since at least 1995. (See Figure 2.)

Central banks

Alarmed by spreading signs of global economic weakness, key central banks changed direction in 2019, cutting interest rates and reviving or expanding quantitative easing programs.

The policy shift has been both widespread and dramatic, Mr. Vaselkiv notes. While 2018 saw approximately two interest rate increases globally for every cut, that trend flipped in 2019, with 126 rate cuts worldwide but only 20 rate hikes. (See Figure 3.)

"Clearly, central banks have been making a synchronized effort to expand liquidity to support the global economy," Mr. Vaselkiv says.

Mr. Vaselkiv says he believes the Fed probably will not cut rates in 2020. However, he predicts that global monetary policy will remain supportive as the European Central Bank and the Bank of Japan continue their quantitative easing programs.

Negative yields

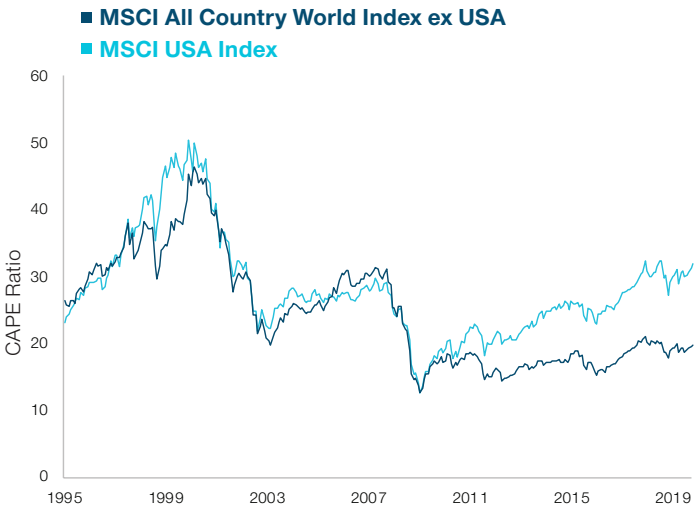
For bond investors, the shift to monetary accommodation in 2019 produced an unanticipated windfall, with virtually all global fixed income sectors delivering strongly positive returns.

- Yields dipped into negative territory across a wide spectrum of sovereign issues, producing sizable capital gains at the long end of the yield curve.
- Corporate bonds—both investment grade and high yield—delivered double-digit returns in 2019, as investors reached to lock in yields before they declined further.
- EM debt markets, including EM corporates, also performed well despite a stronger U.S. dollar, as easing inflationary pressures gave some EM central banks room to cut interest rates.

While the pool of negative-yielding debt shrank somewhat as bond markets recovered from a late-summer flight to quality, it still accounted for more than $11 trillion in bonds outstanding—20% of total global market value—at the end of 2019. (See Figure 4.)

Figure 2 U.S. Equity Valuations Appear Relatively High

Cyclically Adjusted Price/Earnings (CAPE) Ratios*



*January 1995 through December 2019. Sources: MSCI (see additional disclosures on page 12) and Citigroup. Copyright Citigroup 2005–2020. All Rights Reserved.

Credit opportunities

Lingering concerns about the global economy have led many high yield investors to remain cautious about troubled companies and industries, Mr. Vaselkiv says. However, if global reflation strengthens in 2020, investors may want to consider selected opportunities in some disfavored sectors, such as energy and autos, where credit spreads remain relatively high.

Likewise, despite widespread concerns about a deterioration in credit quality and lender protections, attractive opportunities can still be found in floating rate bank loans, Mr. Vaselkiv argues. "Right now, you have an opportunity to earn more attractive yields in loans than you do in high yield bonds."

Credit quality in the high yield universe has improved since the 2008–2009 global financial crisis, Mr. Vaselkiv says, which could provide a cushion if the global economy falters again in 2020. "If we were to go into recession, I think the overall default rate in high yield should be lower than it was 10 years ago," he says.

Duration's double edge

The sharp declines in bond yields seen in 2019 have generated downside risks for 2020, Mr. Vaselkiv warns. Duration is a double-edged sword, he notes, and even a modest rise in bond yields from current low levels could negatively impact total returns.

"If the economic data catch up with expectations, you could see the yield on 10-year Treasuries move north of 2%, maybe as high as 2.25% to 2.5%," Mr. Vaselkiv says. "That's not enough to cause massive pain, but further out the curve—the 30-year Treasury bond, for example—a move to 3% could cause you to lose a bit of money on a mark-to-market basis."

In such an environment, below investment-grade, short-duration credit instruments are likely to offer the more attractive risk/reward combination in 2020, Mr. Vaselkiv says.

For investors who can tolerate price volatility, non-U.S. equities could offer an attractive income alternative in 2020, Mr. Thomson adds. As of late November 2019, he notes, the MSCI Europe, Australasia, and the Far East (EAFE) Index offered a 3.5% aggregate dividend yield. "In the context of negative-yielding sovereigns, even some negative-yielding corporate bonds in Europe, that seems like a reasonable bet," Mr. Thomson says.

Disruption 4.0

Innovation, technological change, and automation—particularly the use of artificial intelligence (AI) applications—continue to disrupt a growing number of global industries. T. Rowe Price analysts expect this dynamic to continue in 2020.

