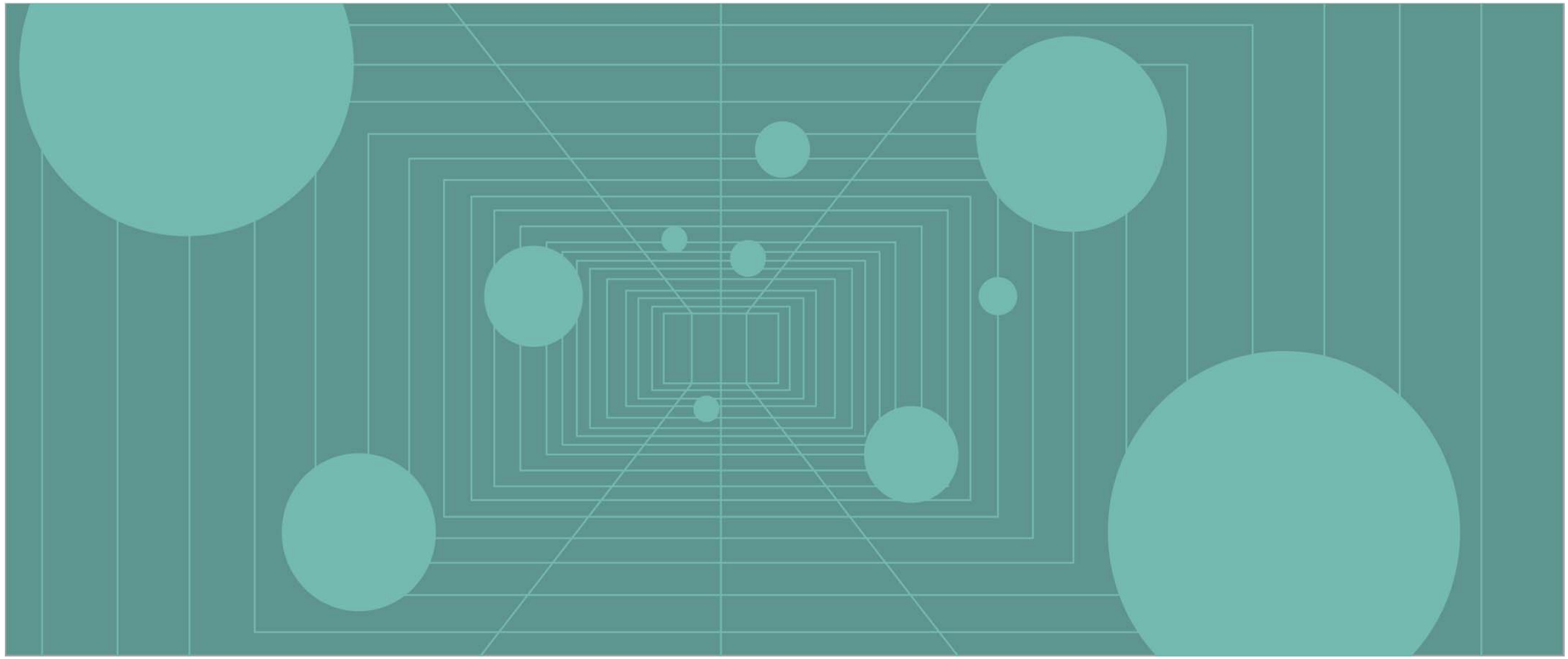
DECADES OF DATA

GLOBAL MARKETS 1900–2018



CAMBRIDGE ASSOCIATES

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INTRODUCTION

In this edition of Decades of Data, we add yet another year of data to our long-term analysis of valuations and returns. Most risk assets declined in 2018, with some reaching bear market territory during the year, as rising risks and volatility stood out in stark contrast to the benign environment of 2017. While recent market developments weigh on investors' minds, this report provides a long-term backdrop to develop a framework for evaluating current market conditions. The charts place current economic conditions, returns, and valuations into historical context.

"Know the history" is a key tenet of our research process, and the insight we have gained from conducting this analysis over many years underpins the long-term investment philosophy at Cambridge Associates.

The analysis presented in this chart book is organized into eight sections:

- Historical returns
- Components of equity returns
- Equity mean reversion
- Equity valuations
- Bond yields, rates, and future returns
- Emerging markets
- Business cycles
- Current market environment

Given the stage of the economic cycle and a shifting paradigm in central bank policy, we incorporate a current market environment section this year, which explores topics such as monetary policy, cash and bond yields, asset correlations, equity fundamentals, and valuations. We also expand on our analysis of emerging markets, a section that was introduced last year.

Executive Summary

- **Basing investment decisions on the extrapolation of capital market returns from recent, relatively short periods is a common mistake.** Viable conclusions about long-term expected returns cannot be drawn from return data for periods shorter than several decades, and even then, investors should be mindful that long-term statistics are beginning- and end-point sensitive and that returns are more variable than commonly assumed. Still, consideration of shorter time periods within a longer-term context can provide a powerful framework for evaluating current market conditions.
- **Global equities sank in 2018 and volatility surged, in contrast to broad-based gains in 2017.** Australia (-2.2%), US (-4.4%), and UK (-9.5%) sold off, whereas Japan (-15.2%) entered a bear market during the year. Emerging markets (-14.6%) underperformed DM after leading most asset classes in 2017. The US posted its first annual decline in total returns since 2008, while other markets delivered the worst performance since 2011. Still, US equities declined in only seven out of the past 40 calendar years, or roughly 18% of the time. In that 40-year period, calendar year market declines have typically been associated with economic recessions, but 2018 was one of few exceptions.
- **The post–global financial crisis (GFC) period has seen stronger returns than over the very long term in the UK and US, while Australian and Japanese equities have posted returns under their very long-term averages.** For the full period analyzed, investors in US equities (1900–2018) earned a 9.5% nominal average annual compound return (AACR); UK equities (1900–2018), 8.7%; Australian equities (1912–2018), 10.6%; and Japanese equities (1921–2018), 11.0%. Over the past ten years post crisis, US equities have posted a nominal AACR of 13.1% and UK equities, 9.1%. Despite a poor showing in 2018, these returns are well above very long-term averages in the US. In the UK, recent ten-year returns are marginally above long-term averages. For Australian and Japanese equities, the post-crisis ten-year AACRs are 8.8% and 7.4%, respectively. Rolling ten-year returns ticked up across regions, as the roughly -30% or worse returns from 2008 fell out of the lookback horizon. This highlights the impact of beginning- and end-point sensitivity, and reminds investors that even over periods as long as ten years, returns can be skewed by short-term market fluctuations.

Executive Summary (continued)

- **Across regions, equities are most likely to outpace inflation over long-term periods, improving purchasing power even at the low end of the real returns range.** Over rolling 50-year periods, real AACRs for stocks across regions ranged, on average, from a low of 3.0% to a high of 9.8%, whereas the range for benchmark government bonds (-2.5% to 3.7%) and cash (-2.9% to 1.9%) indicated higher potential for diminished purchasing power over certain periods. Equities, however, never lost out to inflation over the very long term. The US has had the lowest level of inflation, averaging 3.0% annually, while the UK has averaged 3.7%, and Australia, 4.1%. Japan presents a special case for several reasons. For the full period (1921–2018), inflation has averaged 6.8% annually in Japan, but this includes a period of hyperinflation between 1944 and 1948, when prices rose over 6,000% cumulative. Excluding these years, Japan has averaged annual inflation of 2.5%, just below the US. Japan's "lost decade" has also had a major impact on equity returns. Since 1990, Japanese equities returned -0.9% annualized, while performance for the US, UK, and Australia was more in line with long-term historical averages.

- **Over the long term, equity investors are generally compensated for the additional risk of holding stocks, although results vary by region.** Since 1900, US equity returns exceeded bond returns during 77% of all five-year periods, 86% of all ten-year periods, and ~100% of all 25-year periods (calculated on a nominal basis using rolling monthly data). UK equities and bonds show a similar pattern. In Australia, where data begin in 1912, the likelihood of equity outperformance over the 25-year time horizon falls to 82%. Japan, where data begin in 1921, shows the lowest likelihood of equity outperformance, with equities outperforming bonds 72% over 25-year periods. While equities tend to outperform in the long term, they are more volatile and prone to larger drawdowns than bonds, particularly over short time horizons.

- **Earnings growth and dividend reinvestment, respectively, are the primary contributors to total return over time, whereas mean reversion diminishes the impact of multiple expansion/contraction.** Across regions, earnings growth provides the highest degree of return contribution, on average, but can be highly volatile (especially during periods of economic decline) relative to the steady stream of reliable income provided by dividends. Companies managed to grow dividend payouts even during economic contractions across regions studied. Real price gains are muted relative to the compounding effect of reinvested dividends. Since 1900, real prices accounted for just 33% and 5% of US and UK real total returns, respectively. For Australian equities since 1970, dividends were the only source of total return as real price returns were negative. In Japan, low dividend yields for most of recent history have made dividends less impactful.

Executive Summary (continued)

- **Starting valuations and long-term (ten+ years) subsequent equity returns are related, but the relationship is weaker over shorter time horizons.** Normalized valuations and subsequent returns have a stronger relationship over long time periods (e.g., ten-year subsequent returns), but in no case do starting valuations completely explain subsequent returns—many factors can influence equity performance. At December 31 valuations, the average subsequent ten-year real return for US equities has been about 3%; for UK equities, 9%; and for Australian equities, 6%. The valuation-subsequent return relationship also holds in emerging markets, and, while limited in history, boasts the largest R^2 value at the ten-year subsequent return horizon. From December 31 valuations in EM equities, the average subsequent ten-year real return has been about 9%.
- **High or low valuation environments alone are not a catalyst for market reversals and may persist for several years; waiting for valuations to revert to mean can be an exercise in frustration.** Low valuations provide what famed investment analyst Benjamin Graham called "a margin of safety." High valuations, on the other hand, typically price in lofty projections for the future, providing little room for error. Despite uncertainty regarding the timing of market reversals, the historical record across regions presented in this report is clear—periods of low valuations are followed by higher long-term subsequent returns, while periods of high valuations are followed by poorer long-term returns.
- **Equity dividend yields also provide information value on the likely direction of subsequent returns, though the relationship is not as strong as valuations.** Across developed regions, higher starting dividend yields have typically been associated with higher subsequent ten-year returns relative to long-term averages. In emerging markets, there is an unclear relationship between dividend yields and subsequent returns. Dividend yields in the US are currently around the 30th percentile of the historical distribution, where subsequent real ten-year returns are within a range of roughly 6% to 8%. Dividend yields fail to capture the whole picture, however, as companies can also return excess cash to investors by buying back stock, a strategy which US companies in particular have made great use of in recent years.

