REVIEW OF MARKET PERFORMANCE

CALENDAR YEAR 2020





Safe-haven assets enjoyed strong returns, while risk markets experienced rapid recoveries

As of December 31, 2020 • Total Return (%) • US Dollar EQUITIES **FIXED INCOME** REAL ASSETS USD HF US US ΕM Europe US World Hedge ΗY LC Funds USD Global DM US UK ex UK Japan EΜ Treasurv Gvt IG Corp NRE Global RE Cmdtv Gold 24.8 19.1 18.4 18.3 16.3 15.9 14.2 13.5 14.5 11.6 10.9 8.8 10.1 9.9 8.0 7.1 2.7 1.4 -3.1 -3.2 -7.5 -9.2 -10.5 -13.2 ♦ Local Currency

GLOBAL ASSET CLASS PERFORMANCE: CY 2020

Sources: Bloomberg Index Services Limited, Bloomberg L.P., EPRA, Federal Reserve, FTSE Fixed Income LLC, FTSE International Limited, Hedge Fund Research, Inc., Intercontinental Exchange, Inc., J.P. Morgan Securities, Inc., MSCI Inc., National Association of Real Estate Investment Trusts, Standard & Poor's, and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Notes: Asset classes represented by: MSCI AC World Index ("Global"), MSCI World Index ("DM"), S&P 500 Index ("US"), MSCI UK Index ("UK"), MSCI Europe ex UK Index ("Europe ex UK"), MSCI Japan Index ("Japan"), MSCI Emerging Markets Index ("EM"), market cap-weighted Datastream World Energy Index and Datastream World Basic Resources Index blend ("NRE"), FTSE® EPRA/NAREIT Global Real Estate Index ("Global RE"), Bloomberg Commodity TR Index ("Cmdty"), LBMA Gold Price ("Gold"), Bloomberg Barclays US Treasury Index ("US Treasury"), FTSE World Government Bond Index ("World Gvt"), Bloomberg Barclays US High Yield Bond Index ("US HY"), Bloomberg Barclays US Corporate Investment Grade Bond Index ("US IG Corp"), J.P. Morgan GBI-EM Global Diversified Index ("EM LC"), Hedge Fund Research Fund Weighted US Dollar Index: Broad ("USD"). Total return data for all MSCI indexes are net of dividend taxes. Hedge Fund Research data are preliminary for the preceding five months. Gold performance is based on spot price returns.

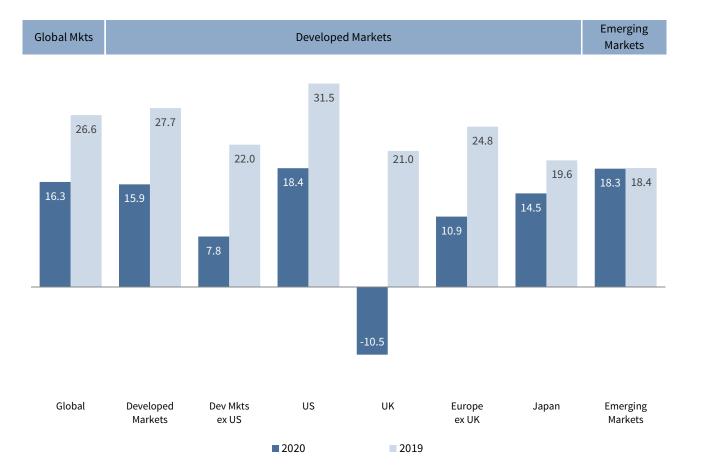
The onset of the COVID-19 pandemic caused steep declines in risk markets in first guarter 2020. Safe-haven assets, such as core sovereign bonds and gold, performed strongly during this period and have held on to much of their gains. Large-scale intervention by both monetary and fiscal authorities eventually put a floor under risk markets. driving rapid recoveries and pushing equity markets to new highs. Central bank purchases allayed fears about credit markets, causing significant tightening in spreads. Real assets, being generally very sensitive to the economic backdrop, struggled as activity was severely reduced. Energy assets were particularly impacted as geopolitical tensions exacerbated the demand decline.

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Equity market gains were broad based, with the UK a notable exception

GLOBAL EQUITY PERFORMANCE: CY 2020 VS CY 2019

Total Return (%) • US Dollar

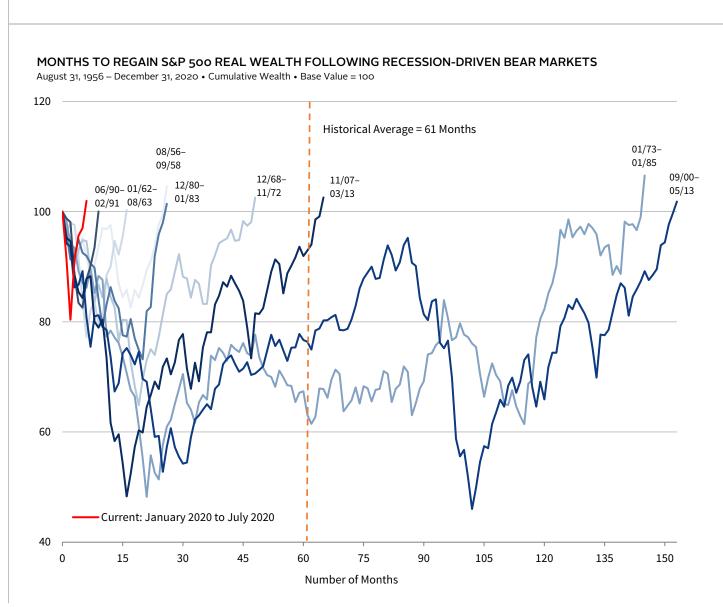


The United States stood out once more in CY 2020, outperforming all other major regions. Less severe economic restrictions, a greater degree of stimulus, and a high weighting to tech stocks allowed US equities to rebound more swiftly than other markets. Among other developed markets (DM), the ongoing Brexit uncertainty contributed to the underperformance of UK stocks. Emerging markets (EM) also delivered strong performance, led by Asia, due to an effective and early response to containing the virus.

Sources: MSCI Inc., Standard & Poor's, and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Notes: Asset classes represented by the following: MSCI All Country World Index ("Global"), MSCI World Index ("Developed Markets"), MSCI EAFE Index ("Dev Mkts ex US"), S&P 500 Index ("US"), MSCI UK Index ("UK"), MSCI Europe ex UK Index ("Europe ex UK"), MSCI Japan Index ("Japan"), and MSCI Emerging Markets Index ("Emerging Markets"). Total return data for all MSCI indexes are net of dividend taxes.