"Whether it's cable television networks, newspapers, retail, legacy tech, or legacy oil, all of these industries are still under pressure," Mr. Giroux says.

continued on page 4 >

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However, the next stage in this economic revolution, which we call "Disruption 4.0," is not limited to specific sectors but is structurally transforming business models across the entire global economy.

In 2018, Mr. Giroux notes, T. Rowe Price analysts estimated that 31% of S&P 500 market cap was threatened by disruption (with those companies accounting for almost 37% of S&P 500 earnings). As of October 2019, the number of at-risk companies had increased, but their share of S&P 500 market capitalization had declined, to only 29%.

"Even though we've added more names to our list, they're actually a smaller part of the universe today because they've been such underperforming stocks," Mr. Giroux says.

Disruption has created a strong fundamental backdrop for its beneficiaries—such as the major technology platform companies—while curbing earnings growth for many incumbent firms trading at lower multiples. (See Figure 5.)

Utilities

Although a number of challenged, or "incumbent," firms are seeking to meet their challengers head on, the track record for these efforts has been relatively poor, Mr. Giroux says.

- Too many boards and management teams are throwing "Hail Mary" passes—pushing ambitious acquisition deals to try to fix their fundamental problems.
- Many, if not most, of these deals have resulted in poor financial returns and have failed to achieve their intended strategic objectives.
- Because of bad capital allocation decisions, many challenged companies are likely to be subpar long-term investments almost regardless of their valuations, Mr. Giroux predicts.

However, disruption also is improving the growth characteristics of some traditional sectors, Mr. Giroux argues.

Utilities, for example, typically have been viewed as defensive yield plays. But he says the sector has evolved in recent years, demonstrating newfound growth potential that may not have been fully rewarded by the market.

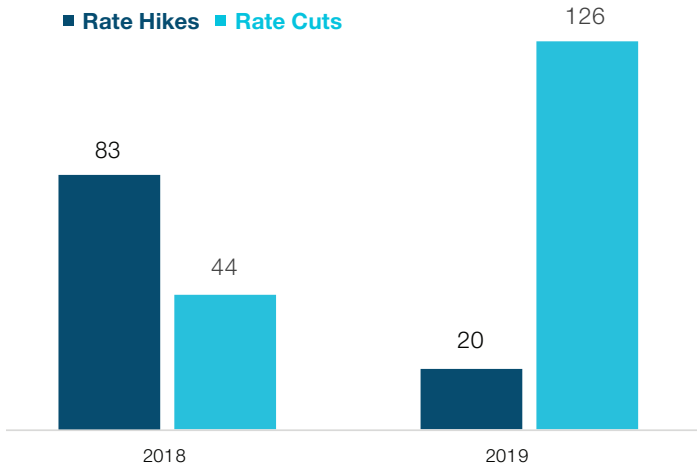
Mr. Giroux credits three related trends for transforming at least some utilities into earnings growth engines:

- Regulatory reform: Many states now allow utilities to start earning a return upon breaking ground on new power plants, rather than when the facility comes on line.
- Fracking technology: Natural gas prices have dropped dramatically in many U.S. service areas. While much of those savings are being passed along to consumers, utilities also have been able to retain a portion, partly boosting return on equity.
- Low-cost renewables: Solar and wind generation is now cheaper than coal-fired power in some regions and at certain times of the day. Operating costs for renewable installations also tend to be significantly lower than for conventional power stations.

The impact on earnings has been dramatic, Mr. Giroux says. While the utilities sector saw virtually zero earnings growth from 1986 through 1998—when S&P 500 earnings rose 159% over that same period—the gap has narrowed substantially over the past two decades.

Figure 3 Global Central Banks Returned to Accommodation

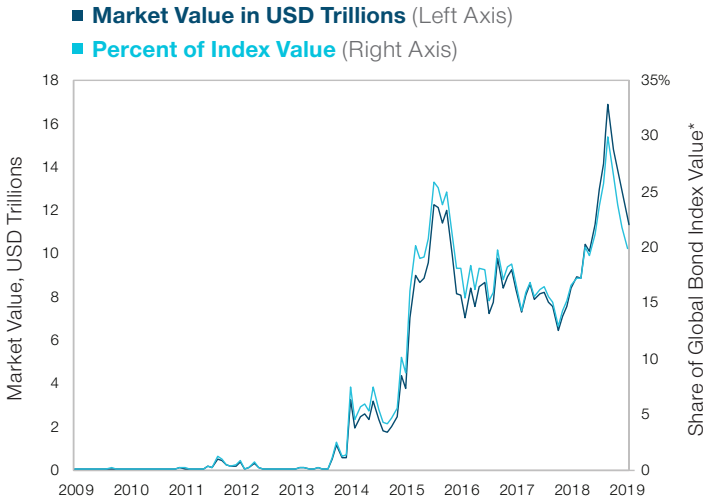
Monetary Policy: Total Number of Rate Hikes and Cuts*



*Total number of rate hikes and rate cuts made by central banks globally. For a full list of the central banks or monetary authorities included in the survey, please see Bank for International Settlements, Central Bank Hub, on the Web at: https://www.bis.org/cbanks.htm?m=2%7C9. Sources: International Monetary Fund and CBRates.com; data analysis by T. Rowe Price.