- **Subsequent nominal ten-year bond returns closely track the entry yield**, and with bond yields at or near historical lows across all four regions, the outlook for future bond returns is decidedly low. While falling yields have been a boon for Australian, UK, and US bond investors for the past 30+ years, with bonds posting strong returns across all these markets (AACRs of 10.4%, 9.2%, and 8.0%, respectively, since 1981), future returns are likely to be capped. Japan's experience, where ten-year bond yields have been below 5% since November 1992 (and averaged a mere 0.6% in the last ten years), may serve as a guide. Since July 1993, no subsequent rolling monthly nominal ten-year return on Japanese bonds has exceeded 5%, and nearly half of these 185 observations have been nominal ten-year returns of less than 2%.
- **Although rising interest rates are commonly viewed as detrimental to equity prices, this is not necessarily the case**—the drivers of change in interest rates, rather than their outright levels or the amount of changes in the rates, are what impact equity returns. Stocks can rise amid rising bond yields if such yields reflect improving growth conditions or increasing consumer confidence. A weak, albeit positive, statistical relationship exists between short-term interest rates and subsequent ten-year returns in the US, UK, and Australia, while the two are negatively correlated in Japan. The relationship deteriorates, however, when the high inflationary and bond yield environment of the late 1970s/early 1980s is excluded, as equities gained strongly in the subsequent ten-year period on moderating inflation and falling interest rates. There are no clear performance trends during historical US Federal Reserve rate hike cycles, further evidence that many other factors influence risk asset performance.
- **The relationship between stock market returns and periods of economic expansion and contraction remains uncertain.** Many investors equate strong economic growth with strong stock performance, and vice versa. However, the stock market is effectively a discounting mechanism that moves in anticipation of (though not always ahead of) changes in economic growth and is subject to the whims of investor sentiment and psychology. Equities have shown a wide range of returns across various levels of economic growth in developed and emerging markets alike.

HISTORICAL RETURNS

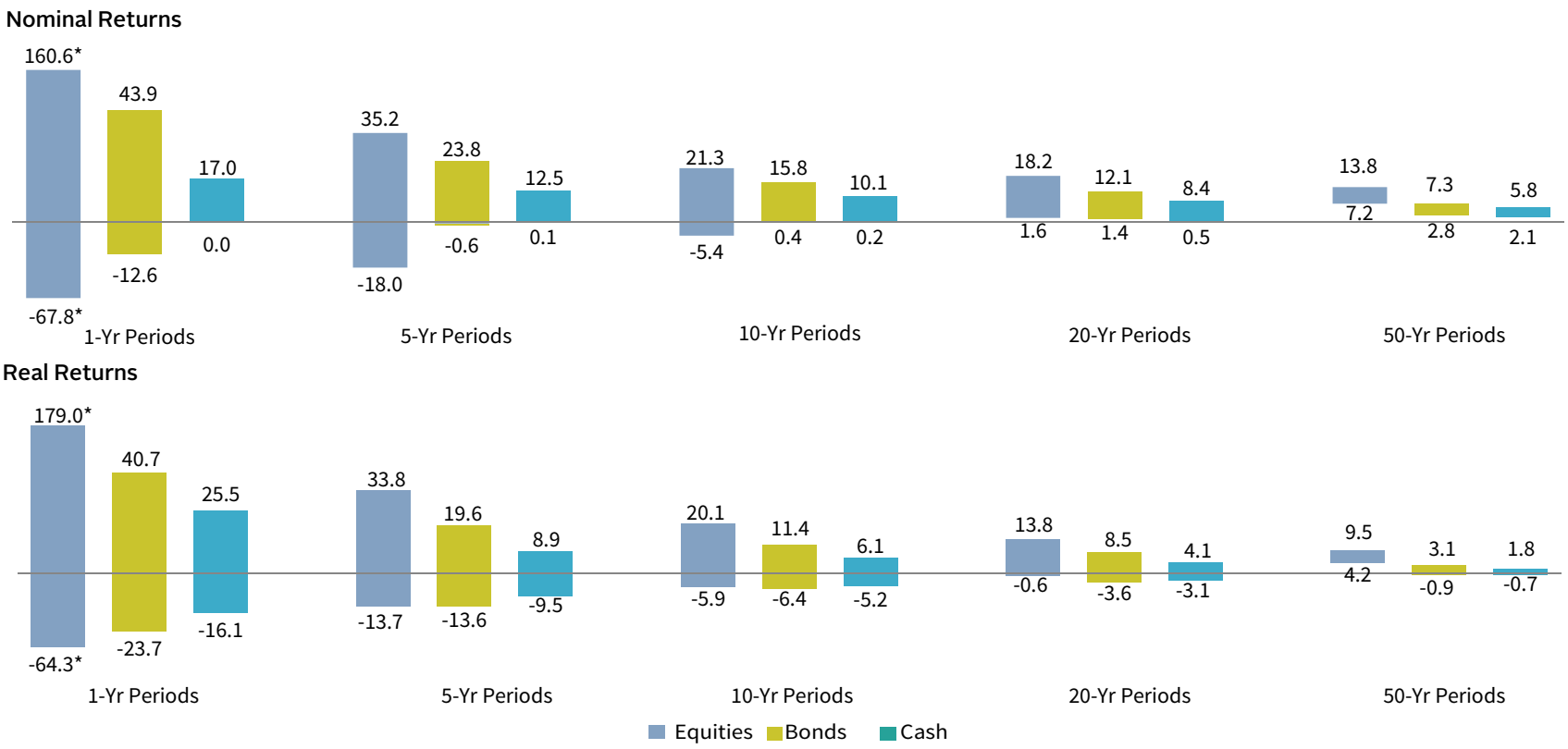
2018 exemplified how equity, bond, and cash returns can vary dramatically from year to year. US cash outperformed both equities and bonds, which has only occurred during 16% of calendar years back to 1900. Over the long term, however, equity returns have exceeded those of bonds and cash, though the consistency of outperformance varies by region, as US and UK equities are most likely to outperform bonds over long time horizons. Equities are considered the riskiest of these three asset classes and investors historically have been compensated by earning a risk premium, which varies by time period and region. Over rolling three-year periods, the average equity outperformance over bonds ranged from 3.8% (UK) to 5.9% (Japan). Global bonds outperformed cash over rolling three-year periods by an average margin of between 0.6% (UK) and 2.3% (Japan), earning a premium for higher interest rate risk. Cash can outperform bonds, however, particularly during periods of unexpected inflation and rising rates. No matter the asset class or region, the range of returns narrows as the holding period increases.

The range of investment returns narrows as holding periods increase

Time increases the probability of earning positive returns. Equities have the widest range of returns for each period, while cash has the narrowest range. In the US, rolling 50-year periods show a minimum real equity AACR of 4.2%, greater than both the maximum bond (3.1%) and cash (1.8%) AACRs. But equities can experience significant drawdowns in the short term relative to bonds or cash.

RANGE OF EQUITY, BOND, AND CASH RETURNS FOR VARIOUS ROLLING MONTHLY TIME HORIZONS: US

1900–2018 • Average Annual Compound Return (%)



* Axis capped for scaling purposes.

Sources: Federal Reserve, Global Financial Data, Inc., Standard & Poor's, and Thomson Reuters Datastream.

The range of investment returns narrows as holding periods increase

Return ranges in the UK show similar outcomes to those of US investments. However, real UK equity returns are lower due to higher inflation. Equities are the clear winner in the long term; in every rolling 50-year period since 1900, UK equities outperformed bonds and cash on a real annualized basis.

RANGE OF EQUITY, BOND, AND CASH RETURNS FOR VARIOUS ROLLING MONTHLY TIME HORIZONS: UK

1900–2018 • Average Annual Compound Return (%)

* Axis capped for scaling purposes.

Sources: FTSE International Limited, Global Financial Data, Inc., and Thomson Reuters Datastream.

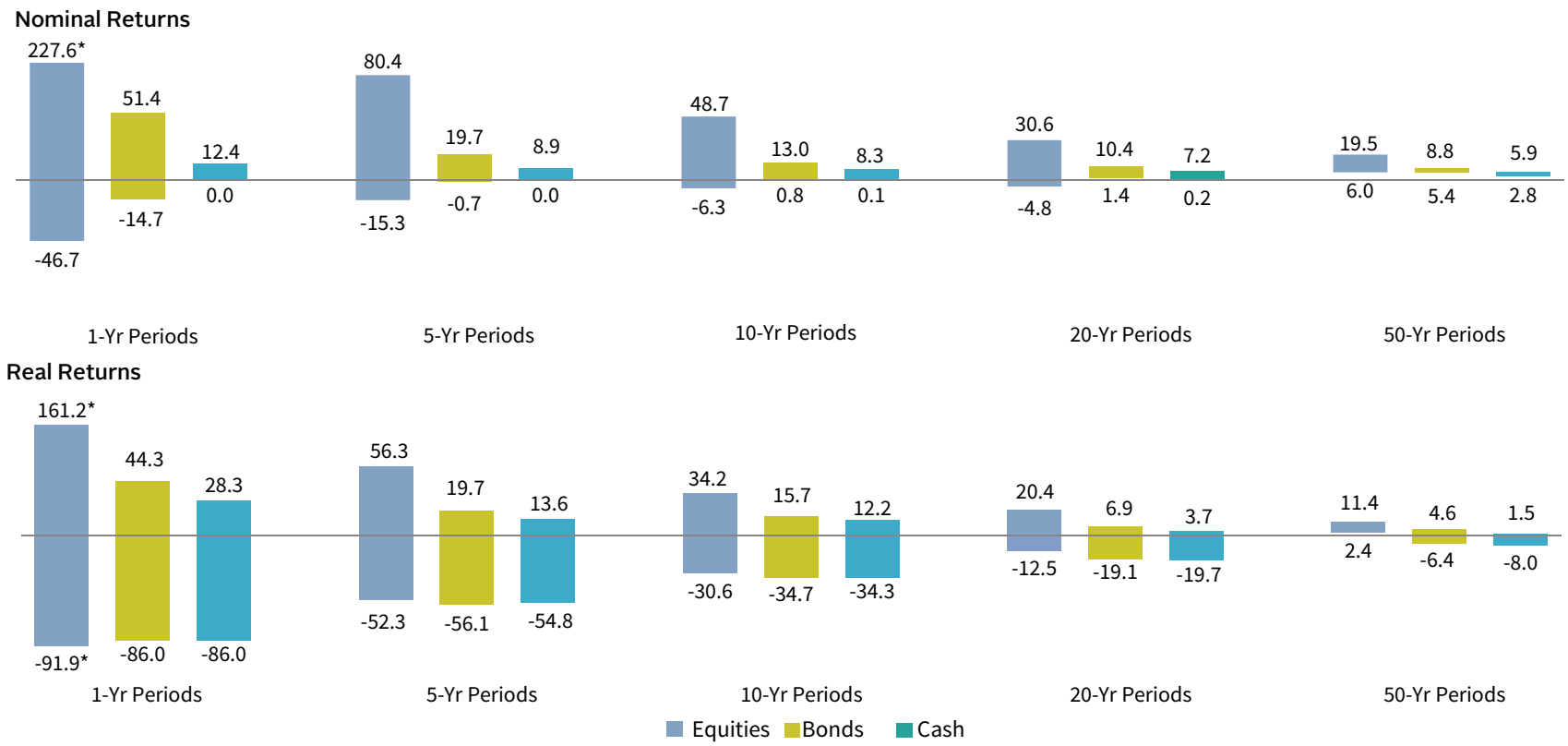
Note: The one-year high real cash return of 45.4% occurred in 1921 and was caused primarily by severe deflation in the post-war period, rather than high cash yields, which yielded an average of 5% during the year.

The range of investment returns narrows as holding periods increase

Top-end nominal equity return ranges for Japan are the highest of all countries in our analysis, partly due to occasional periods of extreme inflation. Real equity returns show lower troughs for the same reason. Over rolling 50-year periods, Japanese equities show the highest maximum range of nominal and real AACRs of the four countries in our analysis. Despite high inflationary periods, Japanese equities gained in real terms in every rolling 50-year period. However, Japan is the only country where bonds have occasionally outperformed equities in such long-term periods.

RANGE OF EQUITY, BOND, AND CASH RETURNS FOR VARIOUS ROLLING MONTHLY TIME HORIZONS: JAPAN

1921–2018 • Average Annual Compound Return (%)



* Axis capped for scaling purposes.