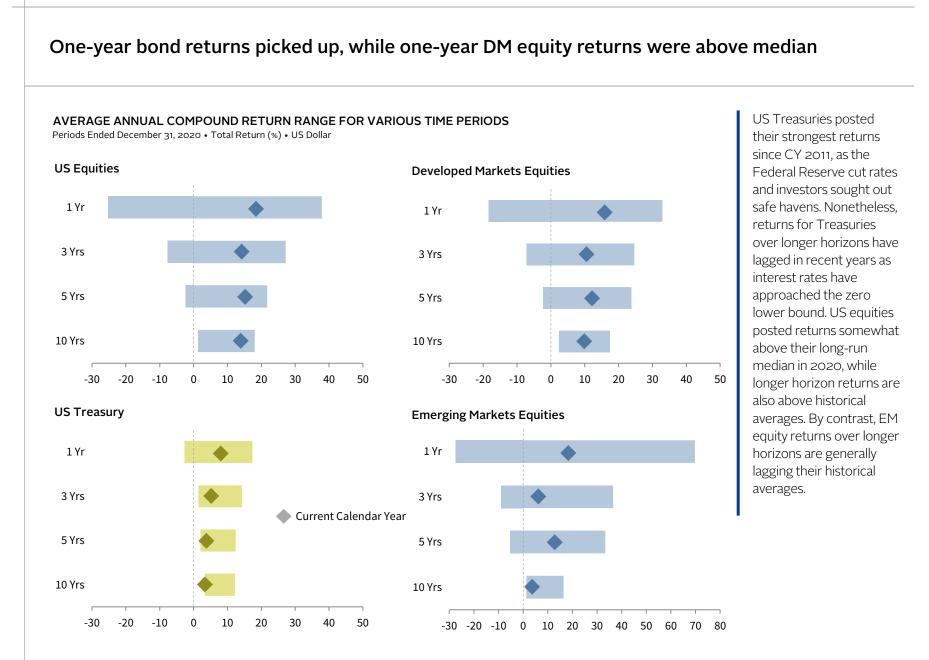
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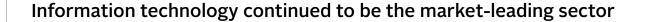
The current market recovery has been swift relative to history

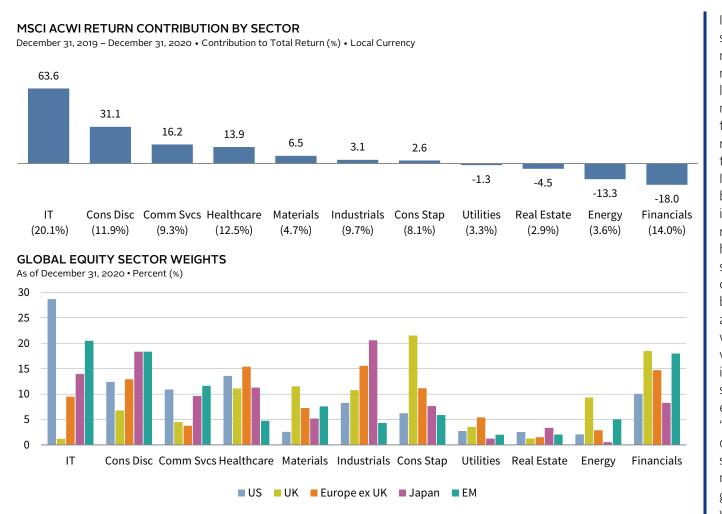
Despite economies globally suffering the steepest recession in modern history, markets appear to be pricing in a so-called V-shaped recovery in economic activity and earnings. This has been supported by swift and sizeable quantities of monetary support, as well as an enormous volume of fiscal spending. The US equity market recovery was particularly aided by a high weighting to the IT sector, with the business models of many of these companies largely unaffected by current events.

Sources: Global Financial Data, Inc., Ned Davis Research, Standard & Poor's, and Thomson Reuters Datastream. Notes: Series are no longer plotted once they regain their initial value of 100. Data are monthly based on S&P 500 Index real total returns. Recession-driven bear markets reflect NBER-defined recessions. Average calculation excludes most recent bear market. 138q_mod

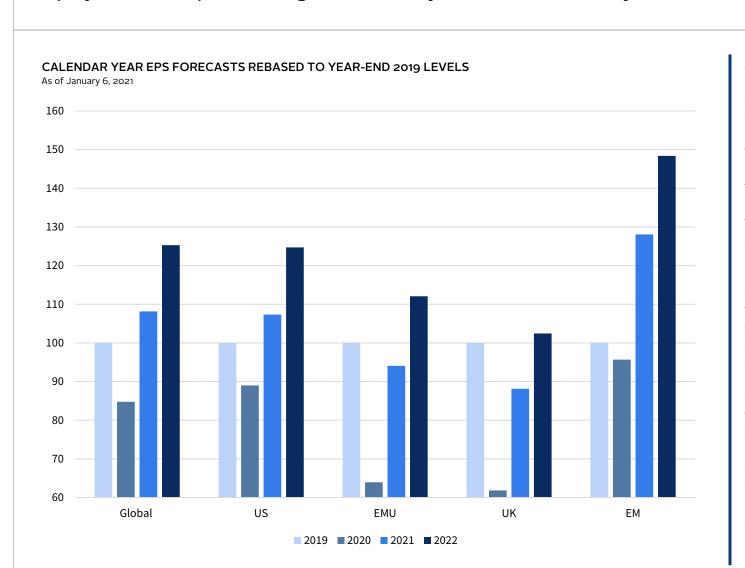


Sources: Global Financial Data, Inc., MSCI Inc., Standard & Poor's, and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties. Notes: Ranges reflect the 5th and 95th percentile of fiscal year returns. Asset classes are represented by the following indexes: S&P 500 Index ("US Equities"), MSCI World Index ("Developed Markets Equities"), Bloomberg Barclays US Treasury Index ("US Treasury"), and MSCI Emerging Markets Index ("Emerging Markets Equities"). Total returns for all MSCI indexes are net of dividend taxes. Total returns for the MSCI Emerging Markets Index are gross of dividend taxes prior to calendar year 2001. The first full calendar year periods are 1901 for S&P 500, 1970 for MSCI World, 1973 for US Treasury, and 1988 for MSCI Emerging Markets. Data prior to 1968 for US Equities are from Global Financial Data, Inc.





IT continued to be the stand-out sector in equity markets and drove the rebound from the March lows. The business models of many firms in the sector escaped relatively unscathed from the COVID-19 crisis. Indeed, many firms benefited from the increase in internet-based retail and working from home. The most cyclically sensitive sectors lagged over CY 2020, as they bore the brunt of reduced activity. However, they were boosted by the vaccine announcements in November, as this seemingly heralds an eventual return to "normal." These sectoral differences contributed substantially to relative regional performance, given their variable weights.