Figure 4 Negative-Yielding Debt Soaring Globally

Total Value and Share of Global Bond Index*



*Bloomberg Barclays Global Aggregate Bond Index, as of the end of 2019. Source: Bloomberg Finance LP. See additional disclosures on page 12.

Continued declines in renewable costs and improvements in storage capacity could fuel a sustained, multi-decade period of above-trend earnings growth for utilities, Mr. Giroux argues. Yet, valuations today reflect only a small premium over the broad U.S. market.

Careful stock selection is needed to avoid troubled utilities and/or those with significant markets in poorly regulated states, he adds. "But a utility that can grow earnings at 6% per year, with a dividend that is 1.5 times the yield on the 10-year Treasury note, should trade for a higher multiple than it does today," he concludes.

Politics, populism, and policy

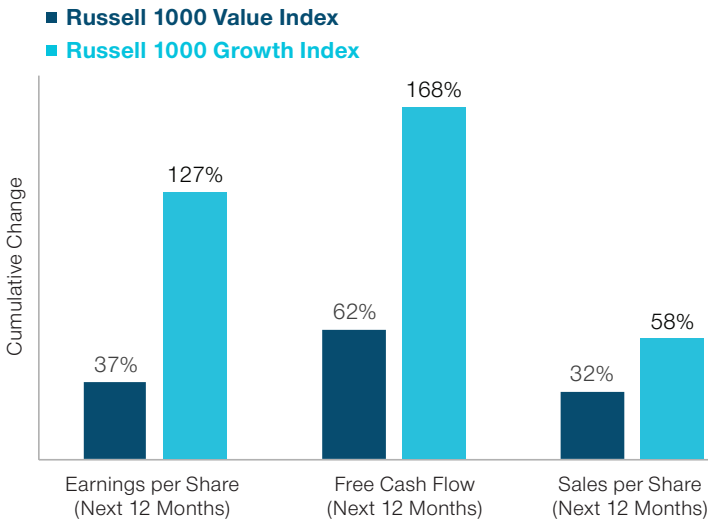
The U.S. presidential election is likely to be the most significant political event of 2020, but a variety of other geopolitical risks, including the trade war, Brexit, and the protests in Hong Kong, also are likely to impact global markets.

The Trade War: The U.S.-China trade dispute was a key driver of market volatility in 2019, as seen in the fluctuating fortunes of the companies most directly exposed to the Chinese market. (See Figure 6.)

After stumbling sharply in August, following a U.S. announcement that it would raise tariffs on an additional $300 billion in imports, China-related stocks subsequently rallied along with the broader market as hopes rose for an interim trade agreement.

Figure 5 Disruption Created Strong Backdrop for Growth

Cumulative Changes Forward Revenue, and Earnings*



*Cumulative changes represent differences between forward measures as of December 31, 2019, and forward measures as of June 1, 2007. Source: Russell via FactSet (see additional disclosures on page 12). T. Rowe Price calculations using data from FactSet Research Systems Inc. All Rights Reserved.

While in January the U.S. and China announced a short-term trade deal—in essence, a truce—that boosts sales of U.S. agricultural goods and rolls back some tariffs, the underlying conflict is unlikely to be resolved in 2020, Mr. Thomson says. On some core issues, such as technology subsidies, compromise may not be possible at all.

"China will not back down on its goals in areas such as AI, robotics, electric vehicles, and domestic semiconductor production," Mr. Thomson predicts. "They will never reach an agreement on Chinese state support for these key industries."

Brexit: The uncertainty generated by the UK's divorce from the EU appears likely to continue into 2020. Repeatedly extended, the Brexit deadline was set for January 31, 2020. As of early January, the British Parliament appeared poised to approve the necessary exit legislation.

Although post-Brexit arrangements—such as the UK-EU trade relationship—could be negative for growth and earnings, further clarity about the timing of the UK's exit should be positive for UK equities and the British pound, Mr. Thomson says, if only because it would reduce uncertainty.

"To a certain extent, because Brexit has dragged on for so long, the economic damage—deferred investment, higher inflation—already has been done," he says.

Hong Kong: The mass protests in China's special administrative region began in reaction to a proposed extradition law allowing residents to be tried on the mainland but have evolved into a movement demanding democratic political reforms.

While the disturbances clearly have had a negative effect on Hong Kong's economy, the impact on China as a whole had been difficult to distinguish from the trade-related and structural issues slowing growth.

It also remains unclear what steps, if any, Beijing might take to restore order. "I don't know what a reasonable outcome in Hong Kong would look like," Mr. Thomson says.

U.S. Election: Equity markets may be underestimating the potential impact of the 2020 presidential race on tax rates, regulation, and companies in the health care, energy, and financial services sectors, Mr. Giroux says. "It's really kind of fascinating to me that the market is not more concerned. We think it has the potential to be very disruptive for many sectors."

Part of the political backdrop to the 2020 election is the debate over the rise in income inequality that has accompanied the free market reforms of the past four decades. Although these structural changes have boosted growth and lowered inflation, the benefits have not always translated into rising wages and living standards.

While economic anxiety has helped fuel populism, the political appeal of candidates promoting tighter regulation and income and

continued on page 6 >

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wealth redistribution poses the more immediate risk to markets, Mr. Giroux argues.