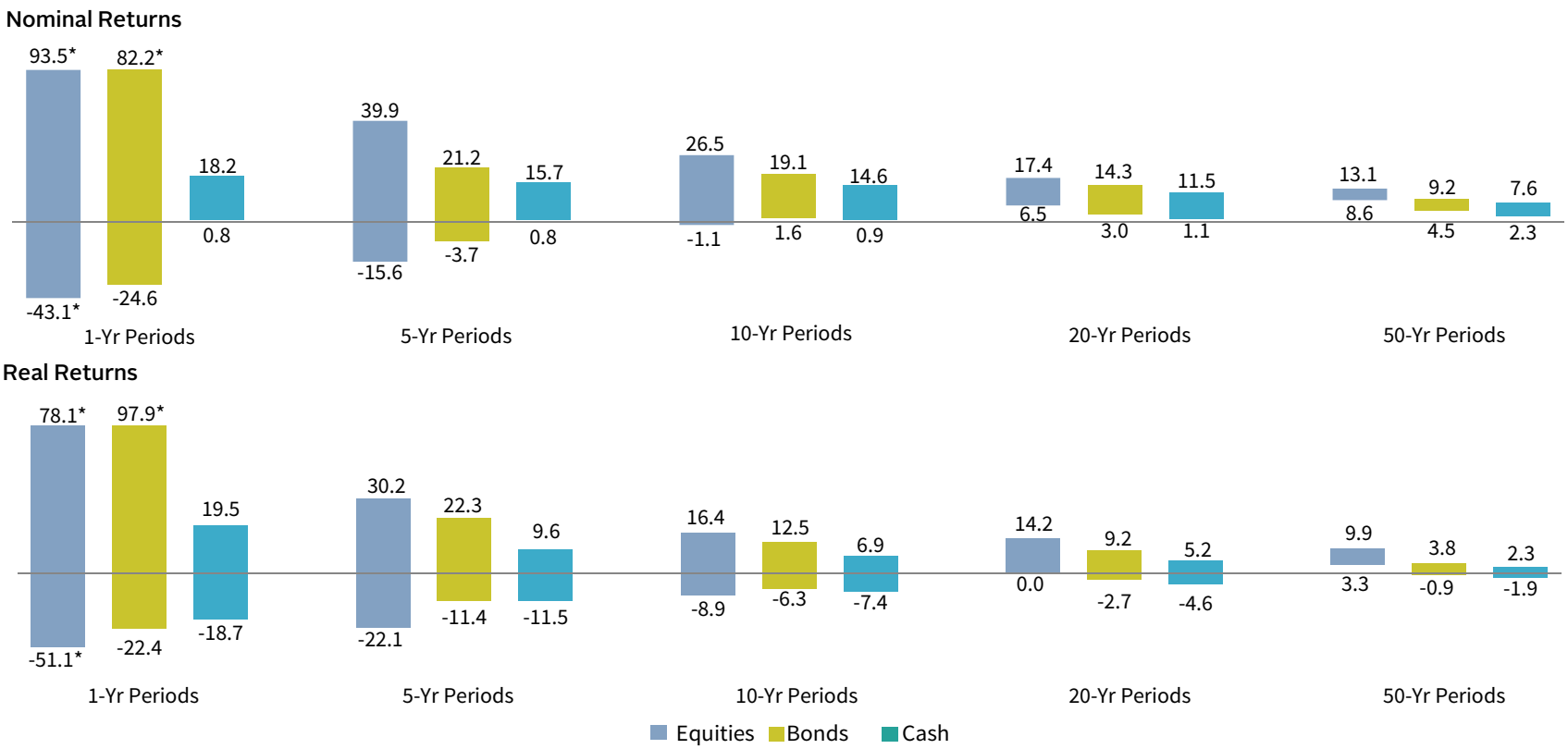
Sources: Global Financial Data, Inc., MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

The range of investment returns narrows as holding periods increase

Australia is the only country in our analysis where the top one-year equity real return was not higher than bonds, with bonds returning 98% from February 1931 to January 1932. Excluding this outlier or looking at medians, the return trends mimic those of other countries. Rolling 50-year nominal and real returns for Australian equities hit new lows as of year-end 2018, at 8.6% and 3.3%, respectively.

RANGE OF EQUITY, BOND, AND CASH RETURNS FOR VARIOUS ROLLING MONTHLY TIME HORIZONS: AUSTRALIA

1912–2018 • Average Annual Compound Return (%)



* Axis capped for scaling purposes.

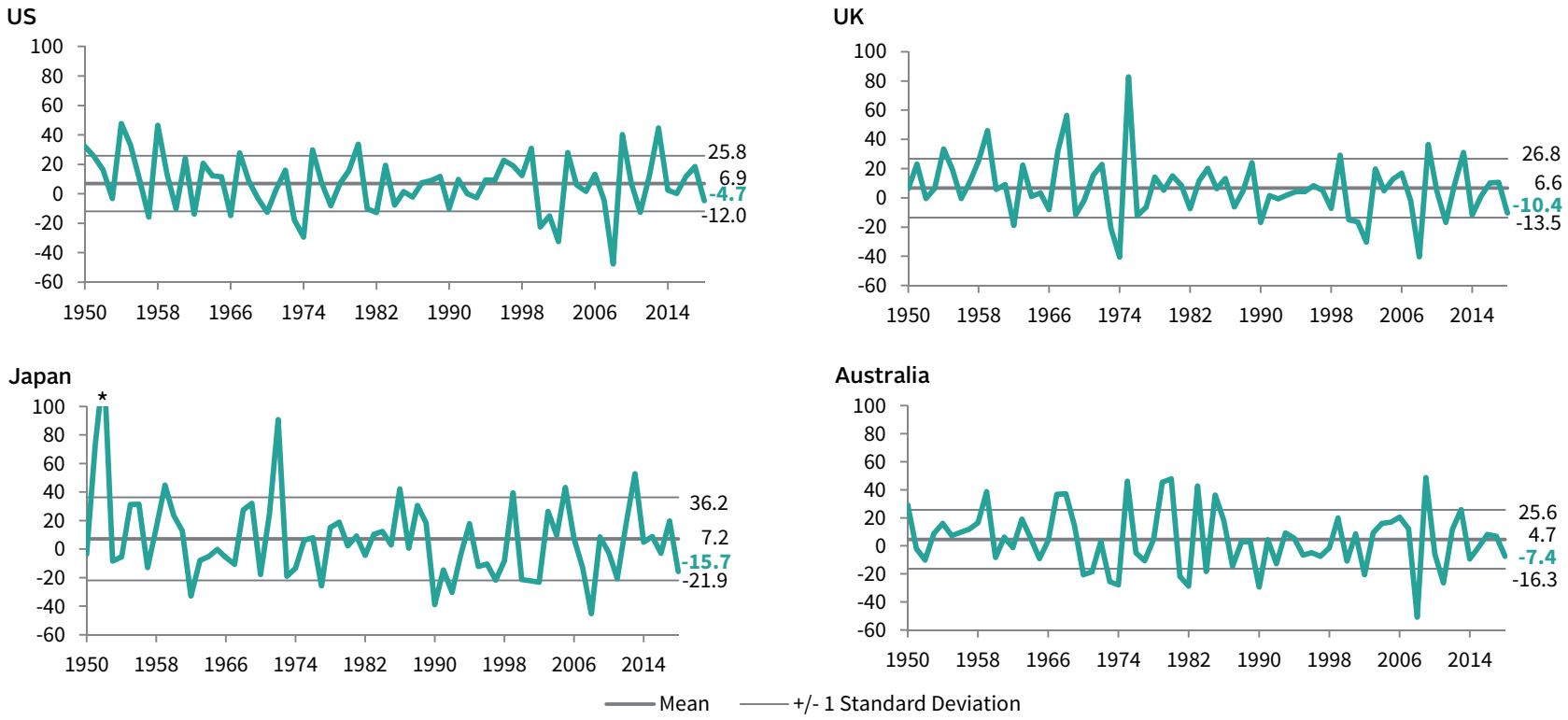
Sources: Global Financial Data, Inc., MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

The equity risk premium is positive on average, but volatile over short periods

Since 1950, equities outperformed bonds by an average of ~5% to ~7% annually, depending on the region. This premium is quite volatile in any given year, particularly in periods of market stress. In the US and UK, equities have outperformed bonds two-thirds of the time. In Japan and Australia, those figures are slightly lower, at 54% and 58%, respectively. Excess returns turned negative across regions in 2018.

REALIZED ANNUAL EXCESS RETURNS OF EQUITIES OVER BONDS

1950–2018 • Percent (%)



*Axis capped at 100% for scaling purposes. In 1952, Japan equity over bond excess return was 129%.

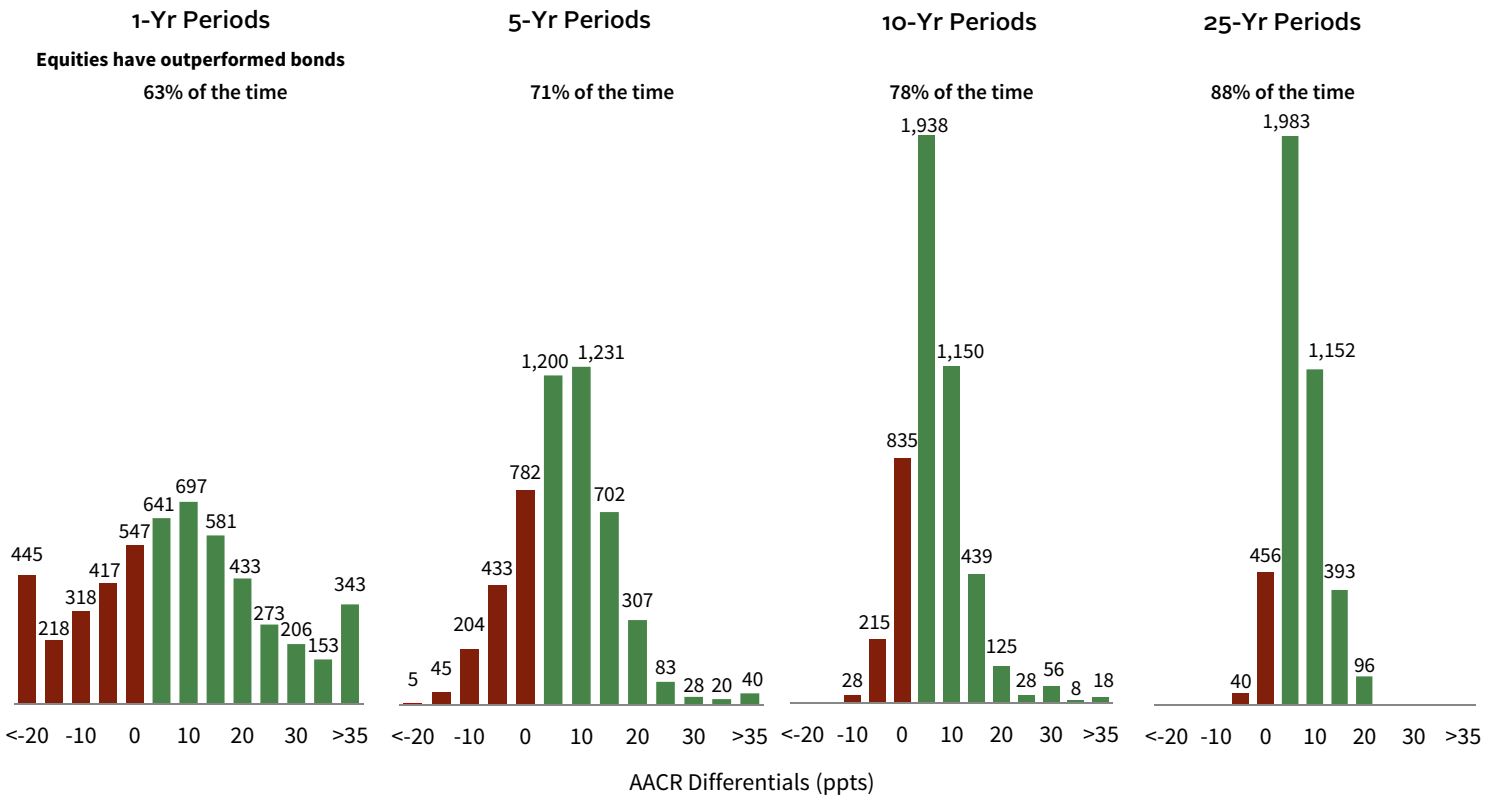
Sources: FTSE International Limited, Global Financial Data, Inc., MSCI Inc., Standard & Poor's, and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.
Note: Realized annual excess return is based on the geometric difference between equities and bonds.

