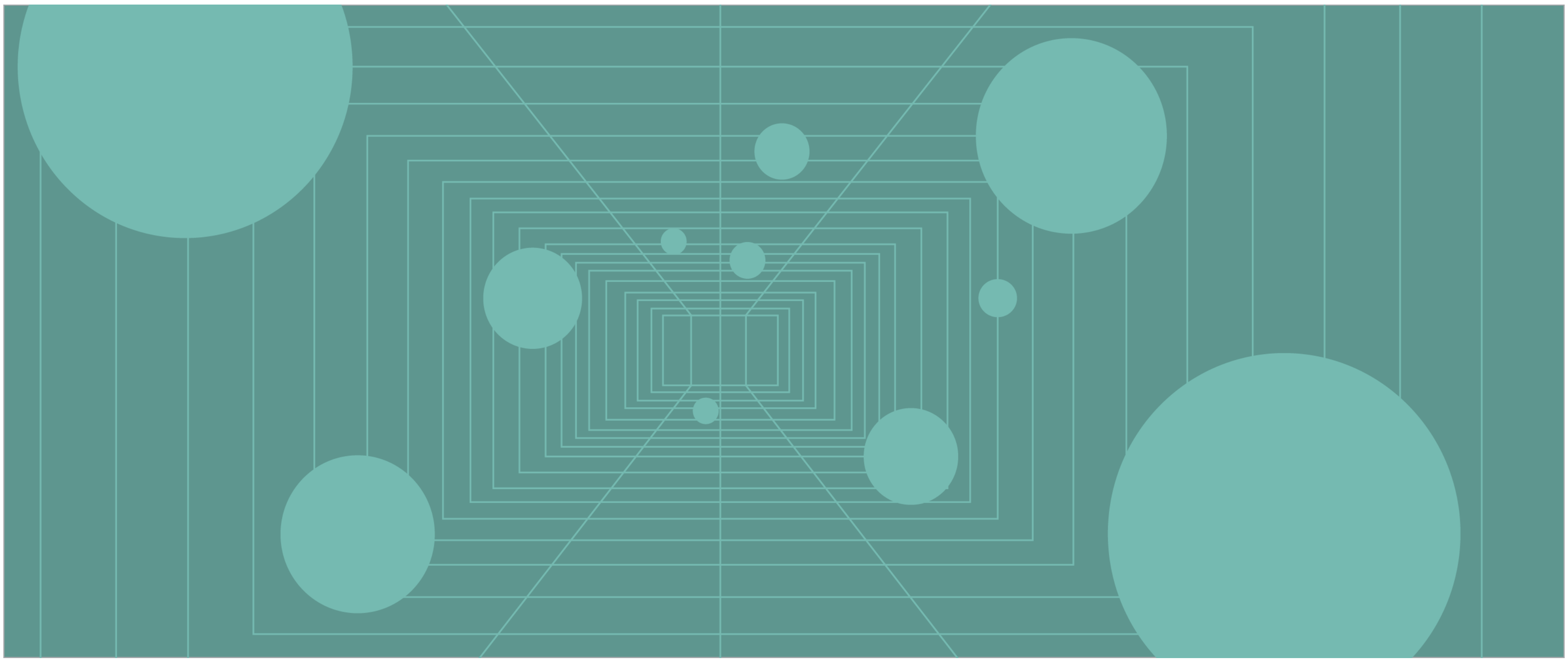
ASSET CLASS FACTS & FIGURES



CAMBRIDGE ASSOCIATES

THIRD QUARTER 2022

Contents

EQUITIES

CAMBRIDGE
ASSOCIATES

Developed Markets Equities

Facts & Figures Third Quarter 2022

DM equities returned -4.4% in 3Q and -15.5% in the period since 3Q 2021, in local currency terms. High levels of inflation, rapid changes in interest rate expectations, and the ongoing war in Ukraine challenged equities in recent months. Countries with higher equity exposures to energy, such as the UK, have performed better.

- The bloc trades at 12.9x cyclically adjusted cash earnings, which ranks higher than 74% of historical data dating back to 1979. The high valuation level masks dispersion across major DM blocs, with the US trading at levels particularly high relative to its history. In contrast, the UK's large exposure to cyclical companies has left the market's equities trading low relative to history.

- The global economy is expected to grow by 2.9% in 2022, according to analysts surveyed by Bloomberg in October. This forecast is slightly lower than what analysts expected in July (3.2%), likely given uncertainties related to the war in Ukraine and changes in monetary policy expectations. Growth expectations for 2022 are highest for the UK (3.5%), followed by China (3.3%), euro area (3.0%), US (1.6%), and Japan (1.6%), among major markets.

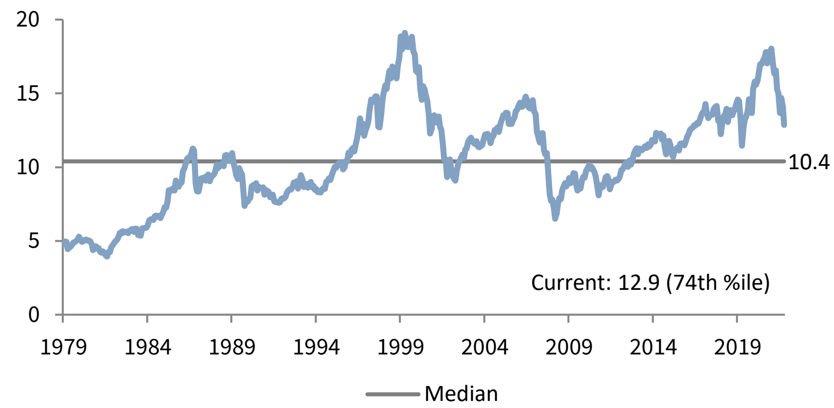
- Corporate earnings are expected to grow by 11.2% in 2022, which follows last year's dramatic 52% growth in earnings. Last year's growth came as companies rebounded from weak economic activity in 2020. Looking ahead, the UK and euro area are expected to grow at levels just above DM as a bloc. In contrast, US earnings are expected to grow at a lower rate.

- Earnings growth for 2022 is expected to come primarily from sales growth. Analysts expect sales to grow by 7% in 2022, which would be higher than the long-term average (2%–3%) but not unusual. To meet earnings growth expectations, DM companies will need to maintain profit margins, which are historically high.

- The pace of monetary policy tightening is a key risk for equities. Higher-than-expected inflation levels have prompted major DM central banks to revise rate expectations. While equity markets are discounting that rates will rise in the coming quarters, faster-than-expected increases or poor central bank messaging could further weaken equity prices.

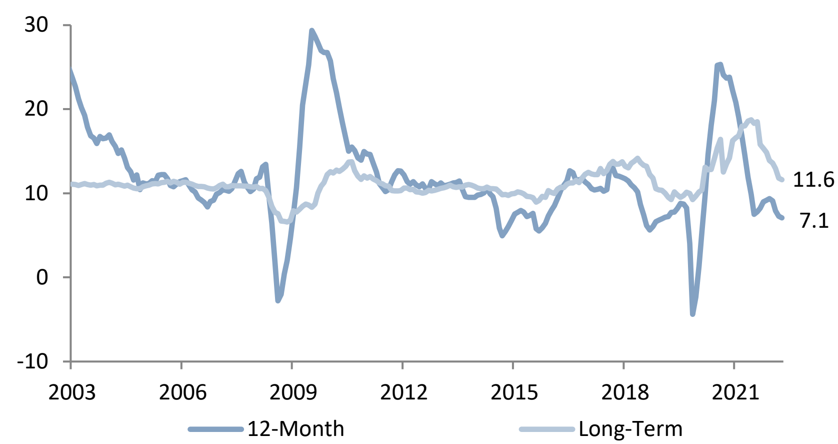
CYCLICALLY ADJUSTED PRICE-TO–CASH EARNINGS

Dec 31, 1979 – Sep 30, 2022



CORPORATE EARNINGS GROWTH EXPECTATIONS

Jun 30, 2003 – Sep 30, 2022 • Percent (%)



Sources: I/B/E/S, MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Note: Data are based on the MSCI World Index.

US Equities

Facts & Figures Third Quarter 2022

US equities returned -4.8% in 3Q and -17.6% since 3Q 2021, in local currency terms. The poor performance across this past year was linked to high levels of inflation, which forced the Fed to tighten monetary policy and raised concerns about future economic activity. The war in Ukraine has also added considerable uncertainty to US equity markets and led to disruptions in many commodity markets.

- US equities trade at 16.2x cyclically adjusted cash earnings, which ranks higher than 78% of historical data dating back to 1979. That valuation multiple is almost twice the same multiple for DM ex US equities, which represents one of the widest valuation gaps in their shared history. Even after adjusting for sector differences, the gap in equity valuations remains stark.

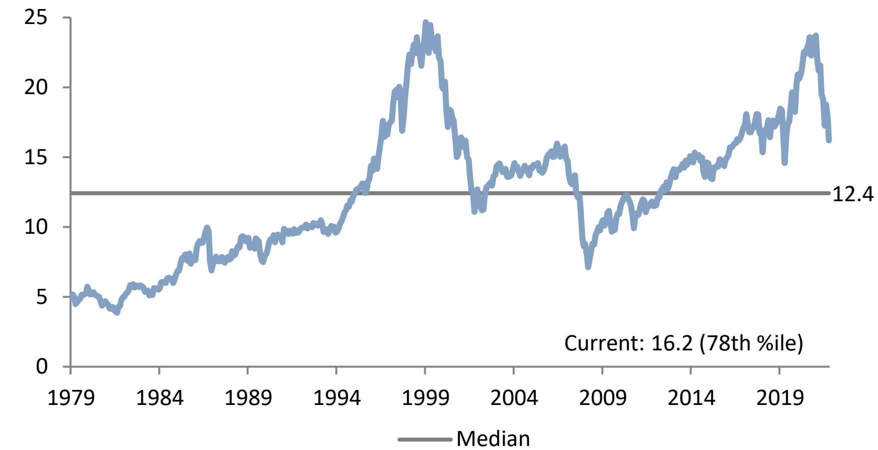
- The US economy is expected to grow by 1.6% in 2022, according to analysts surveyed by Bloomberg in October. This growth is lower than last year's estimated economic growth (5.6%), but it is similar to the US' average growth since 2000 (1.8%). Still, the growth expectation for this year is vulnerable to how the war in Ukraine evolves and decisions made by the Fed.

- Corporate earnings are expected to grow by 7.7% in 2022, which follows last year's dramatic 51% growth rate. Last year's growth came as companies rebounded from weak economic activity in 2020. Analysts expect this earnings growth to come primarily from sales growth and stable profit margins. Collectively, the profit margin for US equities reached 13.0% at the end of last year, which is a record high level. Concerns about economic activity have raised questions about the direction of 2023 earnings.

- The pace of monetary policy tightening is a key risk for equities. Higher-than-expected inflation has prompted the Fed to revise rate expectations higher, which has put downward pressure on valuation multiples. As it stands, the Fed expects to raise its policy rate to 3.9%–4.9% in 2023, according to its September projections.

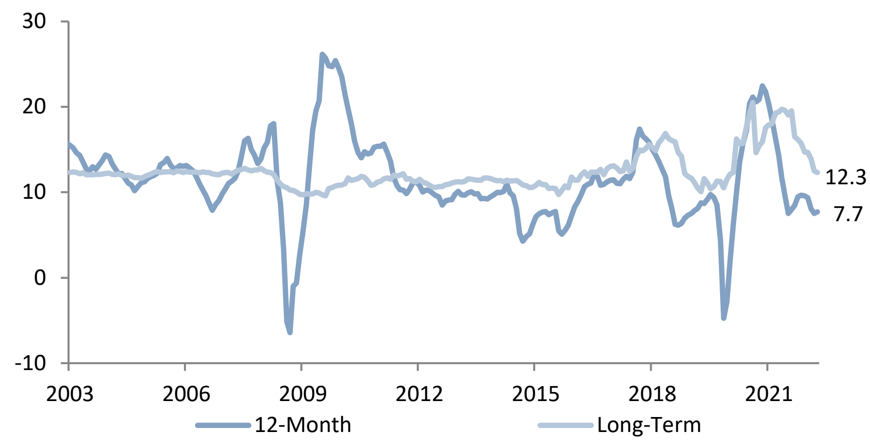
CYCLICALLY ADJUSTED PRICE-TO-CASH EARNINGS

Dec 31, 1979 – Sep 30, 2022



CORPORATE EARNINGS GROWTH EXPECTATIONS

Jun 30, 2003 – Sep 30, 2022 • Percent (%)



Sources: I/B/E/S, MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Note: Data are based on the MSCI US Index.

Developed Markets excluding US Equities

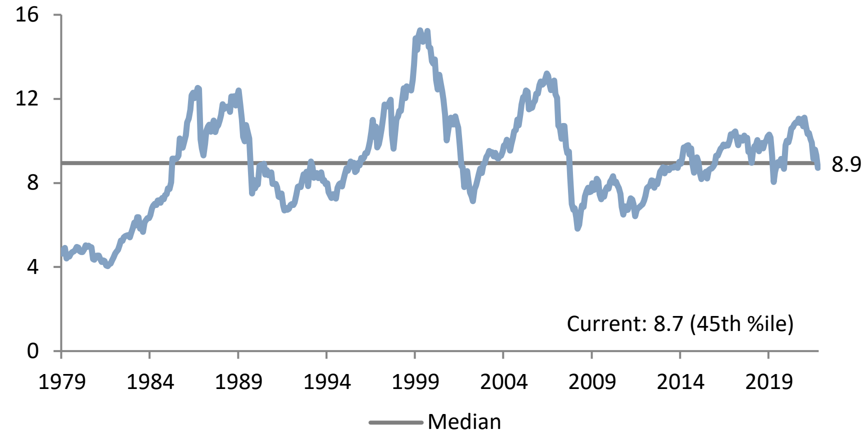
Facts & Figures Third Quarter 2022

DM ex US equities returned -3.4% in 3Q and -10.6% in the period since 3Q 2021, in local currency terms. High levels of inflation, rapid changes in interest rate expectations, and the ongoing war in Ukraine challenged equities in recent months. Countries with higher equity exposures to energy, such as the UK, and countries whose central banks have been more dovish, such as Japan, have performed better.

- The bloc trades at 8.7x cyclically adjusted cash earnings, which ranks higher than 45% of historical data dating back to 1979. That valuation multiple is roughly half the same multiple for US equities, which represents one of the widest valuation gaps in their shared history. Even after adjusting for sector differences, the gap in equity valuations remains stark.
- The global economy is expected to grow by 2.9% in 2022, according to analysts surveyed by Bloomberg in October. This forecast is slightly lower than what analysts expected in July (3.2%), likely given uncertainties related to the war in Ukraine and changes in monetary policy expectations. Growth expectations for 2022 are highest for the UK (3.5%), followed by China (3.3%), euro area (3.0%), US (1.6%), and Japan (1.6%) among major markets.
- Corporate earnings are expected to grow by 17.2% in 2022. That expectation follows the bloc's dramatic growth in 2021 (55.5%), which came as companies recovered from the 2020 pandemic-linked downturn. Within this bloc, the UK (22.8%) and euro area (17.0%) are expected to grow faster than Japan (12.6%), among major countries. This is partly due to UK equities high underlying exposure to commodities, which have performed well this year.
- Corporate earnings growth for 2022 is expected to come primarily from changes in sales, which are expected to grow by 7.6%, with the balance coming from improvement in profit margins. At the end of 2021, the DM ex US profit margin was 9.8%, which is a record high-level, according to MSCI data. But this margin is below the same metric for the US (13.0%).

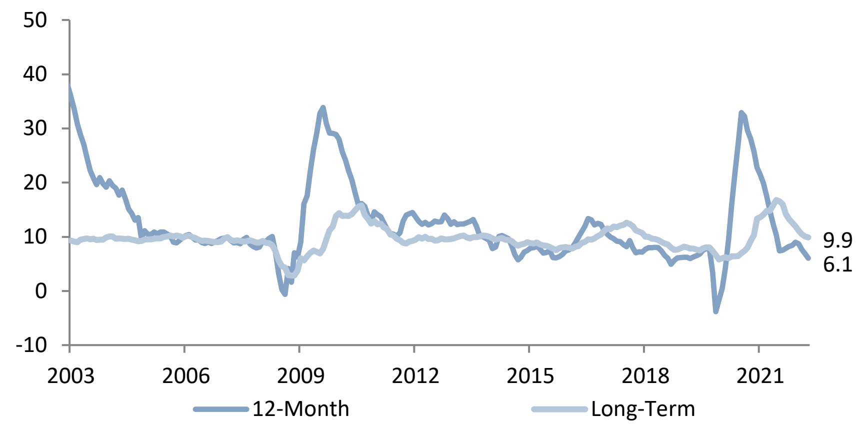
CYCLICALLY ADJUSTED PRICE-TO–CASH EARNINGS

Dec 31, 1979 – Sep 30, 2022



CORPORATE EARNINGS GROWTH EXPECTATIONS

Jun 30, 2003 – Sep 30, 2022 • Percent (%)



Sources: I/B/E/S, MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Note: Data are based on the MSCI World ex US Index.

UK Equities

Facts & Figures Third Quarter 2022

UK equities returned -2.9% in 3Q 2022, outperforming all major DM regions bar Japan, and outperforming broader DM by over 1.5 ppts in local terms. The strength of the dollar and idiosyncratic sterling weakness meant that USD returns painted the opposite picture. The UK trailed all other major regions by returning -10.8%, compared to -6.2% for DM. Outperformance during the quarter was driven both by sectoral differences between the UK index and the DM index and outright UK outperformance. The UK has also vastly outperformed broader DM on a trailing one-year horizon; however, it has still underperformed over longer horizons as long-term earnings growth has lagged its peers and is expected to continue to do so beyond this year.

- Relative valuations were roughly unchanged on the quarter, with the UK remaining relatively cheap on all trailing valuation bases. The ratio of the UK's cyclically adjusted price-to–cash earnings (CAPCE) to that of DM stayed 0.53, in the 6th percentile of observations. When adjusting for the substantial sectoral differences between the indexes, the relative CAPCE stands at 0.71. However, when the weaker expected earnings are considered, i.e., by looking at forward PEs, the ratio of sector-neutral forward PEs stands at 0.82.

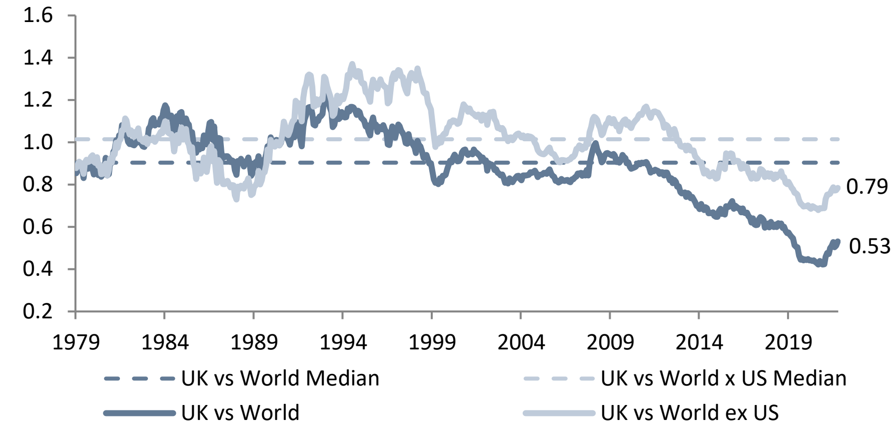
- In general, the UK index has an underweight to growth stocks and an overweight to value stocks. This has been a significant drag on relative performance in recent years, however it was a boon in recent quarters. Five of the six top-performing sectors in DM equities during the quarter were sectors where the UK enjoys a relative overweight. This tilt may help the UK in periods of rising global inflation and yields, particularly when the former are partially driven by rising commodity prices.

- UK EPS are forecast to outperform broader DM by nearly 12 ppts this year (22.8% vs 11.2%) due to the strong performance of commodity markets. However, a material underperformance is currently anticipated in the following two years, with UK earnings expected to contract next year and be only marginally better than flat the year after.

- Similar to the case of EPS, UK GDP is expected to outperform most peers in 2022 as a result of having continued scope for post–COVID normalization, given the greater than average GDP decline in 2020. However, growth in 2023 is forecast to underperform with a mild recession. The current consensus for real GDP in 2023 (-0.04%) is due to exposure to the energy crisis and tightening by the BOE. Financial conditions tightened during the quarter due to the large sell-offs in both gilts and sterling.

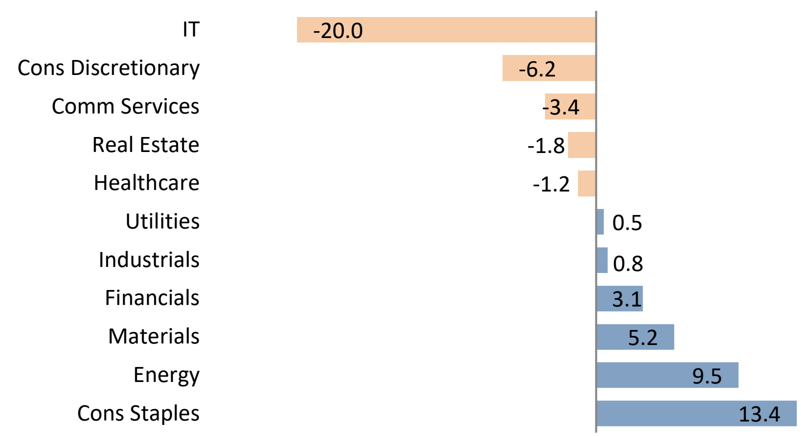
RELATIVE CAPCE: MSCI UK VS WORLD

Dec 31, 1979 – Sep 30, 2022



RELATIVE SECTOR WEIGHTS: UK MINUS WORLD

As of Sep 30, 2022 • Percentage Points



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

Europe ex UK Equities

Facts & Figures Third Quarter 2022

Europe ex UK equities returned -4.5% in 3Q 2022, in line with the -4.4% return of DM equities. However, the strength of the dollar saw the region lag in USD terms, as Europe ex UK returned -9.9% versus -6.2% for broad DM equities. On a trailing one-year horizon, the region's performance is comparable to that of broader DM, though it trails by 8.2 ppts in USD terms. While index composition and profitability lie behind the long-run underperformance, exposure to the war in Ukraine was a large headwind to recent USD performance. Looking forward, earnings growth is expected to lag that of broad DM in 2023.

- The region's cyclically adjusted PE ratio declined to just under 9 during the quarter, standing now at the 61st percentile of its history. Its CAPCE relative to DM is 0.70, in the 26th percentile. A large portion of this relative cheapness is due to the comparative richness of the US market, however. The region's CAPCE relative to that of DM x US is 1.03, in the 78th percentile.

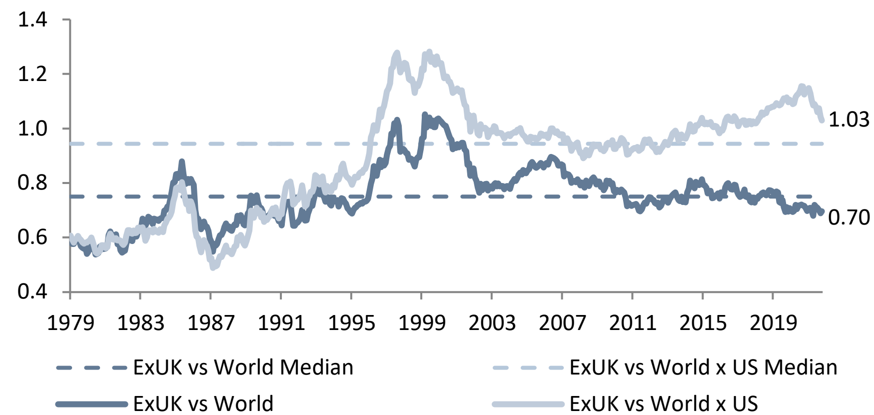
- The longer-term underperformance of the Europe ex UK region versus DM more broadly is down to a lower underlying profitability. The return on equity (ROE) for the region has been below that of broader DM for the last decade and the ratio of their ROEs stands at 0.79. This is partly due to the region's lower exposures to some of the higher ROE sectors, notably tech. However, sectoral ROEs are lower in 10 of the 11 GICS sectors, showing that it's a broader issue. Nevertheless, the region's ROE is slightly greater than that of DM ex US.

- Earnings growth in Europe ex UK is expected to outpace broader DM in 2022, at 16.2% compared to 11.2%, before lagging next year (3.1% vs 5.8%). Projections for 2023 reflect the impact that high energy prices, as a result of the war, will have on consumers and industry, in addition to rising interest rates.

- The war in Ukraine is having a material impact on GDP growth expectations in Europe for 2022. So far this year, consensus GDP growth for 2022 has been revised down from 4.2% to 3.2%, primarily as a result of the region's energy exposure to Russia. Consensus GDP growth for 2023 is now just -0.4%. Nonetheless, the energy-driven spike in inflation has seen the ECB raise rates, with further hikes planned. The euro has depreciated as a result of these challenges, and, combined with rising bond yields, has caused a tightening in financial conditions.

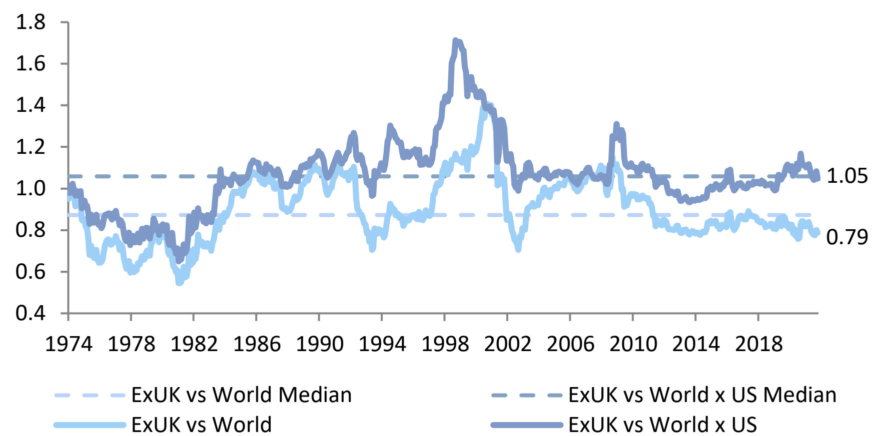
RELATIVE CAPCE: MSCI EUROPE EX UK VS WORLD AND WORLD EX US

Dec 31, 1979 – Sep 30, 2022



ROE: MSCI EUROPE EX UK VS WORLD AND WORLD EX US

Dec 31, 1974 – Sep 30, 2022 • Percent (%)



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

Japanese Equities

Facts & Figures Third Quarter 2022

Japanese equities outperformed their developed markets peers YTD in local currency terms, but lag in USD terms given the recent weakness in the yen. Valuations are below historical medians, both in absolute and relative terms. Improving corporate earnings and a focus on shareholder returns should help to serve as tailwinds for the market.

- The MSCI Japan Index returned -1.6% in 3Q 2022 and -7.5% YTD in local currency terms, versus DM equities which returned -4.4% and -21.9%, respectively. However, Japanese equities lagged DM equities in USD terms, as the yen has declined 20.4% YTD against the US dollar to a 24-year low after the BOJ continued to signal its dovish stance.

- The market trades at 9.5x cyclically adjusted cash earnings, which ranks as the 43rd percentile of historical observations since 1979. Relative to other developed markets, Japanese equities are at the 31st percentile of historical observations.

- Accommodative monetary and fiscal policies may continue to support Japanese equity performance, albeit weigh on the currency. In 4Q 2021, the Kishida administration announced a record stimulus package and budget to counteract ailing economy recovery, while additional stimulus was made in 2022 in response to rising food and energy costs.

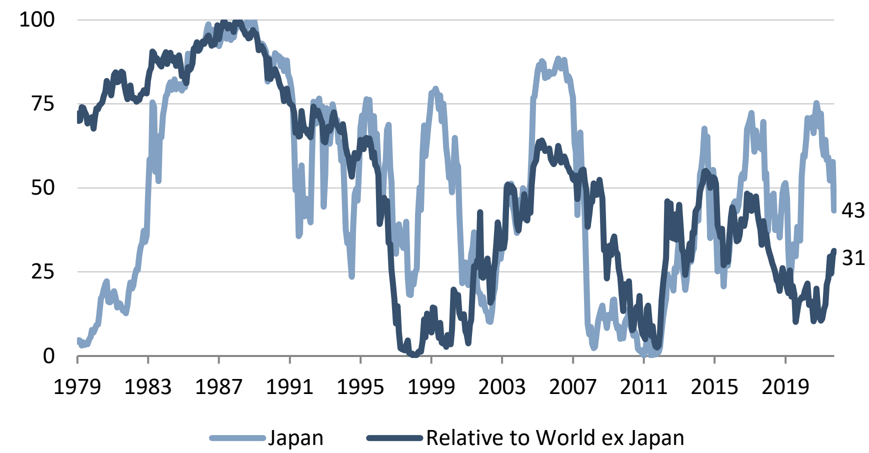
- Japanese corporate earnings have rebounded strongly from pandemic lows, growing by 43% YOY in fiscal year 2021 (ended March 2022). The latest bottom-up analyst estimates show growth moderating to 13% in fiscal year 2022 (ending March 2023).

- The ROE on Japanese equities currently stands at 8.9%, above the historical median of 8.2%. Although Japan's ROE has historically been lower than that of DM counterparts, the gap has narrowed in recent years due to an increased focus on corporate governance and shareholder returns in Japan.

- As of end September 2022, the MSCI Japan Index trailing dividend yield was 2.7%, above the 1.7% historical median. Japanese companies retain significant cash balances and have increased shareholder payouts (dividends plus buybacks) in recent years. As a result of their strong balance sheets, dividend payouts have held up relatively well and may continue to serve as a tailwind for Japanese equities.

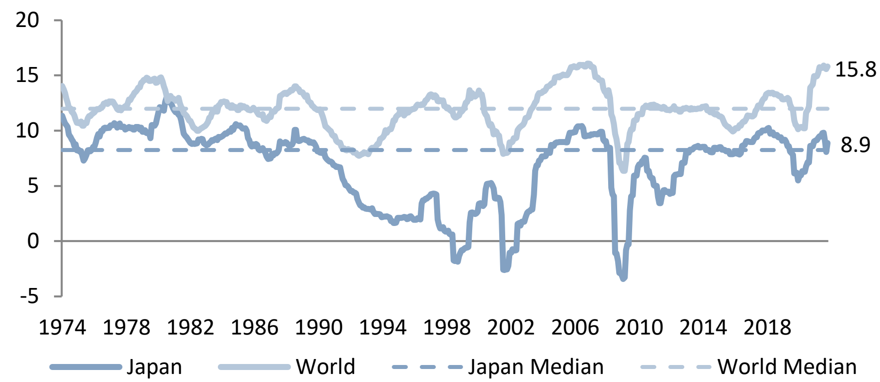
CYCLICALLY ADJUSTED PRICE-TO–CASH EARNINGS

Dec 31, 1979 – Sep 30, 2022 • Percentile (%)



ROE: MSCI JAPAN VS WORLD

Dec 31, 1974 – Sep 30, 2022 • Percent (%)



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

Emerging Markets Equities

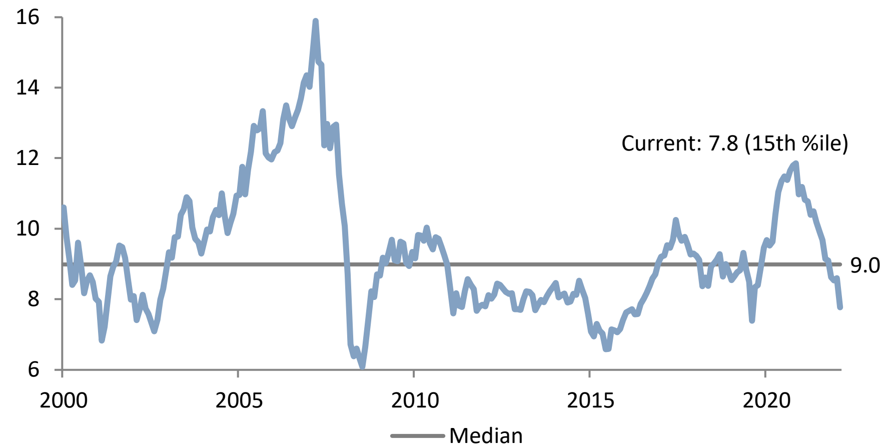
Facts & Figures Third Quarter 2022

EM equities declined 11.6% in USD terms in 3Q, bringing YTD performance to -27.2%. A perfect storm buffeted EM stocks in 3Q, including aggressive US monetary tightening, USD appreciation, and slowing economic activity, particularly in China. China, Taiwan, and Korea were the largest detractors in 3Q, declining by double digits, whereas India and Brazil provided a modest contribution performance.