The odds are about even that such a candidate will win the Democratic nomination, Mr. Giroux contends. If elected, a Democratic president probably would find it difficult to push a left-leaning legislative agenda through the U.S. Senate, he notes.

But potential regulatory changes by such an administration—such as stricter limits on oil and gas fracking—are not being priced into the market at all. "It gives me reason to be a little bit more cautious," he says.

Conclusions

With monetary policy worldwide largely committed to ensuring market liquidity and supporting economic growth, the market outlook for 2020 appears considerably brighter than it did at the midpoint of 2019.

Or, as Mr. Thomson puts it: "I don't think you want to stand in the way of the three major central banks when they are expanding their balance sheets."

However, considerable downside risks—both political and economic—remain. Although equity valuations overall do not appear extended relative to historical averages, forward-looking multiples in the U.S. market may reflect overly optimistic forecasts for 2020 earnings.

Global credit markets are unlikely to deliver the double-digit returns seen in 2019, but attractive opportunities can still be found in EM debt, high yield, and bank loans—assuming that economic data confirm that the reflation expected in 2020 is actually underway.

By contrast, low or negative yields on many sovereign bonds create the risk of subpar returns or even capital losses if a strengthening global economy causes interest rates to rise. However, sovereigns potentially can still be a useful hedge against extreme political or economic shocks.

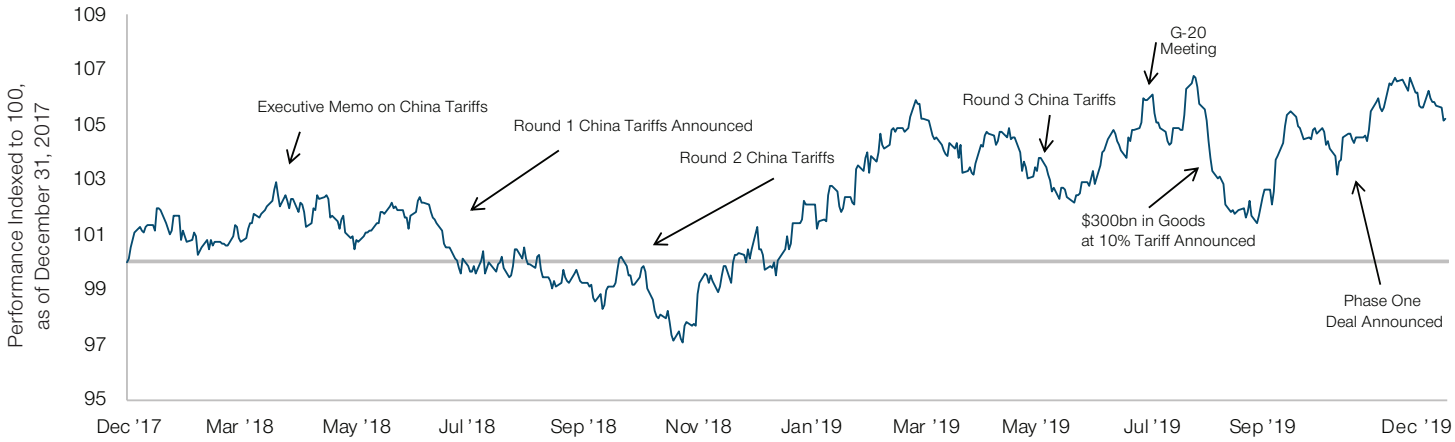
Non-U.S. equities, and EM equities in particular, appear attractive based on relative valuations, raising the possibility that they could break their long streak of underperformance relative to the U.S. market. However, stronger global growth—and, in Europe, improved banking margins—will be essential.

In an uncertain market environment, with a wide dispersion of returns both in and among sectors and industries, in-depth fundamental research will be particularly critical for identifying potential opportunities and risks. ■

All investments are subject to market risk, including the possible loss of principal. Fixed income securities are subject to credit risk, liquidity risk, call risk, and interest rate risk. As interest rates rise, bond prices normally fall. International investments can be riskier than U.S. investments due to the adverse effects of currency exchange rates; differences in market structure and liquidity; as well as specific country, regional, and economic developments. These risks are generally greater for investments in emerging markets. Dividends are not guaranteed and are subject to change.

Figure 6 U.S.-China Trade War Contributed to Volatility

Performance of S&P 500 Companies With Highest China Exposure Relative to the S&P 500 Index*



Past performance is not a reliable indicator of future performance. *The S&P 500 companies with the highest exposure to China are composed of the 30 companies within the S&P 500 Index that have the highest China revenues and/or the largest China trade lobbying efforts according to Strategas Research Partners. The basket of companies was created in March 2019, and its performance was calculated back to December 31, 2017. The basket was reconstituted on June 19, 2019, and again on August 24, 2019. All performance results were based on the companies in the basket following each reconstitution, i.e., historical performance was not rerun to reflect the changes in the basket. Sources: Standard & Poor's (see additional disclosures on page 12), Strategas Research Partners, and T. Rowe Price.

FIXED INCOME

E-commerce's Impact on Retailers in Turn Disrupting Some Bonds

The decimation of brick-and-mortar retail stores puts even more importance on analysis of bonds.