Equities consistently outperform bonds over the long term

Globally, equities outperformed bonds over the long term nearly 90% of the time. This outperformance is more reliable in the US and UK than in Japan and Australia. The likelihood of outperformance diminishes over shorter horizons, while the prevalence of more extreme outcomes increases—the one-year performance distribution exhibits fat tails on both ends of the spectrum.

EXCESS RETURNS OF EQUITIES OVER BONDS

1900–2018 • Number of Rolling Monthly Periods



Sources: FTSE International Limited, Global Financial Data, Inc., Standard & Poor's, and Thomson Reuters Datastream.

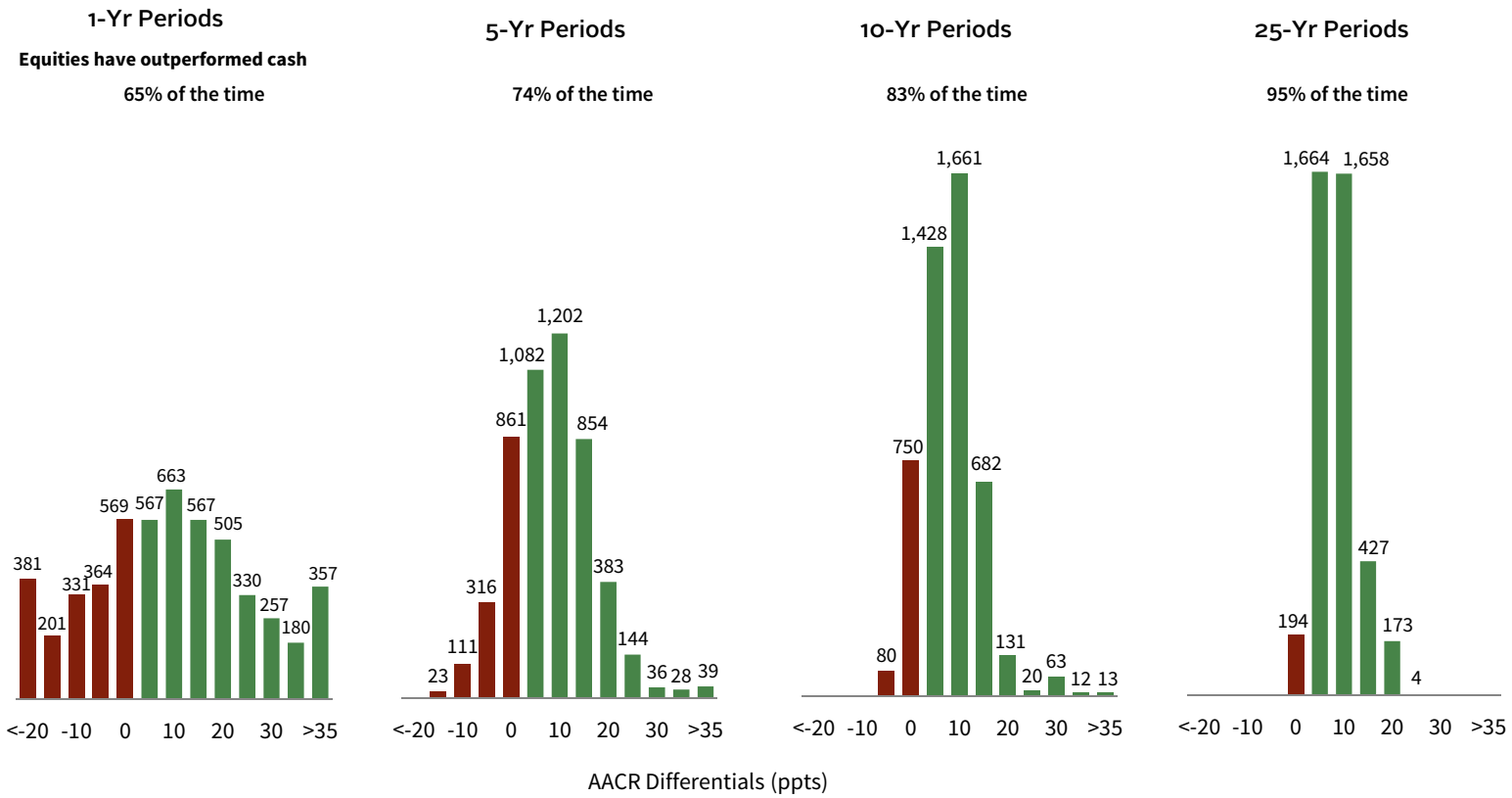
Notes: Buckets represent ranges of 5 ppts each with the label denoting the high end of the range, inclusive. For example, the "0" bucket corresponds to the number of rolling monthly periods in which the excess return of bonds over cash was greater than -5, but equal to or less than zero. Data reflect all four regions.

Equities almost always outperform cash over the long term

Over rolling 25-year periods, US, UK, and Australian equities outperformed cash 95% of the time or more, whereas Japanese equities outperform 89% of the time. Relatively high equity volatility over shorter time periods meant cash outperformance was more likely, with equities outperforming only two-thirds of the time over one-year horizons. In calendar year 2018, equities underperformed cash across regions.

EXCESS RETURNS OF EQUITIES OVER CASH

1900–2018 • Number of Rolling Monthly Periods



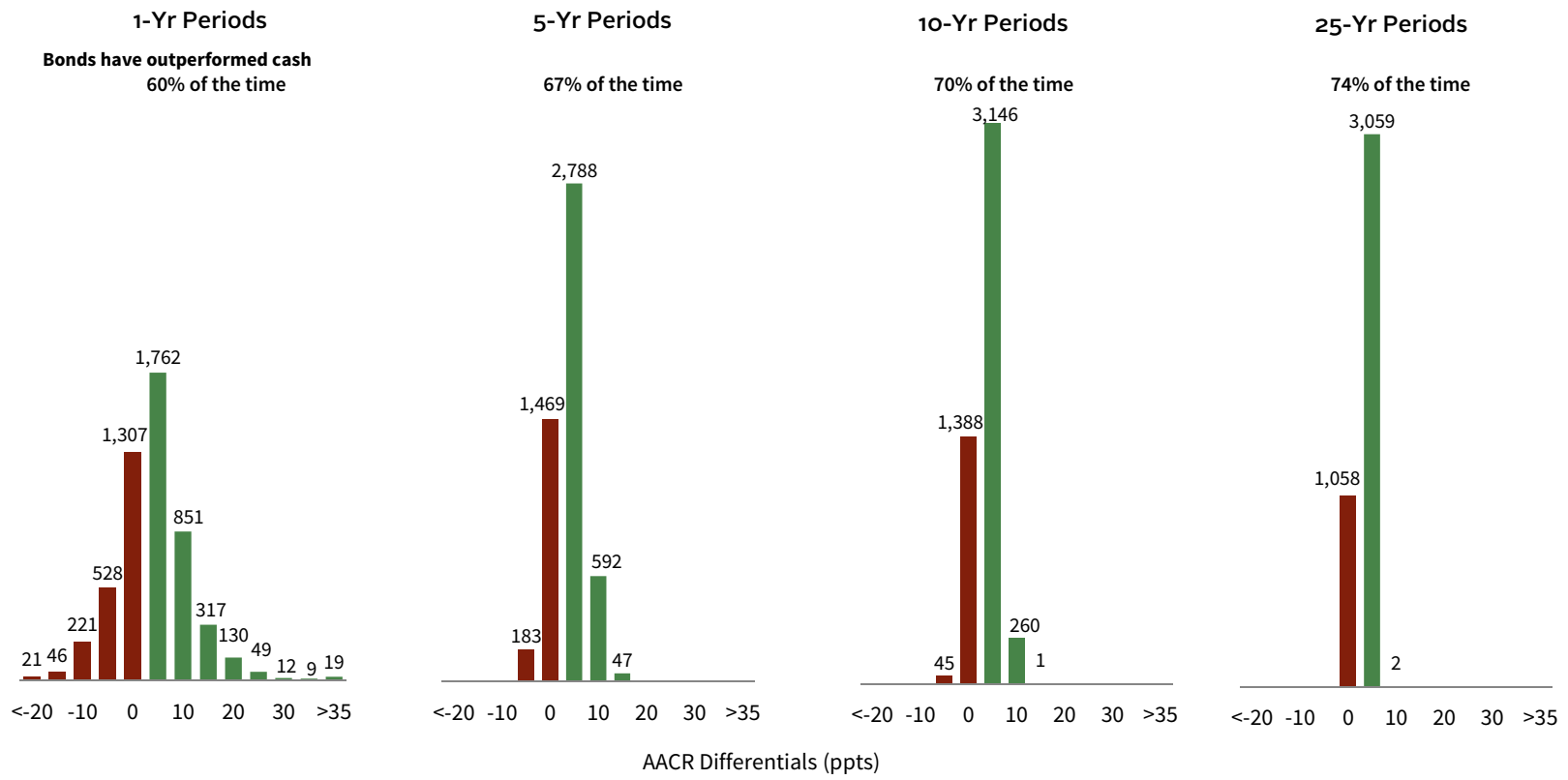
Sources: Federal Reserve, FTSE International Limited, Global Financial Data, Inc., Standard & Poor's, Thomson Reuters Datastream, and UK Debt Management Office.
Notes: Buckets represent ranges of 5 ppts each with the label denoting the high end of the range, inclusive. For example, the "0" bucket corresponds to the number of rolling monthly periods in which the excess return of bonds over cash was greater than -5, but equal to or less than zero. Data reflect all four regions.

Bonds' outperformance of cash is less of a sure bet

Results are more disparate among regions. In the US and UK, bonds outperformed cash about 60% of the time over 25-year rolling monthly periods. But in Japan and Australia, bonds outperform cash 99% and 86% of the time, respectively, over long time horizons, and the regional differences hold over shorter periods. The distribution exhibits a somewhat positive skew over one-year periods. While cash faces constant inflationary risks, bonds face the additional interest rate risk that can impair their performance relative to cash.