- EM stocks declined 28% in the TTM period, with price momentum hitting its lowest level since 2009. Momentum relative to DM remained squarely negative. EM has generally underperformed DM since 2010, a period that coincided with USD appreciation, highlighting that the USD outlook is key to the EM/DM performance cycle. EM trailed DM by 5.4 ppts in 3Q—underperforming for the sixth time in the past seven quarters—as the USD appreciated to 20-year highs.
- Weak performance translated to lower valuations. The EM CAPCE fell 28% over the past year, marking one of the sharpest 12-month valuation contractions on record. Valuations relative to DM declined in 3Q and now sit nearly 20% below median levels (13th percentile.)
- EM Asia (-14.0%) underperformed in 3Q as China's ongoing zero-COVID policy and property sector weakness weighed on economic activity. The region also faced pressure from slowing trade growth and signs of waning semiconductor demand. Asian central banks (ex China) raised policy interest rates more than 500 bps combined and drew down FX reserves to contend with currency depreciation.
- LatAm (3.6%) and EMEA (-5.3%) fared better in 3Q. LatAm has outperformed this year, up 3% due largely to Brazil where economic activity has exceeded expectations. Overall, however, analysts reduced their 2022 EM GDP growth outlook by 2.0 ppts this year to 3.0%.
- Analysts lowered their forward 12-month growth expectations by nearly four ppts in 3Q, downgrading all major EM regions. At 5.8%, the current forward 12-month EPS growth rate sits at just the 2nd percentile since 1987. EM EPS growth is now expected to lag DM by 1.2 ppts, which is 4 ppts below average (-2.9 ppts). Still, EM ROE held steady at 13.3% (74th percentile). However, ROE relative to DM remained roughly 20% below median levels at the 21st percentile.

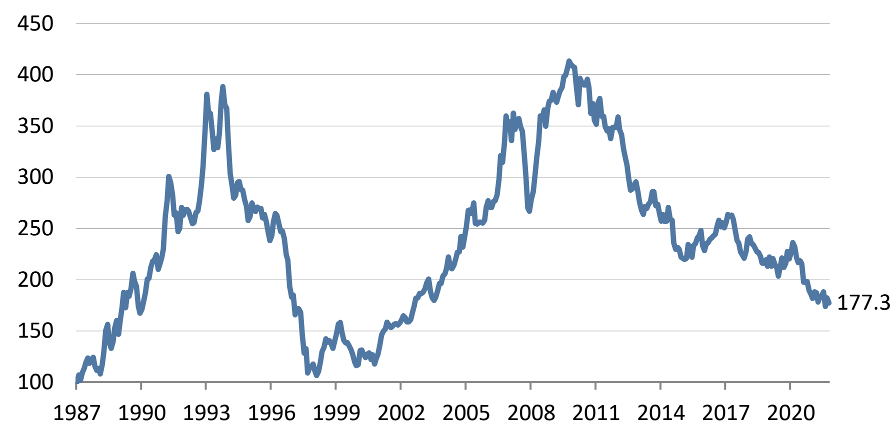
CYCLICALLY ADJUSTED PRICE-TO–CASH EARNINGS: MSCI EM

Aug 31, 2000 – Sep 30, 2022



EM/DM EQUITY RELATIVE CUMULATIVE WEALTH

Dec 31, 1987 – Sep 30, 2022 • US Dollars



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

Notes: EM CAPCE based on five-year average real cash earnings. Total returns are gross of dividend taxes prior to January 2001 and net thereafter. EM and DM equities based on the MSCI Emerging Markets Index and MSCI World Index, respectively.

Asia ex Japan Equities

Facts & Figures Third Quarter 2022

Asia ex Japan equities returned -13.8% in USD terms in 3Q, bringing YTD performance to -27.9%. Asia ex Japan stocks were dragged down by China (-22.5%) and tech hardware stalwarts Korea (-16.4%) and Taiwan (-14.5%). India (6.5%) advanced. A combination of external pressures—namely an aggressive US Fed and strengthening USD—and signs of slowing economic growth weighed on Asia ex Japan in 3Q.

- Underperformance was driven largely by technology stocks. The index's nearly 50% weighting to the IT, consumer discretionary, and communication services sectors detracted more than 8 ppts from performance. Further, nearly all top ten stocks—which make up one-quarter of index market cap—declined by double digits.

- Asia ex Japan valuations ended 3Q at their lowest level since 2016. The index's CAPCE metric has fallen 37% since last February, which coincided with the peak in Chinese equity prices. The valuation discount versus DM widened to 34% (7th percentile), and current relative valuations are 22% below median levels.

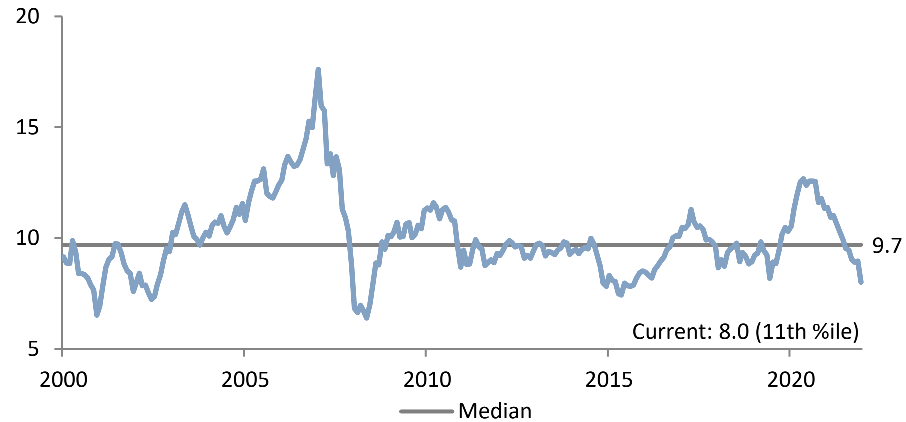
- There is wide dispersion among Asia ex Japan country valuations. Most countries currently trade at a discount to historical medians valuations, with P/B ratios in Korea and Hong Kong near their lowest levels on record. India and Taiwan are the exceptions in today's environment as the latter held near median levels despite underperforming in 3Q.

- Analysts expect forward 12M EPS growth of roughly 8% for Asia ex Japan, topping global counterparts. However, the outlook may prove too lofty. Trade volume growth tends to lead the Asia ex Japan EPS cycle, and the WTO expects global trade to soften for the rest of this year and remain weak in 2023. Slowing semiconductor demand could exacerbate this issue for the tech-heavy Asia ex Japan region.

- Asia ex Japan faces several key risks today. Inflation and a strong USD have pushed many Asia ex Japan central banks to tighten monetary policy and draw down FX reserves to support currency values. The region is also exposed to economic impacts of China's zero-COVID policy and property sector weakness. Finally, higher commodity prices pose an additional headwind for Asia ex Japan as net importers of raw materials. Taken together, analysts have reduced their 2022 Asia ex Japan GDP growth expectations by 1.1% ppts this year to 3.5%.

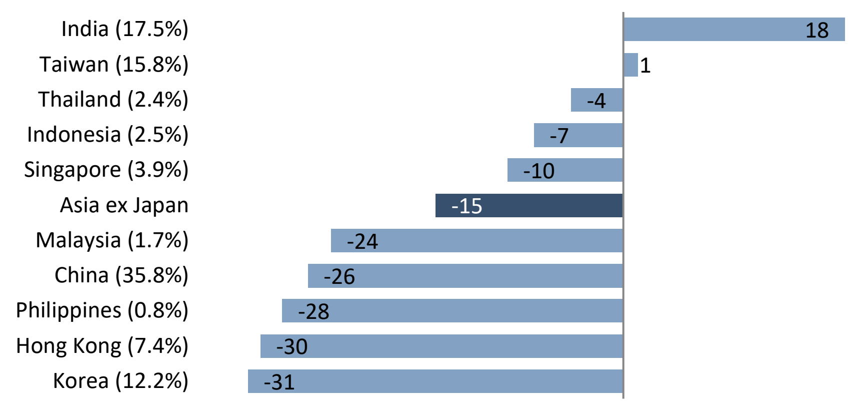
CYCLICALLY ADJUSTED PRICE-TO-CASH EARNINGS: MSCI ALL COUNTRY ASIA EX JAPAN

Oct 31, 2000 – Sep 30, 2022



COUNTRY P/B % DEV FROM HIST MEDIAN: MSCI AC ASIA EX JAPAN

As of Sep 30, 2022 • Index Weight in Parentheses



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

Notes: CAPCE based on five-year average real cash earnings. Totals may not sum to 100% due to rounding.

Chinese Equities

Facts & Figures Third Quarter 2022

Chinese equities remain under pressure in 2022, driven by China's ongoing zero-COVID policy and stress in the property sector. Valuations for Chinese equities remain depressed, particularly for offshore Chinese equities, which are near record lows.

- Chinese A-shares, as measured by the MSCI China A Onshore Index, declined 14.2% in 3Q 2022, while the MSCI China Index, which consists mostly of offshore Chinese equities, declined 21.7%. YTD, A-shares and the MSCI China Index returned -22.0% and -29.5%, respectively versus -21.7% for global equities.

- Chinese equities briefly rallied in 2Q 2022 following a lifting of COVID-19 restrictions, but performance reversed in 3Q 2022 as lockdowns were reimposed. Uncertainty over the timing of the lifting of China's zero-COVID policy and stress in the real estate sector have weighed on consumer sentiments and growth. Continued monetary and fiscal policy easing after the Party Congress in October may help to support the economy but easing of zero-COVID policy will be a key catalyst for the re-rating of Chinese equities.

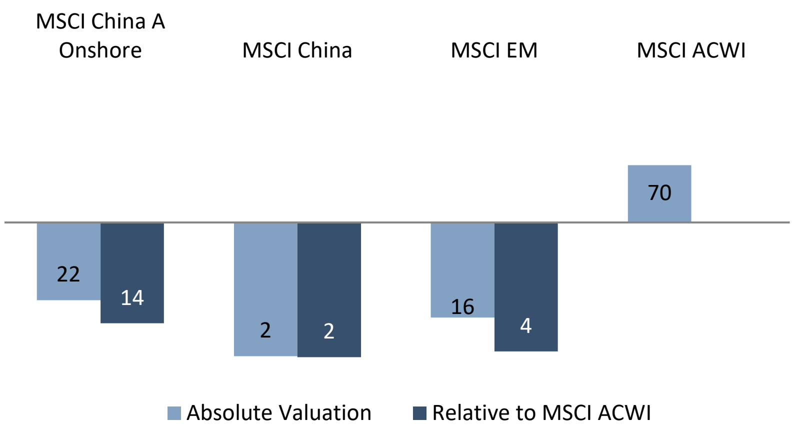
- Valuations for the MSCI China A Onshore Index, which is tilted towards cyclical sectors, are below historical median both in absolute terms and relative to global equities. Valuations for MSCI China—which is overweight the communication services (17%) and consumer discretionary (31%) sectors that have been the hardest hit by 2021's tech reforms—are lower and at the 2nd percentile of historical observations both in absolute terms and relative to global equities.

- Chinese equities consist of mainland China-listed A-shares, Hong Kong-listed Chinese companies, and US-listed Chinese companies. The MSCI China Index, which is the China equity universe of the MSCI EM Index, is tilted towards Hong Kong-listed (73%) and US-listed (9%) securities, with just a 18% weight to A-Shares.

- Active China-dedicated managers have historically demonstrated an ability to add value over the A-share index, given the retail-driven nature of the market. However, the A-share market is underweight the technology sector, with most Chinese tech companies listed offshore in Hong Kong or the US. Managers with flexible "All China" mandates can offer exposure across the China equity universe.

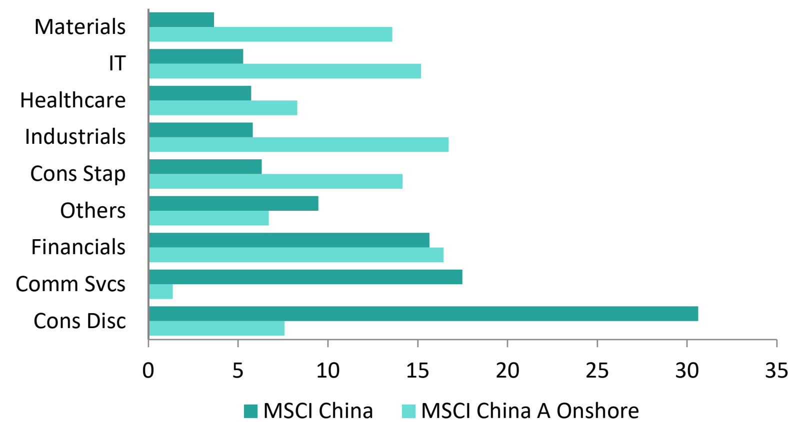
ROE-ADJUSTED P/E: PERCENTILE

Mar 31, 2005 – Sep 30, 2022



SECTOR WEIGHTS

As of Sep 30, 2022 • Percent (%)



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

Notes: Sector weight for "Others" consists of Real Estate, Utilities, and Energy. Totals may not sum to 100% due to rounding.

US Small-Cap Equities

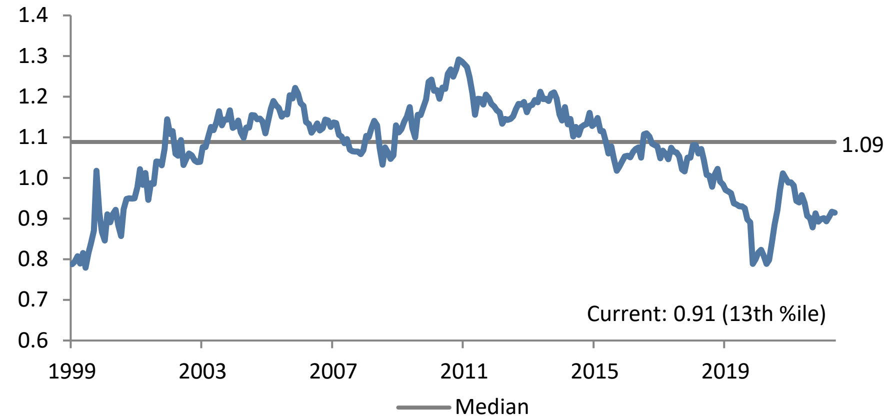
Facts & Figures Third Quarter 2022

US small-cap equities fell 2.4% in 3Q, besting their large-cap peers by 252 bps, as concerns about the economic impact of the Fed's aggressive interest path continued to weigh on equities. Over the past 12 months, small caps have declined by 20.9%, lagging large caps by 364 bps.

- Relative valuations between small caps and mid- to large-cap peers remain sharply discounted, in the bottom quintile of historical observations. However, earnings and measures of profitability have sharply recovered from pandemic-lows. The trailing 12-month return on equity (ROE) of the MSCI US Small Cap Index now stands at 9.5% after plunging to 1.1% in late 2020.
- The US small-cap segment is overweight cyclical sectors and underweight technology compared to the mid/large cap universe. As a result, US small caps suffer disproportionately amid economic downturns and heightened market volatility given their greater cyclicality, weaker profitability, and more leveraged balance sheets. On the flipside, early cycles of recoveries can prove beneficial for cyclically sensitive small caps.
- As the Federal Reserve ramps up its policy tightening to combat inflation, financial stocks can benefit as net interest margins expand, but it depends on the slope of the yield curve. However, an unexpected pause in the Fed's expected tightening path could hamper the performance of small caps relative to larger, growth-oriented equities.
- Small caps boast strong profitability and robust earnings growth. Over the past five years, S&P 600 earnings have grown at a 19% annualized rate, compared with a 16% rate for the MSCI US Index. Forward earnings estimates look healthy, with analysts now expecting a 21% increase for CY 2023.

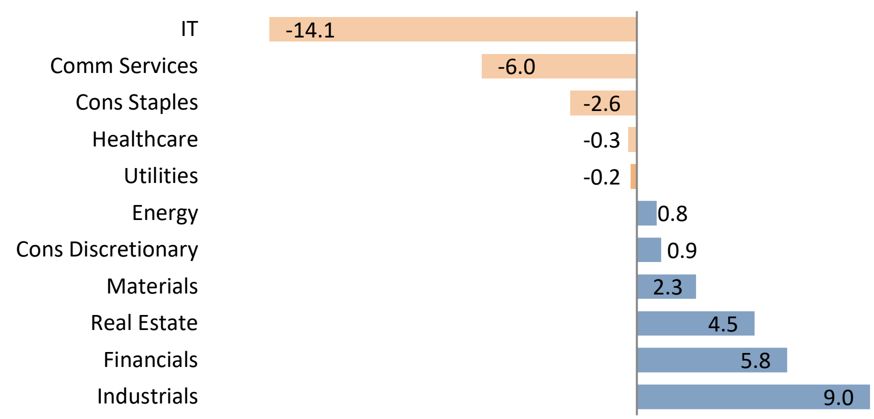
RELATIVE 5-YR CAPCE: MSCI US SC VS US LC/MC

May 31, 1999 – Sep 30, 2022



RELATIVE SECTOR WEIGHTS: US SC MINUS US LC/MC

As of Sep 30, 2022 • Percentage Points



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

Note: CAPCE ratios based on five-year average inflation-adjusted earnings.

Developed ex US Small-Cap Equities

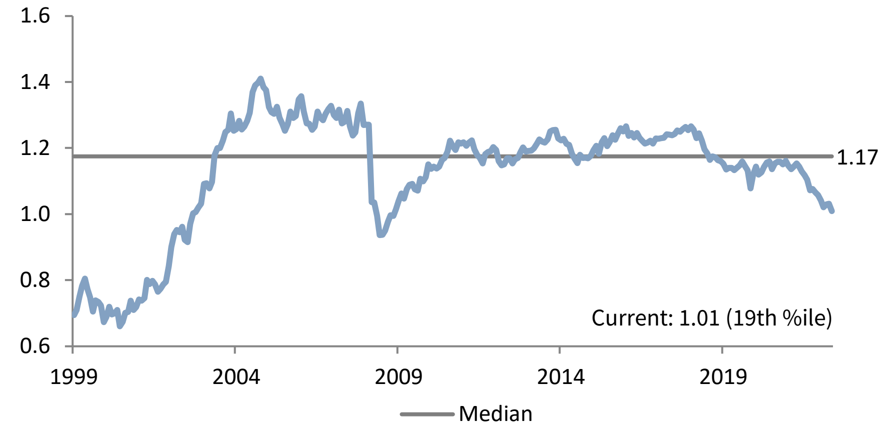
Facts & Figures Third Quarter 2022

Developed ex US small caps declined 3.4% in local currency terms in 3Q, matching the declines of their mid- to large-cap peers. However, small caps have trailed their larger-cap counterparts by 713 bps over the past 12 months.

- The difficult environment for global equities continued in third quarter, despite a rally in July. In the latter half of the quarter, central banks delivered stern messaging about keeping monetary policy aggressive until inflation returns to “target” levels. Interest rates surged, weighing on index heavyweight sectors like real estate.
- Developed ex US small-cap valuations have declined significantly this year. As of September 30, developed ex US small-cap valuations were trading at 9.6x cyclically adjusted price-to-cash earnings (CAPCE) ratio, in the 20th percentile of historical observations. On a relative basis, small-cap valuations are in the 19th percentile versus their large/mid-cap counterparts.
- From a relative sector exposure standpoint, the developed ex US small-cap segment is overweight cyclicals—particularly real estate and industrials—vis-à-vis its large/mid-cap counterpart, though this is partially offset by a large underweight to financials. However, the defensive and higher-quality consumer staples and healthcare sectors are meaningfully underrepresented in the small-cap universe.
- Superior long-term earnings growth has helped developed ex US small caps outperform their large/mid-cap counterparts over time. Over the last 15 years, world ex US small caps compounded real cash earnings per share grew by 2.4% per annum, while real EPS for large/mid-caps has fallen.
- The developed ex US small-cap universe is arguably less efficient than the larger-cap space. Therefore, the former may provide more opportunities for active managers to add value over time.

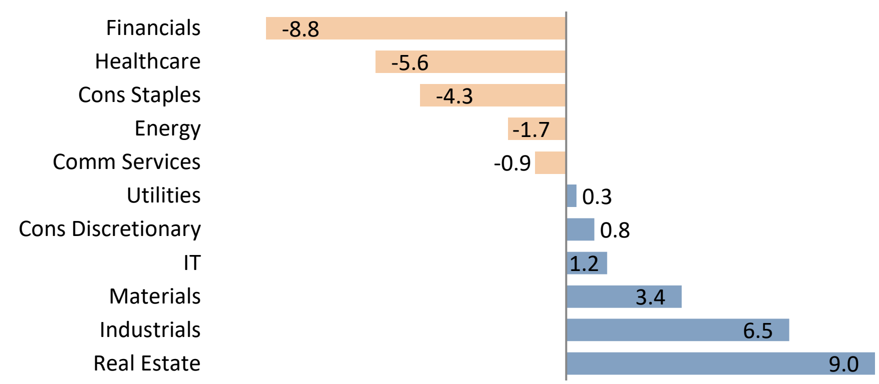
RELATIVE 5-YR CAPCE: MSCI WORLD EX US SC VS LC/MC

May 31, 1999 – Sep 30, 2022



RELATIVE SECTOR WEIGHTS: MSCI WORLD EX US SC MINUS WORLD EX US LC/MC

As of Sep 30, 2022 • Percentage Points



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

Note: CAPCE ratios based on five-year average inflation-adjusted cash earnings.

Emerging Markets Small-Cap Equities

Facts & Figures Third Quarter 2022

EM small caps returned -5.3% in USD terms in 3Q, bringing YTD performance to -24.2%. EM small caps have outperformed their large/mid-cap peers this year and over the trailing three- and five-year periods. Small caps have been relatively insulated from developments out of China, given differences in sector composition and lower index concentration, but remain exposed to many of the prevailing macroeconomic headwinds today.

- EM small-cap valuations came down in 3Q, reaching their lowest levels since mid-2020. Multiples have derated 29% from recent peak levels hit in June last year. Valuations relative to the broader EM index have rallied, ending 3Q at the 74th percentile versus 22nd percentile levels during the market's COVID-19 sell-off.

- EM small caps are less exposed than large caps to the financials, communication services, and information technology sectors, and relatively overweight industrials, real estate, and health care. Relative to large caps, small caps carry a much smaller weighting to China, modest overweights to India, Taiwan, and Korea, and largely similar exposure to other countries.

- The EM small-cap index is far less concentrated than the large- and mid-cap EM index. The small-cap index allocates a total weight of 3% to its largest ten stocks, compared to about 22% for the broad index.

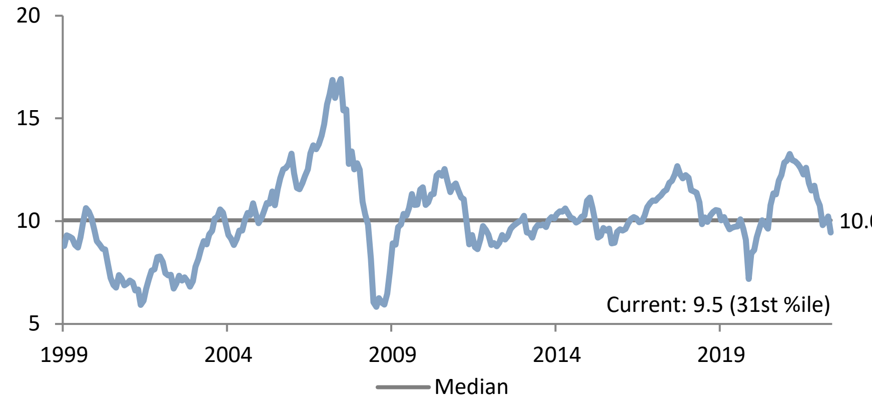
- EM small caps offer a dividend yield of 3.5%, which is at the 97th percentile since 1994 and 46% above its historical average. The small cap index yield is on par with that of the broader EM index.

- EM small cap ROE fell 60 bps to 9.4% (79th percentile) as of third quarter end. ROE relative to the broader EM index fell to a similar extent, ending 3Q at 0.71 (90th percentile) versus historical median relative ROE of 0.60.

- While boosters may expect stronger growth from small-cap firms, the reality over the past two decades has been that real per-share earnings growth for small caps has lagged large and mid-caps, and that large and mid-caps have on average had much higher return on equity.

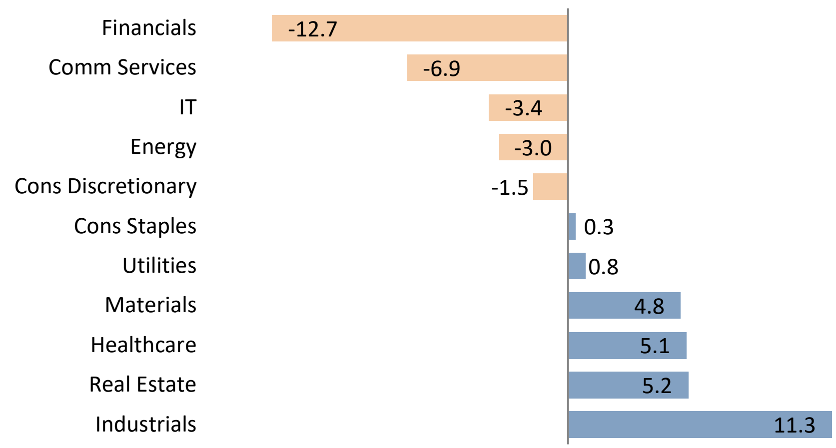
CYCLICALLY ADJUSTED PRICE-TO–CASH EARNINGS: MSCI EM SMALL CAP

May 31, 1999 – Sep 30, 2022



RELATIVE SECTOR WEIGHTS: EM SC MINUS LC/MC

As of Sep 30, 2022 • Percentage Points



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

Note: EM Small-Cap CAPCE based on five-year average real cash earnings.

US Growth and Value Equities

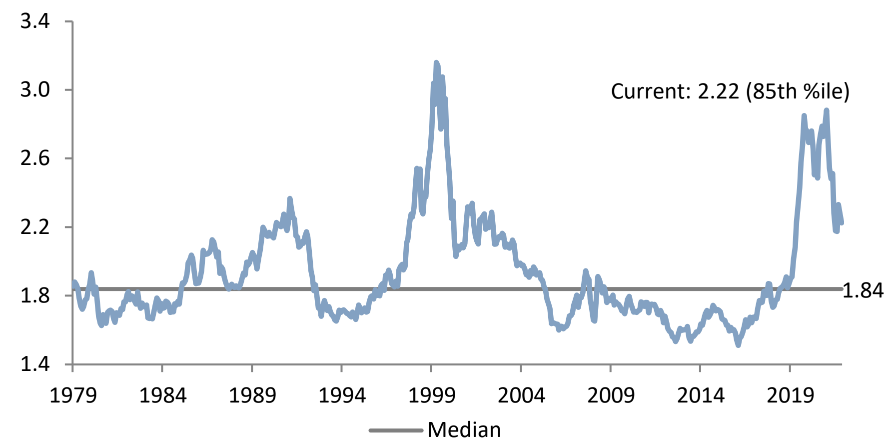
Facts & Figures Third Quarter 2022

US growth stocks declined 3.6% in 2Q, besting US value stocks (-5.9%) by 234 bps as broader equity markets continued to stumble amid rising rates and growing recessionary fears. Value stocks have bested growth stocks by 16 ppts over the past 12 months.

- Growth stocks started the quarter on a high note, posting a 13.3% gain in July and outperforming value by nearly 8 ppts as markets perceived the Federal Reserve to be relenting on its future pace of policy tightening. However, those dynamics quickly changed in the latter half of the quarter, as persistent inflationary readings led to more stern policy messaging from central bank officials. Growth stocks, which tend to be more sensitive to rising interest rates than value stocks, suffered steeper declines in the latter half of the quarter.
- Based on the cyclically adjusted price-to-cash earnings (CAPCE) ratio, the MSCI US Growth Index trades at 2.2 times the valuation of the MSCI US Value Index. That relative ratio is in the 85th percentile of historical observations. Growth is also more elevated than value on an absolute basis. It currently sits in the 86th percentile versus its respective history since November 1979, compared to 64th percentile for value.
- Growth stocks have traditionally generated higher return on equity (ROE) than value counterparts. Today's wide ROE spread is partly driven by differences in sector exposures—technology and financials most prominently—and helps to explain the current valuation disparity between the growth and value indexes.
- Technology stocks have largely driven the US market's profitability, growth, and price performance over the past decade. Today the IT sector plus just two other stocks (Amazon and Alphabet) make up nearly 60% of the growth index. In comparison, IT is just 10% of the value index. In addition, the value index has an 18% weighting to financials, whose profitability has considerably weakened due to stricter regulation and rising disruption.

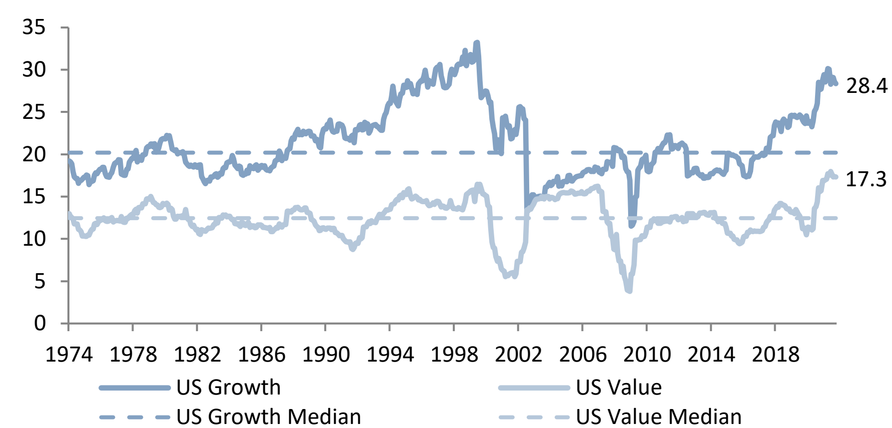
RELATIVE 5-YR CAPCE: MSCI US GROWTH VS US VALUE

Nov 30, 1979 – Sep 30, 2022



ROE: MSCI US GROWTH VS US VALUE

Dec 31, 1974 – Sep 30, 2022 • Percent (%)



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

Developed Markets Equity Factors

Facts & Figures Third Quarter 2022

Momentum (-3.2%), and size (-4.3%) held up better than the MSCI World Index (-4.4%) in third quarter, as market volatility continued amid concerns about inflation and the trajectory of central bank policy tightening. Quality (-5.9%) trailed the broader index by the widest margin, while value (-4.9%) and minimum volatility (-4.8%) also lagged. Over the past 12 months, minimum volatility and value have fared best among major factors, outpacing the MSCI World Index by 8 ppts and 7 ppts, respectively.