KEY INSIGHTS

- **Internet retailers are fundamentally disrupting the traditional retail industry, which is having a profound impact on some segments of the bond market.**
- **Commercial mortgage-backed securities (CMBS) and corporate debt from retail-related issuers are feeling the most meaningful effects of e-commerce.**
- **The disruption of the retail industry by e-commerce has created opportunities as well as areas to avoid in bonds.**

Internet retailers are fundamentally disrupting the traditional retail industry. E-commerce has decimated brick-and-mortar stores by offering a combination of low prices and rapid home delivery. Illustrating the remarkable inroads of internet retailing, approximately 60% of U.S. households now have an Amazon Prime subscription, according to Evercore ISI.

And the e-commerce trend is having a profound impact on some segments of the fixed income markets, in addition to its well-publicized effects on various stock market sectors.

CMBS and corporate debt issued by retailers and real estate investment trusts (REITs) are feeling the most meaningful effects of e-commerce within the bond market. However, as in the stock market, the disruption of the retail industry by e-commerce has created opportunities as well as areas to avoid in bonds.

These are among the key observations of four members of T. Rowe Price's global team of analysts. Carson Dickson covers high yield retail corporates. Mitchell Unger specializes in investment-grade retail sector credit. Jane Rivers analyzes CMBS, and Ted Robson covers investment-grade corporate debt in the financials sector, which includes REITs.

High yield struggles

The effects of e-commerce have been almost universally negative for corporate bonds issued by retailers with below investment-grade credit ratings that reflect their already weak financial conditions.

"Internet retailers increasingly dominate even apparel sales, which was once one of the brick-and-mortar segments that was seen as most resilient to e-commerce because some customers like to try on clothes before purchasing," Mr. Dickson says.

In 2006, Amazon accounted for a negligible share of the U.S. apparel market, but preliminary data show that Amazon overtook Walmart as the top apparel retailer in 2018 with more than 9% of the market.

"Running down a traditional retailer's income statement, revenue has decreased as a result of e-commerce price transparency, gross margin has fallen because of the need for free and fast shipping, and the fixed costs of maintaining stores and paying staff have stayed constant," Mr. Dickson says. "All of these factors lead directly to lower profitability."

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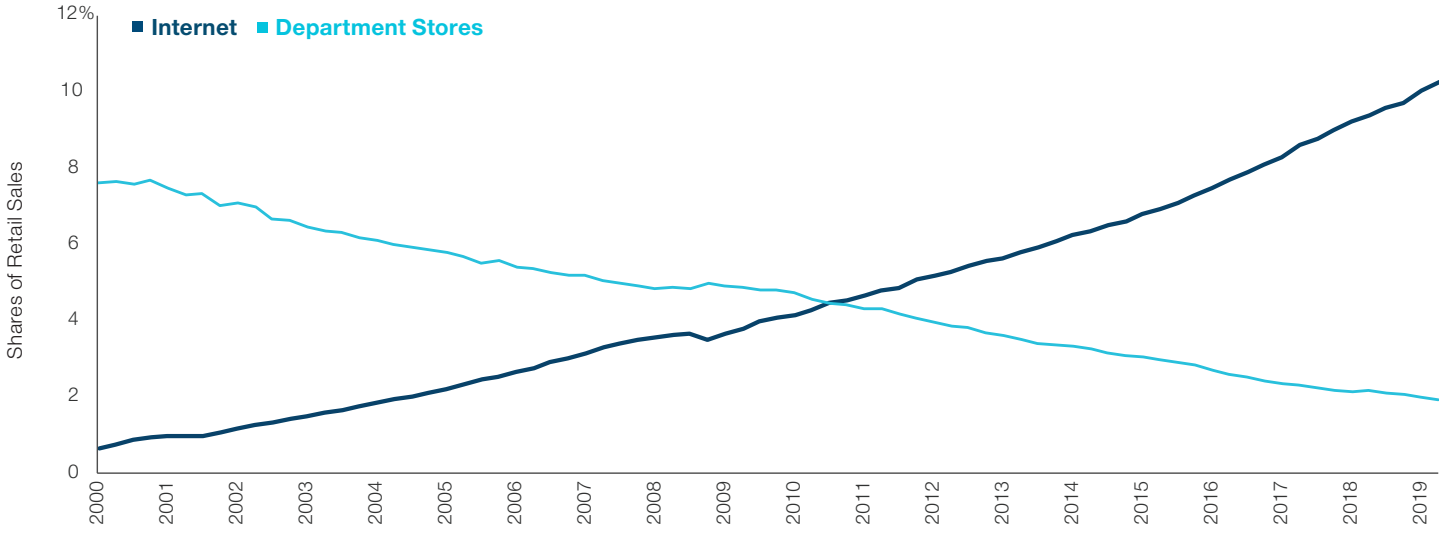
Figure 1 Steady Growth of Internet Retail and Fall of Department Stores

Sales as a Percent of Overall Retail Sales, Excluding Gas Stations



Sources: U.S. Census Bureau and Haver Analytics.

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Retailers with a brick-and-mortar presence also need to invest capital to continually upgrade store appearance or risk losing customers, and they must devote additional capital to inventory in stores. T. Rowe Price analysts and portfolio managers do not see any of these trends reversing, so the firm's fixed income strategies are either underweight retailer high yield bonds or have no exposure to the segment.