Equity markets expect earnings to return to year-end 2019 levels by the end of 2021

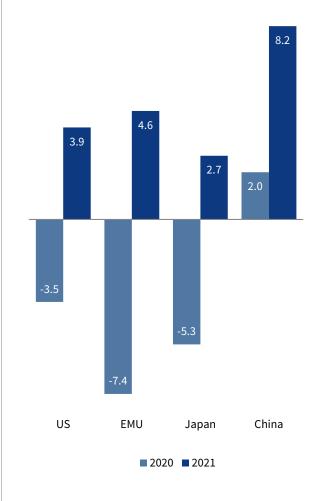
Analysts slashed their CY 2020 earnings estimates on the back of enforced and self-imposed lockdowns throughout the global economy. However, expectations for a so-called V-shaped recovery are evident in their forecasts for earnings to regain their 2019 highs by the end of 2021. Brexit uncertainty and a relatively high weighting to the energy sector means that the UK earnings recovery is expected to take a year longer. EM forecasts contain a lot of regional variation; however, the strong aggregate rebound is attributable to a high weighting to the east Asian nations that managed to get the virus outbreak under control relatively quickly.

Sources: I/B/E/S, MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties. Notes: EPS estimates are based on I/B/E/S aggregates of each region's respective MSCI index. Data in local currency terms, except for Global and EM, which are in US dollars.

Economic activity collapsed in 2020

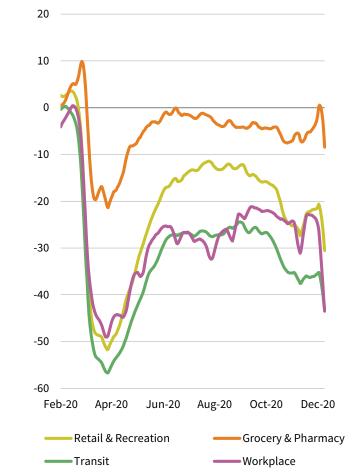
GDP GROWTH ESTIMATES

As of December 31, 2020 • Percent (%)



G7 MOBILITY RECOVERY

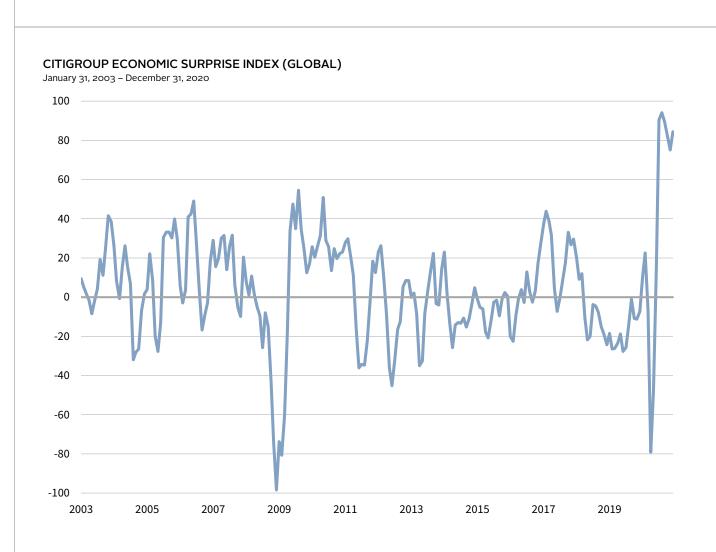
February 23, 2020 – December 31, 2020 • Percent Change From Baseline (%)



Economies globally witnessed the most sudden collapse in economic activity in modern history. A deep but short-lived recession is expected, though economic forecasters are not as optimistic in their expectations for growth next year as equity markets. China, despite being the original location of the virus, looks set to be the only major economy to record growth in 2020. Mobility data showed a dramatic fall in activity, bottoming in April before gradually recovering into the summer. The reimposition of some restrictions towards the end of the year, amid a resurgence in COVID-19 case numbers, has seen mobility decline once more.

Sources: Bloomberg L.P., Google COVID-19 Community Mobility Reports, OECD, and Thomson Reuters Datastream.

Notes: 2020 and 2021 GDP growth forecast data are based on Bloomberg consensus median estimates. G7 mobility data are aggregated using the country-level mobility weighted by its 2019 GDP. Mobility data reflect seven-day averages, and the mobility baseline is derived from data during the five-week period from January 3, 2020, to February 6, 2020.

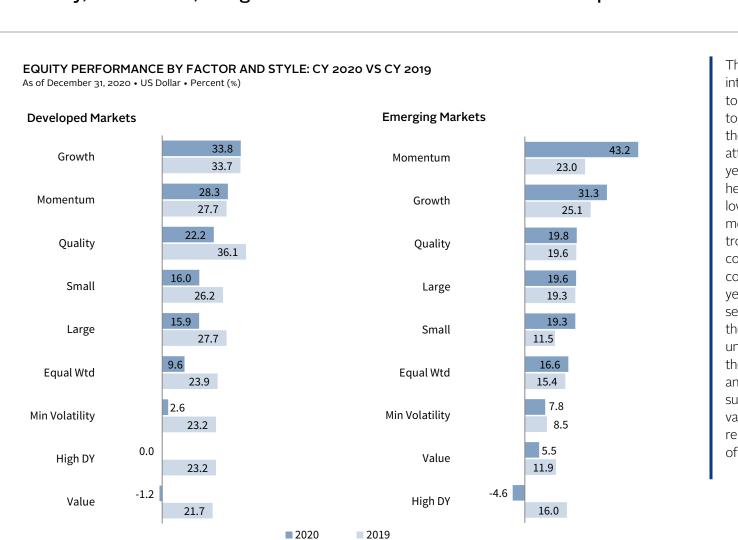


Economic expectations were consistently too bearish in the wake of the pandemic

As the threat of COVID-19 started to emerge, forecasters and markets alike were too sanguine about the potential disruption that could result. This was reflected in a measure of economic surprises registering negative levels not witnessed since the **Global Financial Crisis** (GFC). However, that relationship flipped as we moved past the peak of the COVID-19 crisis. Since that time, forecasters consistently underestimated the strength of unfolding economic data, and by record margins. The persistence of this pessimism is notable and has contributed to the consistent recovery in risk markets.

Sources: Citigroup Inc. and Thomson Reuters Datastream.

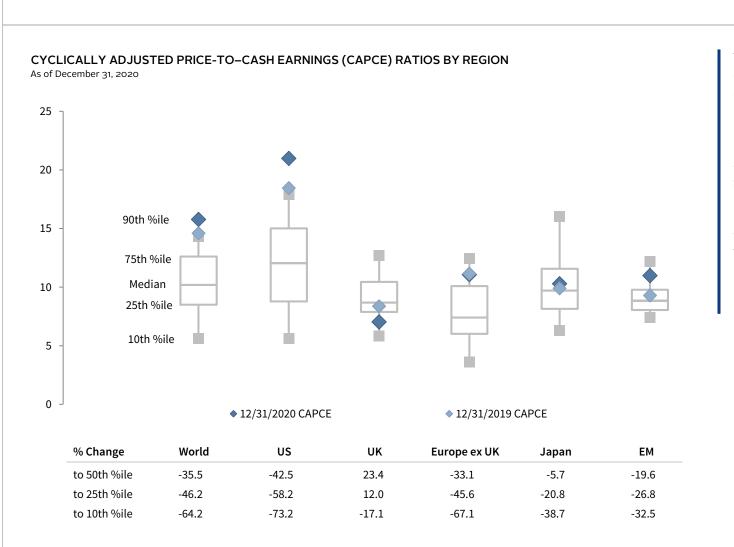
Notes: The Citigroup Economic Surprise Indexes are defined as the weighted historical standard deviations of data surprises (actual releases vs Bloomberg survey median). A positive reading of the Economic Surprise Index suggests that economic releases have on balance been beating consensus. The indexes are calculated daily in a rolling threemonth window.