- After topping all other major factors in 2021, quality has stumbled the most in 2022. Central banks have continued to aggressively hike rates, pressuring longer-duration growth-oriented sectors. Information technology, which tends to have a higher implied equity duration than other sectors, makes up over 30% of the MSCI World Quality Index.

- Minimum volatility has held up better than other factors this year, as would typically be expected in an environment of high volatility. Still, minimum volatility has had a challenging run over the past several decades. Since the GFC, it has trailed the MSCI World Index by the largest margin among major factors.

- Valuations declined further across all factors in third quarter. Minimum volatility and quality command the richest valuations. Momentum trades at lower valuations than other major factors after a 23% sell-loff year-to-date.

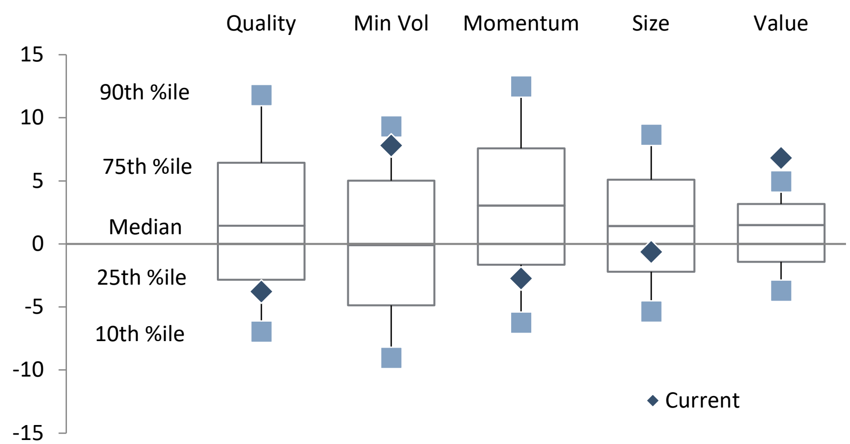
- The P/B ratio tends to have the strongest relationship to subsequent five-year returns across factors, but the strength of the relationship varies by factor. For instance, the relationship between starting valuation and subsequent returns is weak for the momentum factor, which overweights recent outperformers and has an exceptionally high turnover ratio (109% as of September).

- Because the excess returns across several strategies have low or negative correlations with each other, combining these factors can add a diversification benefit. For example, value and momentum had strongly negative correlations over the trailing five-year period, suggesting that certain combinations of factors may work together to smooth out the overall pattern of portfolio outperformance over time.

- Quality, minimum volatility, momentum, size, and value are five factors primarily cited in academic research. These factors represent market premiums that have all shown superior risk/return characteristics compared to broad-market benchmarks.

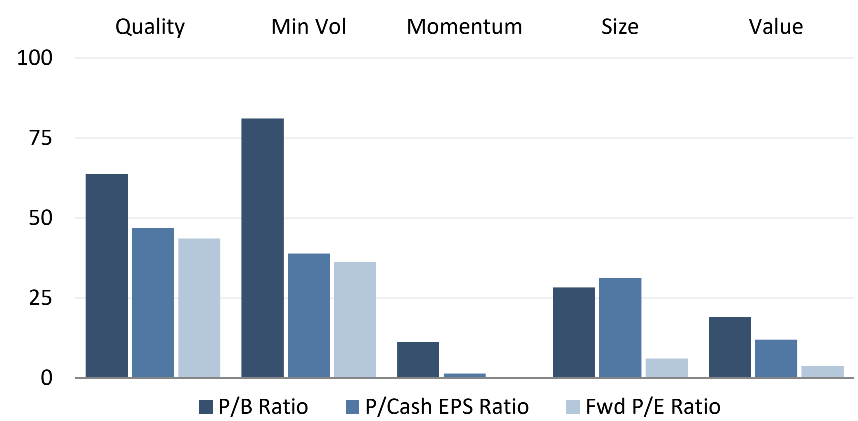
FACTOR RETURNS IN EXCESS OF DEVELOPED MARKETS EQUITIES

As of Sep 30, 2022 • Rolling 12M • Percent (%)



CURRENT VALUATION PERCENTILE RANKING BY FACTOR

As of Sep 30, 2022



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

Hedge Funds

Facts & Figures Third Quarter 2022

Stocks and bonds posted three consecutive quarters of negative returns—the first time in five decades. Uncertainties around inflation, interest rates, geopolitical events, and a US-led recession continue to be at the forefront. Diversifiers continued to perform, while long/short equity and event driven posted another quarter of declines.

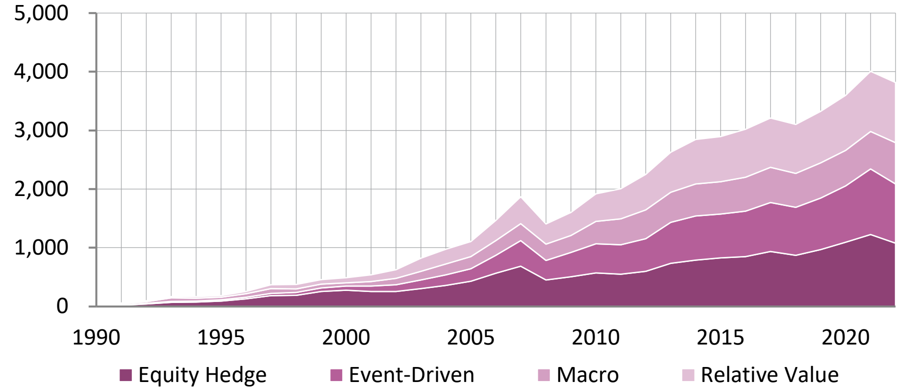
- Among diversifiers, global macro was the quarter's best-performing hedge fund strategy, gaining 1.7% as proxied by HFR Global Macro (Total), while HFR Relative Value: Fixed Income - Sovereign Index returned -0.8%. The average Global Macro fund initially underperformed in first half Q3 as markets bounced off the June lows. However, as inflation concerns returned and the Fed stepped up its rhetoric on fighting inflation, Global Macro was able to profit from its bearish fixed income and bullish US dollar stance, extending its year-to-date gains to 10.3%. Fixed Income Relative Value started the quarter on a positive note, but unexpected policy actions in the UK caused turmoil in the interest rate–sensitive strategies, dragging down returns to end the quarter slightly down.

- Long/short equity funds declined yet again in 3Q thanks to a challenging September with the HFRI Equity Hedge (Total) Index down an additional -2.7%, bringing year-to-date results to -14.1%. Some managers opportunistically added to longs and shorts. Changes to long exposure appear to be centered on companies with earnings, cash flows, and pricing power amid an inflationary environment. Managers are excited about the short side, stating that the summer rally allowed them to revisit shorts that worked earlier in the year, while competition has decreased since the meme short squeeze phenomenon in 1Q 2021 drove many players away from single security shorts. Furthermore, higher interest rates provide a tailwind to shorting, a benefit that was missing for much of the last decade.

- The HFRI Event-Driven (Total) Index ended the quarter down (-0.7%), with much of the drawdown occurring in September (-3.5%), but significantly outperformed volatile global equity indexes. Managers are taking a cautious stance and reporting lower invested levels as they look to navigate market uncertainty and various economic outcomes, including a potential recession. Event-driven and multi-strategy funds faced a difficult quarter as credit spreads widened and "value" areas of the market traded lower. Merger arbitrage opportunities remain sparse, but stressed and distressed credit is starting to become attractive, leading some previously closed managers to open to new capital.

HFRI HISTORICAL ASSET GROWTH BREAKOUT

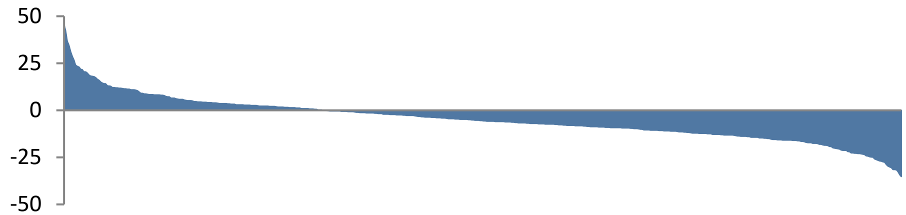
1990–2022 (Jun) • US$B



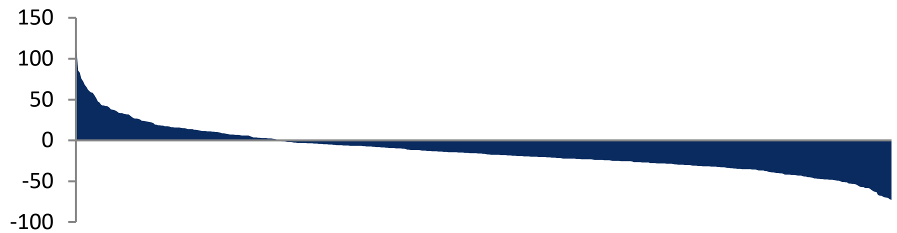
EQUITY DISPERSION: TOTAL RETURNS FOR THE S&P 500 CONSTITUENTS

As of September 30, 2022

Trailing 3-Month Returns (%)



Trailing 12-Month Returns (%)



Sources: Hedge Fund Research, Inc., FactSet Research Systems, and Standard & Poor's.

Note: 2022 HFRI data are as of June 30.

FIXED INCOME

CAMBRIDGE ASSOCIATES

US Bonds

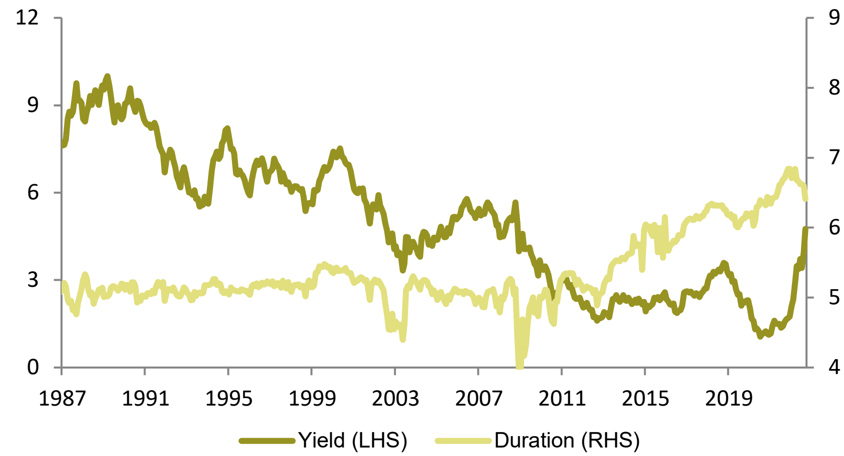
Facts & Figures Third Quarter 2022

Core US bonds are on track for their worst ever full-year performance. The Fed has continued to hike given elevated inflation readings, and quantitative tightening is also putting upward pressure on yields.

- The Bloomberg US Aggregate Bond Index returned -4.8% in Q3, bringing its YTD loss to -14.6%. The Bloomberg Aggregate Index dates to the late-1970s and the previous worst ever annual return was -2.9% in 1994.
- The Fed has hiked its target rate by 300 bps YTD and suggested it may keep hiking through the first part of 2023. The Fed has also started letting assets on its balance sheet mature, though it will take a long time to materially dent its $9T of bond holdings.
- Inflation remains well above the Fed's target levels. While CPI has come down slightly since June, the August reading of 8.3% year-over-year suggests price pressures remain widespread.
- The index yield has risen 300 bps YTD to 4.8%, its highest level since 2008. Higher yields should improve the ability going forward of traditional 70/30 or 60/40 stock/bond portfolios to cushion equity market volatility and meet investors' spending needs.
- The Bloomberg Aggregate Index has a high-quality asset mix—around 70% of the index carries an AAA rating, and most of this is either a direct or indirect obligation of the federal government. Just 14% of the index consists of corporate bonds carrying a rating of BBB or below.
- The 2022 fixed income sell-off has been driven more by rising base (Treasury) rates than fears over weakening higher quality credit fundamentals. The relatively high duration of the index (over 6 years) left it poorly positioned for an unexpected spike in benchmark rates.
- Credit spreads were relatively stable in Q3. For example, the option-adjusted spread on investment-grade corporate bonds (around 24% of the index) is now 159 bps, in the 78th percentile of observed values.

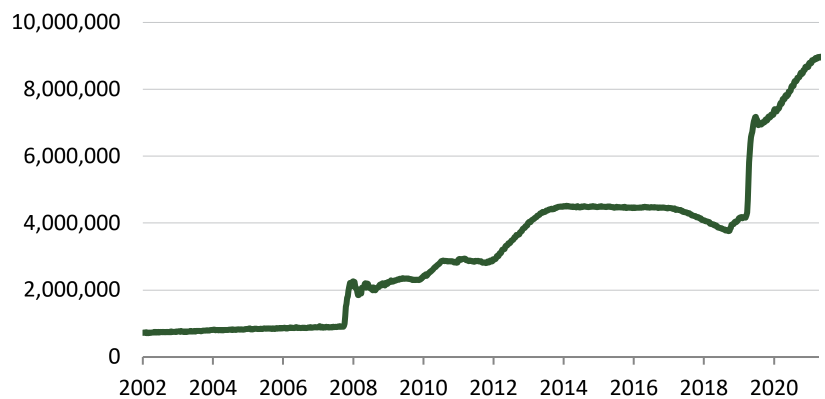
YIELD VS DURATION: BBG US AGGREGATE BOND INDEX

Jan 31, 1987 – Sep 30, 2022



FED BALANCE SHEET TOTAL ASSETS

Dec 18, 2002 – Sep 30, 2022 • US$M



Sources: Bloomberg Index Services Limited, Federal Reserve Bank of St. Louis, and Thomson Reuters Datastream.

Notes: Fed balance sheet assets are weekly and not seasonally adjusted. Total assets are less eliminations from consolidation.

US Treasuries

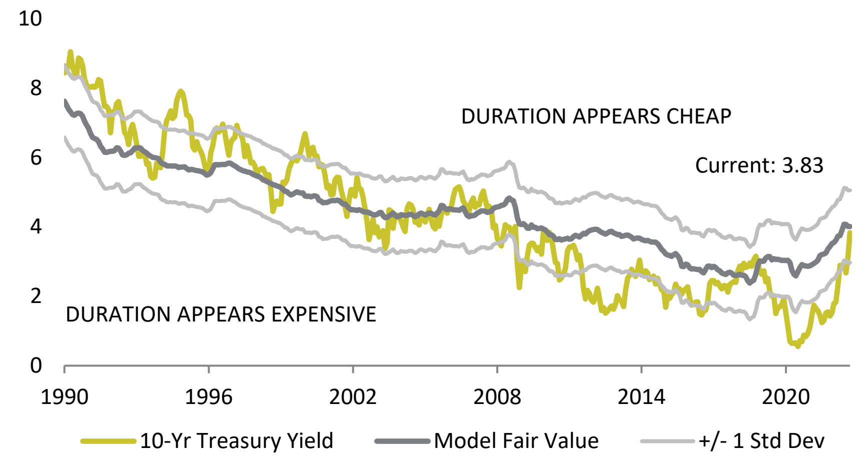
Facts & Figures Third Quarter 2022

The Bloomberg US Treasury Index returned -4.3% in 3Q and is down 13.1% YTD, marking its worst year on record since 1973. Low initial yields and aggressive tightening by central banks in response to stubbornly high inflation have weighed on US Treasuries this year.

- The Fed raised the range of its target policy rate by 150 bps to 3.00%–3.25% in 3Q. It has raised its target policy rate by a total of 300 bps this year, which makes it one of the fastest tightening cycles in the last 40 years. The Fed has signaled it plans to hike rates by at least another 125 bps by mid-2023, which is in line with market expectations.
- The repricing in rates markets has put upward pressure on Treasury yields across the curve. The policy-sensitive two-year yield increased 130 bps in 3Q (+349 bps YTD) and the ten-year yield rose 85 bps (+231 bps YTD). The ten-year/two-year yield spread is inverted at –39 bps.
- Long-dated US Treasuries are more attractively priced following this year's bond sell-off. Ten-year Treasuries are yielding 3.8%, their highest rate since 2010, and they are trading in line with long-term economic fundamentals, based on trailing ten-year nominal GDP growth (4.0%).
- Looking ahead, consensus is forecasting US nominal GDP growth of 5% in 2023—1% real GDP growth and 4% headline CPI growth—which is slightly above trend. This suggests yields could overshoot their implied fair value, especially if inflation remains sticky and the Fed must tighten policy more than expected. Core CPI accelerated 6.3% year-over-year in August, which was faster than expected.
- Treasuries also face headwinds from reduced demand. Some of the largest private holders (i.e., foreigners, domestic banks, etc.) have shed Treasuries amid the rise in yields and the Fed increased its monthly cap for its balance sheet run-off from $47.5 billion to $95 billion last month.
- Mounting concerns about weaker growth could eventually support Treasuries. The US economy had back-to-back quarters of negative GDP growth in the first half of 2022 and real-time indicators, such as PMI surveys, suggest economic activity is contracting.
- Treasuries look extremely oversold following this year's sell-off. The trailing 12-month price momentum for ten-year Treasuries hit its lowest level on record in September, dating back to 1980.

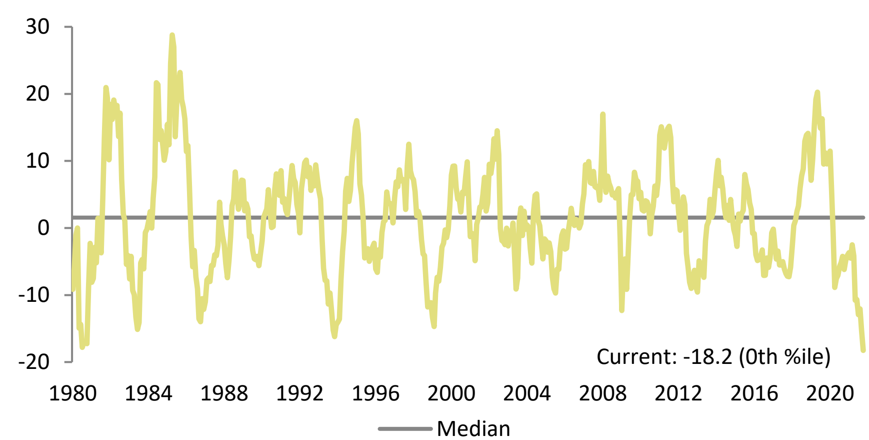
VALUATIONS: 10-YR TREASURY

Jan 31, 1990 – Sep 30, 2022 • Percent (%)



12-MONTH PRICE MOMENTUM: 10-YR TREASURY

Dec 31, 1980 – Sep 30, 2022 • Percent (%)



Sources: Federal Reserve and Thomson Reuters Datastream.

Note: The Model Fair Value is the predicted range of ten-year yields based on a multiple linear regression model that includes trailing ten-year real GDP and CPI change. CPI data are as of August 31, 2022

US Cash

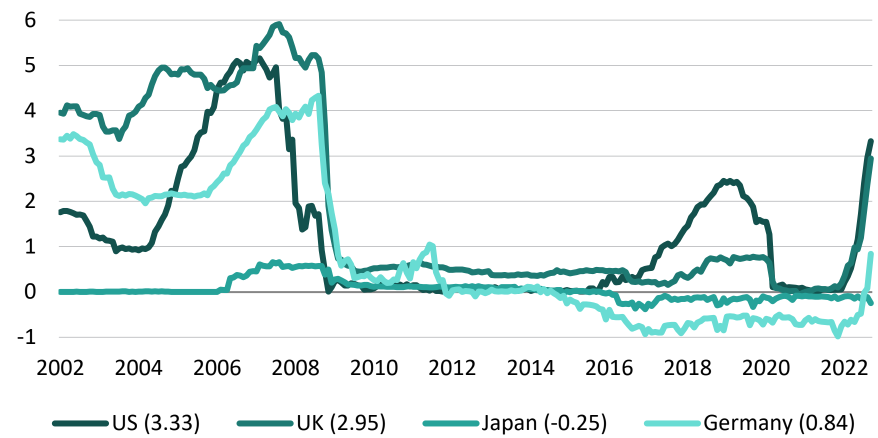
Facts & Figures Third Quarter 2022

Central banks continued to tighten monetary policies in 3Q in response to persistently high inflation. Cash yields in the US, UK, and Germany have notably increased this year.

- The Fed, BOE, and ECB raised their policy rates by 150 bps, 100 bps, and 125 bps, respectively, in the third quarter. Cash yields spiked as a result. US T-bill (3.33%) and UK cash yields (2.95%) are at their highest levels since the GFC, while German cash yields (0.84%) are at their highest level since the European Sovereign Debt Crisis. All three central banks are expected to keep tightening monetary policies, which should keep upward pressure on cash yields in the near term.
- Historically, we have recommended that investors minimize cash holdings, given the risk that inflation erodes the value of cash in real terms and the opportunity costs associated with not investing in assets with higher return potential. While the opportunity cost of holding cash has gone down this year as yield curves have flattened, it has done its job and protected and now there is more carry on offer for risk-averse investors looking to deploy capital in fixed income.
- Cash should be a stable source of returns across several economic environments, and its minimal duration risk should provide downside protection if interest rates continue to rise. However, holding cash for an extended period would be challenging and cash would likely struggle to provide ballast during periods of market stress.
- Cash holdings are important for near-term liquidity needs, particularly for investors that have heavy operational spending, significant unfunded commitments, or that have currency and other hedging overlays. Several factors, including the rapid rise in interest rates, have contributed to a deterioration in liquidity conditions.
- Investors choosing to hold cash for near-term liquidity purposes should stick to secure instruments such as US T-bills. In the Eurozone, cash should be kept in a core country bank within prudent limits. Investors that choose the money market option should review relevant documentation and ensure such funds are not exposed to risks related to securities lending. Money market fund shareholders should beware of gating and floating-NAV provisions, which are much more likely to be used during periods of severe financial stress.

T-BILL RATES

Jan 31, 2002 – Sep 30, 2022 • Percent (%)



MARKET EXPECTATIONS FOR FUTURE CENTRAL BANK RATES

As of Sep 30, 2022 • Percent (%)

	CURRENT	3M	6M	1Y	2Y
UK	2.25	4.12	5.33	5.53	5.15
Japan	-0.10	-0.03	0.01	0.10	0.21
EU	0.75	1.88	2.55	2.82	2.65
US	3.13	4.24	4.51	4.39	3.82

Sources: Bloomberg L.P. and Thomson Reuters Datastream.

Notes: ECB data represented by the ECB overnight deposit rate. Feds funds target range is 3.00%-3.25%. The mid-point of 3.13% is used for future market expectations.

US Corporate Bonds

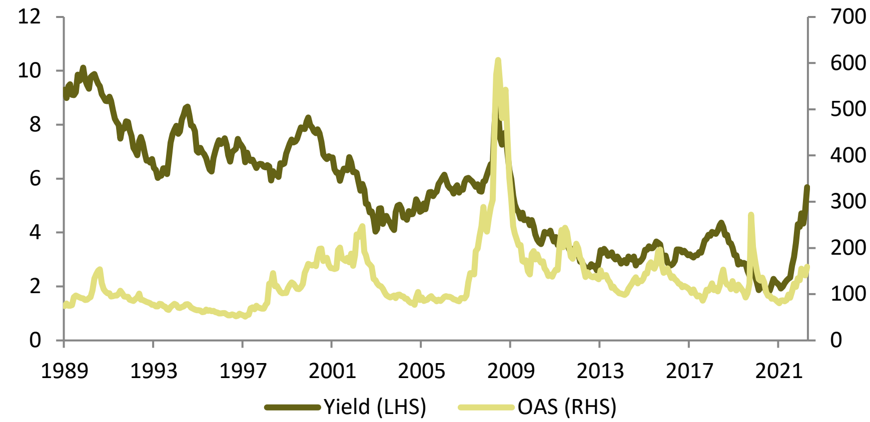
Facts & Figures Third Quarter 2022

Investment-grade corporate bonds are on track for their worst ever calendar-year performance in 2022 as inflationary pressures continue to force the Fed to hike rates. Spreads now look elevated relative to historical medians but rising Treasury yields remain a risk.

- The Bloomberg Corporate Investment-Grade Index returned -5.1% in Q3, bringing its YTD loss to -18.7%. The index is on track for an even larger loss in 2022 than seen during the depths of the 2008–09 financial crisis.
- Yields have more than doubled since January to 5.7%. Much of the rise in yields was driven by the underlying move in benchmark yields. The Fed has hiked rates 300 bps thus far in 2022 and indicated it will continue to tighten into early 2023.
- The 159 bp option-adjusted spread has risen over 60 bps since the start of the year and is in the 78th percentile of observed values.
- The macro backdrop for US corporates is deteriorating as high inflation takes its toll on consumer and corporate confidence. Corporate profit growth is tapering off as margins compress and prospects for stimulative fiscal or monetary seem dim.
- The Fed has begun shrinking its balance sheet in Q2, though it will take time to make a sizable dent in its $9T of holdings. The Fed is likely to proceed cautiously to ensure the combination of rate hikes and asset reduction isn't more disruptive than desired.
- Investment-grade fundamentals have recovered after COVID-related deterioration. After TTM EBITDA for investment-grade issuers rose 22% year-over-year in Q2 2022, J.P. Morgan reports that gross leverage stood at 2.9x EBITA, down slightly from pre-COVID 2019 levels.
- The pace of new issue supply is slowing as rates rise and economic uncertainty grows. Year-to-date, there has been around $430 billion of net investment-grade bond supply, well below the pace set in 2021 (when FY supply reached $561 billion).

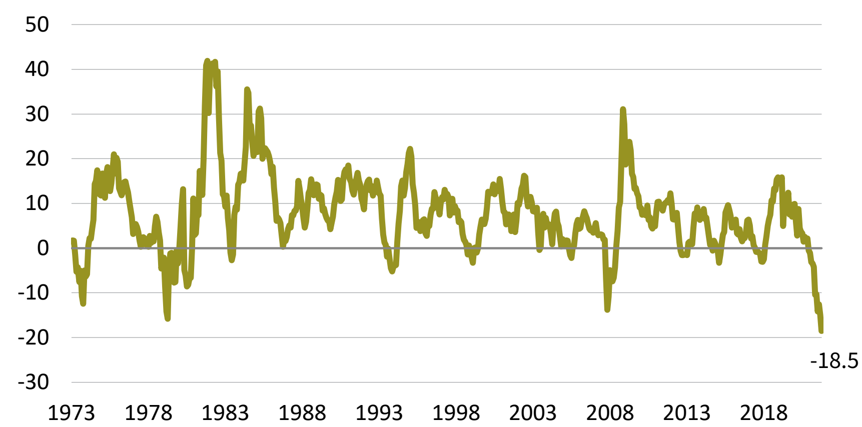
YIELD AND OPTION-ADJUSTED SPREAD: US INVESTMENT-GRADE CORPORATES

Jun 30, 1989 – Sep 30, 2022 • Percent (%)



TRAILING 12-MONTH RETURN: US INVESTMENT-GRADE CORPORATES

Dec 31, 1973 – Sep 30, 2022 • Percent (%)



Sources: Bloomberg Index Services Limited and Thomson Reuters Datastream.

US Tax-Exempt Bonds

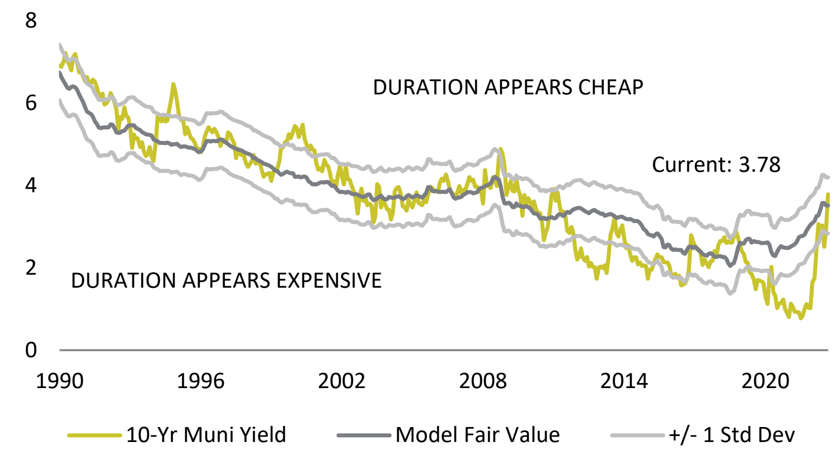
Facts & Figures Third Quarter 2022

US municipal bonds have struggled this year amid the broad sell-off in fixed income, but they have held up relative to US Treasuries thanks in large part to supportive technicals and better relative value versus Treasuries.

- The Bloomberg Municipal Bonds Index returned -3.5% in 3Q and is down 12.1 YTD, compared to the Bloomberg US Treasury Index, which returned -4.3% in 3Q and is down 13.1% YTD.
- Aggressive tightening by central banks in response to stubbornly high inflation has put upward pressure on bond yields. The Fed raised the range of its target policy rate by 150 bps to 3.00%–3.25% in 3Q. It has raised its target policy rate by a total of 300 bps this year, which makes it one of the fastest tightening cycles in the last 40 years. The Fed has signaled it plans to hike rates by at least another 125 bps by mid-2023, which is in line with market expectations.
- Ten-year muni yields increased another 75 bps in 3Q and are up 276 bps YTD. Long-dated munis appear more attractively priced following this year's sharp rise in yields. Ten-year munis are yielding 3.8%, their highest rate since 2011, and they are trading slightly above their implied fair value, based on trailing ten-year nominal GDP growth, adjusted for taxes.
- The rise in muni yields this year has been accompanied by a massive rise in investor outflows. According to ICI, investors have withdrawn a record $80B from municipal bond funds in 2022.
- While outflows have been a headwind, muni issuance and fundamentals have been supportive, allowing munis to holdup relative to Treasuries when compared to previous outflow cycles. Sell-side analysts are forecasting net negative bond supply in 2022 and muni bond issuers are still benefiting from strong domestic economic activity, unspent federal stimulus funds, and strong tax collections.
- The ten-year muni/Treasury ratio has increased 32 bps this year to 0.99, though, it has come down from its recent highs earlier this year. That said, the after-tax yield pick-up over Treasuries looks attractive further out the curve. The taxable-equivalent ten-year Muni/Treasury ratio is 1.57 (79th percentile), versus 1.07 to start the year.