EXCESS RETURNS OF BONDS OVER CASH

1900–2018 • Number of Rolling Monthly Periods



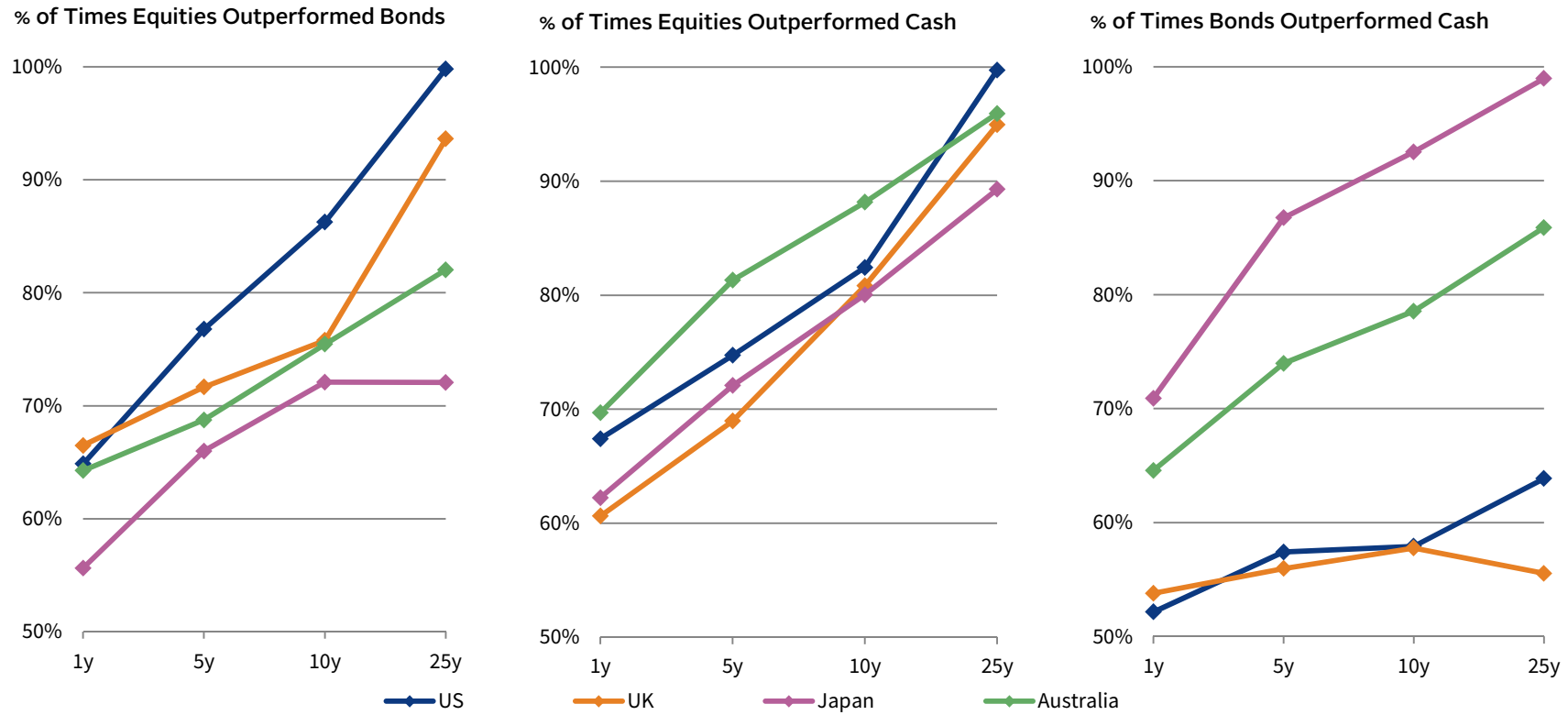
Sources: Federal Reserve, Global Financial Data, Inc., Thomson Reuters Datastream, and UK Debt Management Office.

Notes: Buckets represent ranges of 5 ppts each with the label denoting the high end of the range, inclusive. For example, the "0" bucket corresponds to the number of rolling monthly periods in which the excess return of bonds over cash was greater than -5, but equal to or less than zero. Data reflect all four regions.

Risk assets outperform more frequently in the long run

Investors are rewarded for holding riskier assets, given the clear benefits of holding equities relative to bonds and cash over long time periods. In the US, equities outperformed bonds and cash in 100% of rolling 25-year periods since 1900. In other regions, equity outperformance over bonds is strong, but outperformance over cash is much more reliable in the long term. Shifting macroeconomic factors—particularly interest rates and inflation—affect the relative returns of bonds versus cash over time in the US and UK.

RELATIVE PERFORMANCE OF EQUITIES, BONDS, AND CASH ACROSS REGIONS
1900–2018

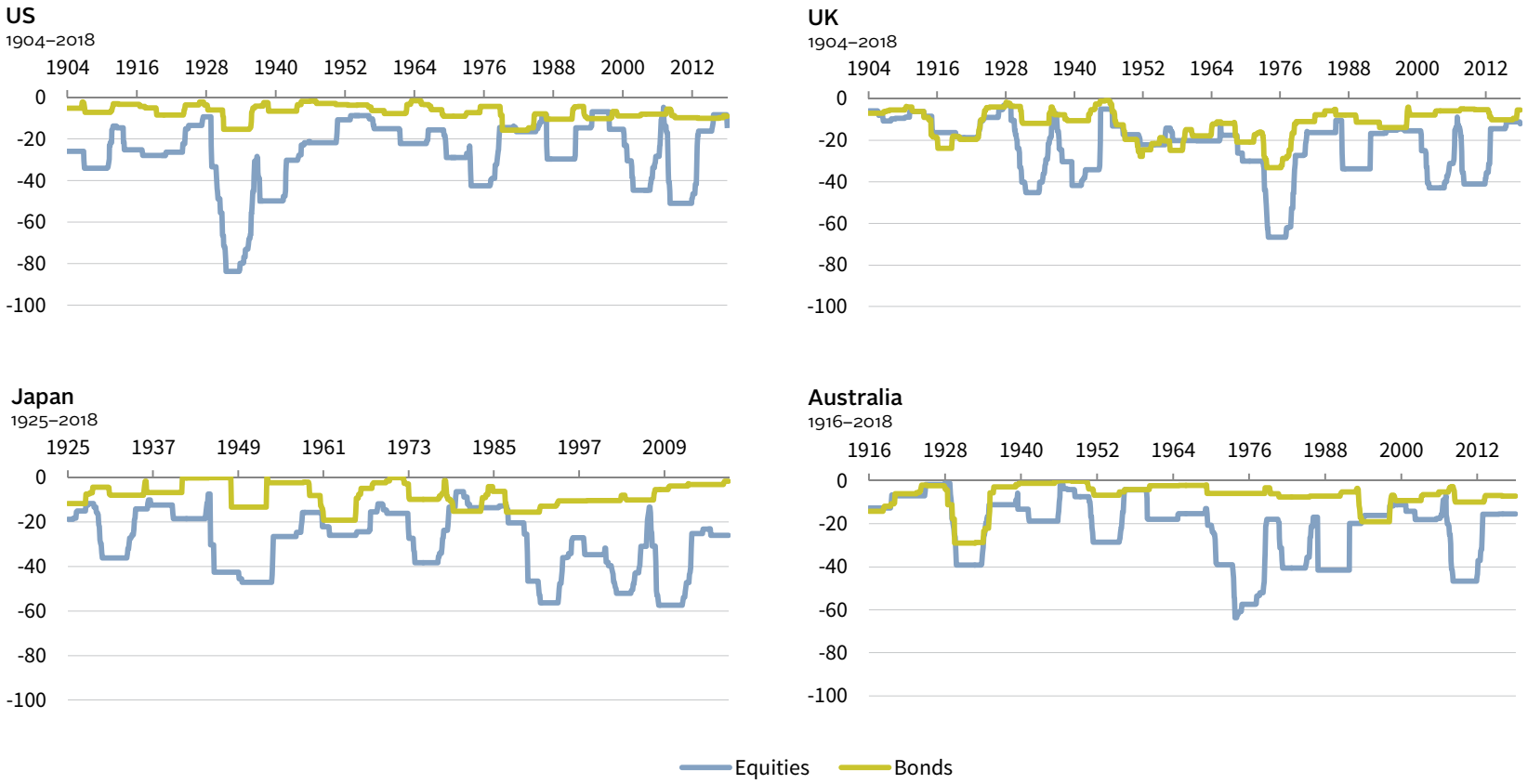


Sources: Federal Reserve, FTSE International Limited, Global Financial Data, Inc., MSCI Inc., Standard & Poor's, Thomson Reuters Datastream, and UK Debt Management Office. MSCI data provided "as is" without any express or implied warranties.

Equity drawdowns are more severe than those of bonds—but both are common

The maximum five-year drawdown in equities ranges from -1% to -84%, whereas bonds show a milder range from 0% to -33%. Equity drawdowns tend to be larger in magnitude, but the historical prevalence of drawdowns are quite common for equities and bonds alike. The median equity max drawdown ranges from -17% to -26%, while the median for bonds ranges from -6% to -11%. In the US, UK, Japan, and Australia, equities experienced greater drawdowns than bonds 94%, 87%, 80%, and 95% of the time, respectively.

ROLLING MONTHLY 5-YR MAXIMUM DRAWDOWN OF EQUITIES AND BONDS



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

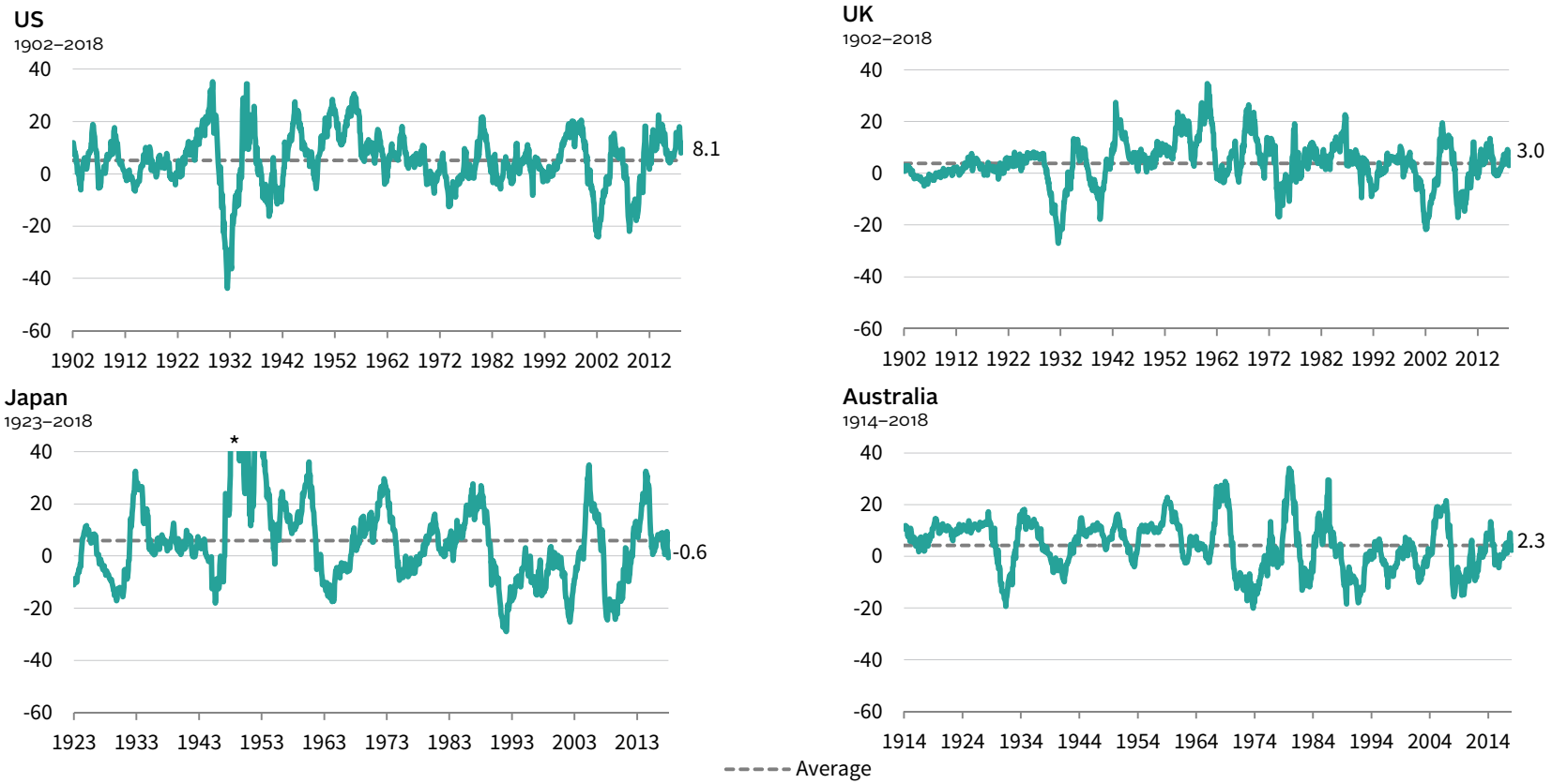
Notes: Data for US and UK begin on January 1, 1900. Data for Japan begin on January 1, 1921. Data for Australia begin on January 1, 1912.