Quality, momentum, and growth maintained their factor leadership

The large decline in interest rates continued to aid growth stocks due to the large proportion of their value that is attributable to future years. Quality stocks were helped by their relatively lower leverage, which meant that they were less troubled by the funding concerns that many companies endured this year. The growthsensitive composition of the value factor saw it underperform once more, though the announcement of successful COVID-19 vaccine trials saw it rebound towards the end of the year.

US equity market valuations remain historically elevated



The rapid rebound in US equity markets, even as earnings have declined, means that valuations remain near their historical peak. This was aided by the large and swift decline in interest rates. The United Kingdom, by contrast, saw some cheapening in its valuation in CY 2020, as Brexit concerns weighed on investor sentiment.

Sources: MSCI Inc. and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Notes: The cyclically adjusted price-to-cash earnings (CAPCE) ratio is calculated by dividing the inflation-adjusted index price by trailing ten-year average inflation-adjusted cash earnings. Cash earnings are defined as net income from continuing operations plus depreciation and amortization expense. MSCI does not publish cash earnings for banks and insurance companies and therefore excludes these two industry groups from index-level cash earnings. EM is cyclically adjusted by trailing five-year data.

Developed markets bonds rallied, as QE programs supported sovereigns and corporates

GLOBAL BOND PERFORMANCE: CY 2020 VS CY 2019 Total Return (%) • US Dollar US **BROAD DM** EM 15.0 14.5 14.3 13.5 12.6 11. 10.4 8.7 7.0 8.0 7.5 7.16.8 6.9 5.6 5.7 5.9 5.3 US US US US Dev Mkts Dev Mkts Dev Mkts Dev Mkts **EM** Local EM Hard Agg Treasury IG Corp HΥ Agg Govt IG Corp HY Currency Currency CY 2020 CY 2019 USD Hedged CY 2020 USD Hedged CY 2019

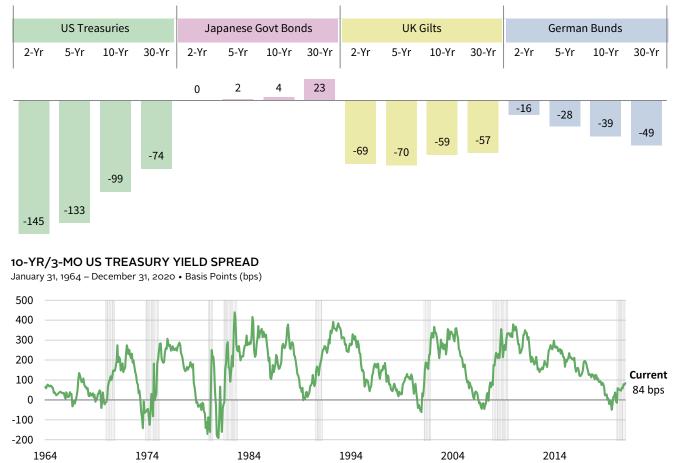
Virtually all major categories of bonds delivered positive performance in CY 2020. Sovereign bonds rallied as central banks delivered rates cuts, where feasible, as well as the expansion of quantitative easing (QE) programs. The inclusion of corporate bonds in QE programs helped reverse declines seen in the early stages of the crisis, with investment-grade (IG) performing particularly strongly due to the duration tailwind. EM local currency bonds rallied in local currency terms, as rate cuts were also delivered in those markets. However, weakness in EM currencies meant that unhedged US dollar returns were more muted.

Sources: Bloomberg Index Services Limited, FTSE Fixed Income LLC, J.P. Morgan Securities, Inc., and Thomson Reuters Datastream. Notes: Asset classes represented by Bloomberg Barclays US Aggregate Bond Index ("US Agg"), Bloomberg Barclays US Treasury Index ("US Treasury"), Bloomberg Barclays US Corporate Investment Grade Bond Index ("US IG Corp"), Bloomberg Barclays US High Yield Bond Index ("US HY"), Bloomberg Barclays Global Aggregate Bond Index ("Dev Mkts Agg"), FTSE World Government Bond Index ("Dev Mkts Govt"), Bloomberg Barclays Global Aggregate Corporate Bond Index ("Dev Mkts IG Corp"), Bloomberg Barclays Global High Yield Bond Index ("Dev Mkts IG Corp"), Bloomberg Barclays Global High Yield Bond Index ("Dev Mkts IG Corp"), Bloomberg Barclays Global Aggregate Corporate Bond Index ("Dev Mkts IG Corp"), Bloomberg Barclays Global High Yield Bond Index ("Dev Mkts IG Corp"), Bloomberg Barclays Global High Yield Bond Index ("Dev Mkts IG Corp"), Bloomberg Barclays Global Aggregate Corporate Bond Index ("Dev Mkts IG Corp"), Bloomberg Barclays Global High Yield Bond Index ("Dev Mkts IG Corp"), Bloomberg Barclays Global Magregate Corporate Bond Index ("Dev Mkts IG Corp"), Bloomberg Barclays Global High Yield Bond Index ("Dev Mkts IG Corp"), Bloomberg Barclays Global Markets Global Diversified Index ("EM Local Currency"), and J.P. Morgan Emerging Markets Bond Index - Global Diversified Index ("EM Hard Currency").

The Treasury curve steepened in a generally strong year for sovereign bonds

CHANGE IN YIELD VS DECEMBER 2019 FOR VARIOUS GOVERNMENT BOND MATURITIES

As of December 31, 2020 • Basis Points (bps)



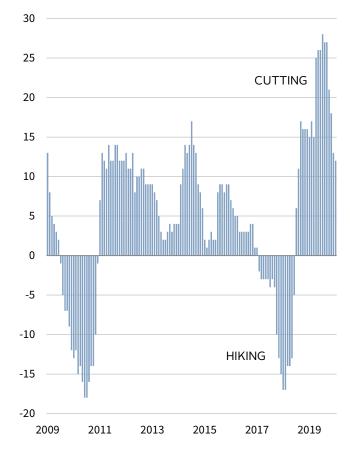
Core government bond yields of most tenors declined, on the back of rate cuts and/or QE delivered by the various central banks. US yields declined the most, reflecting the greater room the Federal Reserve had to cut rates. The US yield curve steepened, which is typical of a recessionary environment. Shorterdated bonds are pricing in the probability that the federal funds rate will be at zero for some years to come, while longer-dated bonds are also sensitive to rising future inflation expectations.