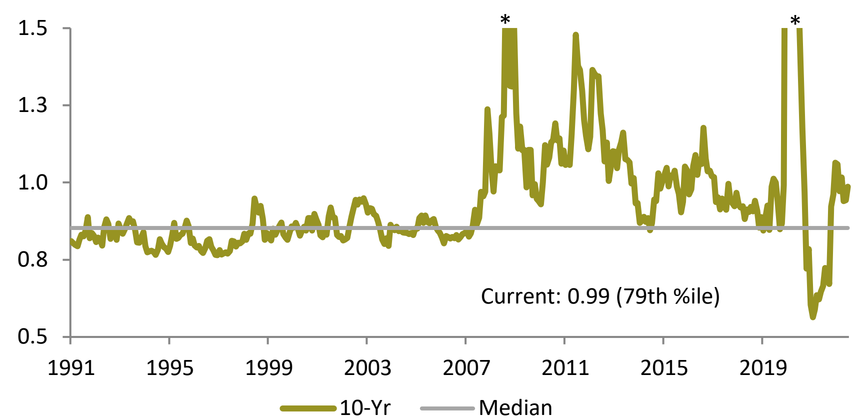
VALUATIONS: 10-YR MUNI

Jan 31, 1990 – Sep 30, 2022 • Percent (%)



RATIO OF 10-YR MUNI YIELDS TO TREASURY YIELDS

Apr 30, 1991 – Sep 30, 2022



* Axis is capped for scaling purposes. Ratio hit a high of 3.16 on 4/30/2020.

Sources: Bloomberg Index Services Limited and Thomson Reuters Datastream.

Note: The Model Fair Value is the predicted range of ten-year yields based on a multiple linear regression model that includes trailing ten-year real GDP and CPI change. CPI data are as of August 31, 2022

US Inflation-Linked Bonds

Facts & Figures Third Quarter 2022

US TIPS underperformed US Treasuries in 3Q as tighter monetary policy and weaker growth caused real yields to spike and breakeven inflation rates to fall, despite persistently high inflation.

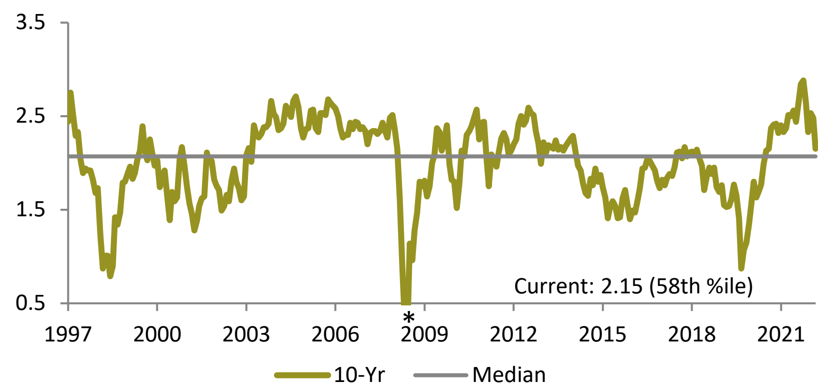
- The Bloomberg US TIPS Index returned -5.1% in 3Q and is down -13.6% YTD, compared to the Bloomberg US Treasury Index, which returned -4.3% in 3Q and is down 13.1% YTD.
- US real yields surged in 3Q and are now positive across the curve. Two-year real yields increased 244 bps to 2.2% and ten-year real yields rose 95 bps to 1.7%. Ten-year real yields appear more attractively priced following the rapid rise in yields last quarter. They are at their highest point since late-2009 and trade slightly above their implied fair value, based on trailing ten-year real GDP growth.
- The Fed raised the range of its target policy rate by 150 bps to 3.00%–3.25% and has raised its target policy rate by a total of 300 bps this year, making it one of the fastest tightening cycles of the previous 40 years. The Fed has signaled it plans to hike rates by at least another 125 bps by mid-2023, which is in line with market expectations.
- The Fed's aggressive tightening and forward guidance put significant upward pressure on real yields in 3Q, which rose more than nominal yields, given their sensitivity to policy expectations. As a result, breakeven inflation rates plummeted. One-year breakevens fell nearly 300 bps to 1.39% and ten-year breakevens declined 18 bps to 2.15%.
- Fed tightening, weaker growth, and potentially slower inflation are headwinds for TIPS in the near-term, in addition to rising recession risk and generally poor market liquidity conditions. TIPS are less liquid than Treasuries, which has led to challenging trading conditions and periods of underperformance during previous periods of severe markets stress.
- However, TIPS are one of the few assets that can help support spending and other cash needs in the event of unexpectedly high inflation (TIPS coupons are contractually linked to CPI. US core CPI accelerated 6.3% year-over-year in August , which was faster than expected. If inflation remains high, then TIPS may offer value over the medium-term on an absolute basis and relative to nominal equivalents, given higher real yields and low breakeven inflation rates.

HISTORICAL YIELD: 10-YR TIPS

Jan 31, 1997 – Sep 30, 2022 • Percent (%)

10-YR BREAKEVEN INFLATION

Jul 31, 1997 – Sep 30, 2022 • Percent (%)



* Capped for scale purposes. 10-Yr BE Inflation hit a low of 0.11% on 12/31/2008.

Sources: Bloomberg Index Services Limited, Global Financial Data, Inc., and Thomson Reuters Datastream.

Global Inflation-Linked Bonds

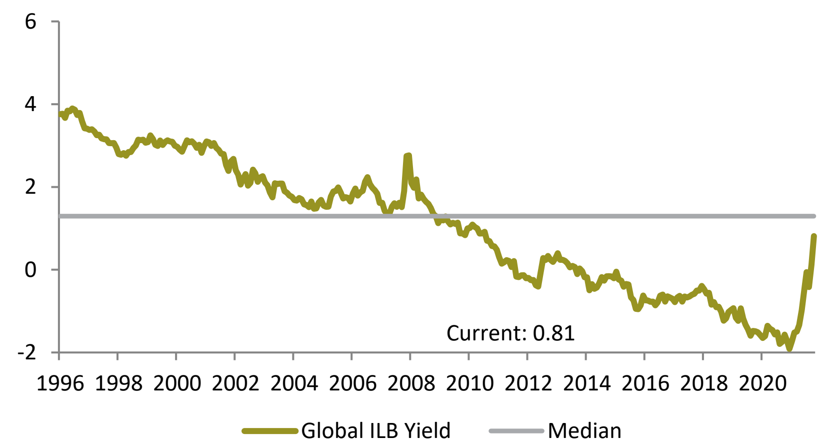
Facts & Figures Third Quarter 2022

GILBs underperformed global Treasuries in 3Q as tighter monetary policy and weaker growth caused real yields to spike and breakeven inflation rates to fall, despite persistently high inflation.

- The Bloomberg Global Inflation-Linked Bond Index returned -10.0% in 3Q and is down 26.0% YTD, compared to the Bloomberg Global Treasury Index, which returned -7.6% in 3Q and is down -21.3% YTD.
- Central banks continued to aggressively tighten monetary policies in 3Q. The Fed, BOE, and ECB raised their policy rates by 150 bps, 100 bps, and 75 bps, respectively, and they signaled they plan to continue raising rates beyond what was previously expected. According to rates markets, investors increased their forecasts of the terminal policy rate to 5.5% in the UK, 4.5% in the US, and 2.8% in the euro area.
- The repricing in rate expectations put significant upward pressure on global real yields in 3Q, given their sensitivity to policy expectations. Global real yields spiked 87 bps to 0.81% and are up 254 bps YTD.
- Global real yields appear more attractively priced following the rapid rise in yields last quarter. Real yields are positive for the first time since 2014 and are at their highest point since 2011, though, they are still slightly below their historical median of 1.3% and trade below their implied fair valued, based on trailing ten-year real global GDP growth.
- The aggressive tightening by global central banks has also caused breakeven inflation rates to decline globally, despite persistently high inflation. Year-over-year G7 CPI rose 7.5% in August.
- Continued tightening by global central banks, weaker growth, and potentially slower inflation are headwinds for GILBs in the near-term, in addition to rising recession risk and generally poor market liquidity conditions. GILBs are less liquid than global Treasuries, which has led to challenging trading conditions and periods of underperformance during previous periods of severe markets stress.
- However, GILBs are one of the few assets that can help support spending and other cash needs in the event of unexpectedly high inflation. If inflation remains higher, then GILBs may offer value over the medium-term on an absolute basis and relative to nominal equivalents, given higher real yields and low breakeven inflation rates.

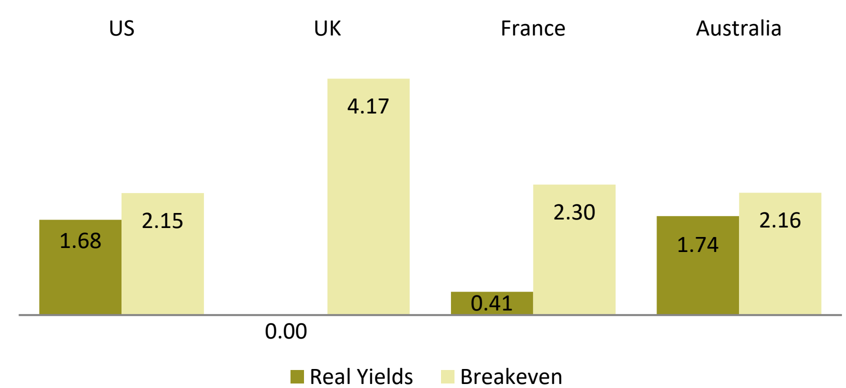
HISTORICAL INDEX YIELD: BBG GLOBAL LINKERS

Dec 31, 1996 – Sep 30, 2022 • Percent (%)



10-YR REAL YIELDS AND BREAKEVEN INFLATION

As of Sep 30, 2022 • Percent (%)



Sources: Bloomberg Index Services Limited and Thomson Reuters Datastream.

Notes: France data are based on the underlying securities within the Bloomberg Global Agg Treasuries and Bloomberg World Govt Inflation-Linked indexes. All other data are based on the Bloomberg real yield and breakeven series.

UK Gilts

Facts & Figures Third Quarter 2022

The Bloomberg Sterling Gilts Index returned -13.6% in 3Q and is down 26.4% YTD. Low initial yields, aggressive tightening by central banks, and recently, concerns about debt sustainability, have weighed on UK gilts this year.

- The BOE raised its main bank rate by 100 bps to 2.25% in 3Q and it has increased its bank rate by a total of 200 bps this year. Investors anticipate the BOE will need to raise its bank rate another 225 bps to 5.5% by the end of 2023 to bring down elevated inflation.

- The repricing in rates markets has put upward pressure on gilt yields across the curve. The two-year yield increased 233 bps in 3Q (+360 bps YTD), and the ten-year yield rose 189 bps (+313 bps YTD).

- The rise in gilt yields last quarter was exacerbated by the UK government's mini-budget. The budget proposed several tax cuts and estimated the cost of the energy subsidy plan to be £60 billion for the next six months, which fueled concerns about long-term debt sustainability. Additionally, some pension funds, which use leverage to buy long-dated gilts for liability hedging were forced to sell in response to margin calls. The BOE ultimately intervened to stabilize the market by temporarily buying long-dated gilts.

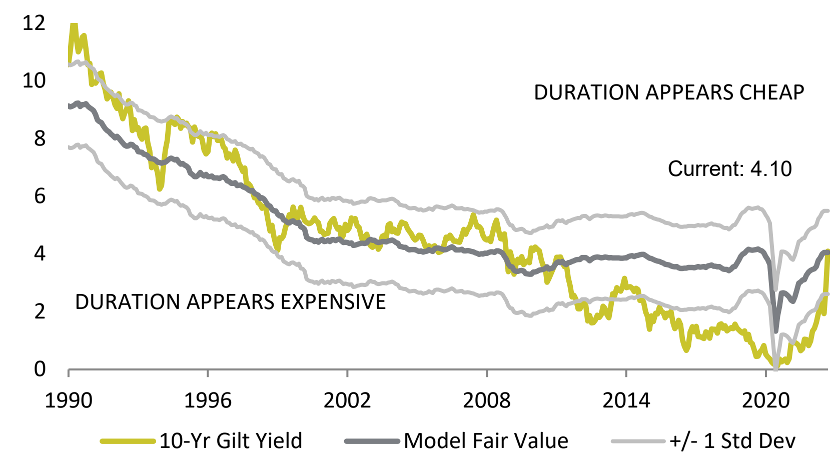
- Long-dated UK gilts appear more attractively priced following this year's sharp rise in yields, but they are not outright cheap. Ten-year gilts are yielding 4.1%, their highest rate since 2010, and they are trading in line with their long-term economic fundamentals, based on trailing ten-year nominal GDP growth (4.1%).

- Looking ahead, consensus is forecasting UK nominal GDP growth of 5.8% in 2023 (-0.4% real GDP growth and 6.2% headline CPI growth), which is slightly below trend. The weakening growth outlook could eventually support gilts, but there is a risk gilt yields overshoot their implied fair value in the face of stubbornly high inflation and overtightening by the BOE. UK CPI accelerated 9.9% year-over-year in August, and core CPI, which excludes energy and food prices, remained elevated at 6.3%.

- Though, gilts look massively oversold following this year's sharp rise in yields. The trailing 12-month price momentum for ten-year gilts hit its lowest level on record in September, dating back to 1980.

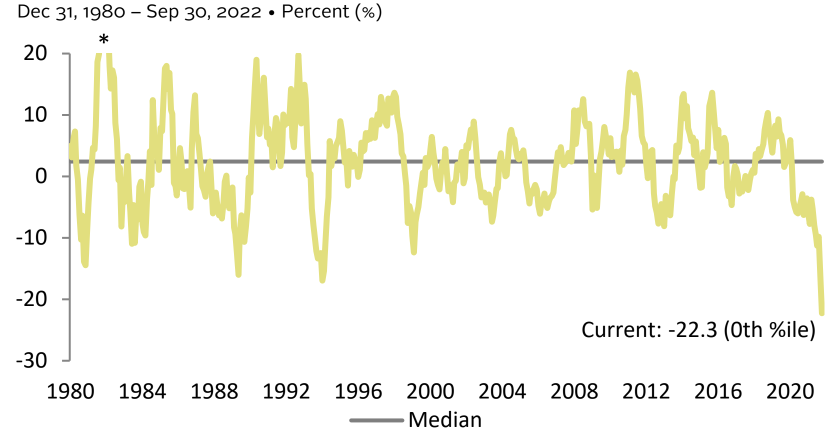
VALUATIONS: 10-YR GILTS

Jan 31, 1990 – Sep 30, 2022 • Percent (%)



12-MONTH PRICE MOMENTUM: 10-YR GILTS

Dec 31, 1980 – Sep 30, 2022 • Percent (%)



* Capped for scale purposes. The rolling 12-M Momentum was 44.5% in October 1982.

Source: Thomson Reuters Datastream.

Note: The Model Fair Value is the predicted range of ten-year yields based on a multiple linear regression model that includes trailing ten-year real GDP and RPI/CPI change. CPI data are as of August 31, 2022.

UK Corporate Bonds

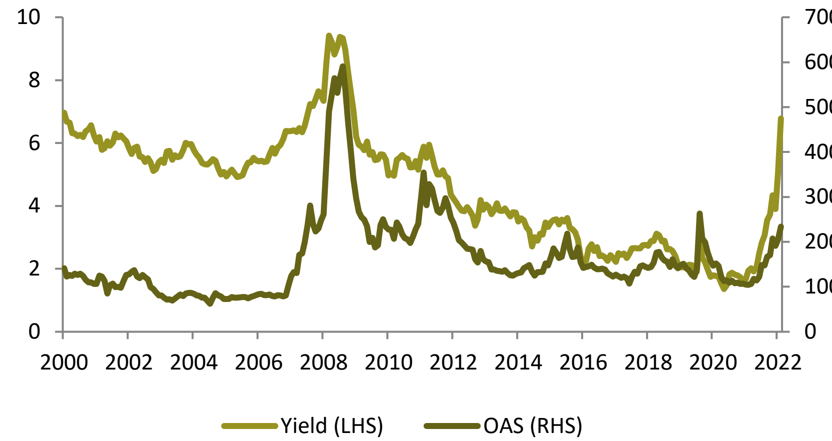
Facts & Figures Third Quarter 2022

Sterling-denominated investment-grade corporate bonds suffered their worst three-month performance ever in Q3, as soaring inflation pressures, rate hikes and issues with LDI oriented investors have pushed Gilt yields dramatically wider.

- Sterling investment-grade corporate bonds returned -12.0% in Q3, bringing their full-year loss to -24.5%. The previous record for a full-year drawdown was -10.0% in 2008.
- The index yield rose roughly 250 bps during the quarter to 6.8%, its highest level since early 2009.
- Rising benchmark yields helped push credit yields higher. CPI (9.9% in August) is well above the Bank of England's desired level, prompting six rate hikes thus far (for a total of 200 bps) in 2022.
- Further contributing to the dramatic sell-off in gilts in September was a mini-budget the government released, which included energy-related stimulus and tax cuts, prompting the BOE to step in and stabilize the market.
- UK fixed income assets suffered from selling pressure in September as the sell-off in gilts forced pensions to post additional collateral for interest rate derivatives. While this cheapens valuations for investors, it also could fuel additional market volatility if the gilt market doesn't stabilize.
- The option-adjusted index spread rose over 25 bps in Q3 to 234 bps and is now around the 85th percentile of observed values.
- The macro backdrop for credit in the UK is deteriorating. While the consensus is still forecasting around 4.1% GDP growth in 2022, the economy is expected to contract in 2023. Stagflation seems likely as the war in Ukraine underpins inflationary pressures and rising debt service costs dampen consumer and business spending.
- Net leverage rose over the course of the pandemic as EBITDA dropped and companies raised debt to shore up balance sheets. However, rebounding profits mean leverage has declined and at around 1.5x EBITDA it remains, for now, slightly below long-term averages.

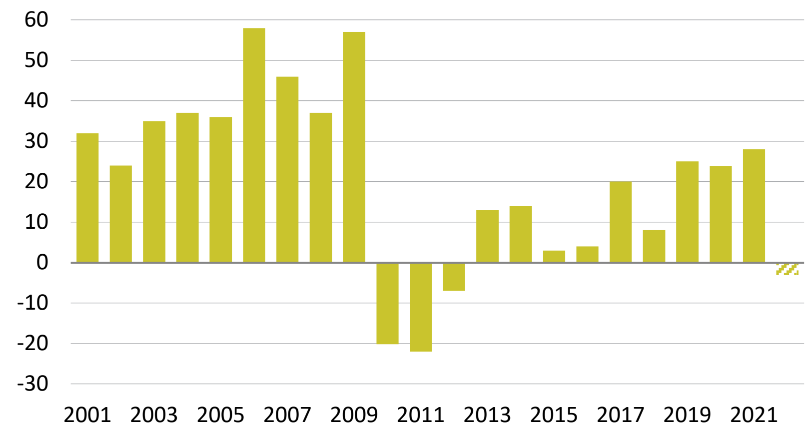
YIELD AND OPTION-ADJUSTED SPREAD: STERLING CORPORATES

Aug 31, 2000 – Sep 30, 2022 • Percent (%)



NET ANNUAL ISSUANCE: STERLING CORPORATES

2001-22 • Sterling (Billions)



Source: Bloomberg Index Services Limited.

Note: Issuance data for 2022 are through September 30.

Euro Area Sovereign Bonds

Facts & Figures Third Quarter 2022

The Bloomberg Euro-Aggregate Treasury Index returned –5.1% in 3Q and is down –16.7% YTD. Low initial yields and aggressive tightening by central banks in response to stubbornly high inflation have weighed on euro area government bonds this year.

- The ECB raised its overnight deposit rate by 125 bps in 3Q to 0.75%. This is the first time the deposit rate has been positive since 2014. Investors anticipate the ECB will need to raise its deposit rate another 200 bps to 2.8% by the end of 2023 to bring down elevated inflation.

- The repricing in rates markets has put upward pressure on core euro area yields across the curve. In Germany, the policy-sensitive two-year bund yield increased 111 bps in 3Q (+242 bps YTD), and the ten-year bund yield rose 74 bps (+229 bps YTD).

- Long-dated German bunds appear more attractively priced following this year's sharp rise in yields, but they are not outright cheap. Ten-year bunds are yielding 2.1%, their highest rate since 2011, and they are trading comfortably within their implied fair value range of 1.1%–4.4%, based on trailing ten-year nominal GDP growth.

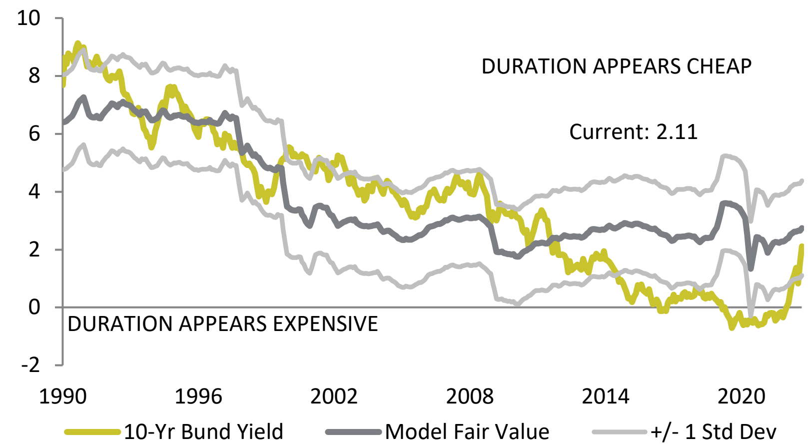
- Looking ahead, consensus is forecasting euro area nominal GDP growth of 7.4% in 2023 (-0.4% real GDP growth and 7.8% headline CPI growth), which is slightly below trend. The weakening growth outlook could eventually support euro area government bonds, but there is a risk bond yields overshoot their implied fair value in the face of stubbornly high inflation and overtightening by the ECB. Euro area CPI accelerated 10% year-over-year in September, up from 9.1% in August.

- EA periphery spreads—a measure of EA sovereign default risk—have increased this year following the rise in interest rates and political instability in Italy. The spread between Italian/German ten-year yields is currently 240 bps—its highest level since March 2020.

- Looking ahead, further rate increases by the ECB, loose fiscal policies, and the threat of quantitative tightening beginning as early as 4Q in the euro area could cause spreads to widen further. At which point, the ECB may have to rely on its Transmission Protection Instrument to purchase bonds in periphery countries.

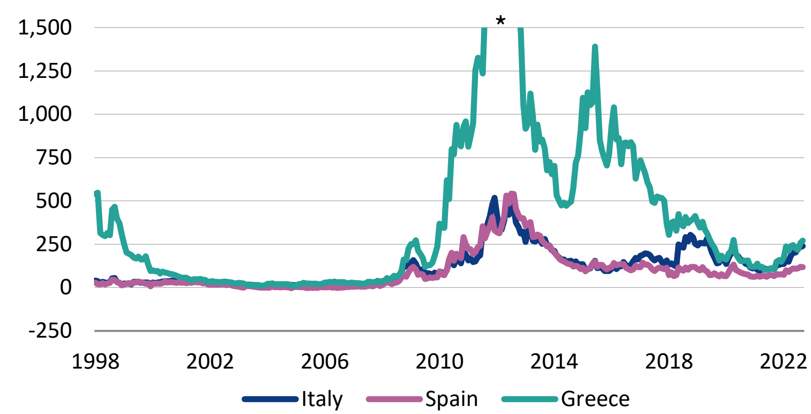
VALUATIONS: 10-YR BUNDS

Jan 31, 1990 – Sep 30, 2022 • Percent (%)



HISTORICAL 10-YR SPREADS OVER BUND YIELDS

Jan 31, 1998 – Sep 30, 2022 • Basis Points (bps)



* Capped for scale purposes. Greece spread hit a high of 3,476 bps on 2/29/2012.

Source: Thomson Reuters Datastream.

Note: The Model Fair Value is the predicted range of ten-year yields based on a multiple linear regression model that includes trailing ten-year real GDP and CPI change.

Euro Area Corporate Bonds

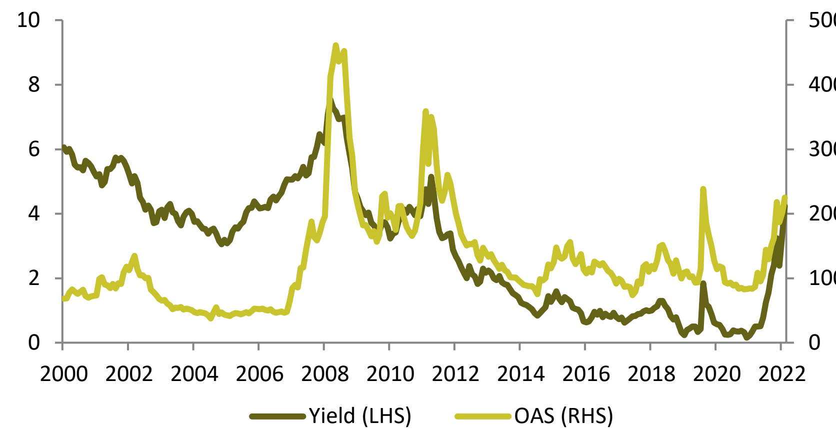
Facts & Figures Third Quarter 2022

The Bloomberg Euro-Aggregate Corporate Index returned -3.1% in Q3, bringing its YTD loss to 14.6%—its largest drawdown on record. The Russian invasion of Ukraine has added to existing concerns around inflation by pushing commodity prices higher and further tangling up supply chains.

- Yields on euro corporate bonds rose another 100 bps in Q3 and are now up around 375 bps YTD. The current 4.2% yield is the highest in over a decade. The bulk of this rise was due to underlying benchmark rates moving higher, but the option-adjusted spread has risen 130 bps YTD. This OAS represents the 91st percentile of observed values and offers investors some cushion if rates rise further from here.
- The macro backdrop has deteriorated, and GDP growth forecasts are being slashed both for 2022 and 2023. The war in Ukraine is exacerbating pre-existing inflationary pressures and rising input costs are eating into corporate margins.
- Even with the recent backup in nominal yields, real yields are still deeply negative for bond investors given Eurozone HICP rose to another all-time high of 9.1% in August.
- Central banks have been forced by rising inflation pressures to become more hawkish. The Fed has hiked its base rate by 300 bps in 2022 and ceased bond purchases, while the ECB hiked 125 bps in Q3 and is expected to keep increasing its base rate into 2023.
- Fundamentals for European corporate credit have deteriorated. According to J.P. Morgan, slowing EBITDA growth for European IG issuers (excluding oil & gas sectors) means net leverage rose to 3.6 times debt-to-EBITDA in Q2, well above historical averages. Net leverage for sectors like industrials and telecoms is at all time peaks.
- After issuers rushed to shore up cash positions due to the pandemic in 2020, issuance of euro-denominated investment grade–corporate debt fell around 45% in 2021 to €138B net. YTD net issuance of €56B marks a further deceleration from that pace.

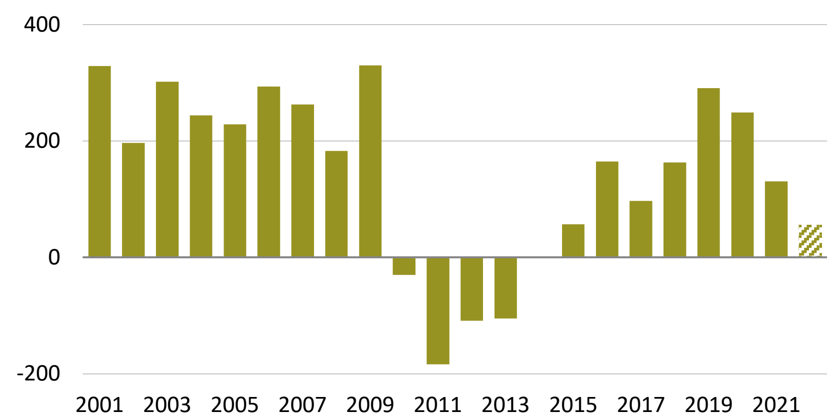
YIELD AND OPTION-ADJUSTED SPREAD: EUROPEAN CORPORATES

Aug 31, 2000 – Sep 30, 2022 • Percent (%)



NET ANNUAL ISSUANCE: EUROPEAN CORPORATES

2001-22 • Billions (EUR)



Source: Bloomberg Index Services Limited.

Note: Issuance data for 2022 are through September 30.

Structured Finance

Facts & Figures Third Quarter 2022

Structured credit markets have not been spared during the vicious sell-off in fixed income seen thus far in 2022. However, many floating-rate products have seen relatively smaller drawdowns than longer-duration fixed-rate equivalents as the Fed has hiked rates to tame inflation.

- Structured credit indexes have struggled thus far in 2022, in line with broader risk markets. Fundamentals have held up reasonably well, but market concerns are mounting that slowing economic growth and rising rates will take their toll. Meanwhile, technicals have been poor as CLO issuance slows and investor outflows accelerate.

- While YTD 2022 returns are mostly negative, many structured finance instruments are floating rate, and this helped insulate returns against the back up in interest rates. For example, BB-rated CLO debt has returned -9.6% YTD, outperforming US HY bonds (-14.7%). Fixed-rate BBB-rated CMBS, which tend to be high duration, have declined -12.4%.

- Some structured credit assets are less liquid than corporate equivalents and often require specialized data to analyze. Many also have indefinite maturities given amortizing loan pools. The result is a spread premium to similarly rated corporate debt. For example, BB-rated CLO bonds spreads of 1,060 bps are around 3x the equivalent spread on BB-rated corporates.

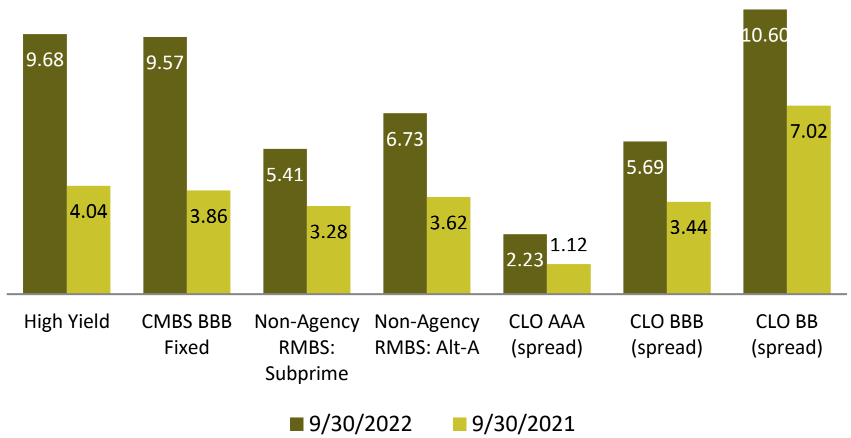
- Fundamentals for structured credit are healthy but will suffer if a recession ensues in 2023. Rating agency upgrades of high-yield bonds now outpace downgrades, and the share of CCC-rated loans in CLO pools has steadily shrunk. Residential property prices are rising strongly, boosted by low rates and increased affordability.

- Certain types of commercial real estate, including retail and hospitality, have been less resilient, but overall delinquency rates for loans in CMBS pools are declining. The flipside is that question marks remain over certain commercial property types, including office, given shifting work patterns post-COVID.

- Investors can access structured credit through a number of vehicles and mandates, including mutual funds, hedge funds, and closed-end funds.