Although the same trends are impacting investment-grade retailers, T. Rowe Price analysts are somewhat more positive on corporates issued by select retailers with investment-grade credit ratings because of their stronger balance sheets, as well as their broader scale.

"The financial resources and pure size of some retail companies in the investment-grade universe give them the ability to invest in upgrading logistics, better positioning them to compete with internet retailers," Mr. Unger says. "We favor investment-grade corporates from 'e-tail natives,' such as QVC, as well as home improvement and auto parts retailers that have a larger share of business-to-business sales, which insulates them to some degree from Amazon risk."

Nuanced effects of CMBS

While e-commerce has definitely affected the CMBS market, its impacts on CMBS are more nuanced than on corporate bonds issued by retailers.

CMBS are bonds backed by cash flows from mortgages on commercial properties, including malls. As T. Rowe Price's real estate equity analysts noted in 2018, the universe of enclosed malls is bifurcating into high and low quality as internet retail forces many mall tenants into bankruptcy.

Carson Dickson

Jane Rivers

Ted Robson

Mitchell Unger

"We think that top-quality malls in healthy markets that have financially strong sponsors and unique stores will still thrive, while low-quality malls will continue to deteriorate," Ms. Rivers says.

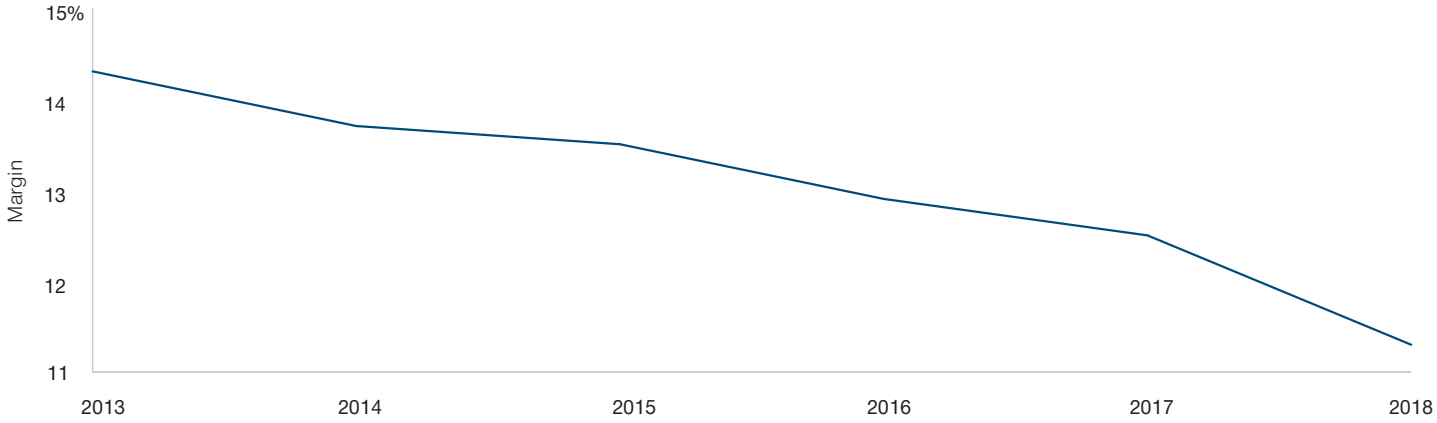
"The outlook for these struggling malls is highly dependent on demographics, degree of competition, diversification of tenant types, amount of capital invested by the owner, and redevelopment potential," she adds.

This makes detailed credit analysis essential for understanding which mall-backed mortgages are at greater risk of default and for quantifying the potential risk.

However, CMBS structures provide varying degrees of credit enhancement, which can help offset elevated default risk. This

Figure 2 E-commerce Weighs on Retailers' Profits

EBITDA Margin of Select Retailers*



*EBITDA is earnings before interest, taxes, depreciation, and amortization. Data as of the end of 2018. Sources: Corporate filings for 7 publicly traded retailers (Carter's, J. Crew, L Brands, Macy's, Neiman Marcus, Party City, and Sally Beauty) and 2 privately held retailers; data analysis by T. Rowe Price.

typically involves providing the bond buyer with assurance the bond issuer will pay its debt obligation through additional collateral, insurance, or a third-party guarantee.

"We are finding select opportunities in mall-backed CMBS that provide the right balance of default risk and credit enhancement, but detailed examination of both the deal structure and the underlying mall assets is essential for the risk/reward analysis," Ms. Rivers says.

REIT opportunities

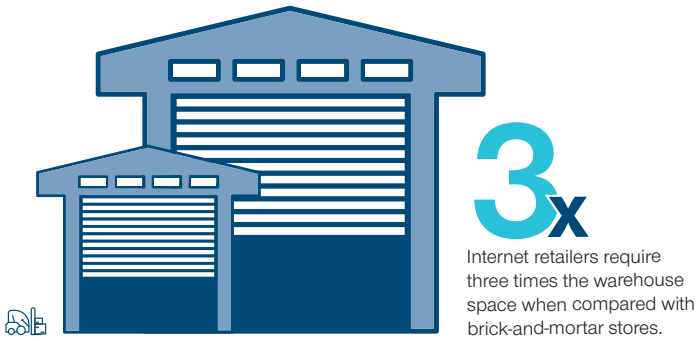
A REIT is a company that generates income by owning, operating, or financing real estate, which can include commercial properties. REITs issue corporate bonds to fund their operations.