Sources: Federal Reserve, Global Financial Data, Inc., National Bureau of Economic Research (NBER), and Thomson Reuters Datastream. Note: Shaded bars on the bottom chart represent NBER-defined US recessions.

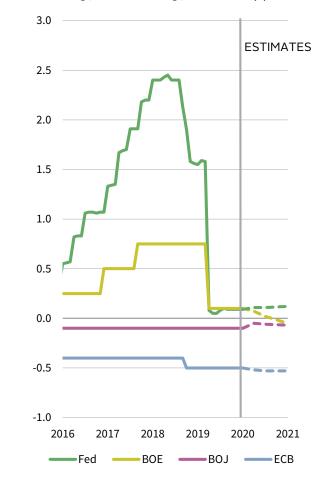
Central bank rate-cutting activity increased as the scale of the pandemic became clear

NET NUMBER OF CENTRAL BANKS CUTTING RATES

December 31, 2009 – December 31, 2020



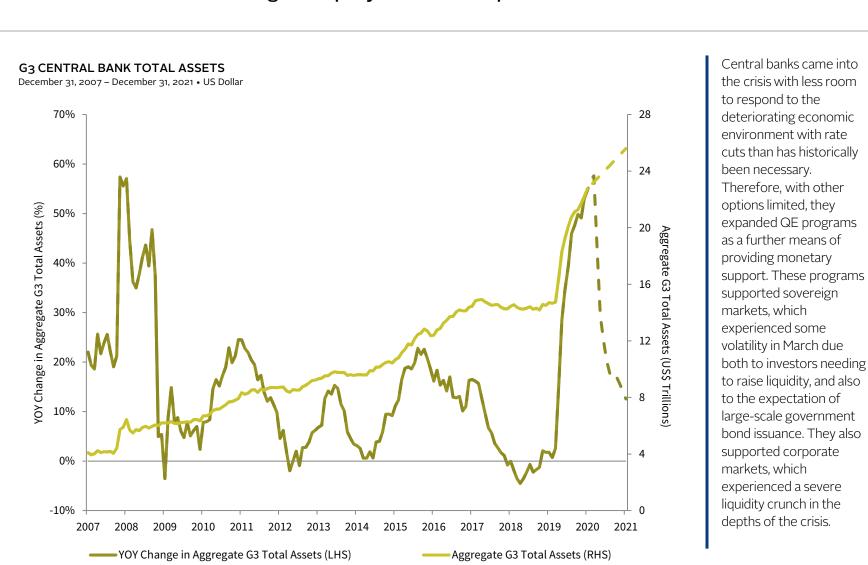




Central banks initially pivoted from hiking to cutting interest rates during the second half of CY 2019, in the wake of the US-China trade war. This migration to delivering a more accommodative monetary stance expanded as the scale of the economic challenge presented by the pandemic became clear. The Fed cut rates by a further 1.5% in March, taking their policy rate to zero, while the Bank of England (BOE) cut rates by 0.65%. Though the BOE is considering the use of moderately negative rates if circumstances in the United Kingdom require it, the four major DM central banks are all close to what they consider to be their effective lower bound for interest rates.

Sources: Bank for International Settlements, Bloomberg L.P., National Sources, and Thomson Reuters Datastream.

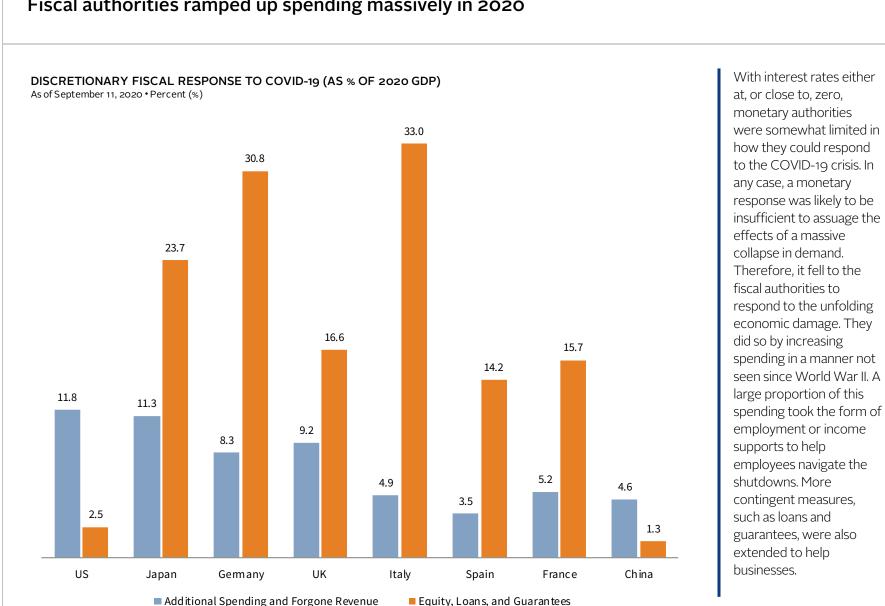
Notes: Data are monthly. Net cutting represents the number of central banks cutting policy rates minus the number increasing policy rates over a trailing six-month period. Central bank data are based on national sources from 35 of the 38 central banks included in the Bank for International Settlements database; the central banks of Argentina, Iceland, and Turkey are excluded due to data availability. Policy rate data are as of December 31, 2020. Policy rate data are estimated after December 31, 2020, and based on market implied rates.



Central bank balance sheets grew rapidly as QE was expanded

Sources: Bloomberg L.P., J.P. Morgan Securities, Inc., MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties. Notes: The G3 central bank total assets consists of the total assets of the US Federal Reserve, European Central Bank, and Bank of Japan. Estimates are represented by dotted lines and begin after December 31, 2020, and are based on J.P. Morgan estimates.

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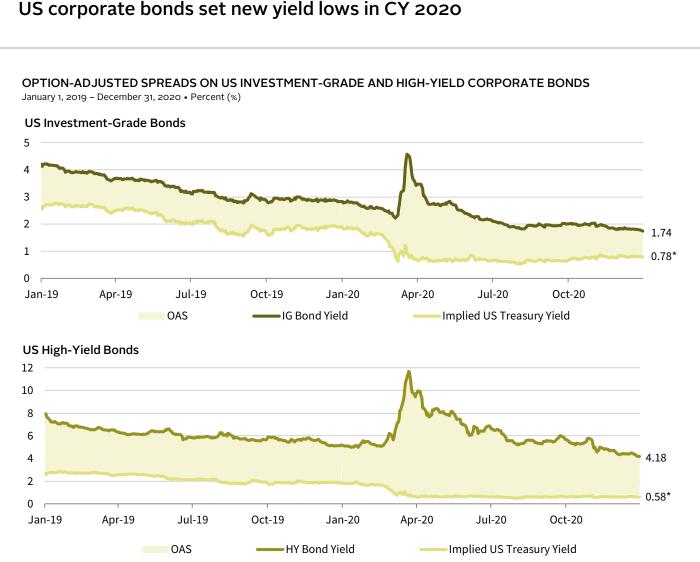


Fiscal authorities ramped up spending massively in 2020

Source: IMF Fiscal Monitor Report — October 2020.