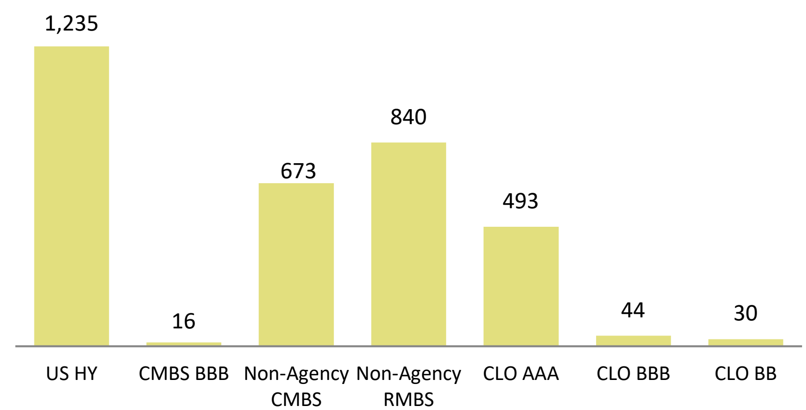
YIELD: SELECT STRUCTURED CREDITS

Percent (%)



MARKET CAP: SELECT STRUCTURED CREDITS

As of Sep 30, 2022 • US$B



Sources: Bloomberg Index Services Limited, ICE BofA Merrill Lynch, J.P. Morgan Securities, Inc., Securities Industry and Financial Markets Association(SIFMA), and Thomson Reuters Datastream.

Notes: CLOs yield data are represented by discount margins. Non-Agency CMBS and Non-Agency RMBS market-cap data are as of December 31, 2021.

C|A

US High-Yield Bonds

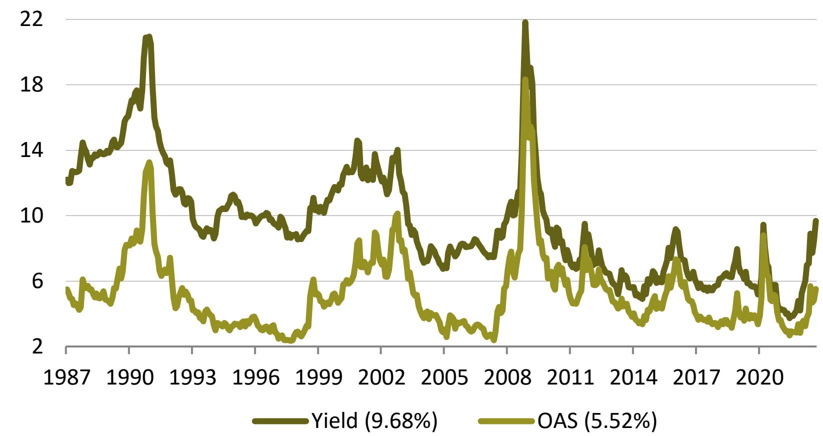
Facts & Figures Third Quarter 2022

US high-yield bonds have returned -14.7% YTD through the end of Q3, on track for their worst year since the financial crisis. Spreads now look elevated by historical measures, but the question remains whether fundamentals will hold if economic growth deteriorates further.

- After a 60 bp decline in Q3, the Bloomberg High-Yield Index has returned -14.7% YTD, on track for its second worst year on record (after 2008) as fears grew over rising inflation and slowing growth.
- The high-yield index yield has more than doubled since the start of 2022 to 9.7%, the highest since late 2009. One driver has been the rise in underlying Treasury yields to start 2022 as the Fed has hiked its target rate 300 bps and is expected to keep hiking into 2023.
- Spreads have roughly doubled YTD and the current index spread of 552 bps represents the 66th percentile of observed values. Spreads historically have risen to an even greater extent during extreme dislocations, for example in Q1 2020 spreads rose over 500 bps.
- Investors are now demanding higher spreads as default risks are rising. The Moody's speculative-grade default rate was 1.0% at the end of August but is expected to rise around 300 bps over the next 12 months.
- The distressed ratio (BoA reports around 7% of HY bonds have spreads above 1,000 bps) actually declined in Q3 and suggests investors are taking a nuanced approach.
- Should the US economy enter a recession, credit fundamentals will be starting from a healthy position. Bank of America reports net leverage for high-yield borrowers fell to 3.6x at the end of Q2, below its long-term average. Interest coverage is elevated (around 6.0x) but may decline as interest rates rise.
- Technicals have worsened for high-yield bonds, as issuance has plunged and so too has investor demand. Lipper reports YTD outflows from US HY mutual funds hit $54B through the end of Q3 2022.
- The average credit rating for the high-yield index has remained roughly stable at around Ba3/B1. Rating agency upgrades outnumbered downgrades for credits in the index by a 1.6x ratio in Q3, but this is a deceleration from the healthier 2.4x ratio seen at the end of Q1.

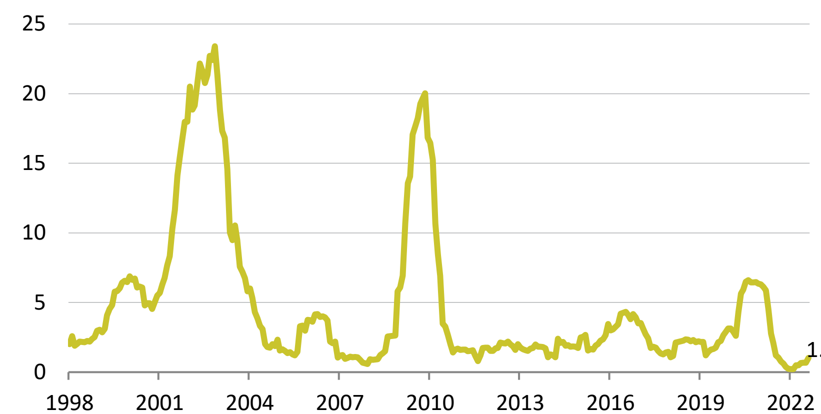
YIELD AND OPTION-ADJUSTED SPREAD: US HIGH-YIELD INDEX

Jan 31, 1987 – Sep 30, 2022 • Percent (%)



PAR DEFAULT RATES: US HIGH-YIELD

Jan 31, 1998 – Aug 31, 2022 • Percent (%)



Sources: Bloomberg Index Services Limited, Deutsche Bank Credit Strategy, and Moody's Investors Service.
Notes: Data prior to June 30, 2017, are represented by Moody's default rates as provided by the Deutsche Bank US Credit Strategy Chartbook. All default rate data on and after June 30, 2017, are sourced from the Moody's Investor Services Default Report.

Leveraged Loans

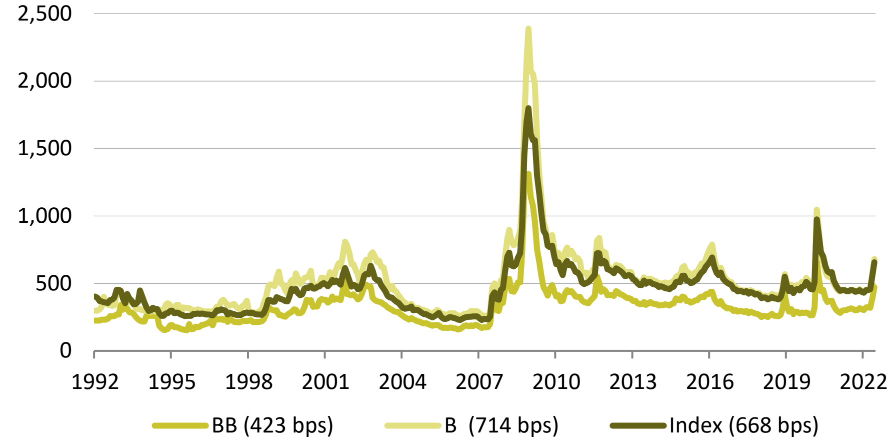
Facts & Figures Third Quarter 2022

US leveraged loans have significantly outperformed high-yield bonds and other risk assets during the first three quarters of 2022, insulated from rising rates by their floating rate coupons. Fundamentals have been improving, but higher rates are likely to begin challenging metrics like interest coverage ratios.

- Leveraged loans have returned -3.3% YTD through the end of Q3, outperforming US high-yield bonds by over 1,100 bps.
- After jumping over 200 bps during the first half of the year, the discount margin for leveraged loans was fairly stable in Q3 and ended September at 668 bps, which represents the 92nd percentile of observed values. The index DM overall is driven by that for B-rated loans (714 bps) given their high index weight.
- The current discount margin coupled with the three-month Libor rate (around 3.7%) means the implied yield (to a three-year takeout) on leveraged loans is above the yield of high-yield bonds (9.7%).
- According to J.P. Morgan, the trailing default rate for leveraged loans rose to 1.6% at the end of Q3. Defaults are expected to rise in 2023 as debt service costs will rise alongside higher interest rates and slowing economic growth means revenue may not keep pace.
- The loan index has lower average credit quality than the HY index, leaving it more vulnerable to future downturns. According to Credit Suisse, just 39% of the loan index has at least one BB rating, 10 ppts lower than five years ago.
- Recoveries for first lien leveraged loans have dropped below long-term averages and this may persist given around 75% of new issuance comes from loan-only capital structures. Higher leverage levels encouraged by the low levels of rates in recent years and trends in weaker loan documentation mean there is less for creditors when a company eventually defaults.
- Loan technicals have weakened as higher funding costs have reduced CLO issuance (down over 40% YTD) and retail fund flows have slowed to a trickle (just $1.9B YTD).

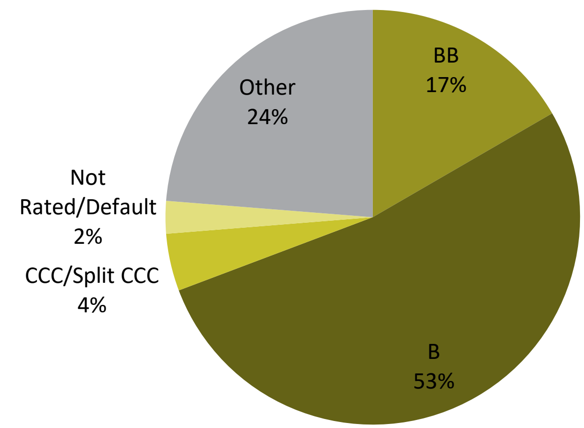
DISCOUNT MARGIN: CS LEVERAGED LOAN INDEX

Jan 31, 1992 – Sep 30, 2022 • Basis Points



RATINGS BREAKDOWN: CS LEVERAGED LOAN INDEX

As of Sep 30, 2022



Source: Credit Suisse.

Notes: Discount margin assumes a three-year life and represents the yield-to-maturity above and beyond the current LIBOR rate, assuming all loans are paid off at par with no defaults. Other category includes Split BBB, Split BB, and Split B. Not Rated/Default includes CC, C, and Not Rated/Default loans.

Pan-European High-Yield Bonds

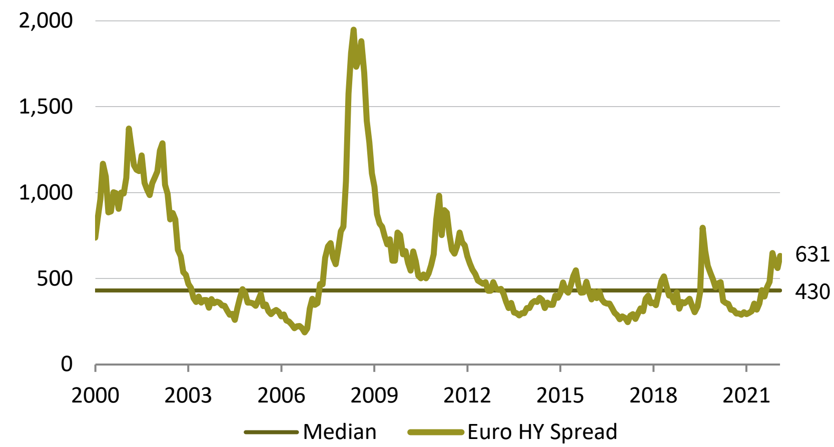
Facts & Figures Third Quarter 2022

European high-yield bonds fell further in Q3 as both spreads and underlying yields rose. The war in Ukraine has added to existing inflationary pressures and prompted concerns over a looming recession.

- The Bloomberg Pan-European High-Yield Index returned -0.9% in Q3, bringing its YTD loss to -15.1%.
- The yield on the index has risen around 540 bps YTD to 9.0%, the highest since Covid-related widening in Q1 2020.
- The majority of this was driven by an increase in spreads. The index OAS fell slightly in Q3 but at 631 bps remains around 310 bps higher than where it started 2022 and in the 71st percentile of observed values. Investors are demanding higher spreads given mounting concerns over how the war is disrupting energy supplies and causing economic growth to slow.
- Rising benchmark sovereign yields have also pushed yields higher. The ECB hiked rates twice in Q3 but its benchmark intertest rate is just 0.75%. Meanwhile, the Bank of England also hiked in Q3, and its base rate is much higher (2.25%), but both are expected to continue tightening given soaring inflationary pressures, which have been exacerbated by the war in Ukraine.
- Looking backward, defaults have been contained as growth rebounded post Covid and low rates boosted interest coverage metrics. Moody's reports the trailing 12-month default rate was just 0.3% at the end of August, close to 2008 levels. Looking ahead, the rising distressed ratio (around 15% of the JPM European HY Index has a spread >1,000 bps) suggests fundamentals are weakening as companies face growing margin pressures from higher commodity and labor costs.
- Credit globally has been boosted by central bank asset purchases and investors' thirst for income in a low-yield environment. This tailwind is reversing in 2022, with the Fed now shrinking its balance sheet and the ECB no longer making new purchases (though it reinvests proceeds from maturing bonds) under its Asset Purchase Program.
- On a relative basis, European borrowers are less levered than those in the United States. More than 65% of the European HY index carries at least one BB rating.

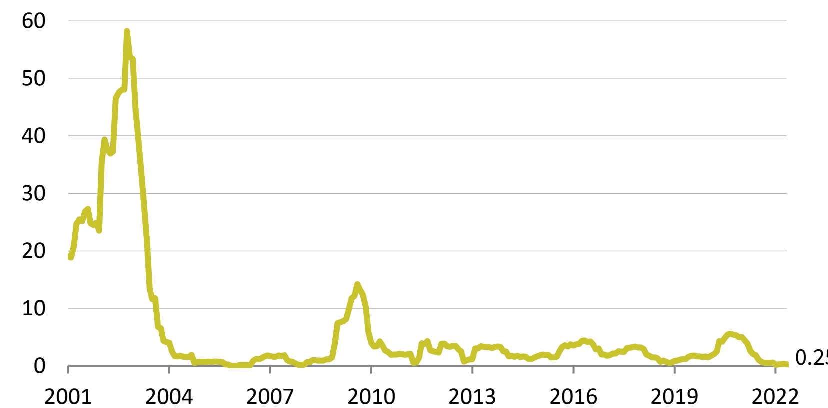
OPTION-ADJUSTED SPREAD: EUROPEAN HIGH YIELD

Aug 31, 2000 – Sep 30, 2022 • Basis points (bps)



PAR DEFAULT RATES: EUROPEAN HIGH YIELD

Apr 30, 2001 – Aug 31, 2022 • Percent (%)



Sources: Bloomberg Index Services Limited and Moody's Investor Services.

Notes: The European high-yield option-adjusted spread peaked in December 31, 2008, at 1,949 bps. The European high-yield default rate peaked on January 31, 2003, at 58.2%.

Distressed Investing: Non-Control

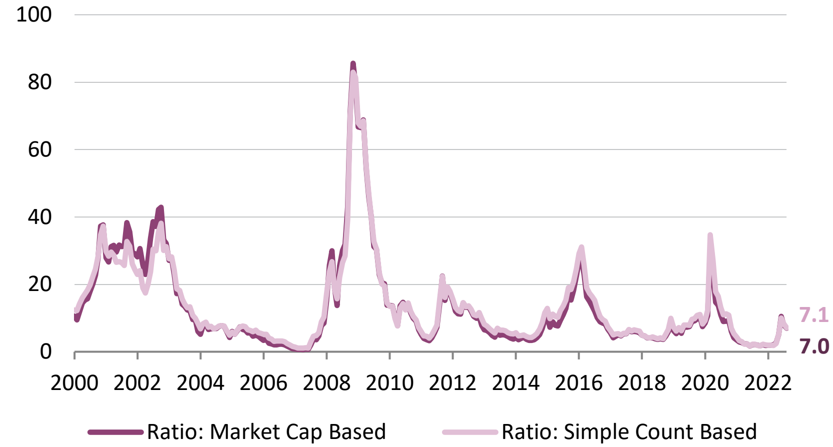
Facts & Figures Third Quarter 2022

Distressed hedge funds generated strong returns in 2021 as the COVID-related downturn was followed by a swift economic rebound. As economic growth softens and corporate stress rises, the growing distressed opportunity set should create additional opportunities for skilled distressed investors.

- The HFRI Event Driven: Distressed/Restructuring Index has returned -6.4% YTD in 2022, cooling off after a strong 2021. Distressed hedge funds are trailing the broader fund-of-funds (diversified) HF Index though but are outperforming broader credit indexes like US High Yield (-14.7% YTD).
- Rising markets generated healthy mark to market gains in 2021 but at the expense of a shrinking opportunity set for distressed funds. Things have changed dramatically in 2022, as the distressed ratio (share of HY index with spread above 1,000 bps) has risen to 7.1%, well above the 2.0% where it started the year.
- The distressed opportunity set has broadened out with a number of sectors offering significant volumes of higher-spread assets. The average dollar price of the Bloomberg US HY Index (83.9 cents) also suggests a widespread opportunity to earn double-digit returns.
- Metrics like debt/EBITA have declined back down below pre-COVID levels and interest coverages ratios are elevated relative to historical averages. Still, slowing economic growth and rising inflationary pressures will challenge some business models, especially lower-rated credits that are highly levered.
- There are a variety of ways to invest in distressed debt, including hedge funds and lock-up vehicles, which will do everything from trade existing securities to provide rescue finance for troubled companies. Skilled managers may find opportunities beyond traditional focus areas, though one area of potential focus—property-backed credit—has not suffered to the same extent as corporate credit YTD.

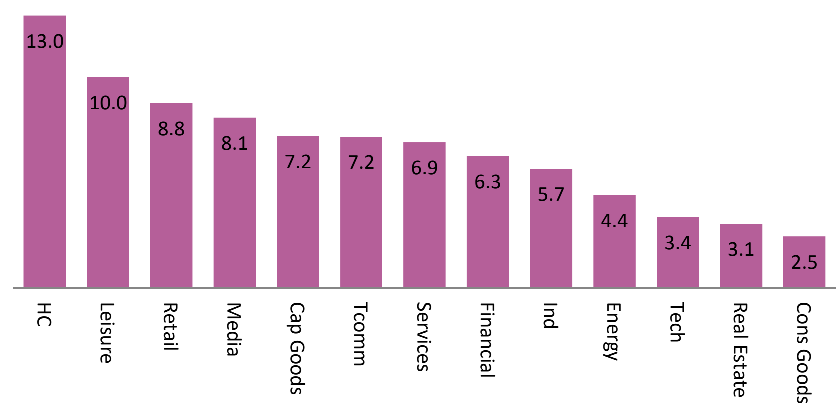
DISTRESSED RATIO: BOFA ML HIGH YIELD MASTER II INDEX

Jan 31, 2000 – Aug 31, 2022 • Percent (%)



MARKET VALUE OF DISTRESSED PAPER FOR SELECT INDUSTRIES

As of September 30, 2022 • US$B



Source: ICE BofA Merrill Lynch.

Notes: Bottom chart represents the ICE BofA Merrill Lynch US High Yield Index universe. Distressed bonds are defined as bonds with option-adjusted spreads greater than 1,000 basis points. Only industries with a market value equal or greater than $2 billion are shown.

USD-Denominated Emerging Markets Debt

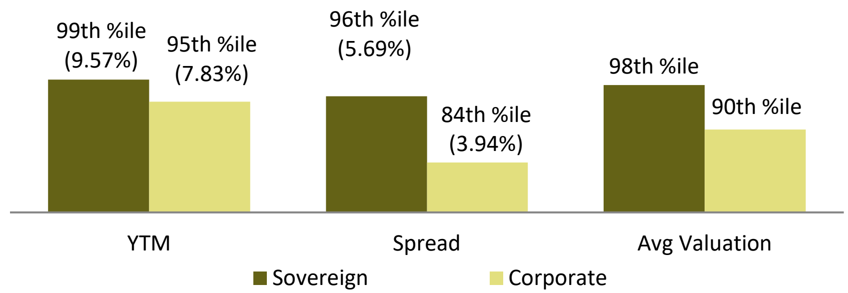
Facts & Figures Third Quarter 2022

EM debt indexes have plunged in 2022, with the JPM EMBI Global Diversified and (corporate) CEMBI Broad Diversified indexes returning -23.9% and -16.2%, respectively, YTD. Central bank tightening, the Russian invasion of Ukraine, and rising default risk all have taken a toll.

- The JPM EMBI Global Diversified and (corporate) CEMBI Broad Diversified indexes returned -4.6% and -2.6%, respectively in Q3. Returns have been hurt both by rising benchmark yields and spreads.
- Yields have risen around 430 bps and 330 bps, respectively, for sovereign and corporate bonds YTD. EM debt yields have been pushed higher by the underlying move in Treasury yields, which have risen as growth and inflation forced the Fed to hike its target rate by 300 bps YTD and signal that further hikes may be required.
- Spreads on EM sovereign debt have moved wider in recent months to the 96th percentile. Corporate spreads have also risen and are at their 84th percentile.
- Spreads look elevated from a historical perspective but events in 2022 highlight some of the unique risk factors for the asset class. In February, Russia invaded Ukraine, and EM index providers responded to the uninvestible nature of Russian assets by eliminating them from many indexes. The benchmark JPM EMBI GD Index saw its 3% weight for Russian bonds written down to zero, while debt from Ukraine and surrounding countries also plunged.
- More broadly, EM debt index stats disguise wide variation in underlying fiscal health across borrowers. For example, the main EM sovereign index includes a number of CCC/CC-rated borrowers (Argentina, Ukraine, Sri Lanka, etc.) whose optically cheap debt will only prove attractive if coupons and principal payments are repaid.
- About 50% of the EM sovereign index has an investment-grade rating, and the percentage is similar for EM corporates. The wide dispersion of fundamentals and possible political outcomes suggests an active management approach to these assets may generate more successful outcomes.

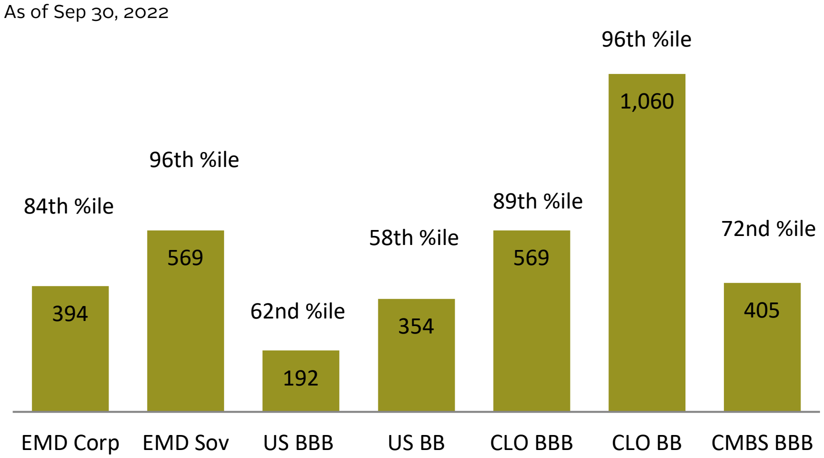
PERCENTILE RANK: USD EM DEBT

As of Sep 30, 2022 (Based on Post-2003 Data)



PERCENTILE RANK: OPTION-ADJUSTED SPREAD

As of Sep 30, 2022



Sources: Bloomberg Index Services Limited, J.P. Morgan Securities, Inc. and Thomson Reuters Datastream.

Notes: Composite Valuation Indicator is the average of YTM percentile and spread percentile. Asset classes represented by J.P. Morgan Emerging Market Bond Index (EMD Sov), J.P. Morgan Corporate Emerging Markets Bond Index (EMD Corp), Bloomberg US Corporate Investment Grade BBB Index (US BBB), Bloomberg US High Yield BB Index (US BB), J.P. Morgan CLOIE BBB Index (CLO BBB), J.P. Morgan CLOIE BB Index (CLO BB), and Bloomberg US CMBS Baa Index (CMBS BBB).

Local Currency Emerging Markets Debt

Facts & Figures Third Quarter 2022

LC EM debt managed to return 0.6% in LC terms in 3Q 2022, however USD returns were more challenged, coming in at -4.7% for the quarter. This brings YTD performance to -9.3% in LC terms and -18.6% in USD terms. The asset class has faced several headwinds recently including slowing global growth, elevated domestic inflation, and rising DM bond yields.

- In 3Q, EM local currency bond yields continued their near straight-line ascent that has been ongoing since they bottoming at the end of 2020. Firstly, inflationary pressures have been rising in quite a few emerging markets, with domestic central banks hiking to contain the rise in prices. The acceleration in food and energy prices was particularly painful as these categories have a greater weight in EM CPI baskets. Despite domestic monetary policy having a limited impact on food and energy prices, EM central banks tend to have to overtly demonstrate their inflation-fighting credentials regardless.

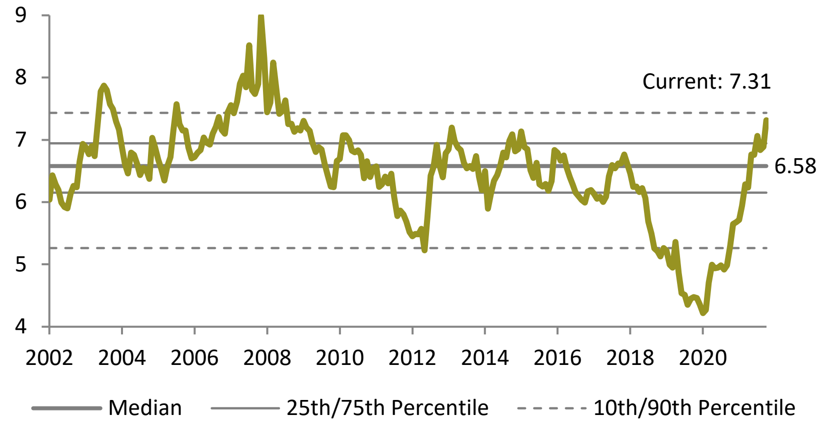
- Secondly, with inflation proving persistent in developed markets, core government bond yields have also continued to move higher, most significantly those of US Treasuries. This has lessened the relative attractiveness of EM local bonds yields at their prior levels. Flows have left the asset class as a result, adding to the upward pressure on yields.

- Finally, EM currencies remain sensitive to global growth given the importance of exports, both manufacturing and commodities, to the grouping. Therefore, the continued impairment of trade and global supply chains has been a headwind. Downward revisions to global growth, particularly in China, have also been challenging. This currency weakness has both exacerbated domestic inflationary pressures, as well as adding to outflows given the impact on USD returns.

- EM-LC bond yields are at their 89th percentile, having risen by 3.1 ppts from their year-end 2020 lows. More value is opening up as yields stand 73 bps above their median and investors wonder whether sufficient tightening has been priced in to quell inflation. EM currencies are likely to remain the larger driver of returns for unhedged investors. In that regard the asset class remains modestly valued, with the REER of EM fixed-income-weighted currencies standing just above its lowest ever reading. Some headwinds for EM currencies remain, but the level of dispersion between the underlying countries suggests there are opportunities for active managers with broad mandates to add value.

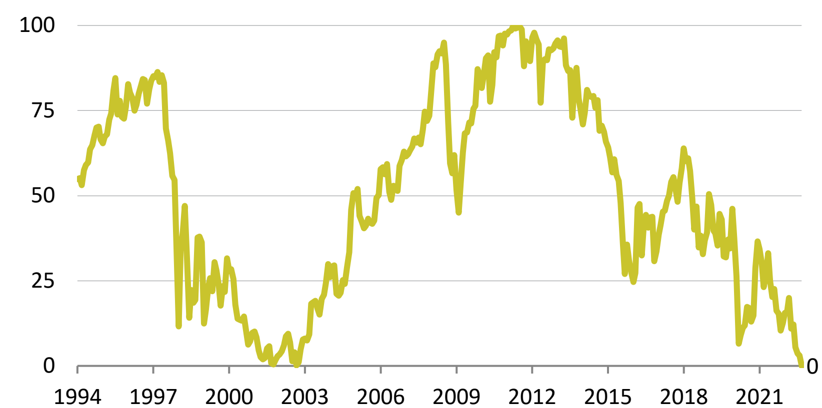
NOMINAL YIELD: JPM GBI-EM GLOBAL DIVERSIFIED INDEX

Dec 31, 2002 – Sep 30, 2022



FI-WEIGHTED EM REAL EXCHANGE RATE VS US: PERCENTILE

Jan 31, 1994 – Sep 30, 2022



Sources: Directorate-General of Budget, Accounting and Statistics, Executive Yuan, Taiwan; INE - National Institute of Statistics, Chile; International Monetary Fund; J.P. Morgan Securities, Inc.; MSCI Inc.; National Bureau of Statistics of China; Thomson Reuters Datastream; and US Department of Labor - Bureau of Labor Statistics. MSCI data provided "as is" without any express or implied warranties.

PRIVATE EQUITY/VENTURE CAPITAL

CAMBRIDGE
ASSOCIATES

US Private Equity

Facts & Figures Third Quarter 2022

US PE returns turned negative in 1Q 2022, according to the Cambridge Associates US Private Equity Index. However, three- and ten-year performance remained strong at 27% and 18%, respectively, and US PE outperformed public markets over these time periods. Still, it's likely the full impact of today's macroeconomic environment has not yet been evident in US PE returns this year. While activity in 1H 2022 has boosted overall YTD fundraising, deal, and exit figures, signs of slowing have emerged.

- Fundraising remained robust in 2022. The $259B raised through 3Q22 is on pace with last year's record haul ($353B), according to PitchBook. Activity was bolstered by large funds with a median size of $175M, the highest in more than a decade. The number of funds closed (286) is tracking at the lowest since 2013. US PE managers secured 75% of capital raised globally this year, roughly in line with 2021. That share is the highest since 1999, and it is materially higher than during the decade ended in 2020 (56%).

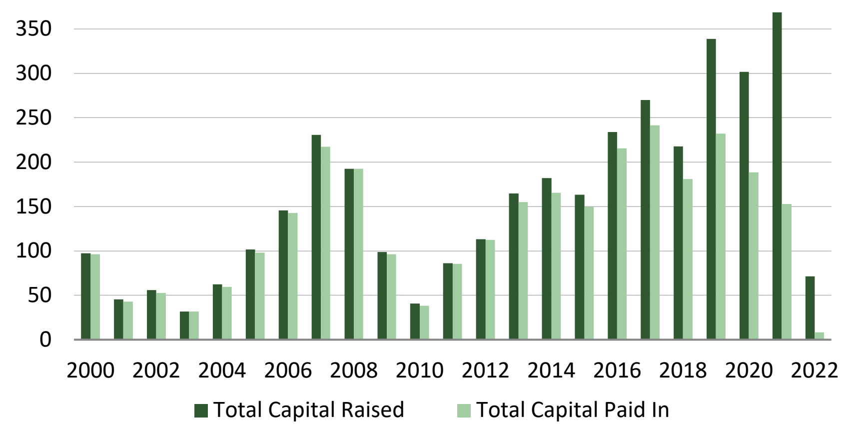
- Deal activity has been healthy following 2021's torrid pace. According to PitchBook, capital invested across US buyout and growth equity deals totaled $323B, compared to a near record of $547 deployed last year. Still, this year's pace is tracking ahead of the trailing five-year average of around $380B. Information technology companies attracted 42% of this year's investment, double the trailing five-year average share of 23%. Healthcare accounted for 14% of this year's investment.