Equities outperformed bonds by a wide margin over time

Over rolling three-year periods, global equities outperformed bonds by an average annualized margin of between 3.8% (UK) and 5.9% (Japan). Compounded over 119 years, a 3.0% margin equates to an equity return 34 times that of bonds. Bonds do outperform equities in some periods, but equity outperformance is far more common. Over rolling three-year periods, equities outperformed bonds roughly 70% of the time in the US, UK, and Australia, but slightly lower in Japan (62% of the time), likely due to the prolonged Japanese equity bear market in the 1990s.

AACR OF ROLLING MONTHLY 3-YR RETURN DIFFERENTIAL BETWEEN EQUITY AND BOND RETURNS

Percent (%)



* Axis capped at 40% for scaling purposes. Between January 1949 and April 1954, Japan's differential exceeded 40% in multiple periods, reaching as high as 102% in August 1949.

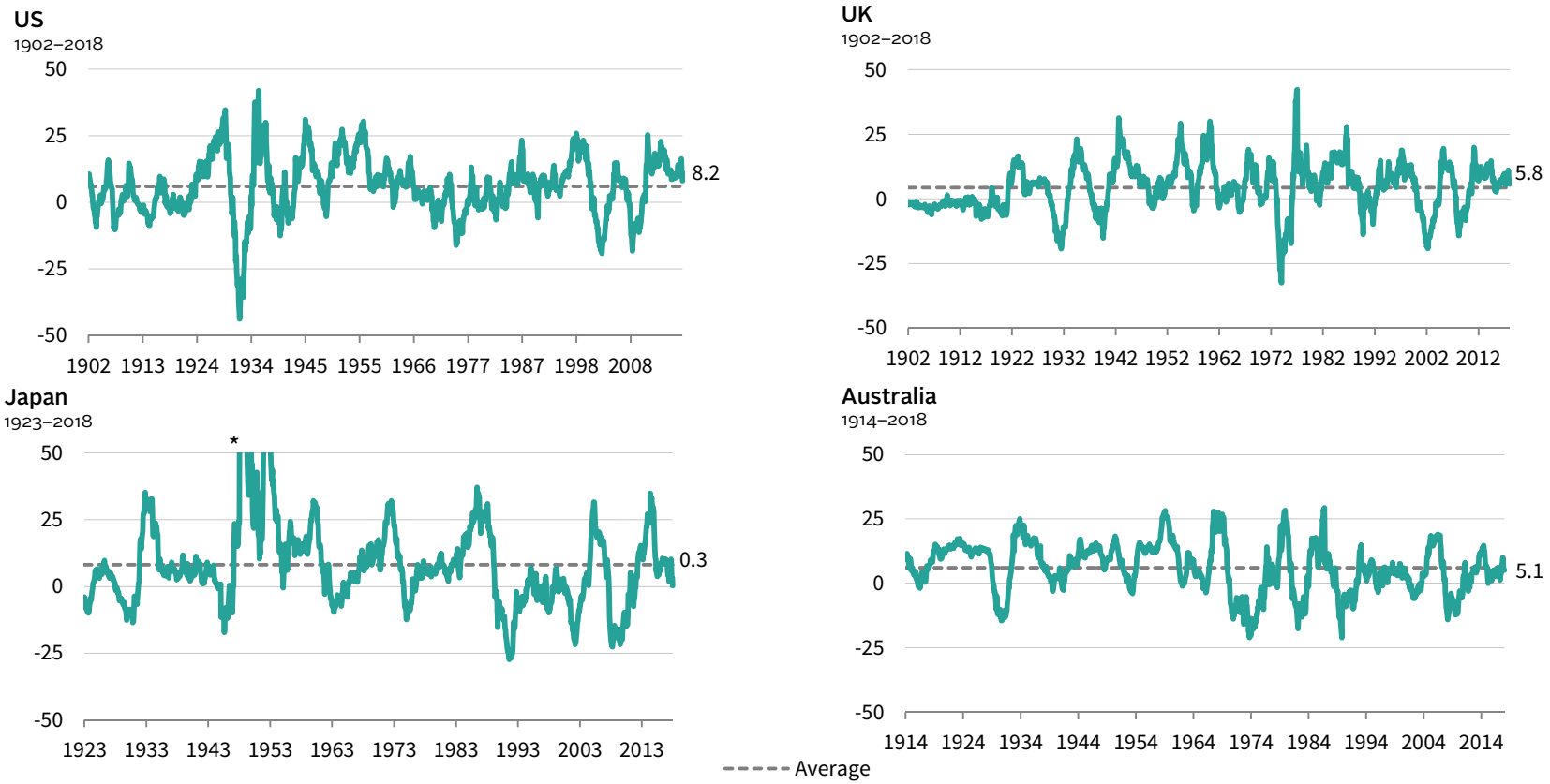
Sources: FTSE International Limited, Global Financial Data, Inc., MSCI Inc., Standard & Poor's, and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Equities outperformed cash by an even wider margin over time

The difference between equity and cash returns, as expected, is more than that of equities and bonds, ranging from an average annualized margin of 4.4% (UK) to 8.1% (Japan). Cash can outperform equities due to the higher volatility associated with the latter, although the duration of such outperformance tends to be shorter than that of bonds due to the lower yield (and hence returns) associated with cash.

AACR OF ROLLING MONTHLY 3-YR RETURN DIFFERENTIAL BETWEEN EQUITY AND CASH RETURNS

Percent (%)



* Axis capped at 50% for scaling purposes. Between January 1949 and December 1953, Japan's differential exceeded 50% in multiple periods, reaching as high as 98% in August 1949.

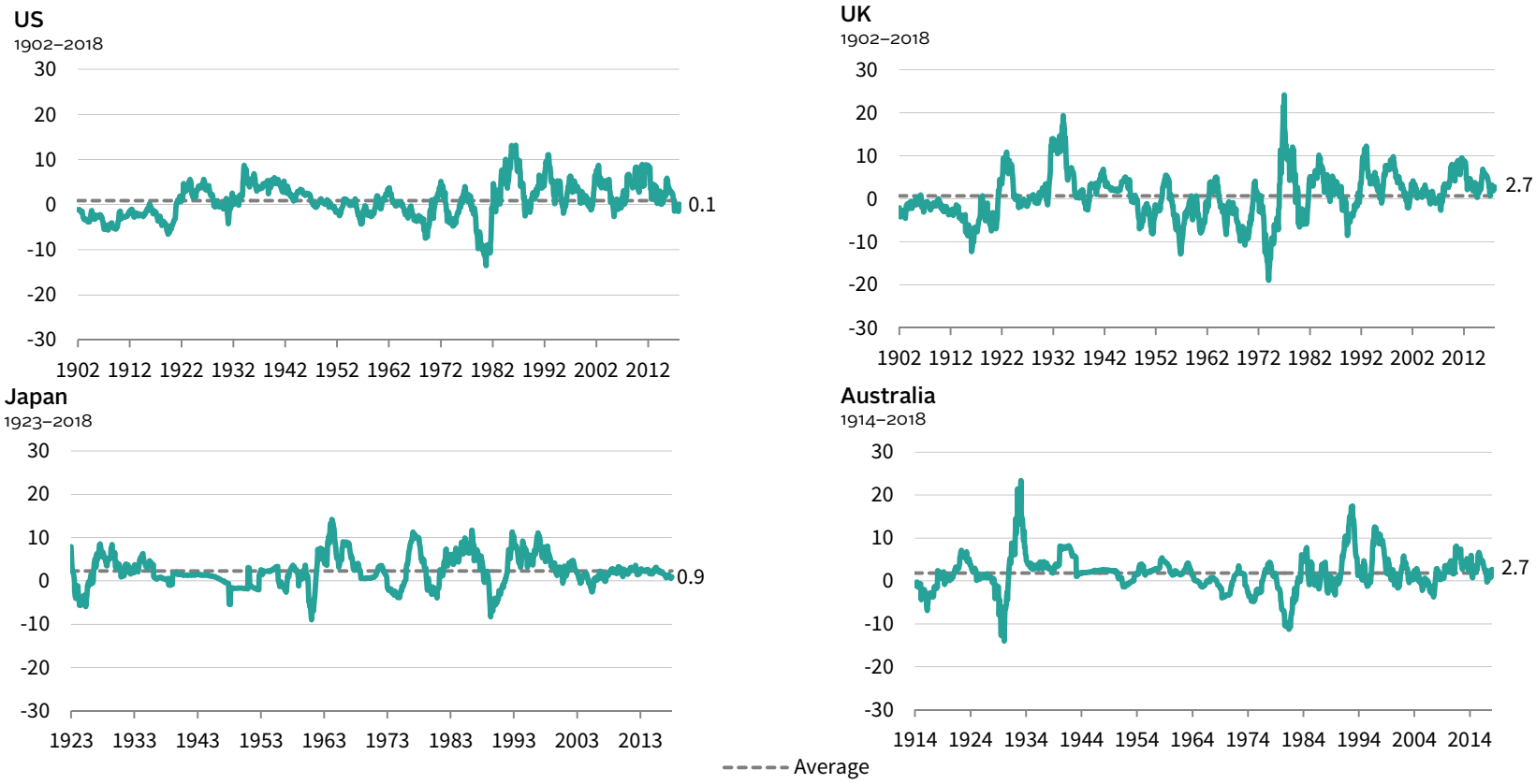
Sources: Federal Reserve, FTSE International Limited, Global Financial Data, Inc., MSCI Inc., Standard & Poor's, Thomson Reuters Datastream, and UK Debt Management Office. MSCI data provided "as is" without any express or implied warranties.

Bonds outperformed cash by a narrower margin

Over rolling three-year periods, bonds outperformed cash by an average annualized margin of between 0.6% (UK) and 2.3% (Japan). Relative to equities over cash, bonds offer limited upside vis-à-vis cash but a more muted downside, which results in net positive margins over time, on average. Over the past 30 years, bonds generally outperformed as the bond bull market progressed and cash yields fell. However, cash can outperform bonds for sustained periods of time, given bonds' sensitivity to unexpected inflation and rising rates.