Notes: Additional spending reflects government expenditure in both health care and non-health care related items. Forgone revenue reflects tax breaks, tax incentives, and other measures that lead to lower government revenues. Equity, loans and guarantees refer to equity injections, loan programs, and guarantees on loans and deposits for affected companies and sectors.

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US corporate bonds set new yield lows in CY 2020

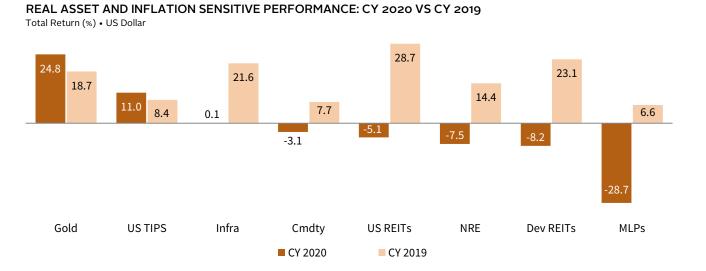
Corporate bond spreads in both the IG and highvield (HY) markets blew out in the midst of the pandemic, as the sustainability of many businesses was called into question. Support from federal QE programs, which purchased corporate bonds for the first time, helped to stabilize the market when the sell-off was in its most severe phase. Since then, a broader recovery in risk sentiment has helped spreads narrow further, with both IG and HY spreads approaching the levels they were at just prior to the pandemic. Indeed, rock-bottom Treasury yields helped to push the all-in yield on both IG and HY bonds to fresh all-time lows.

* US Treasury yields are calculated by subtracting the IG and HY OAS from the IG and HY bond yields.

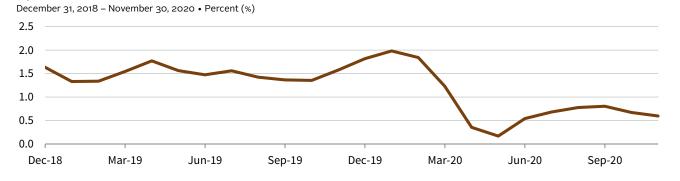
Sources: Bloomberg Index Services Limited and Thomson Reuters Datastream.

Notes: Data for US investment-grade (IG) bonds are represented by the Bloomberg Barclays US Corporate Investment Grade Bond Index, and data for US high-yield (HY) bonds are represented by the Bloomberg Barclays US High Yield Bond Index.





G7 CPI YOY % CHANGE



Declining real yields supported TIPS and gold, even as realized inflation fell. Widespread economic shutdowns depressed the demand for many commodities, pressurizing both commodities themselves as well as natural resource equities. The impact on energy, and oil specifically, was exacerbated by geopolitical tensions in the oil markets. Meanwhile, real estate suffered both directly from the lockdown, and also from fears that the widespread adoption of working from home may have implications for the future demand of commercial real estate in particular.

Sources: Alerian, Bloomberg Index Services Limited, Bloomberg L.P., EPRA, FTSE International Limited, Intercontinental Exchange, Inc., MSCI Inc., National Association of Real Estate Investment Trusts, OECD, and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties. Notes: All returns are total returns, except those for gold, which are based on spot price returns. Asset classes represented by the following: LBMA Gold Price ("Gold"), Bloomberg Barclays US TIPS Index ("US TIPS"), MSCI World Infrastructure Index ("Infra"), Bloomberg Commodity TR Index ("Cmdty"), FTSE® NAREIT All Equity REITs Index ("US REITs"), market cap-weighted Datastream World Energy Index and Datastream World Basic Resources Index blend ("NRE"), FTSE® EPRA/NAREIT Developed Real Estate Index ("Dev REITs"), and Alerian MLP Total Return Index ("MLPs"). Total return data for all MSCI indexes are net of dividend taxes.

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Oil declined due to demand, production, and storage concerns

PERFORMANCE OF SELECT ENERGY ASSETS December 31, 2019 - December 31, 2020 • December 31, 2019 =100 • US Dollar 110 100 90 80 70 60 50 40 30 20 Feb-20 Jun-20 Oct-20 Dec-20 Dec-19 Apr-20 Aug-20 World Energy Stocks Brent Crude Oil Prices MLPs WTI CRUDE OIL FUTURES CURVE As of December 31, 2020 • US Dollar 65 60 55 50 45 40 34 2 10 18 26 42 50 58 Contract for Delivery in Month December 31, 2019 December 31, 2020

Energy markets suffered a dual impact in the first half of CY 2020. Even as demand for oil was declining due to the virusinduced lockdowns, Russia and Saudi Arabia announced an increase in oil production, accelerating these price declines. The resulting glut of oil, and a lack of storage capacity at Cushing in Oklahoma, meant that short-dated WTI contracts briefly traded at deeply negative prices in mid-April. Subsequent supply cuts by OPEC, an easing of storage concerns, and vaccine approvals heralding an eventual end to lockdowns helped to support markets later in the year.

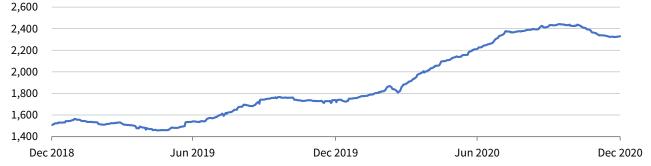
Sources: Alerian, Bloomberg L.P., Intercontinental Exchange, Inc., MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Notes: Brent Crude Oil Prices, World Energy Stocks, and MLPs are represented by ICE Brent Crude Near-Month Futures, MSCI World Energy Index, and the Alerian MLP Total Return Index, respectively. Total return data for all MSCI indexes are net of dividend taxes. Data on top graph are daily. Data on bottom graph reflect prices of WTI Crude Oil futures contracts as traded on the New York Mercantile Exchange. MMHC mod