- According to S&P LCD data, purchase price multiples (PPMs) for all transactions have climbed steadily since 2009, hitting 12.0X in 2022. Leverage held steady since 2017 and reached 5.9X EBITDA in 2022. Average equity contributions for large company transactions declined to 40% this year from 46% in 2021, the largest decline since 2010. The longer-term average equity contribution was 36%.

- Exit activity has slowed in 2022 after soaring last year, but activity is in-line with pre-2021 levels. IPOs are the exception, having nearly ground to a halt this year; M&A has accounted for 98% of YTD exit value, according to PitchBook. M&A is the typical exit route as IPOs made up just 20% of exit value over the past five years, on average.

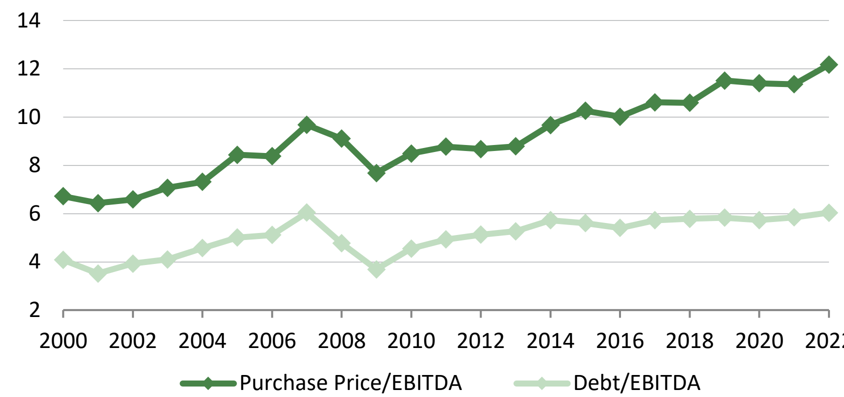
FUNDRAISING AND PAID-IN CAPITAL: US PE

Vintage Years 2000–22 (Mar 31) • US$B



AVERAGE PURCHASE PRICE AND DEBT MULTIPLES: US PE

2000–22 (Mar 31)



Sources: Cambridge Associates LLC, PitchBook, and Standard & Poor's LCD.

US Venture Capital

Facts & Figures Third Quarter 2022

US VC returns turned negative in 1Q 2022, according to the Cambridge Associates US Venture Capital Index. However, three- and ten-year performance remained strong at 37% and 20%, respectively, with US VC outperforming public markets over these time periods. Still, it's likely the full impact of today's macroeconomic environment has not yet been evident in returns this year. While activity has been resilient YTD through 3Q, signs of slowing have emerged.

- As of September 30, US VC funds had already raised a record amount of capital, according to PitchBook. The $151B raised so far has surpassed 2021's record-setting haul of $148B, though the pace has slowed in the second half. Fund sizes this year have averaged a record $261M. US funds attracted 70% of global VC capital committed in 2022, the highest share since 2006. For the decade ending in 2020, US VC garnered 33% of global fundraising flows.

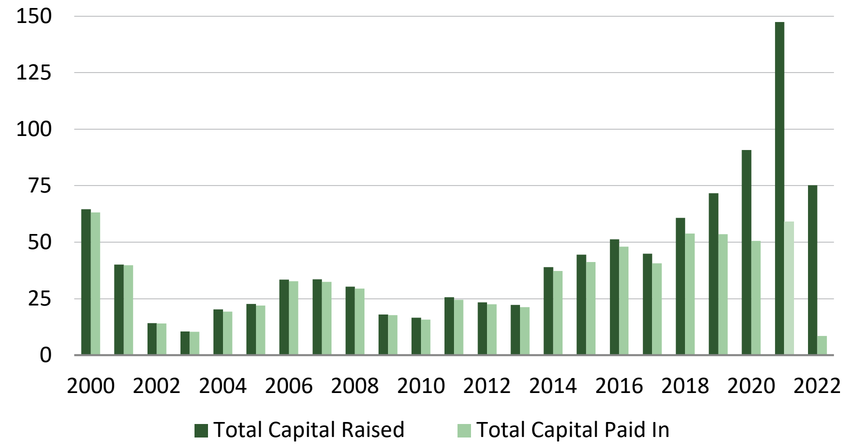
- US VC deal activity reached nearly $200B through 3Q 2022, the second-highest pace since 2021's record of $350B. But deal activity showed signs of slowing in 3Q 2022, with the $44B of deployed capital the lowest since 2Q 2020. Two-thirds of the year's deal activity was concentrated in the information technology and healthcare sectors, roughly in line with their trailing five-year average share.

- Later-stage US VC valuations have cooled in 2022, but earlier round valuations continued climbing to new highs. Median valuations for series D+ deals declined for the first time since 2016 but remained almost 3x more than 2019's pre-pandemic level. Technology sector deals have been the primary driver of the upswing in valuations in recent years.

- US VC exit activity has slowed, with total exit value on pace to fall below $100B for the first time since 2016, according to PitchBook. This follows extraordinary IPO activity in 2021. The 300 public listings more than doubled from 2020, and exit value nearly tripled to a whopping $670B compared to a prior ten-year average of roughly $80B per year. Although M&A and buyouts typically dominate by number of deals, they are historically just a fraction of the IPO exit value.

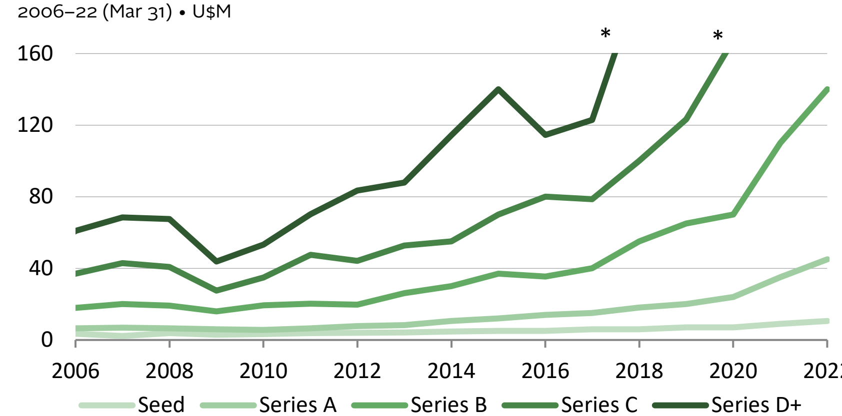
FUNDRAISING AND PAID-IN CAPITAL: US VC

Vintage Years 2000–22 (Mar 31) • U$B



MEDIAN PRE-MONEY VALUATIONS BY SERIES: US VC

2006–22 (Mar 31) • U$M



* Y-axis capped for scale purposes. Latest values for Series C and Series D+ are 320 and 750, respectively.

Sources: Cambridge Associates LLC and PitchBook.

European Private Equity

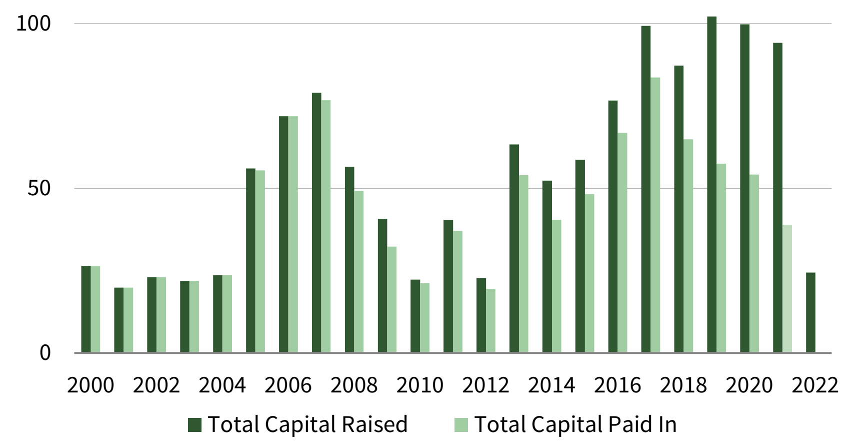
Facts & Figures Third Quarter 2022

European PE returns turned negative in USD terms in 1Q 2022, according to Cambridge Associates data, due in large part to the strength of the dollar. In EUR terms performance was flat, but still the lowest since early 2020. European PE returned a solid 24% and 18% over the last three- and ten-year periods, respectively, outperforming public equivalents over those horizons. Still, it's likely the full impact of today's macroeconomic environment has not yet been evident in European PE returns this year.

- European PE funds raised €38B through 3Q in 2022, on pace for the weakest year since 2014. This is off the €91B raised in 2021 and 2019's record haul of €107B, according to Pitchbook. Although activity has slowed, the median fund size increased to €300M, tracking at the largest fund size on record and up almost 40% from last year. Among all PE funds globally, European funds attracted just 12% of capital raised, which was half their share in the decade ending 2020 (24%).
- Deal activity soared in 2021. According to PitchBook, the number and value of European PE deals increased by roughly 50% last year, with total deal value at around €690B, a new record. Among sectors, information technology comprised about 20% of deal value. Both were in-line with recent trends. Activity in 1H 2022 was resilient with a deal value of €312B, exhibiting a similar sector split.
- According to S&P LCD, purchase price multiples (PPMs) declined in 2022 to 10.4x EBITDA, more than two turns off their peak in 2020. The PPMs were the lowest since 2015, but in-line with their trailing ten-year average. Leverage multiples have inched up gradually since 2016, holding steady at 5.8x EBITDA in 2022. Leverage continues to trail the high reached in 2007. Equity contributions to leveraged buyouts declined to 42% YTD, their lowest since 2007. This is down from 52% in 2020 and 4 ppts below the trailing ten-year average.
- Exit activity hit a record in 2021. According to PitchBook, total exit value of €410B exceeded the prior record (2015) by nearly 50%. Activity last year was bolstered by public listings, with the total value (€109B) roughly equal to the prior four years combined. Exits slowed in 1H 2022 but their total value so far has maintained pace with the pre-2021 trailing ten-year average.

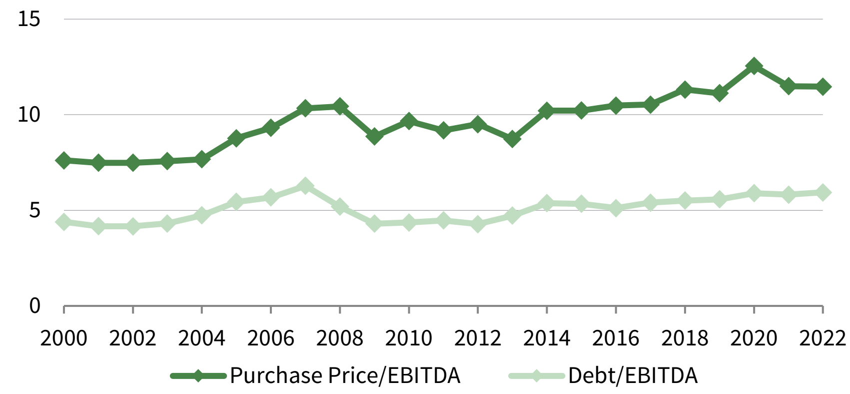
FUNDRAISING AND PAID-IN CAPITAL: EUROPEAN PE

Vintage Years 2000–22 (Mar 31) • Euro (Billions)



AVERAGE PURCHASE PRICE AND DEBT MULTIPLES: EUROPEAN PE

2000–22 (Mar 31)



Sources: Cambridge Associates LLC, PitchBook, and Standard & Poor's LCD.

C|A

European Venture Capital

Facts & Figures Third Quarter 2022

European VC returns turned negative in EUR terms in 1Q 2022, according to Cambridge Associates data. However, the negative rate was nearly doubled in USD terms as the dollar appreciated. European VC returned 43% and 24% over the latest three- and ten-year periods, respectively, outperforming public markets by a wide margin. Still, it's likely the full impact of today's macroeconomic environment has not yet been evident in this year's performance, as signs of slowing activity have emerged.

- European VC funds raised a record amount of capital in 2021, according to PitchBook. The €22B raised modestly eclipsed 2017's haul (€21B). Fundraising remained healthy through 3Q 2022 at €17B, driven by increased fund sizes. The average size of €150B is on pace to set a record this year. Among all VC funds globally, European managers secured 10% of all capital raised in 2021, and 8% of 2022's total. Recent fundraising shares are in-line with the decade ended 2020 (10%).

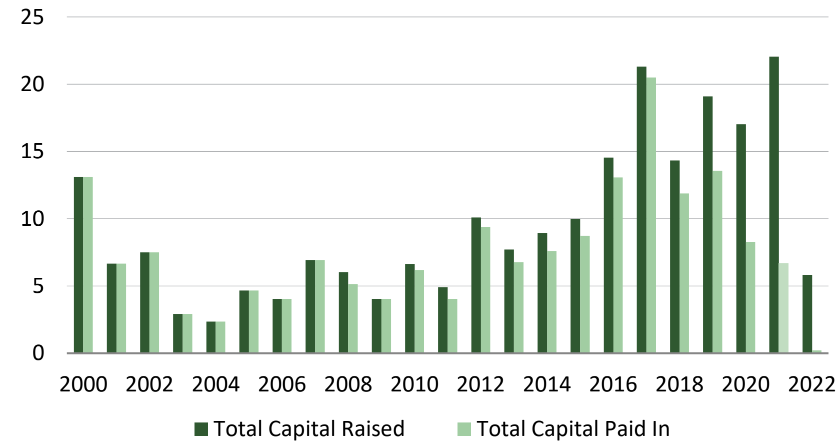
- Deal activity surged to record highs in 2021. According to PitchBook, European VC deal value reached €106B last year, more than double that in 2020. Activity already hit €54B YTD through 1H 2022 but showed signs of slowing in 3Q. Software accounted for more than 40% of deal flow this year. This was a new high and has been trending upwards in recent years.

- Valuations for seed- and early-stage companies have increased gradually since 2012 and continued doing so in 1H 2022. The increases in median later-stage valuations (Series C and D+) have been more dramatic, however; they jumped more than €10M over the past five years, hitting a record as of mid 2022. The drivers were some very large financing rounds (evidenced by the difference between the median of €19M and the average of €268M).

- Exit activity went stratospheric in 2021, with total exit value (€137B) coming in more than 5x that of the trailing five-year average (€25B.) Exit value dropped to €26B in 1H 2022 but remains healthy relative to the pre-2021 norm. Still, through 3Q 2022, exit activity has slowed for four straight quarters. IPO activity was exceptional in 2021, hitting €103 in value, a ten-fold increase over 2020. IPO activity was solid in 1H 2022 at €11B versus a pre-2021 five-year average of €12B. IPOs share of the total exit value this year (43%) was in-line with pre-2021 averages.

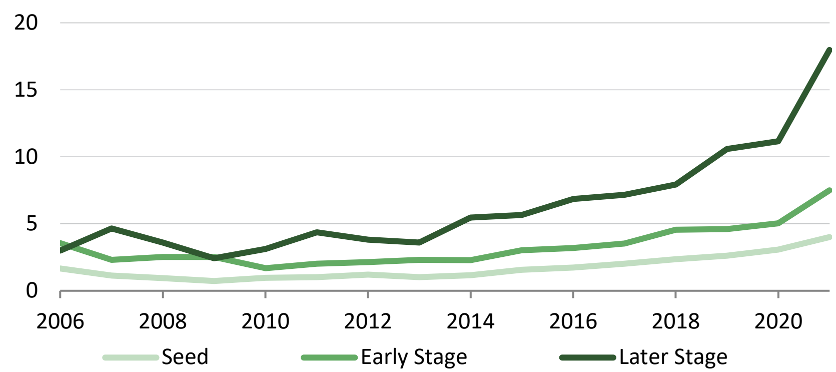
FUNDRAISING AND PAID-IN CAPITAL: EUROPEAN VC

Vintage Years 2000–22 (Mar 31) • Euro (Billions)



MEDIAN PRE-MONEY VALUATIONS BY STAGE: EUROPEAN VC

2006–21 (Dec 31) • Euro (Millions)



Sources: Cambridge Associates LLC and PitchBook.

Notes: Valuations are shown by stage (as defined by PitchBook) rather than by series due to small sample sizes.

Asian Private Equity

Facts & Figures Third Quarter 2022

Asian PE returns turned negative in USD terms in 1Q 2022, according to Cambridge Associates data. However, three- and ten-year performance remained healthy at 13% and 12%, respectively, outperforming public markets. Still, it's likely the full impact of today's macroeconomic environment has not yet been evident in US PE returns this year. While activity in 1H 2022 has boosted overall YTD fundraising, deal, and exit figures, signs of slowing have emerged.

- Asian PE funds raised $47B through 3Q 2022, which is on track to exceed the $50B of capital raised in 2021, according to Pitchbook. These totals are less than the $80B+ raised in 2014, 2018, and 2019. The number of funds raised this year is tracking well below the five-year average, meaning that the median fund size ($300M) is on track to hit a record. Among all PE funds globally, Asian PE funds secured 13% of capital raised so far in 2022. That share is in-line with the region's global share across the decade ending in 2020 (17%).

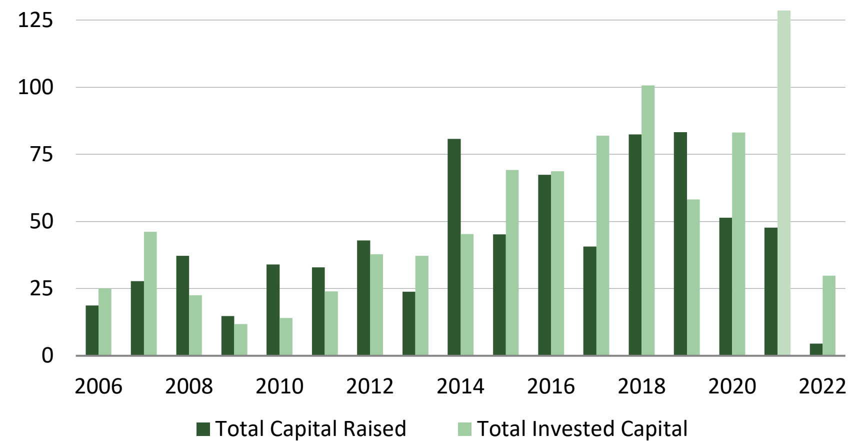
- Deal activity remained solid, with $100B of capital invested YTD through 3Q 2022, according to PitchBook. This follow's 2021's record when $163B was invested in the region. However, deal activity in 3Q was the weakest since mid-2020 and has slowed for four straight quarters. Australian-based targets received for one-third of deal flow in 2022, followed by China (28%) and India (10%). Among sectors, IT companies attracted one-quarter of investment.

- Buyout strategies are more prevalent than growth in Australia, Korea, and Japan, while the reverse has been true in China. Regardless of strategy, leverage has historically been modest or low, while valuations, especially in growth sectors, have been as high as those in other regions.

- Exit activity was robust in 2021. According to Dealogic, M&A exit value increased nearly five-fold last year to $111B, a new high. M&A activity was resilient in 2022, hitting $89B through Q3. IPO activity faltered this year, with exit value of only $2B across five listings. M&A has been the typical exit path for PE-backed companies in Asia.

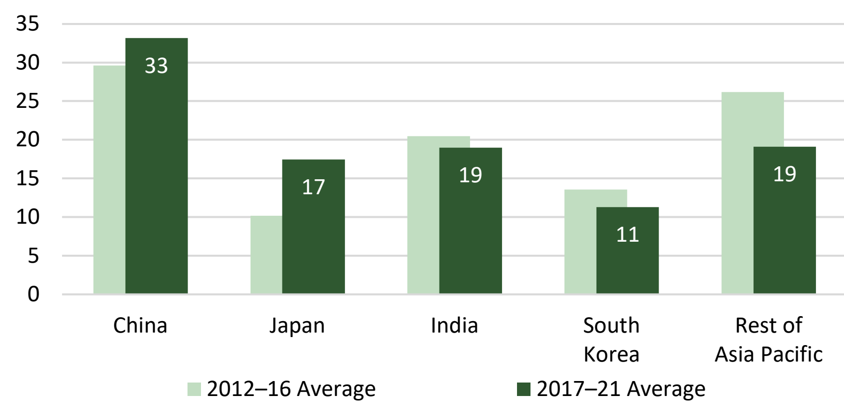
FUNDRAISING AND INVESTED CAPITAL: ASIA PE

2006–22 (Mar 31) • US$B



PERCENT (%) OF INVESTED CAPITAL BY COUNTRY OF TARGET COMPANY

As of March 31, 2022



Source: PitchBook.

Note: Total Capital Raised does not include Softbank Vision funds. For the top chart, invested capital includes deals where the investor is an Asia-based PE fund. For the bottom chart, invested capital includes PE deals where the target company is headquartered in Asia; data may not sum to 100 due to rounding.

Asian Venture Capital

Facts & Figures Third Quarter 2022

Asian VC returns turned negative in mid-2021 and continued to be so through 1Q 2022 in USD terms, according to Cambridge Associates data. Still, Asia VC returned 22% in the latest three- and ten-year periods, outperforming public markets. Despite the recent turn in performance, it's likely the full impact of today's macroeconomic environment has not yet been evident in returns this year. While activity has been resilient in 2022, signs of slowing emerged in 3Q.

- Asian VC funds raised nearly $40B YTD through 3Q 2022, following $77B of capital raised last year. 2022 is tracking to be the lowest year of fundraising since 2014, and fewer than 200 funds have closed. This pushed average fund size ($240M) to an all-time high. Among all VC funds globally, Asian funds secured 18% of all capital raised in 2022. That share is down considerably from the decade ended in 2020 (48%).

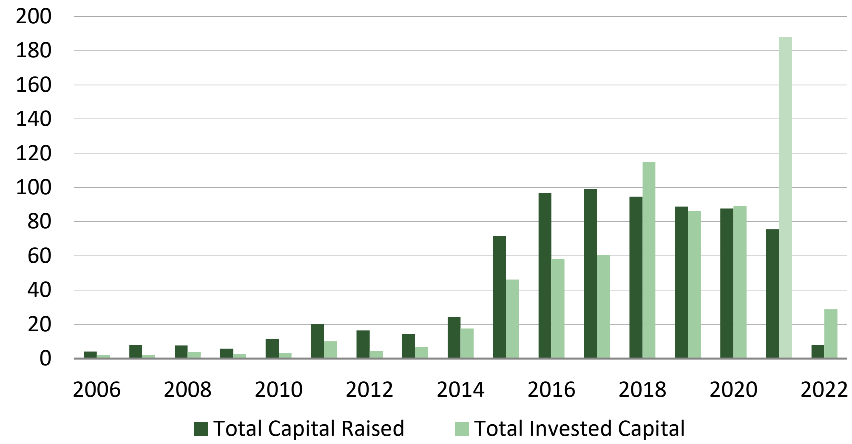
- Deal activity slowed in 2022 after 2021's record year. Global investors allocated $95B to Asia-based venture companies through 3Q 2022, which is down from $212B in 2021, but tracking in-line with pre-2021 averages. Asian VC managers themselves invested just $36B through 3Q, which is down from $177B last year. Notably, the investment pace by Asian VC managers in 3Q was the lowest since 2013. Chinese-based companies received nearly 50% of invested capital this year, followed by India and Korea. Information technology accounted for roughly one-third of deal activity. Although VC in Asia has expanded beyond China, it has remained the largest country constituent in the industry.

- Median pre-money valuations fell in 2022 across later-stage VC deals but continued climbing at the seed and early-stage rounds. Later stage valuations are down for the first time since 2018 and now back to 2019 levels. Consumer and IT valuations have increased this year, whereas health care fell to the lowest since 2017. These three sectors have historically dominated the Asia VC landscape.

- Exit activity was resilient in 2022 but slowing to $36B through 3Q, down from 2021's record of $105B. Still, this year's activity is in-line with pre-2021 averages. IPO's have accounted for almost 90% of all exit value this year, which is elevated relative to the five-year average. The exit outlook appears tenuous, however, given weak public market performance and falling valuations among later stage companies.

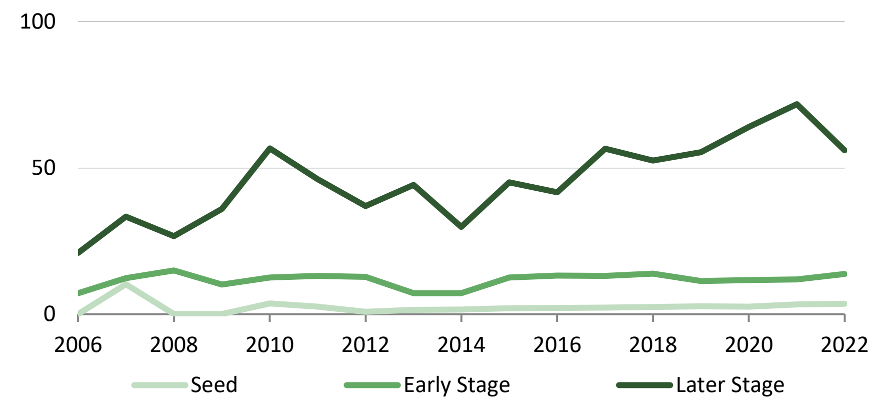
FUNDRAISING AND INVESTED CAPITAL: ASIA VC

2006–22 (Mar 31) • U$B



MEDIAN PRE-MONEY VALUATIONS BY STAGE: ASIA VC

2006–22 (Mar 31) • U$M



Source: PitchBook.

Notes: Total Capital Raised does not include Softbank Vision funds. Invested capital includes deals where the investor is an Asia-based VC fund. Valuations are shown by stage (as defined by PitchBook) rather than by series, due to small sample sizes.

REAL ASSETS

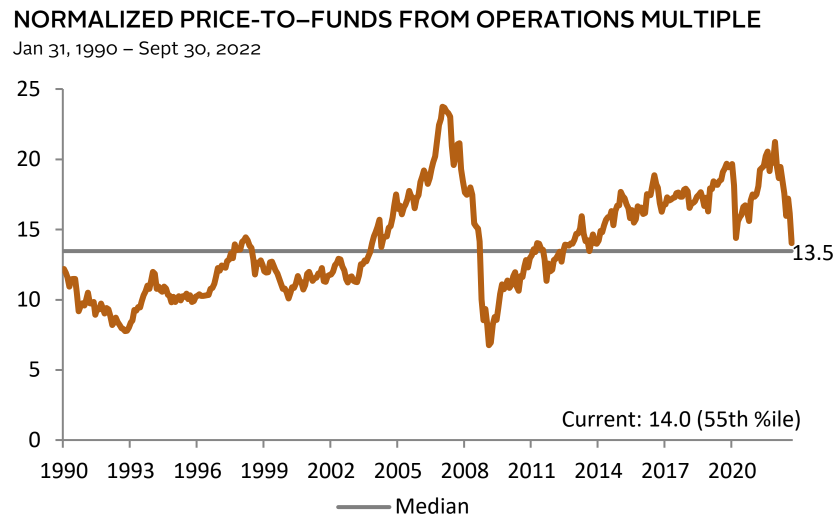
CAMBRIDGE
ASSOCIATES

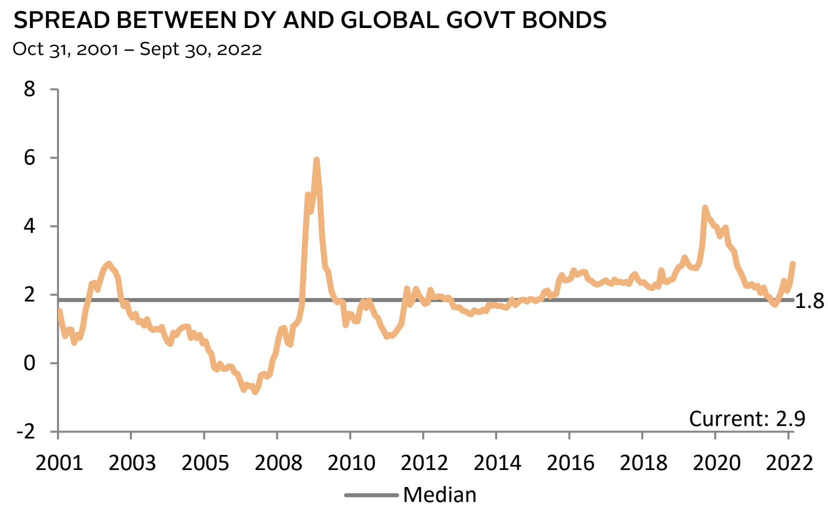
Developed Markets Property Securities

Facts & Figures Third Quarter 2022

DM property securities returned -11.4% in 3Q and -22.1% since 3Q 2021, in USD terms. The asset class's poor performance is consistent with the performance of the broader equity market, which has struggled amid a mix of challenges including elevated inflation, higher interest rates, and the war in Ukraine. Property has also had to confront changes with consumer and business behaviors resulting from the pandemic.

- DM property securities trade at 14.0x normalized funds from operations. While that multiple is higher than 55% of historical data going back to 1990, property securities offer a reasonable yield, particularly when compared to government bonds. In fact, the current spread between the yields on property securities and global government bonds is about 290 bps, which is above the long-term median (roughly 180 bps).
- The global economy is expected to grow by 2.9% in 2022, according to analysts surveyed by Bloomberg in early October. This forecast is slightly lower than what analysts expected in January (4.4%), likely given uncertainties related to the war in Ukraine and changes in monetary policy expectations. Growth expectations for 2022 are highest for the UK (3.5%), followed by China (3.3%), euro area (3.0%), US (1.6%), and Japan (1.6%), among major markets.
- A key concern for property investors is the pandemic's long-term impact on consumer and business preferences. For instance, while operating profit figures of DM property securities at the end of 2021 are roughly the same as at the end of 2019 (27%), hotels (-37%), offices (-15%), and retail (-5%) are down over the two-year period. Industrials (147%), diversified properties (48%), and healthcare (29%) have seen their profits expand.
- Real estate is a capital-intensive business, which uses debt to finance its growth to a greater degree than other sectors. Still, developed property securities' leverage has fallen since the GFC, with net debt as a percentage of total assets at roughly 26.9% at the end of 2021 relative to the 30.2% average since the beginning of 2010. The current level of leverage is near a low over the last two decades and reflects more discipline in capital markets.





Sources: EPRA, FTSE International Limited, J.P. Morgan Securities, Inc., National Association of Real Estate Investment Trusts, and Thomson Reuters Datastream.

Natural Resources Equities

Facts & Figures Third Quarter 2022

Natural resources equities returned 0.6% in 3Q and 26.4% since the end of 3Q 2021, according to the MSCI World Natural Resources Index in local currency terms. The strong trailing 12-month performance was driven in part by the rise in oil & gas prices. The increase in energy commodity prices coincided with supply disruptions linked to the pandemic and more recently, the war in Ukraine.

- Natural resources firms trade at 3.3 times cyclically adjusted cash earnings, which ranks in the 71st percentile of month-end observations dating back to 1990. Earnings for these firms contracted considerably in 2020, as the virus weighed on economic activity. But the outlook has improved with the rise in oil and gas prices. Through 3Q, the average price of oil on the New York Mercantile Exchange in 2022 was $98 per barrel, which is the highest calendar-year average since 2008.