Like CMBS, the credit quality of corporate debt issued by REITs that own malls or other retail properties is subject to the ongoing bifurcation of the mall market into high- and low-quality corporates.

However, unlike CMBS, REIT corporates do not have the added protection of credit enhancement. "Within the REIT universe, we prefer REITs with relatively stable, grocery store-oriented community shopping centers and financially strong malls," Mr. Robson says.

He believes that another segment of the REIT universe—those focused on industrial properties—stands to benefit directly from the rapid rise of internet retail.

"The boom in e-commerce sales and accompanying demand for same-day or two-day delivery are driving strong demand for warehouse space," Mr. Robson says. "REITs that own or operate industrial warehouses are benefiting from this trend as e-commerce operators need increasing amounts of space."



In fact, internet retailers require three times the volume of warehouse space as traditional retailers, according to Prologis, a REIT specializing in logistics-related properties.

Credit analysis

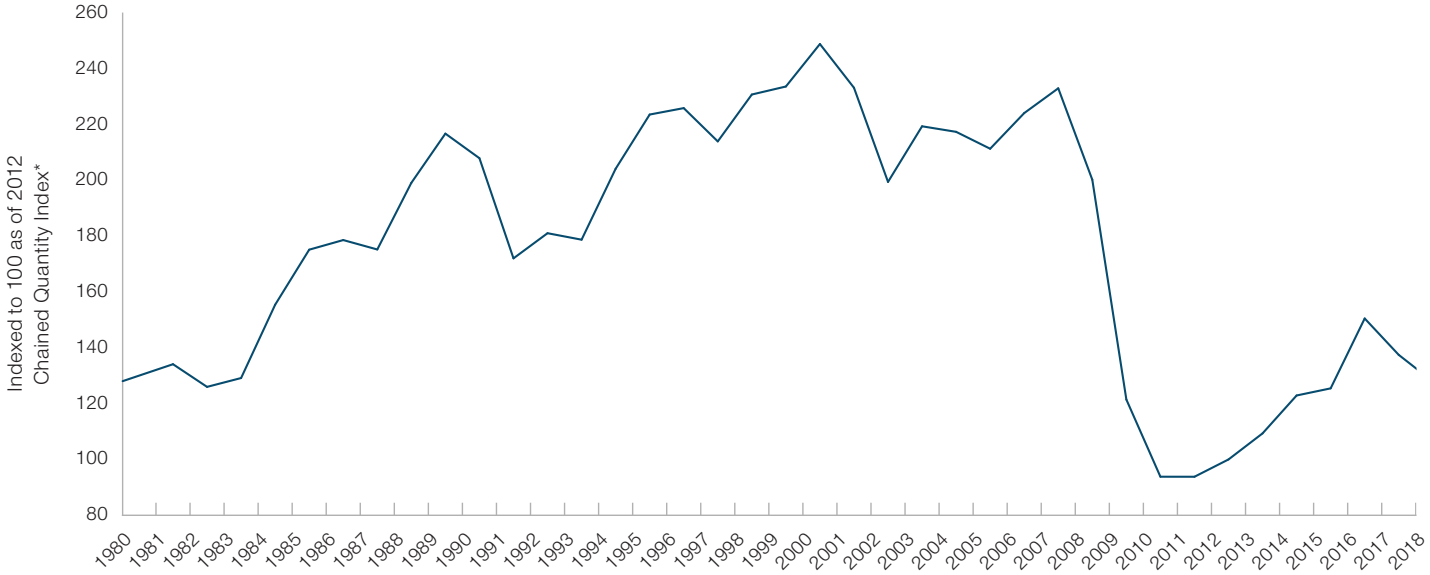
Although e-commerce has unquestionably had a negative effect on many retail-related corporate bonds, analysis of CMBS and REIT debt can uncover areas in which internet retail has created opportunities.

Industrial REITs that can capitalize on the growing warehouse needs of e-commerce companies are a prime example. However, detailed analysis of the properties underlying a particular security, whether CMBS or a REIT corporate bond, and the structure of a CMBS deal are essential. ■

All investments are subject to risk, including the risk of loss of principal. Fixed income securities are subject to credit risk, liquidity risk, call risk, and interest rate risk. As interest rates rise, bond prices normally fall.

Figure 3 The Boom in Retail Investment Turned to a Bust

Retail Industry Investment in Physical Structures, 1980 Through 2018



*Adjusted for changes in the composition of the retail industry over time. Sources: Bureau of Economic Analysis and Haver Analytics.

BACKGROUNDER

NY Tech Center Aids Managers, Analysts in Deepening Insights

IA instead of AI—"intelligent augmentation," not artificial intelligence—extends our analyses.