Gold moved higher as real yields plummeted

GOLD BULLION PRICE VS 10-YR US REAL YIELDS





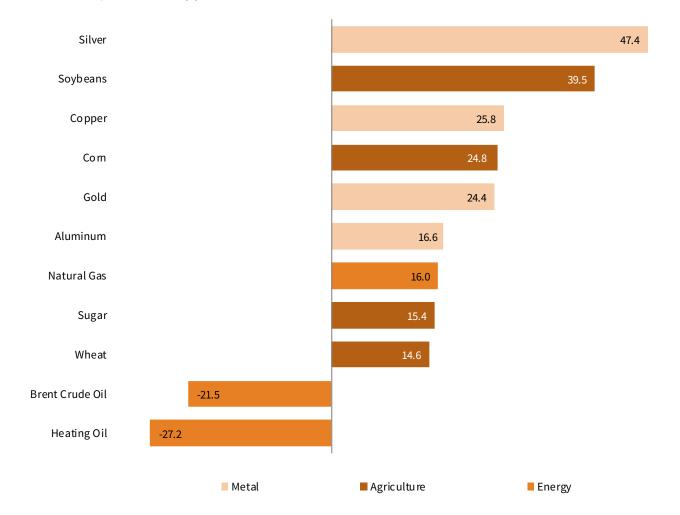
Gold has tended to trade in line with real yields historically. Gold's lack of income is a negative trait for the asset when real yields are positive; however, its lack of a negative yield when real yields move below zero becomes a highly desirable characteristic. With real yields moving into deeply negative territory this year, gold's attractiveness from a valuation perspective soared. Gold also enjoys a safe-haven status, with investors drawn to it when threats to established economic and political norms emerge. COVID-19 was one such threat, and flows into the asset accelerated as the impact of the virus began to be felt.

Sources: Federal Reserve, Intercontinental Exchange, Inc., Thomson Reuters Datastream, and World Gold Council. Notes: Real yields reflect the US ten-year TIPS yield. Data are daily.

Oil was the outlier as most commodities rose in 2020

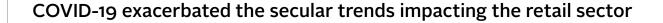
SELECT COMMODITY SPOT PERFORMANCE: CY 2020

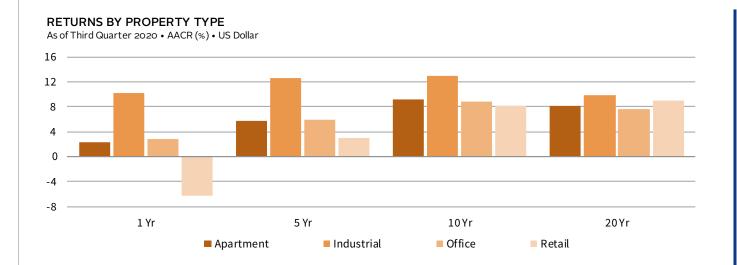
As of December 31, 2020 • Percent (%) • US Dollar



While a high weighting to oil meant broad commodity indexes declined on the year, many other classes of commodities rallied for a variety of reasons. Precious metals rose on safe-haven demand grounds. Agricultural commodities enjoyed a continuation of their bounce after being beaten down as a result of the US-China trade war. Demand from China combined with reduced production saw prices rise, led by soybeans. Natural gas rose, based on strong demand for gasfired power generation in the United States in addition to supply disruptions. Firm Chinese demand and expectations of elevated levels of infrastructure investment also supported industrial metals.

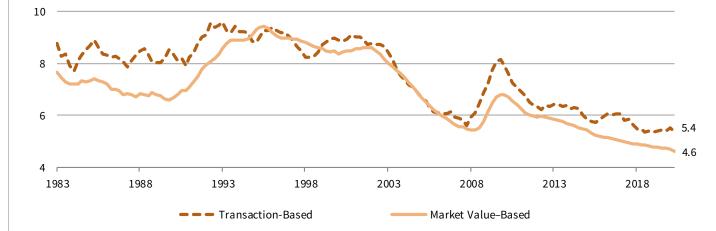
Source: Bloomberg L.P. Note: Spot returns reflect changes in near-month futures contracts, as reported by Bloomberg L.P.





ALL PROPERTY CAP RATES

Second Quarter 1983 – Third Quarter 2020 • Percent (%)



Property price appreciation slowed across all categories in CY 2020 in comparison to longer horizon trends. Retail remained the sector under most pressure among those shown, experiencing its worst guarter since 2009. While the secular trend away from brick-andmortar retail has impacted the sector over the past several years, this year it also bore the brunt of the economic lockdowns that saw consumers remain at home. Despite a moderately slowing growth rate, industrial property once again performed strongly over the year, with e-commerce and logistics firms relatively insulated from the worst of the economic effects of the pandemic.

Source: National Council of Real Estate Investment Fiduciaries.

Notes: AACR represents total returns. Cap-rate data represent a four-quarter moving average. All data are quarterly.

Private investments outperformed public equivalents in recent years

PERFORMANCE OF SELECT CAMBRIDGE ASSOCIATES PRIVATE INVESTMENT INDEXES VS PUBLIC EQUIVALENTS As of Second Quarter 2020 • Percent (%)



With the exception of real estate, private markets posted one-year returns that were generally comparable to those posted over longer horizons. Private markets also outperformed comparable public markets over the course of the year, with the latter proving more sensitive to the concerns and impacts of COVID-19. This outperformance of private markets is also witnessed over longer horizons, with the three private indexes shown all outperforming over fiveand ten-year horizons.

Sources: Cambridge Associates LLC, Frank Russell Company, FTSE International Limited, National Association of Real Estate Investment Trusts, and Thomson Reuters Datastream. Notes: Private index returns are pooled horizon IRRs, net of fees, expenses, and carried interest. The CA Modified Public Market Equivalent (mPME) replicates private investment performance under public market conditions. The public index's shares are purchased and sold according to the private fund cash flow schedule, with distributions calculated in the same proportion as the private fund, and mPME net asset value is a function of mPME cash flows and public index returns. 1788q mod

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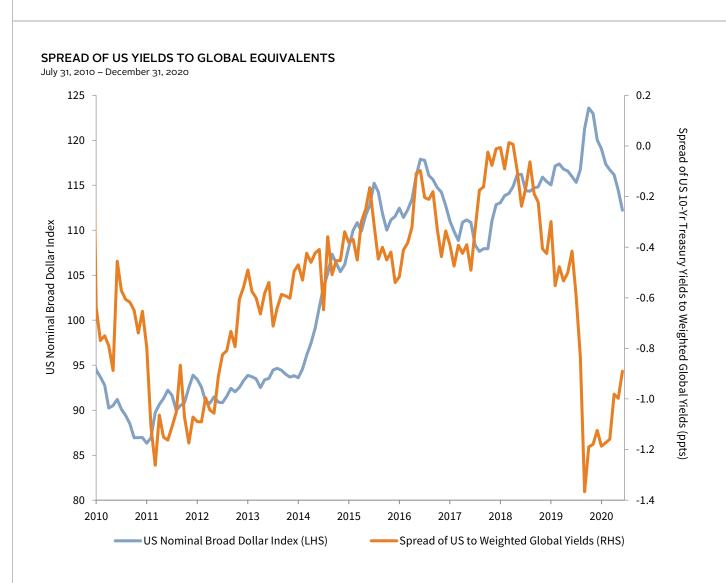
Hedge fund performance was generally solid across strategies

HEDGE FUND PERFORMANCE: CY 2020

Total Return (%) • US Dollar



Preliminary data from Hedge Fund Research, Inc., suggest performance across the primary hedge fund strategies was generally solid in calendar year 2020, with the widely followed HFRI Fund Weighted Composite up 11.6%. Equity hedge funds generally delivered positive returns as markets rose; however, market neutral funds were unable to benefit from the broad market rally. Event-driven strategies particularly benefited from the strong market gains into the end of the year. Systematic strategies were caught off balance by the swift decline in prices across nearly all asset classes, combined with a rapid recovery.