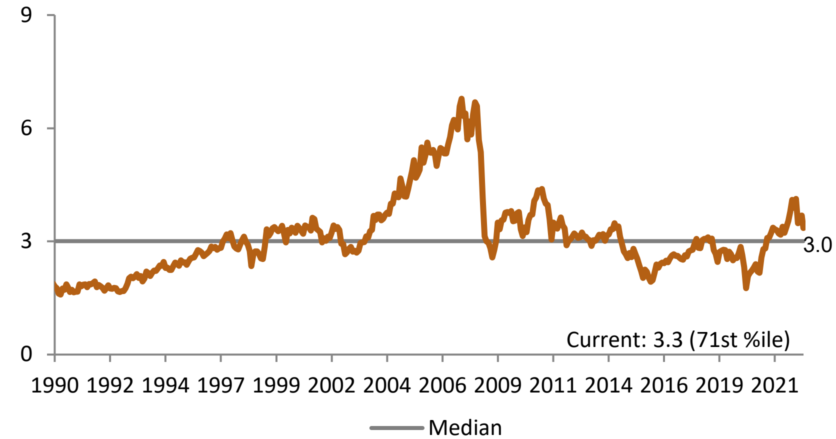
- Low investment levels contributed to last year's rise in oil & gas prices. Prior to 2017, capital expenditures typically amounted to around 8% of assets, but that level led to a severe glut in energy commodities. Since 2017, capital expenditures at an industry level have fallen to under 6%, which has curtailed available supplies. Baker Hughes estimates the number of rotary rigs operating in the world is currently 1,853, which is far lower than the ~3,000 rigs that operated on average between 2010 and 2016.

- The tragic war in Ukraine has upended energy markets. This is most obvious in European natural gas markets, which are under strain from reduced supply from Russia and low inventories and which has sent prices to historically high levels. But it also challenged oil markets. The US government expects Russia's oil production to fall by at least a couple million barrels per day by the end of 2023, as western sanctions challenge Russia's ability to sell.

- A key consideration for investors is the extent that renewable energy could undercut future hydrocarbon demand. Some long-term energy analyses, such as the US Energy Information Administration's 2020 Annual Energy Outlook reference case, highlight that oil and natural gas may continue to be the largest global energy sources for decades. Still, long-term energy forecasts have wide confidence intervals, and investors would be wise to carefully consider how different future energy scenarios may impact their portfolios.

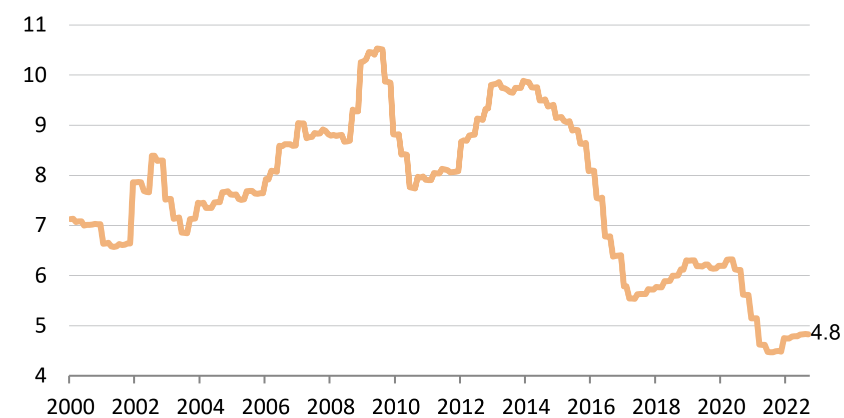
CYCLICALLY ADJUSTED PRICE-TO–CASH EARNINGS

Jan 31, 1990 – Sep 30, 2022



CAPITAL EXPENDITURES

Jan 31, 2000 – Sep 30, 2022 • Percent (%) of Total Assets



Source: Thomson Reuters Datastream.

Notes: Natural resources equities are made up of constituents in the Datastream World Energy Index and the Datastream World Basic Resources Index, weighted on a market-capitalization basis. Historical data may revise.

Commodity Futures

Facts & Figures Third Quarter 2022

The Bloomberg Commodity Index returned -4.1% in 3Q and 11.8% since 3Q 2021, in USD terms. The performance this past year was driven by energy (30.3%) and agriculture commodities (19.9%), both of which have been impacted by the war in Ukraine. The war and the sanctions placed on Russia for its role in it have further backwardated many commodities, indicating market participants are concerned about future supplies.

- Commodity spot prices are currently 0.4 standard deviations above the ten-year inflation-adjusted mean, using the constituents and weights associated with the Bloomberg Commodity Index. Among commodities, including those that are not part of the broad index, soybean oil, coffee, and heating oil currently have prices that are the biggest outliers relative to their recent histories. These prices, and all prices, reflect demand and supply issues unique to those markets.

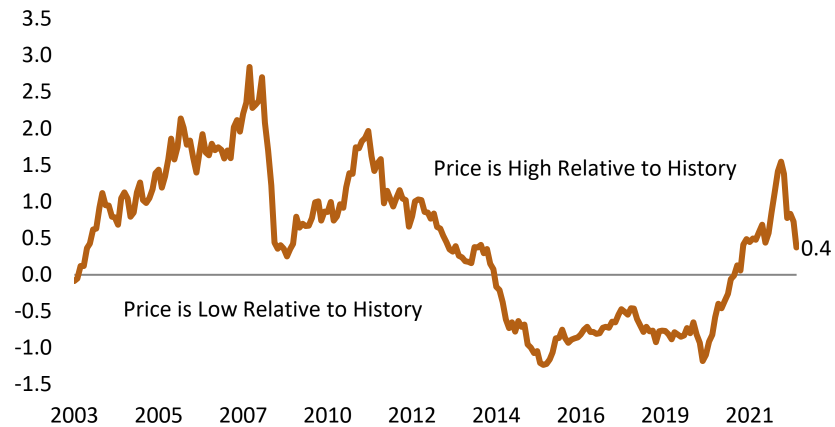
- The global economy is expected to grow by 2.9% in 2022, according to analysts surveyed by Bloomberg in early October. This forecast is slightly lower than what analysts expected in January (4.4%), likely given uncertainties related to the war in Ukraine and changes in monetary policy expectations. Growth expectations for 2022 are highest for the UK (3.5%), followed by China (3.3%), the euro area (3.0%), US (1.6%), and Japan (1.6%), among major markets.

- The performance of commodity futures consists of the returns linked to spot price changes, rolling a futures contract forward as it comes due, and the cash used to collateralize the contracts. For many years, the roll return detracted from commodity index returns. This was because many markets were in contango, meaning near-dated contracts were cheaper than contracts dated further out. But this is not the case at present. The aggregate market is now in backwardation.

- Two frequently referenced commodity benchmarks are the Bloomberg Commodity Index and the S&P GSCI™. The former is a world production- and liquidity-weighted index, with restrictions on individual commodity and commodity subsector sizes to promote diversification. The latter is a world production-weighted index of liquid futures contracts, which has most of its exposure in energy. While both indexes only hold near-month futures contracts, many active managers have the capability to buy contracts all along futures curves.

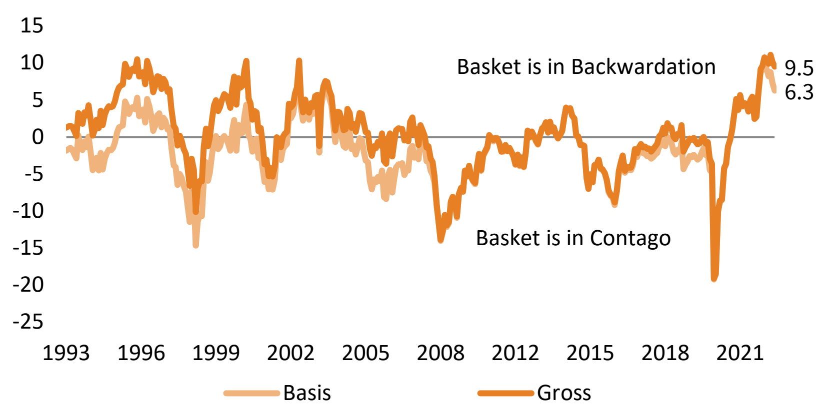
COMMODITY FUTURES BASKET PRICE DEVIATION

Jun 30, 2003 – Sep 30, 2022 • Z-Score



COMMODITY FUTURES BASKET INDICATIVE ROLL YIELD

Jul 31, 1993 – Sep 30, 2022 • Percent (%)



Sources: Bloomberg L.P. and Thomson Reuters Datastream.

Notes: Exhibits are based on the current futures and weights of the Bloomberg Commodity Index. Price deviation is the weighted z-score of commodity futures using ten years of trailing data. Basis is the roll yield's weighted percentage difference of front month contract relative to contracts one year later. Gross is the roll yield plus cash yield.

Gold

Facts & Figures Third Quarter 2022

The price of gold fell 7.4% in 3Q, ending at $1,674/troy ounce, which has reduced its YTD return to -8.1%. Gold's recent price decline has been driven largely by rising bond yields and the surging US dollar. Still, gold has outperformed most asset classes this year amid the broad-based bear market.

- Central bankers' messaging in third quarter indicated that aggressive policy measures will continue until inflation is under control, even if that results in an economic slowdown. The hawkish rhetoric signaled that rates could stay higher for longer, and real yields turned sharply higher during the quarter. This negatively impacted gold prices, because as real yields rise, so too does the opportunity cost of holding a non-interest-bearing asset like gold.

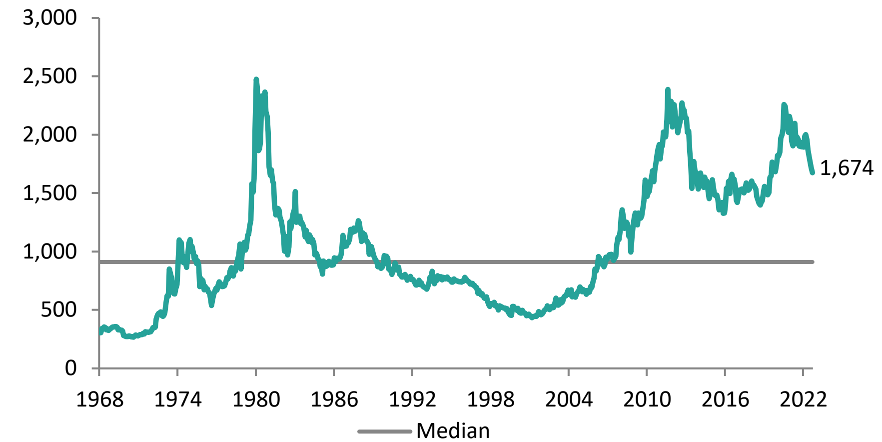
- The US dollar's rapid rise in 2022 has also been a key headwind for gold's price in USD terms. However, gold's performance outside the US remains quite strong this year. It has been a top-performing asset in JPY, EUR, and GBP terms. The latter currency has suffered historical weakness, falling to its lowest level versus the US dollar on record after the new UK government announced widely criticized fiscal policy initiatives—which were later abandoned.

- There are several low-cost, physically backed gold ETFs that track the price of gold without requiring physical storage. While these "paper gold" products offer liquidity, they also carry counterparty risk. Physical gold, which provides investors with a tangible asset, is subject to purchase premiums and storage fees.

- Gold has an expected real return of zero over the long term, which makes it problematic for institutions tasked with meeting a real spending objective. However, it provides a hedge against conditions that are hostile to capital markets.

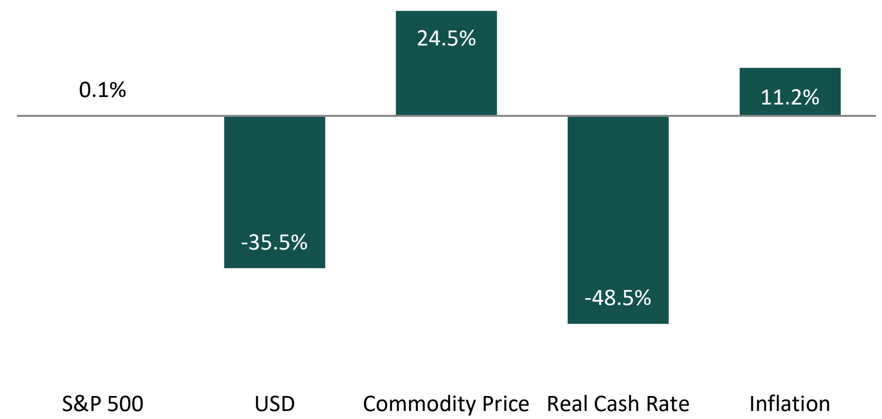
GOLD BULLION REAL PRICE

Jan 31, 1968 – Sep 30, 2022 • US Dollars per Troy Oz



LONG-TERM CORRELATION VS GOLD PRICES

Dec 31, 1970 – Sep 30, 2022



Sources: Intercontinental Exchange, Inc., Standard & Poor's, and Thomson Reuters Datastream.

Notes: Real prices are inflation adjusted to today's dollar. Data for CPI-U are as of August 31, 2022.

US Private Property

Facts & Figures Third Quarter 2022

US property returned 10.2% annually over the last three-year period at the asset level, according to NCREIF Property Index data as of 2Q. That return masks considerable sector dispersion, with industrial properties returning 26.0% annually over the same three-year period and retail returning 0.2%. Part of that dispersion reflects the pandemic's impact on the consumer, which hastened the long-standing shift away from some brick-and-mortar retail to online.

- Capitalization rates, or cap rates, have steadily fallen since the end of the GFC and are now at low levels relative to history. Across sectors, cap rates are lowest within apartments (3.7%) and industrial (3.8%) and highest within office (4.7%) and retail (5.2%). The recent rise in US rates and the expectation for tighter monetary policy could put pressure on property markets in the coming quarters.

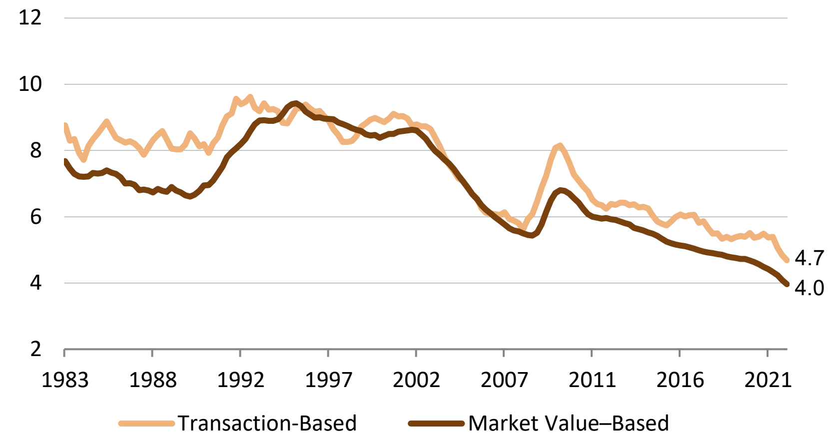
- Net operating income (NOI) at an aggregate level increased by 10.5% in the last four quarters, helped by the rebound in economic activity following the pandemic-linked downturn last year. While retail (16%) experienced substantial growth, it lost far more ground during the pandemic than other sectors. In contrast, industrial sector NOI didn't exhibit turmoil and has grown by 12% over the last four quarters. While the office sector has had some modest NOI growth in recent quarters, that sector has seen the largest increase in vacancy rates, rising from 9.8% at the end of 2019 to 12.9 in the first quarter.

- The global economy is expected to grow by 2.9% in 2022, according to analysts surveyed by Bloomberg in early October. This forecast is slightly lower than what analysts expected in January (4.4%), likely given uncertainties related to the war in Ukraine and changes in monetary policy expectations. Growth expectations for 2022 are highest for the UK (3.5%), followed by China (3.3%), euro area (3.0%), US (1.6%), and Japan (1.6%), among major markets.

- New commercial real estate construction collapsed following the GFC, and, while it has been minimal for most of this cycle, construction has picked up in recent years. As of 2Q, commercial construction accounted for roughly 1.1% of GDP, slightly higher than the average level since 2000 (1.0%). Within sectors, higher-than-normal levels of construction are occurring in industrial, with retail experiencing a lower-than-normal level of construction.

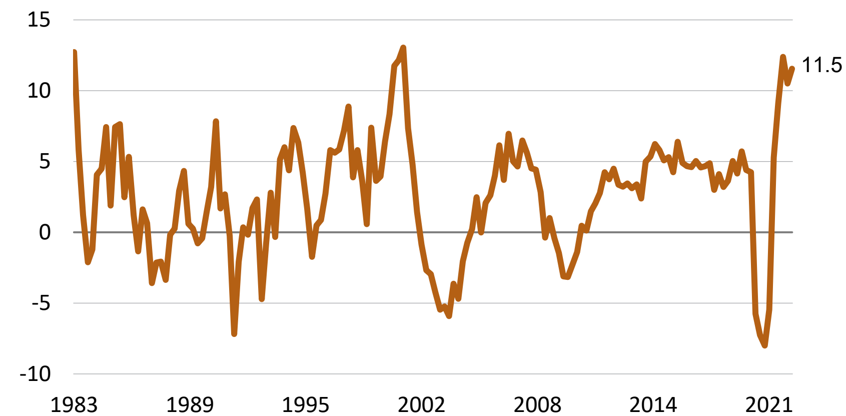
ALL PROPERTY CAP RATES

Second Quarter 1983 – Second Quarter 2022 • Percent (%)



FOUR-QUARTER ROLLING NOI GROWTH

First Quarter 1983 – Second Quarter 2022 • Percent (%)



Source: National Council of Real Estate Investment Fiduciaries.

UK Private Property

Facts & Figures Third Quarter 2022

UK private property returned 7.2% annually over the last three-year period at the asset level, according to the unlevered MSCI UK Quarterly Property Index as of 1Q in GBP terms. The performance was driven by strong industrial property performance over the period (20.3%). Retail and office properties, which have delivered weak performances in recent years, returned -0.2% and 2.9% over the period, respectively.

- Yields across all UK investment properties ticked down from 6.2% at the start of the 2021 to 5.3% at present. The sector benefited from high transaction volumes; 30,000 non-residential transactions in 2Q, according to UK government data, is higher than approximately two-thirds of prior quarters over the last ten years. Of course, greater economic concerns and higher government yields may mean transaction activity slows in the coming quarters.

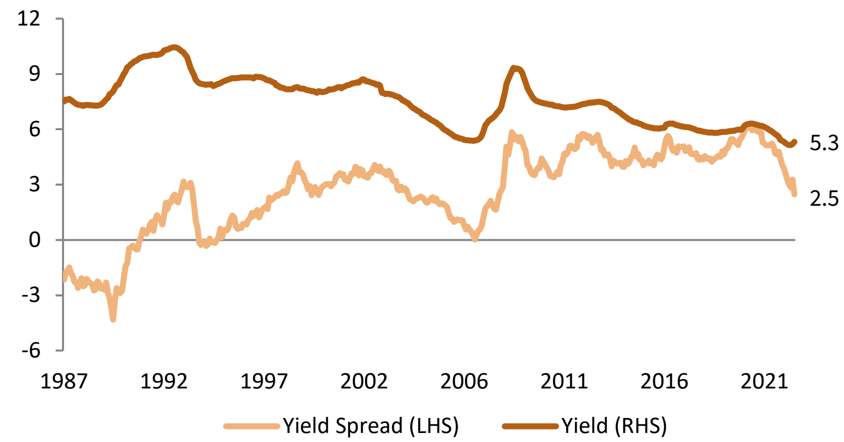
- Property yields can be sensitive to changes in government rates. As government rates have increased this year, property's yield spread over those rates has fallen from 4.5 ppts to 2.5. The current spread is lower than the ten-year average (4.8 ppts), which suggests the asset class's attractiveness relative to gilts has decline in recent quarters.

- The global economy is expected to grow by 2.9% in 2022, according to analysts surveyed by Bloomberg in early October. This forecast is slightly lower than what analysts expected in January (4.4%), likely given uncertainties related to the war in Ukraine and changes in monetary policy expectations. Growth expectations for 2022 are highest for the UK (3.5%), followed by China (3.3%), euro area (3.0%), US (1.6%), and Japan (1.6%), among major markets.

- As of the end of 2021, the UK commercial real estate market is estimated to be roughly $720B, according to MSCI Real Estate. It is the largest market in Europe and is followed by Germany's roughly $650B market. The UK commercial real estate market is composed primarily of retail, office, and industrial properties, with the industrial sector being the largest sector in the country.

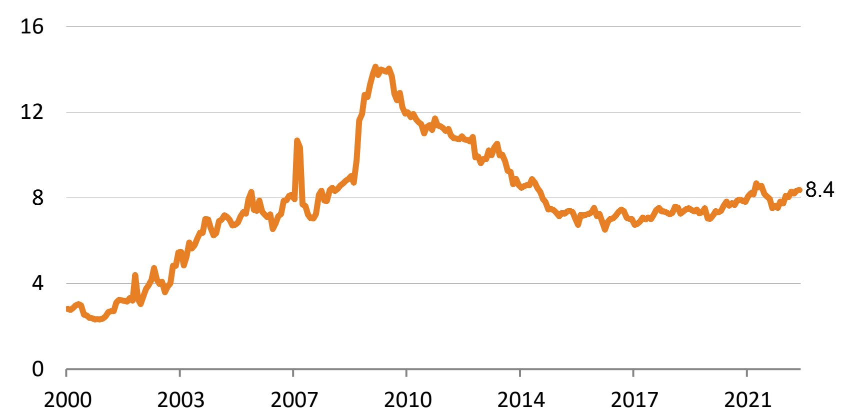
ALL PROPERTY EQUIVALENT YIELDS AND SPREADS

Dec 31, 1987 – Aug 31, 2022 • Percent (%)



VACANCY RATE

Jan 31, 2000 – Aug 31, 2022 • Percent (%)



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

Notes: The MSCI Real Estate index measures returns to direct investment in commercial property. Initial yield is current net income divided by gross capital value.

Europe ex UK Private Property

Facts & Figures Third Quarter 2022

Continental property returned 7.1% annually over the last three-year period at the asset level, according to the unlevered MSCI Global Property Fund Index data as of 1Q in LC terms. At a sector level, industrial (12.1%) and office (4.5%) properties fared well, while the retail sector disappointed (0.2%). But the sector faces challenges, including the uncertainties related to the war in Ukraine and tighter monetary policies.

- Property yields across most European countries have steadily decreased over the last decade. Top markets, such as Germany and France, have property yields near the lowest level for which data are available, according to MSCI Real Estate. But it seems reasonable to expect property yields to come under some pressure, given the increase in sovereign yields this year. Indeed, this has been visible in some markets.

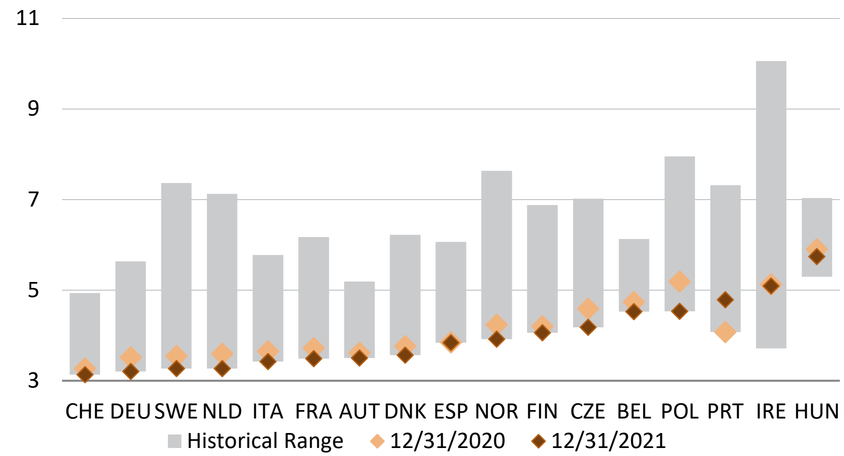
- The global economy is expected to grow by 2.9% in 2022, according to analysts surveyed by Bloomberg in early October. This forecast is slightly lower than what analysts expected in January (4.4%), likely given uncertainties related to the war in Ukraine and changes in monetary policy expectations. Growth expectations for 2022 are highest for the UK (3.5%), followed by China (3.3%), euro area (3.0%), US (1.6%), and Japan (1.6%), among major markets.

- Transaction volumes in Europe increased by 31% in 1Q to €80B from 1Q 2021, according to CBRE. Germany remained the largest investment market in Europe ex UK, with total investment volumes reaching €24B and far outpacing France (€5.3B). Office (€28.7B) and industrial (€16.6B) properties were the two largest property types involved in transactions in 1Q.

- The top two largest commercial real estate investment markets across Europe, excluding the UK, are Germany and France. MSCI estimates the size of all commercial real estate at the end of 2020 in those two markets to be roughly $650B and $470B, respectively. Offices make up a large portion of both Germany and France's commercial real estate markets.

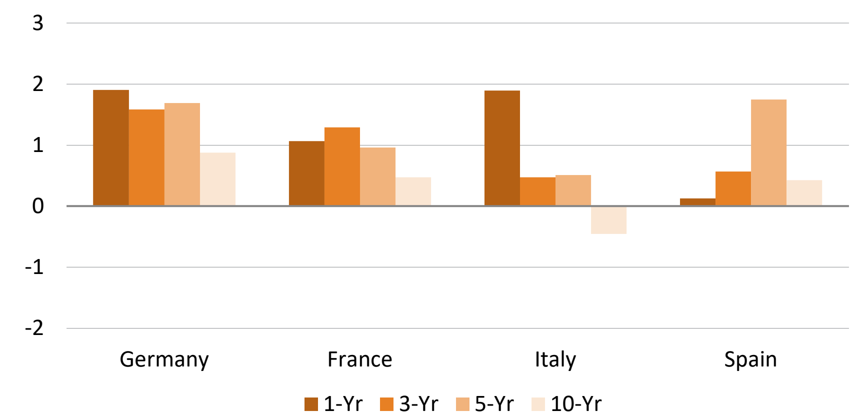
EUROPEAN PROPERTY NET OPERATING INCOME YIELDS

As of Dec 31, 2021 • Percent (%)



ANNUALIZED RENT GROWTH

As of Dec 31, 2021 • Percent (%)



Source: MSCI Real Estate. MSCI data provided "as is" without any express or implied warranties.

Asian Private Property

Facts & Figures Third Quarter 2022

Asian property returned 3.4% annually over the last three-year period at the asset level, according to MSCI Global Property Fund Index data as of 1Q in USD terms. At a sector level, industrial and office properties delivered the best results, returning 9.1% and 4.5% annually, respectively, over the same three-year period.

- Property yields in many markets have steadily decreased since the GFC. Two top markets, Australia and Japan, have property yields near or at the lowest level for which data are available, according to MSCI real estate data. Property yields in some countries, such as Australia, may face pressure, given sovereign yields have increased.

- Vacancy rates held mostly steady through the pandemic for many markets. But many properties have multi-year leases, so they make not reflect changed consumer and work life preferences. In some geographies with higher frequency data, higher office and retail vacancy rates have been observed.

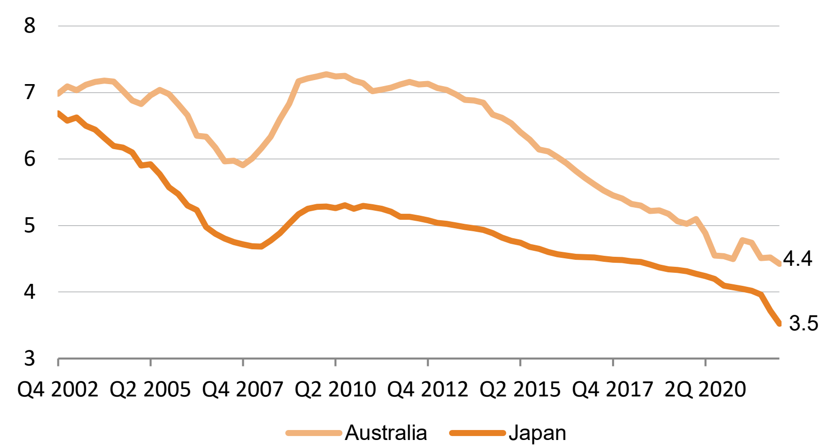
- The global economy is expected to grow by 2.9% in 2022, according to analysts surveyed by Bloomberg in early October. This forecast is slightly lower than what analysts expected in January (4.4%), likely given uncertainties related to the war in Ukraine and changes in monetary policy expectations. Growth expectations for 2022 are highest for the UK (3.5%), followed by China (3.3%), the euro area (3.0%), US (1.6%), and Japan (1.6%), among major markets.

- The volume of Asia-Pacific real estate investments totaled just over $31.2B in 1Q, according to CBRE. That level represents a 15% increase over the same quarter in 2021. China was the biggest investment market, attracting nearly $8B in sales in 1Q, outpacing Singapore (~$5B) and Australia (~$5B).

- Property investors continue to focus on six primary locations in the Asia Pacific. These six—China, Japan, Hong Kong, Australia, South Korea, and Singapore, in order of recent interest—collectively account for more than 96% of all property transactions in the region. The focus as it relates to Asian properties (that is, ex Australia) has been primarily from investors within Asia.

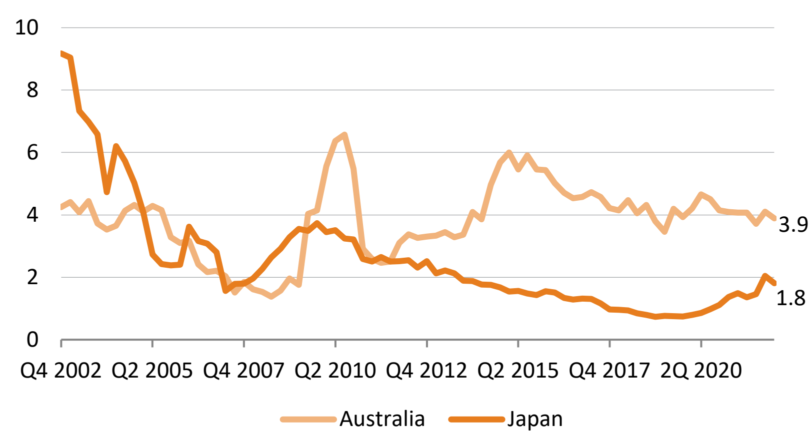
PROPERTY YIELDS

Fourth Quarter 2002 – Second Quarter 2022 • Percent (%)



VACANCY RATES

Fourth Quarter 2002 – Second Quarter 2022 • Percent (%)



Source: MSCI Real Estate. MSCI data provided "as is" without any express or implied warranties.

Note: Japan second quarter data are as of May 31, 2022.

Private Infrastructure

Facts & Figures Third Quarter 2022

Private infrastructure returned 12.5% annualized over the last three-year period, according to the Cambridge Associates Infrastructure Index as of 1Q. This index, which calculates horizon internal rates of return, net of fees, expenses, and carried interest, returned 11.3% annualized over the last ten-year period. The industry benefited from stable demand and increased interest among institutional investors.

- Infrastructure companies transacted at roughly 11 times EBITDA over the prior 12-month period on average, which is slightly below the industry's long-term average level. Broadly speaking, institutional investors have been increasingly attracted to brownfield infrastructure investments, as an effort to generate portfolio income and protect against inflation.