BY **ROBERT SHARPS**, T. ROWE PRICE CHIEF INVESTMENT OFFICER

Robert Sharps

KEY INSIGHTS

- **Our New York Technology Development Center is designed to be a technology accelerator for our firm, as well as a partner for our investment division.**
- **Tools developed by the center and our Equity Data Insights team in Baltimore have helped our analysts and portfolio managers deepen and extend their understanding of market dynamics and industry trends.**
- **Identifying hidden patterns in industry data through machine learning will provide important new tools for analysts in the coming years.**

At T. Rowe Price, we believe that there are crucial factors in a business's success that can't be captured by numbers and spreadsheets. That's why our analysts and managers travel across the globe to meet with managements and get ground-level views of companies' operations and customers.

People, not computers and algorithms, are central to our investment process. This sets us apart from some Wall Street firms, which are increasingly turning to computers to make investment decisions.

That said, we have been early and continuing believers in the power of technology to upend markets and industries—including our own.

For many years, we have eagerly embraced the potential that technology offers to help us better serve clients and improve investment outcomes. We are especially interested in how our investment staff can deploy technology to deepen and extend their understanding of market dynamics and industry trends.

Collaboration

It is in this spirit that we opened our New York Technology Development Center two years ago. The center is designed to be a technology accelerator for our firm, with a focus on developing specialized capabilities in data science.

We located the center in New York partly because of the city's unique ecosystem of "fintech" (financial tech) firms, which offers both access to talent and closer proximity to our business partners.

The center is far more than the fintech resource of T. Rowe Price, however. Our New York team members work closely with our investment division, seeking to harness the power of technology to aid their research and decision-making processes. The data scientists, application developers, and data engineers in our New York office collaborate to provide end-to-end solutions for our business.

Technologists and investment professionals have separate skill sets and sometimes seem to speak different languages. For that reason, we established a special Equity Data Insights (EDI) team with skills in both arenas.

Situated in Baltimore in our investment division—as far as we are aware, a unique arrangement within our industry—this team helps analyze the unmet needs of our analysts and managers and translates them into actionable projects for our New York team.

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The combined teams' goal is to help our investment analysts absorb more information and derive better insights into their industries.

As the center's leader, Jordan Vinarub, puts it, the goal is "intelligent augmentation" instead of artificial intelligence—IA instead of AI. According to Mr. Vinarub, his team "aims to apply automation and insight generation to help our business partners shift their mindshare to more valuable parts of the investment process."

IA in action

Recent advancements in cloud computing, along with the availability of massive new datasets, have made it possible to apply machine learning to investing. Here are a few examples of how our investment division, the EDI team, and the center have come together to put IA into action:

1. Clearly, how well a company is performing affects the value the market places on its stock, but the precise linkage is often unclear. The investment division wanted to gain deeper insight into how a company's various fundamentals—such as its earnings growth rate and profit margins—feed through into the stock's valuation multiples (such as its price-to-earnings ratio).

   Using machine learning to analyze decades of performance information and millions of data points, the EDI team and the center developed a model that provides a theoretical valuation for every stock in the Russell 1000 Index of large-cap stocks. Analysts can use the tool to see how this valuation might respond to a given change in fundamentals, such as an acceleration in the company's growth rate.

2. Cloud-based computing, falling memory prices, and other innovations have made gathering massive amounts of data cheap and easy. Government agencies, companies, and other institutions have put online valuable databases on consumer patterns and other information that can be mined for investment insights. The challenge is how to sort through these massive datasets—especially for analysts trained on common spreadsheet programs, such as Excel, but unfamiliar with database software.

   Vincent DeAugustino, one of our financial services analysts, knew there was valuable information buried in the millions of consumer complaints filed with the federal Consumer Financial Protection Bureau (CFPB). The EDI and center teams helped provide him and his colleagues with a CFPB "dashboard," which provides quick and easy information into how complaint volumes are changing over time. Mr. DeAugustino and his team now can quickly determine how well banks and other institutions are addressing problems.

3. Big datasets also have opened the possibility of analyzing consumer trends at the level of the individual purchaser. Using anonymized credit card data, the EDI team and the center developed a pipeline for our retail analysts to gauge which brands in a given category do the best job at retaining customers. Our analysts can now see not only how likely consumers are to keep spending at a given retailer, but how much their spending is changing over time. This helps our analysts make more nuanced predictions about a company's revenue growth than by simply looking at trends in topline numbers.

What's next?

Investment analysts pore through reams of data to track a company's "key performance indicators." Some of these indicators apply broadly, such as revenue growth or net profit margin. Others are more tailored to a given industry, such as average daily users for a social media platform. The release of such information can have an immediate and large impact on a company's stock price.

For this reason, finding novel and obscure indicators that provide insights into a company's performance might provide a considerable investment advantage.

To search for them, the EDI team is cooperating with the center in deploying machine learning, which uses algorithms and statistics to find patterns in data, rather than relying on explicit instructions from a programmer. In this way, machine learning has the potential to help our analysts find indicators that we've never even considered.

Deeper insights

According to *The Economist* magazine, funds run by computers now account for 35% of the U.S. stock market and 60% of its trading activity.*

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That will never be our strategy, as we believe that the insights of our investment professionals provide the only way to potentially deliver index-beating returns.

I am excited to see technology extending and deepening our perspectives, however, and I look forward to seeing what new advantages we gain from the efforts of our EDI and New York teams in the coming years. ■

*"*The Rise of the Financial Machines,*" October 3, 2019.

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