AACR OF ROLLING MONTHLY 3-YR RETURN DIFFERENTIAL BETWEEN BOND AND CASH RETURNS

Percent (%)



Sources: Federal Reserve, Global Financial Data, Inc., Thomson Reuters Datastream, and UK Debt Management Office.

COMPONENTS OF EQUITY RETURNS

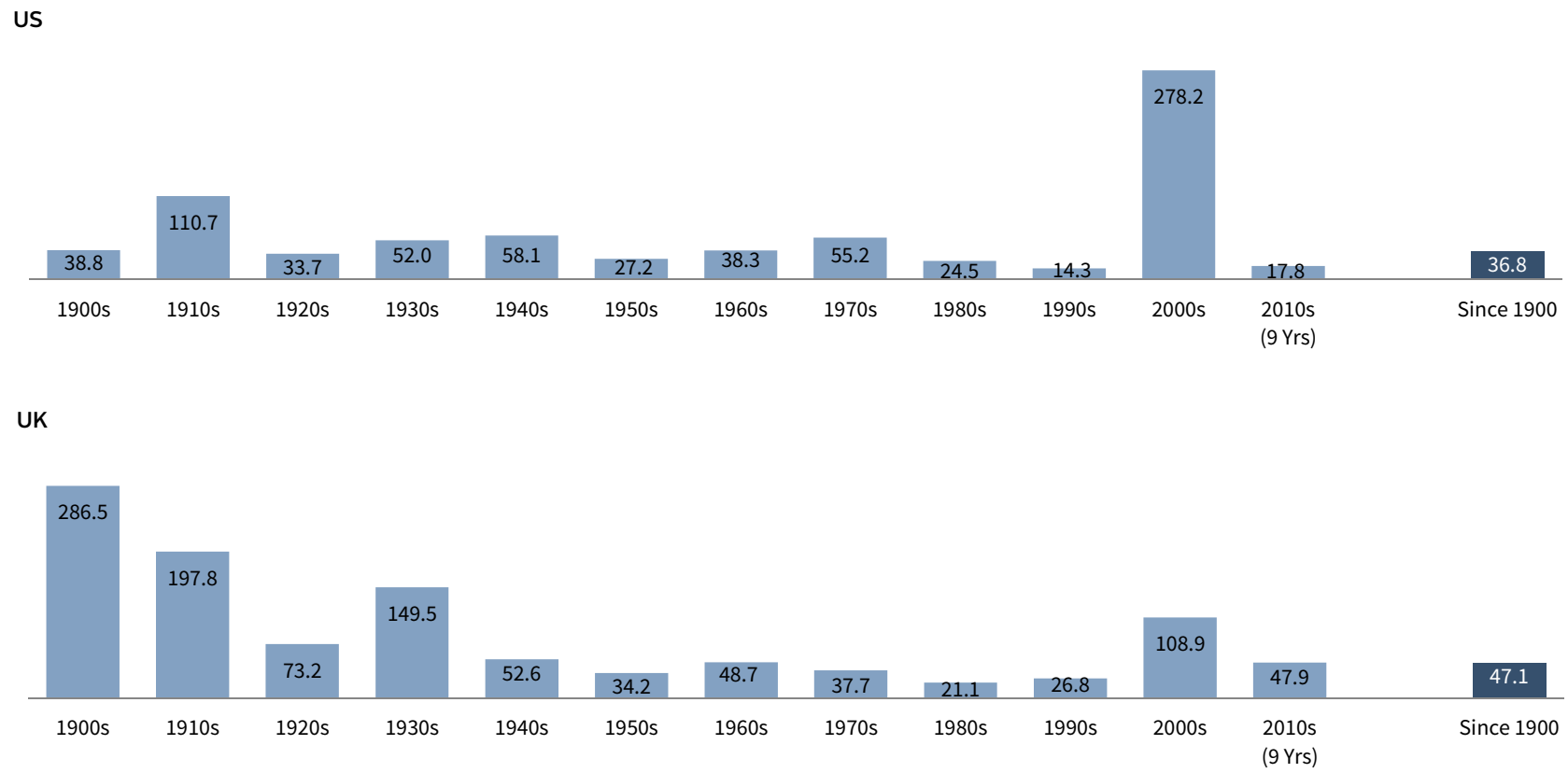
Equity returns can be broken down into three components: earnings growth, dividend yields, and valuation multiple repricing. Therefore, the forward outlook for equity returns depends largely on the prospects for these three factors. Over the long term, earnings growth and dividends are the primary contributors to equity returns, whereas contributions from valuation multiple repricing (i.e., expansion and contraction) are null due to its mean-reverting nature. While the long-term trends are clear, earnings growth and multiple repricing can vary significantly over shorter time periods. Dividends, on the other hand, are the only component of equity returns that are always positive, and the compounding of dividends provides a steady stream of income regardless of earnings and market cycles. However, as the exhibits in this section demonstrate, some markets have historically been more reliant on dividends for returns than others.

Dividends are a consistent positive contributor to total return

In the US and UK, reinvested dividends comprise over one-third to nearly one-half of nominal returns, respectively, since 1900. In a number of decades, particularly those in which severe market crises occurred, dividends were the only positive contributor to total returns, as prices ended the ten-year period lower than where they started.

DIVIDEND INCOME AS A PERCENTAGE OF TOTAL RETURN

1900–2018 • Percent (%)



Sources: FTSE International Limited, Global Financial Data, Inc., Standard & Poor's, and Thomson Reuters Datastream.

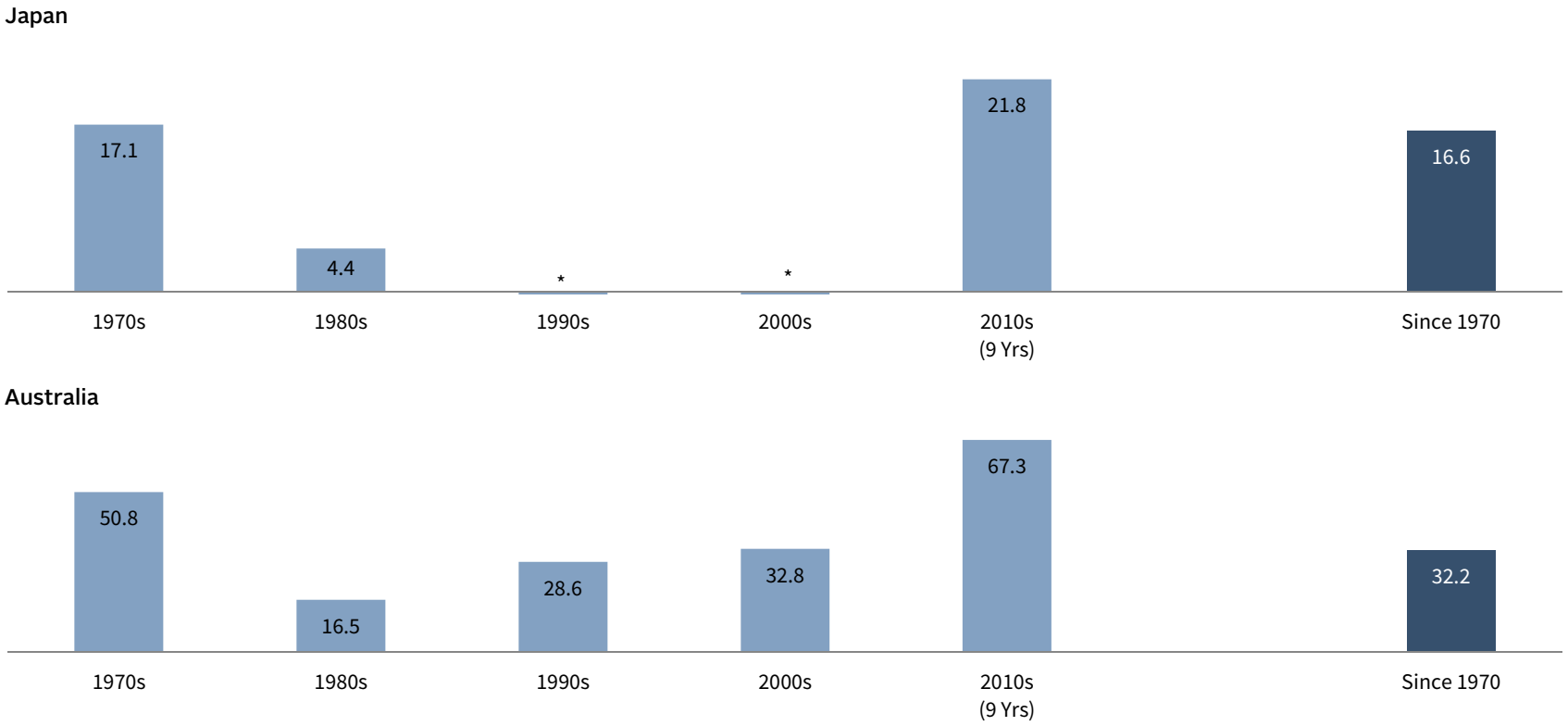
Note: Dividend income as a percentage of total return is shown as the average income return for the period divided by the average total return for the period.

Dividends are a consistent positive contributor to total return

Since 1970, dividends contributed nearly one-third of the total nominal return of Australian equities. Low dividend yields in Japan made dividends less impactful to total returns. During the 1990s and 2000s, Japanese dividends could not offset the declines seen in equity prices, resulting in negative total returns for those decades.

DIVIDEND INCOME AS A PERCENTAGE OF TOTAL RETURN

1970–2018 • Percent (%)



* Average quarterly dividend income for Japan for the 1990s and 2000s was 0.16% and 0.27%, respectively, but average quarterly total returns for each decade were negative.