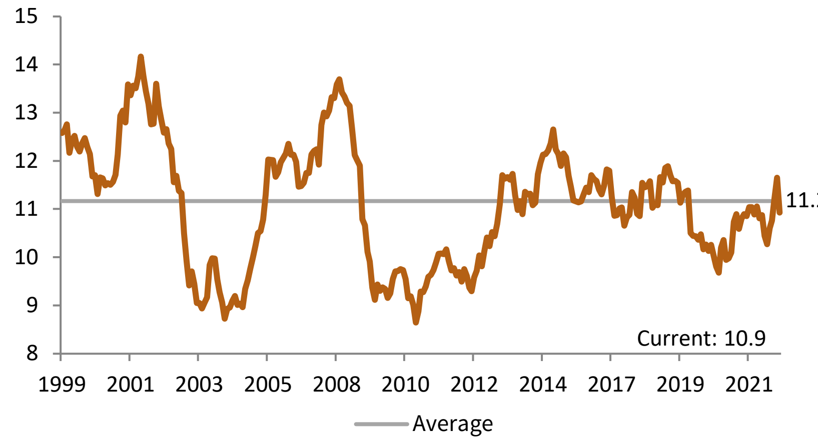
- The global economy is expected to grow by 2.9% in 2022, according to analysts surveyed by Bloomberg in early October. This forecast is slightly lower than what analysts expected in January (4.4%), likely given uncertainties related to the war in Ukraine and changes in monetary policy expectations. Growth expectations for 2022 are highest for the UK (3.5%), followed by China (3.3%), euro area (3.0%), US (1.6%), and Japan (1.6%), among major markets.

- Global infrastructure transaction volume totaled $790.8B in the first nine months of 2021, according to InfraDeals. This compares to $1,135.4B in all of 2020. Global greenfield, brownfield, refinancing and project finance deals accounted for 13%, 34%, 18%, and 35% of global 2021 deal volume, respectively. Energy and renewable investments were the top two types of investments, accounting for 27% and 22% of deal volume, respectively.

- Global infrastructure PE funds raised $147B in the first nine months of 2022, which is a new record haul, according to InfraDeals. In addition to this capital, direct investments by pension funds and sovereign wealth funds in infrastructure assets have increased in recent years. Direct investments can offer attractive return potential, given fees are generally lower, and they allow investors to build custom exposures.

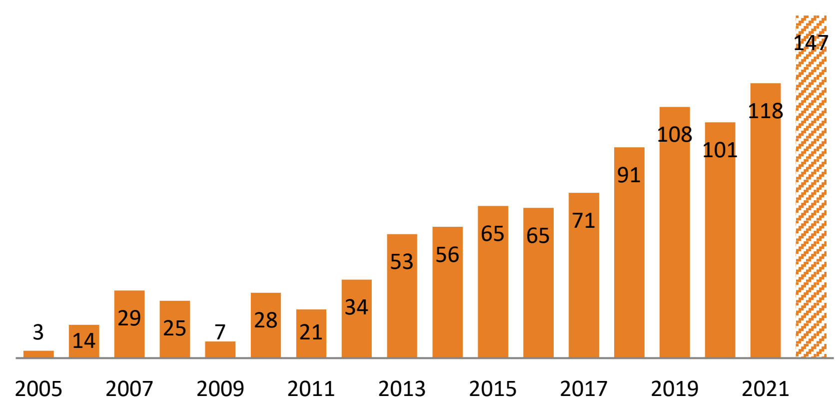
PRICES OF TRANSACTIONS (EV/EBITDA)

Mar 31, 1999 – Sept 30, 2022 • Rolling 12M Average



GLOBAL CAPITAL COMMITMENTS TO INFRASTRUCTURE PE FUNDS

2005–22 • US$B



Sources: Dealogic and InfraDeals.

Notes: Data are monthly and represent the trailing 12-month average EV/EBITDA for all infrastructure transactions. Historical data may revise. 2022 capital commitments data are through September 30.

Private Energy
Facts & Figures Third Quarter 2022

Private energy returned 4.2% over the last three-year period, according to the Cambridge Associates US Private Equity Energy Index as of 1Q. This index, which calculates horizon internal rates of return, net of fees, expenses, and carried interest, returned 3.8% over the last ten-year period. Low transaction multiples, which are partly linked to what was previously an oversupplied industry and negative sentiment around hydrocarbons, have challenged performances.

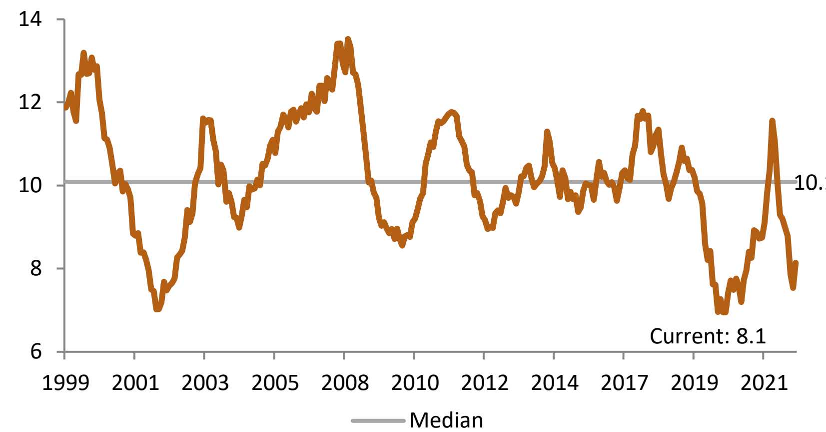
- Private energy companies tended to transact at 8.1x EBITDA over the prior 12-month period, which is low relative to multiples paid in 2021 The lower multiples are linked to the fact that operating profits have spiked in recent quarters. This is due partly to the fact that the average price of oil on the New York Mercantile Exchange jumped to $98 per barrel in 2022 through Q3, which is the highest calendar-year average since 2008.

- Low investment levels contributed to this year's rise in oil & gas prices. Prior to 2017, capital expenditures typically amounted to around 8% of assets, but that level led to a severe glut in energy commodities. Since 2017, capital expenditures at an industry level has fallen to under 6%, which has curtailed available supplies. Baker Hughes estimates the number of rotary rigs operating in the world is currently 1,853, which is far lower than the ~3,000 rigs that operated on average between 2010 and 2016.

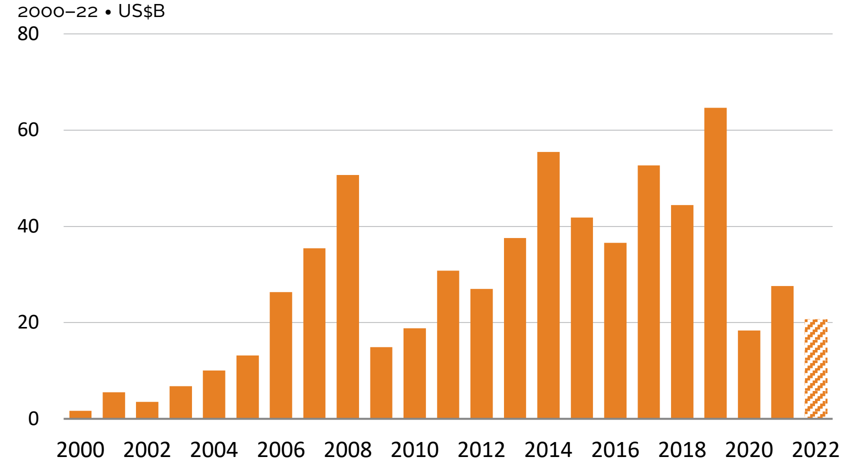
- The tragic war in Ukraine has upended energy markets. This is most obvious in European natural gas markets, which are under strain from reduced supply from Russia and low inventories and which has sent prices to historically high levels. But it also challenged oil markets. The US government expects Russia's oil production to fall by at least a couple million barrels per day by the end of 2023, as western sanctions challenge Russia's ability to sell.

- A key consideration for investors is the extent that renewable energy could undercut future hydrocarbon demand. Some long-term energy analyses, such as the US Energy Information Administration's 2022 Annual Energy Outlook reference case, highlight that oil and natural gas may continue to be the largest global energy sources for decades. Still, long-term energy forecasts have wide confidence intervals, and investors would be wise to carefully consider how different future energy scenarios may impact their portfolios.

PRICES OF TRANSACTIONS (EV/EBITDA)
Mar 31, 1999 – Sept 30, 2022 • Rolling 12M Average



PRIVATE EQUITY ENERGY FUNDRAISING
2000–22 • US$B



Sources: Cambridge Associates LLC and Dealogic.

Note: Data represent the trailing 12-month average EV/EBITDA for all reported private energy transactions. Historical fundraising data may revise. 2022 fundraising data are through August 31.

CURRENCIES

CAMBRIDGE
ASSOCIATES

USD vs Developed Markets Currencies

Facts & Figures Third Quarter 2022

The US dollar rose 6.6% in 3Q 2022 in nominal trade-weighted terms. Since early 2Q interest rate differentials have not been the primary driver of dollar strength, with the notable exception of against Japan. Risk aversion and expected growth differentials rose to prominence in recent months as the primary supports of the dollar. The trade balance impact of energy market strength has also been a supportive factor. With growth slowing, these factors may be sufficient to keep the dollar elevated; however, its real valuation remains very rich from a longer-term perspective.

- A widening in interest-rate differentials between the US and its peers, as a result of a more hawkish Fed, has been the main plank of dollar strength since this rally began last June. This widening has reversed a little against some peers in recent months as markets predict other central banks will continue to play catch-up with the Fed's hikes, due to domestic inflationary pressures. Japan was the notable exception to this, where the BOJ's commitment to accommodative policy drove further widening and substantial yen weakness.

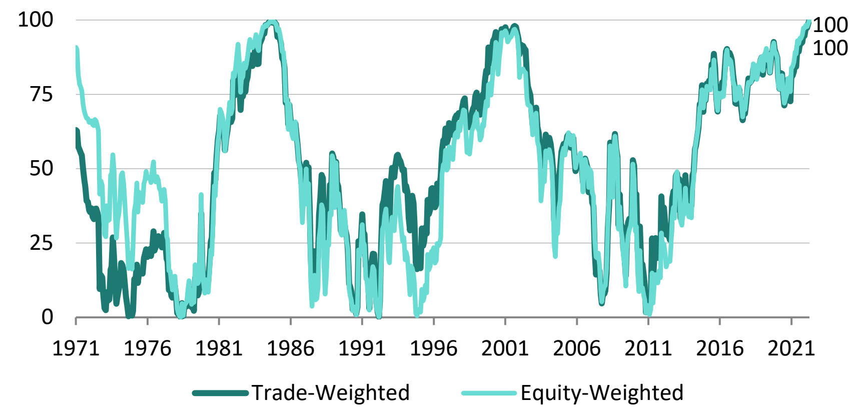
- 2022 has also witnessed considerable risk aversion. This was initially due to factors such as COVID-induced inflation and the war in Ukraine, but more latterly has included fears of an economic slowdown. Global equities have declined, while credit spreads have widened. With Treasuries and gold also declining, the dollar fulfilled its traditional role as a safe-haven, appreciating against most other currencies.

- Trade dynamics surrounding increasing energy prices have also boosted the dollar. Europe and Japan are both large net energy importers and so their trade balances have deteriorated as the cost of these imports has risen. Europe's reliance on Russian gas has proven a major vulnerability. GDP growth revisions for next year have been more negative for Europe than the US as a result.

- The US dollar remains richly valued on a longer horizon. Its real effective exchange rate stands at the 100th percentile for both the trade- and equity-weighted series, representing a substantial premium versus the median valuation. Potential catalysts for USD weakness are an easing of US rate expectations, due possibly to a decline in inflation and/or slowing growth, cooling of the global energy crunch, or a hawkish pivot by the BOJ.

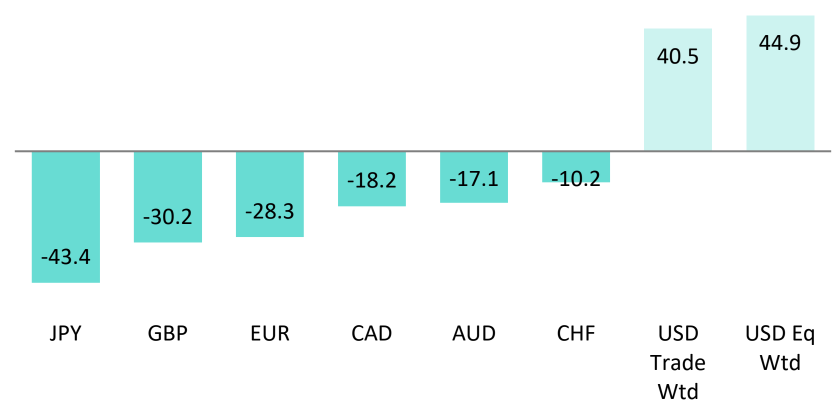
USD BASKET REAL EXCHANGE RATE PERCENTILE

Jun 30, 1971 – Sep 30, 2022



REAL EXCHANGE RATE VS THE USD: % FROM MEDIAN

As of Sep 30, 2022



Sources: Eurostat, MSCI Inc., OECD, Refinitiv, Thomson Reuters Datastream, and US Federal Reserve. MSCI data provided "as is" without any express or implied warranties.

Notes: Australian inflation data are quarterly and as of June 30, 2022. Eurozone inflation data are as of September 30, 2022 and preliminary. All other inflation data are as of August 31, 2022.

Emerging Markets Currencies

Facts & Figures Third Quarter 2022

EM currencies, as measured by an equal-weighted basket, were down by 6.1% in 3Q 2022. Rising levels of hawkishness amongst DM central banks has been a particularly relevant headwind for these currencies, as has the decline in risk sentiment. The moderation of growth from peak recovery levels has also been a challenge. The strength of the dollar against EM currencies continues to be remarkably broad-based, with only one currency out of the 20 in our index strengthening last quarter. Most saliently for the EM complex, the CNY fell 6% on the quarter as China continued to implement COVID-19 lockdowns.

- EM currencies are highly sensitive to global growth prospects, given the importance of trade to their economies. Therefore, the continued impairment of global supply chains has been a headwind to many EMs. Moreover, recent fears of an economic slowdown, due to the impact of high inflation and the effect of monetary tightening designed to mitigate it, have exacerbated the issue. Several commodities have experienced meaningful declines during the quarter, which has hurt the exporters of those materials.

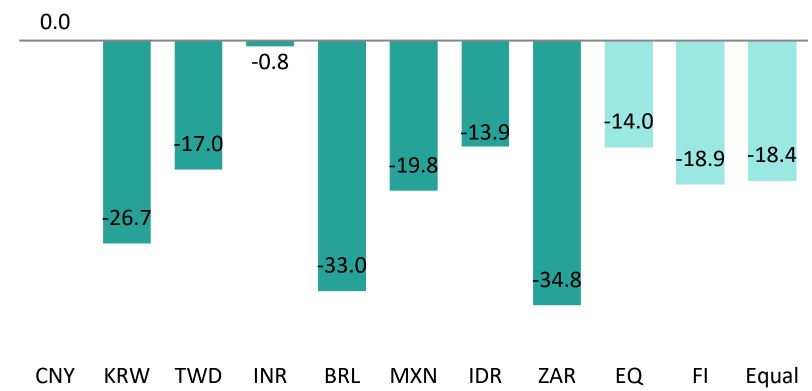
- EMs have been especially impacted by the persistence of inflation given the greater weight of food and energy in their CPI baskets. EM central banks were forced to raise interest rates aggressively to maintain their price stability–targeting credibility, presenting a headwind to growth. Rising DM yields as a result of climbing rate hiking expectations have attracted capital away from EMs. Both factors have put downward pressure on their currencies in recent months.

- Continued COVID-19 lockdowns in China have caused a notable fall in the CNY. Given the large exposure to China in the equity index, fixed income-weighted EM currencies have outperformed equity-weighted EM currencies so far this year. However, both fixed income and equity-weighted EM currency baskets are well below their historical medians at 18.9% and 14.0%, respectively.

- The carry of EM currencies has declined since the end of 2021 as the interest rate differential with DM markets has narrowed, due to the increased number of hikes expected from the latter. The cost of hedging out the FX exposure of EM equities is now essentially zero for a USD-based investor, the lowest it has been post-GFC. It costs 3.1% to do likewise for EM local bonds.

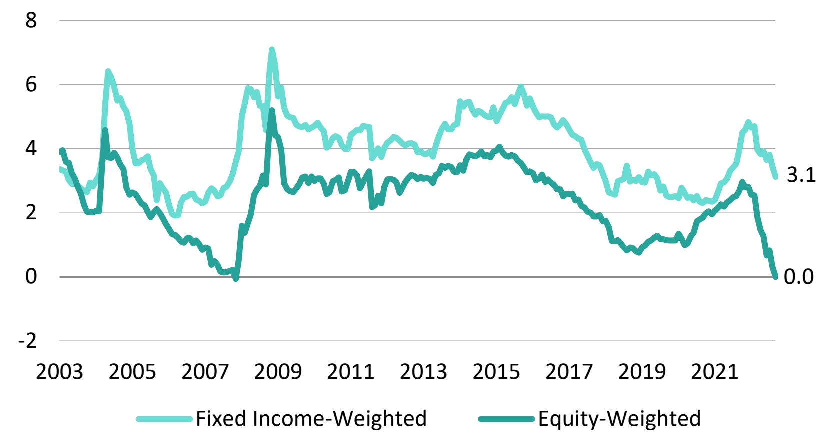
EM REAL EXCHANGE RATE VS USD: % FROM MEDIAN

Jan 31, 1994 – Sep 30, 2022



EMFX IMPLIED CARRY

Jan 31, 2003 – Sep 30, 2022 • Percent (%)



Sources: Directorate-General of Budget, Accounting and Statistics, Executive Yuan, Taiwan; INE - National Institute of Statistics, Chile; International Monetary Fund; J.P. Morgan Securities, Inc.; MSCI Inc.; National Bureau of Statistics of China; Refinitiv; Thomson Reuters Datastream; and US Department of Labor - Bureau of Labor Statistics. MSCI data provided "as is" without any express or implied warranties.

GBP vs Developed Markets Currencies

Facts & Figures Third Quarter 2022

The pound fell by 3.7% in trade-weighted terms in 3Q 2022. The strength of the dollar during the quarter was the biggest factor behind the pound's decline, especially on an equity-weighted basis where its valuation is depressed. However, the pound also experienced idiosyncratic weakness during the quarter due to the growth/inflation trade-off faced by the UK. Currency volatility also spiked late on in the quarter after the government's 'mini' budget announcement.

- The Bank of England (BOE) raised its policy rate by 100 bps during the quarter to 2.25%, as the UK faced a rising rate of inflation that may stay elevated for some time. At the same time, growth is expected to be challenged (consensus 2023 growth is -0.2%), directly by the energy crisis and indirectly by the increase in interest rates delivered to cool its inflationary impact. The latter was exacerbated by planned Gilt sales by the BOE, the announcement of an unfunded fiscal expansion by the government and aggravated by forced selling from pension funds.

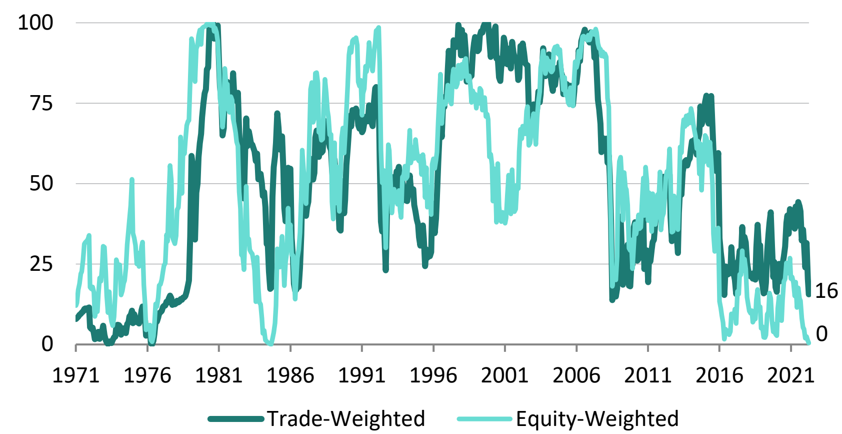
- The UK's current account deficit, which widened to over 5%, and the greater prevalence of cyclical sectors in the country's asset markets, gives sterling a propensity to behave as a risk-on/risk-off currency. This is in stark contrast to the dollar, which acts as a safe-haven in times of stress. The sell-off in risk assets therefore, and the UK's greater exposure to the energy impacts of the war in Ukraine, saw the pound decline by 8.1% versus the dollar.

- The USD dominates the equity-weighted index, with a weight of 75%, given its dominance of the MSCI World index. The euro dominates the trade-weighted index, with a weight of 61%. The strength of the dollar therefore saw sterling decline more steeply on an equity-weighted basis (-6.7%) than trade-weighted. The REER of the equity-weighted series is now close to its record low, while the trade-weighted series is back towards the lows that have been seen since the Brexit vote.

- There remain some fundamental headwinds for the UK to contend with. The supply-side impacts of the pandemic and Brexit mean there is a higher possibility of a stagflationary environment in the UK than elsewhere. There are also lingering concerns about the UK's external economic footing once other impacts have faded. Sentiment toward the UK and its risk assets remains depressed however, which could prove supportive in the event of any improvement in fundamentals or a continued rebound in value sectors versus growth.

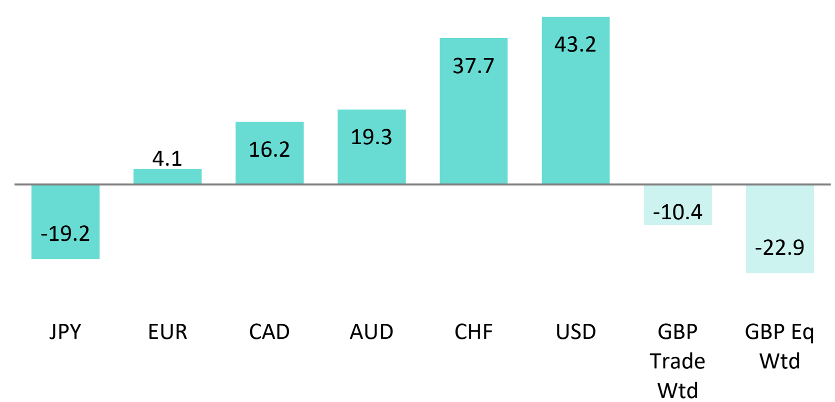
GBP BASKET REAL EXCHANGE RATE PERCENTILE

Jun 30, 1971 – Sep 30, 2022



REAL EXCHANGE RATE VS THE GBP: % FROM MEDIAN

As of Sep 30, 2022



Sources: Bank of England, Eurostat, MSCI Inc., OECD, Refinitiv, and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Notes: Australian inflation data are quarterly and as of June 30, 2022. Eurozone inflation data are as of September 30, 2022 and preliminary. All other inflation data are as of August 31, 2022.

EUR vs Developed Markets Currencies

Facts & Figures Third Quarter 2022

The euro fell 2.3% in trade-weighted terms in 3Q 2022. The broad-based strength of the dollar during the quarter was the biggest factor behind the euro's decline. An additional headwind was the continued impact of the war in Ukraine, as it clouds the European growth outlook while keeping inflation elevated.

- Risk aversion continued as a cross-asset theme in the third quarter. COVID-induced inflation, the associated rise in interest rates and the war in Ukraine remain the drivers. Fears of a growth slowdown in 2023, centered on Europe, became an increasing focus. The dollar fulfilled its traditional role as a safe haven in this environment, appreciating rapidly by 6.3% versus the euro. The euro gained nearly 2% against sterling.

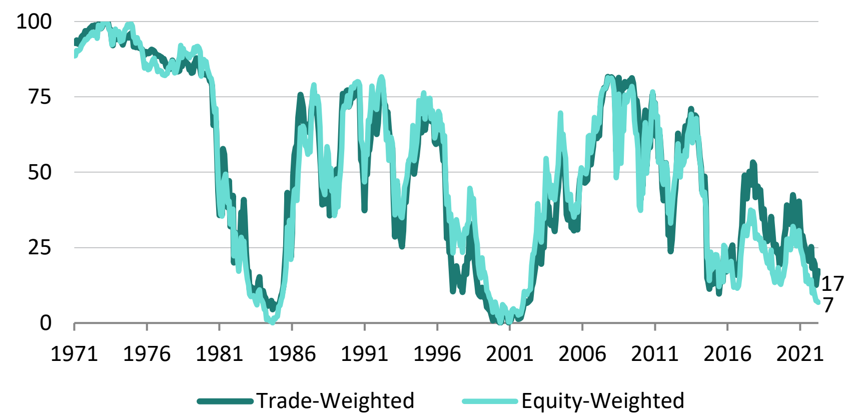
- Conflict in Ukraine has clouded the growth outlook for Europe. The surging cost of energy and food is a headwind to consumption. Industry may be impacted by existing and planned sanctions on Russia, and a restriction of gas flows by Russia. As an energy importer, the euro area's deteriorating trade balance has also dented the euro. The ECB meanwhile faces an unenviable trade-off between stubborn inflation and slowing growth, with planned tightening causing stresses in peripheral fixed income markets.

- To see sustained, domestically generated outperformance of the euro we likely need to see follow through on the hope generated by the NextGenerationEU and REPowerEU plans. Not just in terms of delivering on those plans, but also in terms of a further deepening of continental ties, including; completion of the capital markets union, a permanent and growing role for jointly issued bonds and increased flexibility in budgetary rules. Such changes are necessary to increase the integration between periphery and core and limit future existential concerns about the region.

- The valuation of the euro stands at just the 7th percentile on an equity-weighted basis and at the 17th percentile on a trade-weighted basis. These values are 21.5% and 7.9% below median, respectively. Therefore, the direction of the dollar, which accounts for 78% of the equity-weighted index, remains key for the euro outlook. The greenback may stay supported in the near term as slowdown fears and risk aversion persist. The market beginning to price a Fed pivot is one potential way in which we could see a dollar reversal in the coming quarters.

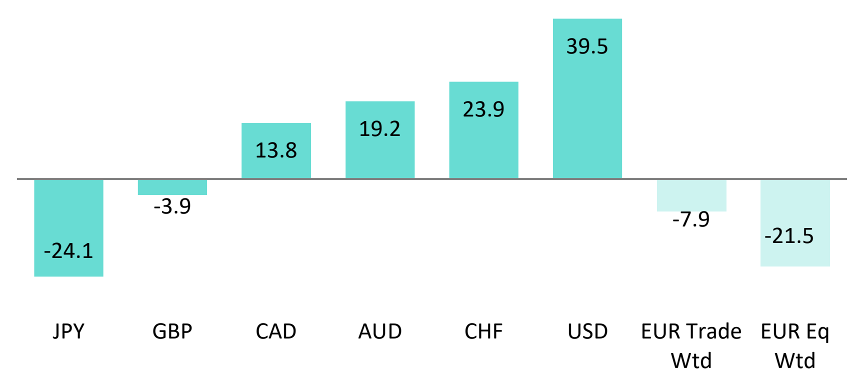
EUR BASKET REAL EXCHANGE RATE PERCENTILE

Jun 30, 1971 – Sep 30, 2022



REAL EXCHANGE RATE VS THE EUR: % FROM MEDIAN

As of Sep 30, 2022



Sources: European Central Bank, Eurostat, MSCI Inc., OECD, Refinitiv, and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Notes: Australian inflation data are quarterly and as of June 30, 2022. Eurozone inflation data are as of September 30, 2022 and preliminary. All other inflation data are as of August 31, 2022.

Bitcoin

Facts & Figures Third Quarter 2022

The price of bitcoin stabilized in Q3, declining by just 2.5%, a welcome respite after what has been a tumultuous year for digital asset prices. Bitcoin's price has fallen 71% since reaching its all-time high of nearly $69,000 last November, representing its fifth decline of more than 70% in the past decade. The decline has been precipitated by broader negative market sentiment, as investors have shunned digital assets amid rising interest rates and concerns about slowing economic growth.

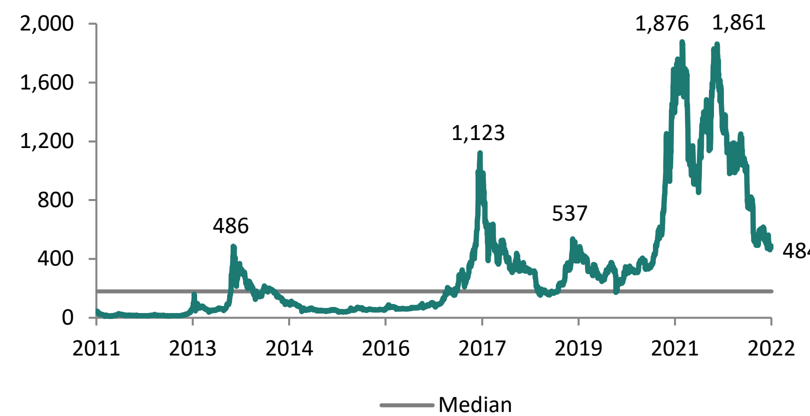
- Bitcoin's price is largely influenced by scarcity; there will only be 21 million bitcoins ever produced. More than ninety percent of all bitcoin has now been mined; with only around 2 million left to be mined. Proponents of bitcoin cite its appeal as a decentralized currency that can protect against currency destabilization and government overreach. It is not printed by any central entity but is minted and secured by a vast network of "miners."
- Price to transactions per coin (P/TC) can be viewed as a crude valuation metric for bitcoin. Transactions per coin offers a way to gauge the utility of coins in circulation. Thus, a high P/TC could indicate speculation, with bitcoin being priced expensively for every unit of its transaction volume. But transactions per coin only show bitcoin's utility as a medium of exchange and doesn't inform on how users "stake" bitcoins, which can indicate bitcoin's utility as a store of wealth.
- There are several major risks associated with bitcoin investing; the most obvious is high price volatility. Indeed, the annualized standard deviation of bitcoin has been more than 6x that of major equity indexes in the past five years. Bitcoin also faces other key risks, including complicated tax considerations and the negative environmental impacts of bitcoin mining.
- Bitcoin is just one of thousands of different cryptoassets that utilize blockchain technology. Implementation options have historically been limited, but passive and active options—including dedicated custodians, cryptoasset trusts, and venture capital and hedge funds—continue to be introduced.

BITCOIN PRICE

Dec 31, 2015 – Sep 30, 2022 • US Dollars

RATIO OF BITCOIN PRICE TO TRANSACTIONS PER COIN

Aug 31, 2011 – Sep 30, 2022



Sources: Blockchain.com and Thomson Reuters Datastream.

Notes: Data are daily and represent the USD price of bitcoin divided by the number of transactions per coin outstanding. Total bitcoin in circulation and transactions are weekly.

Notes on Data

Third Quarter 2022

Note on CA House Views

- All performance data is quoted in US dollars unless otherwise noted.

Notes on Our Cyclically Adjusted Price-to–Cash Earnings Calculations

- For most equity markets, we construct a cyclically adjusted price-to–cash earnings (CAPCE) ratio. 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.
- On our equity valuation charts, we use a consistent approach to our median and percentile calculations for valuation ratios across all regions. All charts are labeled to indicate the current valuation's percentile versus the historical median. We typically consider the range from the 25th to the 75th percentile as fairly valued. Valuations in the 75th to 90th percentile are typically overvalued relative to history, and in the 10th to 25th percentile, undervalued. The top 10th and bottom 10th percentiles generally represent very overvalued and very undervalued relative to history, respectively. An asset class's valuation call takes into account valuations, fundamentals, momentum, sentiment, and other factors, and calls do not mechanistically change with percentiles; rather these ranges are used as guides for our valuation calls.

Notes on the 12-Month Absolute and Relative Price Momentum

- The 12-month absolute momentum is the trailing 12-month index price return in local currency terms.
- The 12-month relative momentum is calculated as the geometric difference between each market's trailing 12-month price return in local currency terms.

Notes on Specific Data Providers

- Dealogic updates its database on a regular basis; therefore, historical data may change.
- Hedge Fund Research data are preliminary for the preceding five months.
- Total return data for all MSCI indexes are net of dividend taxes.
- US CPI data lag by one month.