The US dollar finished slightly down on the year despite an early sharp appreciation

The US dollar appreciated sharply during the most acute phase of the COVID-19 crisis. The rapid decline in risk assets globally saw the dollar's traditional safe-haven gualities become particularly prized. The large quantity of USDdenominated debt globally meant that many foreigners looking to delever needed to acquire dollars. This dollar appreciation took place despite the currency losing the support of the interest rate differential. which had been a driver of its multi-year appreciation. As we moved past the peak of the crisis, the dollar gave up all of its gains as risk appetite improved, aided by large scale fiscal and monetary support.

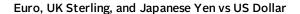
Sources: Federal Reserve, FTSE Fixed Income LLC, and Thomson Reuters Datastream

Notes: The global yield series is constructed by taking the ten-year government bond yields of the nine currency regions that currently have the largest weights in the Federal Reserve "US Nominal Broad Dollar Index" series and weighting them in proportion to their historical weights. Historical weights are updated annually, and the nine currency regions are as follows as of December 31, 2020: Euro Area (23%), China (19%), Mexico (16%), Canada (16%), Japan (8%), UK (6%), South Korea (4%), India (4%), and Switzerland (3%). Weights do not sum to 100% due to rounding. The global yield series is then subtracted from the US ten-year Treasury yield to create the "Spread" series.

DM currencies rose against the US dollar, while EM currencies declined

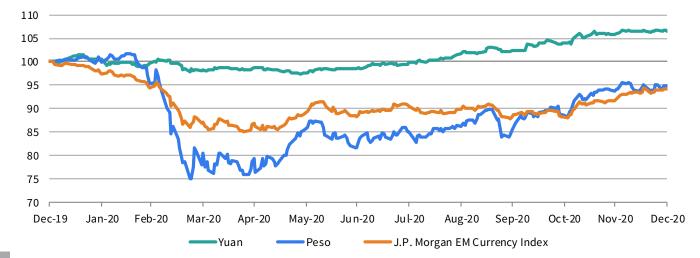
SELECT NOMINAL CURRENCY MOVEMENTS VS THE US DOLLAR

December 31, 2019 – December 31, 2020 • December 31, 2019 = 100



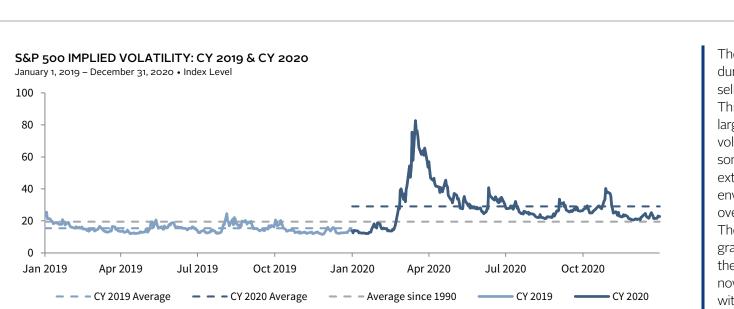






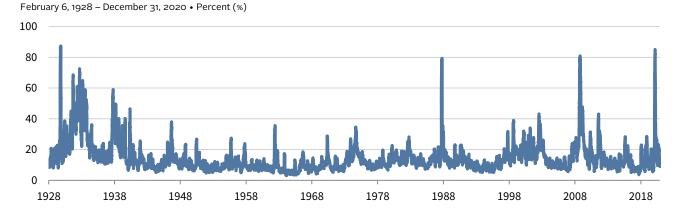
The dollar appreciated against virtually all currencies in March, sharply in many cases, as investors sought out safe havens during the pandemic. However, as risk appetite returned, DM currencies gradually made up the ground they lost against the dollar, finishing up on the year. The euro, in particular, was boosted by news of the issuance of pan-Euro Area bonds to help the region's recovery. Sterling trailed versus the euro and yen as Brexit uncertainties persisted into year end. EM currencies' declines were steeper, and their recoveries were more gradual. The yuan has been the exception, with China's control of their domestic virus cases and swift economic recovery contributing to currency strength.

Sources: J.P. Morgan Securities, Inc., and Thomson Reuters Datastream. Note: Data are daily.

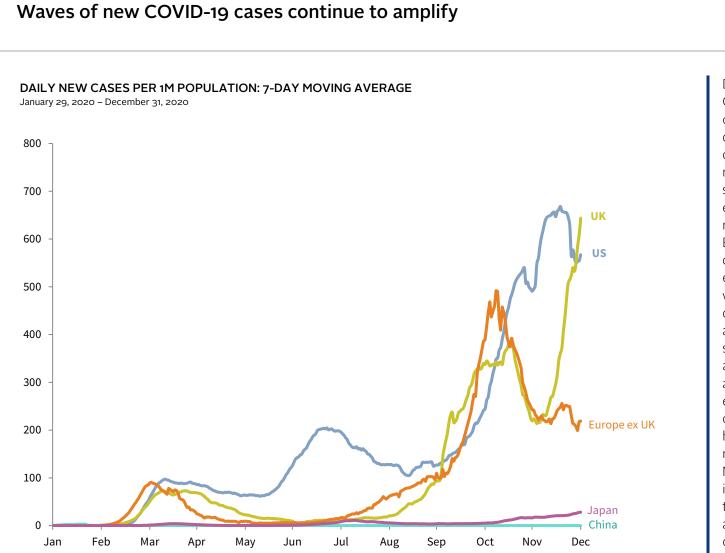


Equity volatility spiked as markets declined, but has since moderated to average historical levels

S&P 500 ANNUALIZED 30-DAY REALIZED VOLATILITY



The VIX rose sharply during the equity market sell-off in first half 2020. This was justified by the large rise in realized volatility, which matched some of the most extreme volatility environments witnessed over the past 100 years. The level of the VIX has gradually normalized in the ensuing months and is now at levels consistent with its long-run average.



Despite originating in China, the COVID-19 outbreak turned out to be guite contained there in comparison to most other regions. This resulted in a shorter and shallower economic impact in China relative to its global peers. By contrast, most developed nations experienced more widespread infections during the March wave and were managing a second surge as winter approached. The appearance of several effective vaccines does change the calculus in how authorities will respond to these waves. Nonetheless, activity was impacted once again in the final quarter of 2020, as widespread distribution of vaccines will take some months.

Sources: Johns Hopkins University and World Bank WDI. Note: Europe ex UK data are represented by Germany, France, Italy, and Spain.



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