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

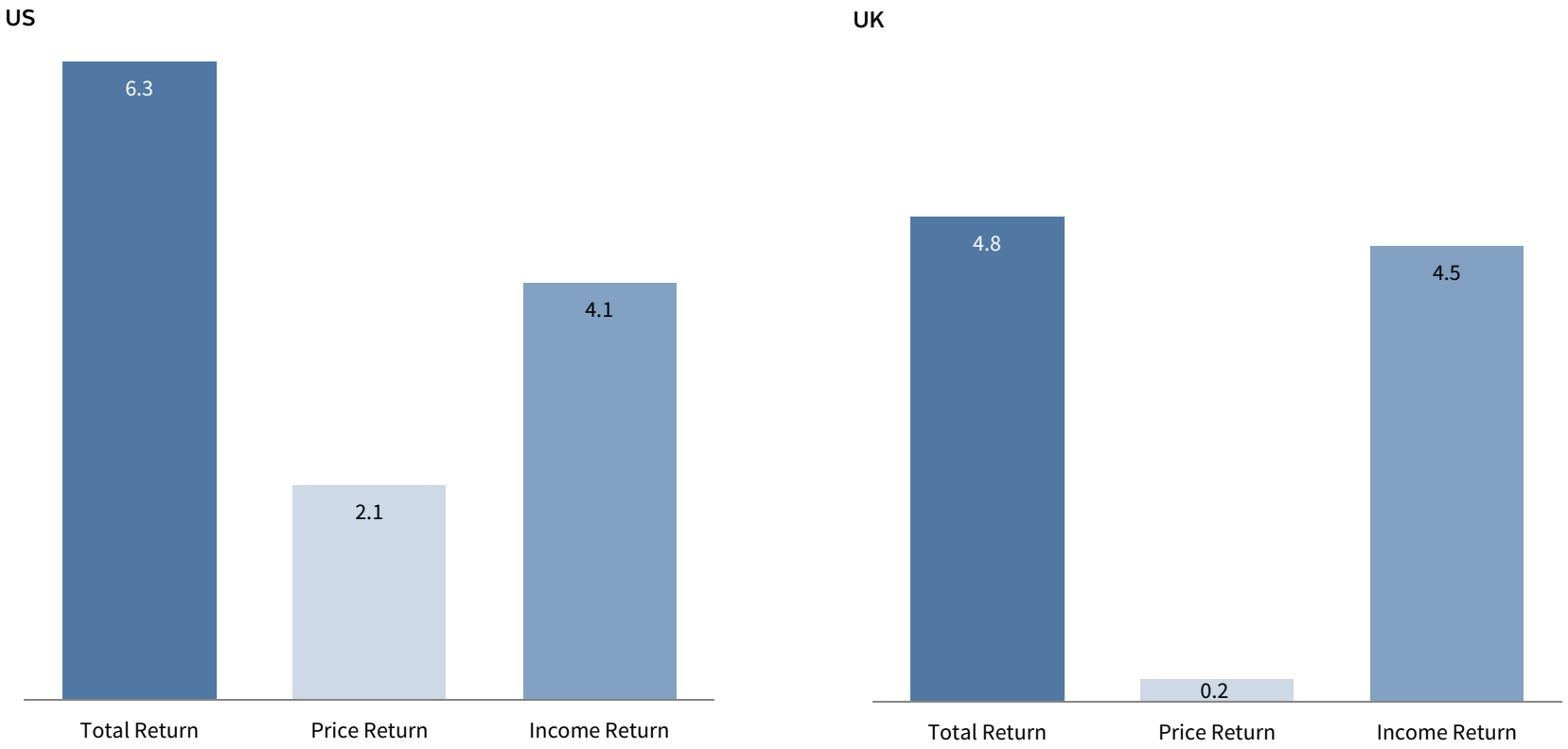
Note: Dividend income as a percentage of total return is shown as the average income return for the period divided by the average total return for the period.

Dividend reinvestment boosts total returns over the long run

Compounding of reinvested dividends is a powerful driver of total returns for US and UK stocks alike. In the US, reinvesting dividends led to earning three times the price return (2.1% price return versus 6.3% total return). In the UK, dividends had an even more pronounced effect, contributing over 90% of the equity real total AACR.

REAL AVERAGE ANNUAL COMPOUND RETURNS OF EQUITIES

1900–2018 • Percent (%)



Sources: FTSE International Limited, Global Financial Data, Inc., Standard & Poor's, and Thomson Reuters Datastream.

Notes: All data are quarterly. Data for UK start in second quarter 1900. Price return is the return generated by capital appreciation, net of dividends. Total return is the capital appreciation plus the impact of dividends. Income return is the difference between total and price return.

Dividend reinvestment boosts total returns over the long run

Of the four developed countries we analyzed, Japan is the only market where real price returns outstripped dividend returns based on data since 1970. Average historical Japanese dividend yields are roughly one-third to one-half that of the other regions and spent a 20-year period—from 1986 to 2005—averaging less than 1.0%. In Australia, cumulative real price returns detracted from total returns overall over the last 49 years, with all positive real returns attributable to dividends.

REAL AVERAGE ANNUAL COMPOUND RETURNS OF EQUITIES

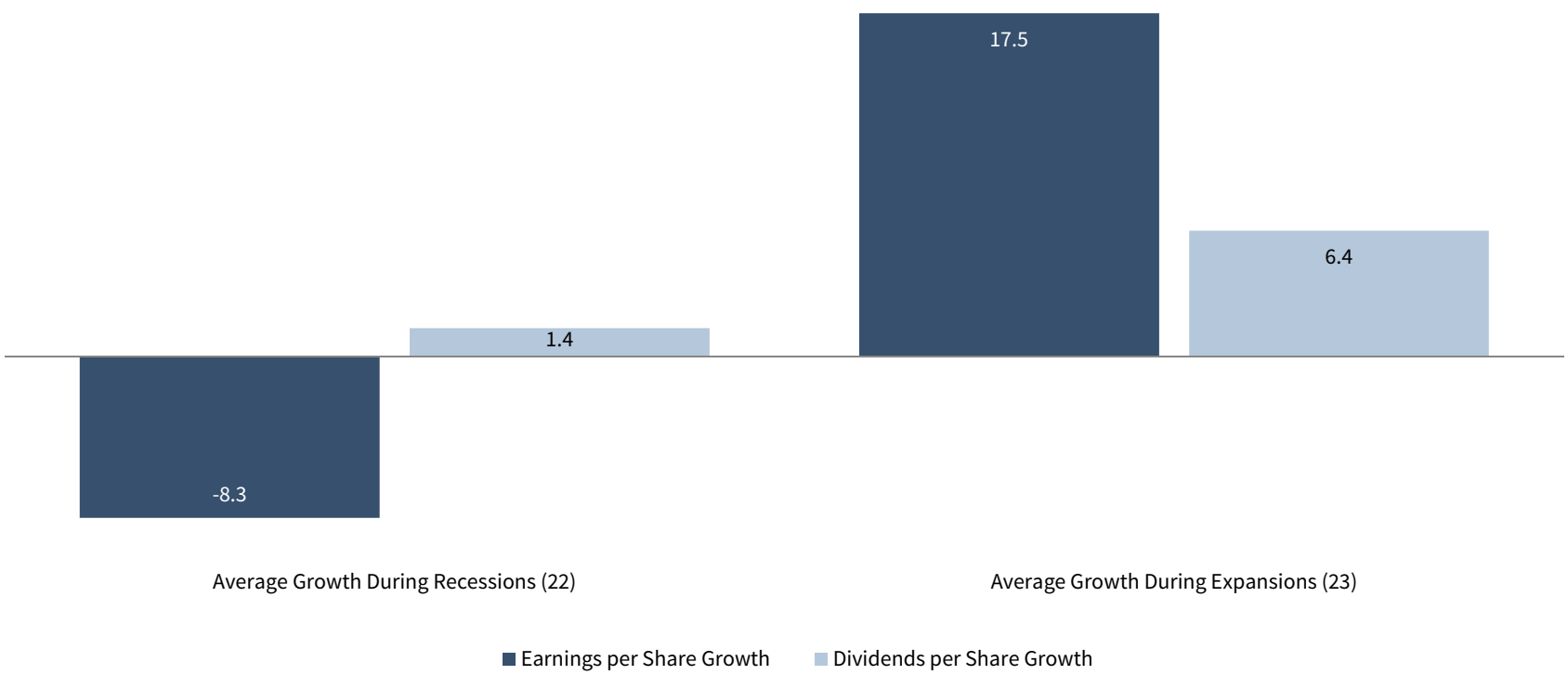
1970–2018 • Percent (%)

Sources: MSCI Inc. and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.
Notes: All data are quarterly. Price return is the return generated by capital appreciation, net of dividends. Total return is the capital appreciation plus the impact of dividends. Income return is the difference between total and price return.

Dividend growth persists during recessionary periods

During periods of economic contraction, dividend cuts tend to lag earnings declines, as companies adjust to diminishing fiscal health. Still, since 1900, US companies managed to maintain a net positive average dividend growth rate during recessions, albeit nearly 80% lower than the growth rate during economic expansions. While earnings growth is more sensitive to the economic cycle, dividends provide a relatively stable tailwind to total returns.

S&P 500 EARNINGS PER SHARE AND DIVIDENDS PER SHARE YEAR-OVER-YEAR CHANGE
1900–2018 • Percent (%)



Sources: Ned Davis Research, Inc., Standard & Poor's, and *The Wall Street Journal.*
Notes: Recessions and expansions defined by Economic Cycle Research Institute business cycle peak-to-trough dates. Numbers in parentheses indicate the number of recessions and expansions experienced over the period.

Dividend growth persists during recessionary periods

Australia shows a similar pattern to the US, with slightly positive average dividend growth and earnings declines during recessions. UK companies, on the other hand, have seen positive dividend and earnings growth during recessionary periods. However, this is largely skewed by extreme movements during the early 1980s recession in the UK. Excluding that time period, the UK would see a similar pattern to Australia and the US.

EARNINGS PER SHARE AND DIVIDENDS PER SHARE YEAR-OVER-YEAR CHANGE
Percent (%)

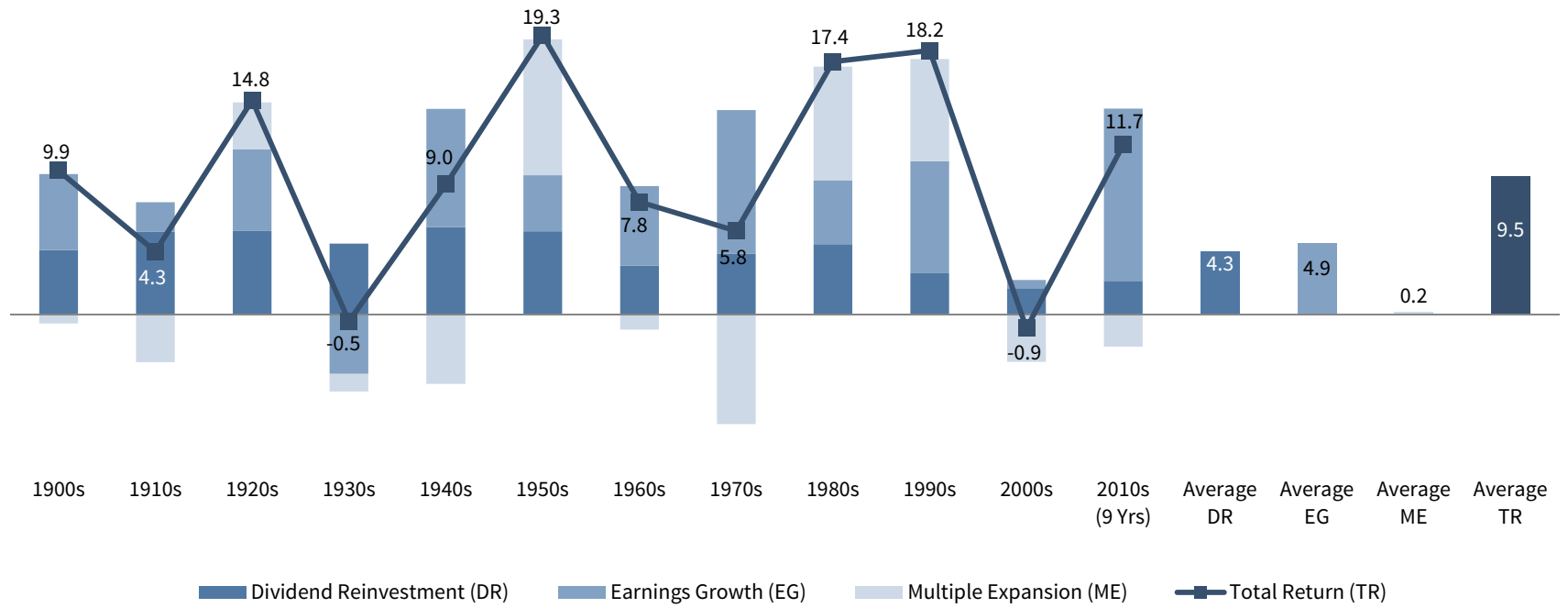
Sources: Economic Cycle Research Institute, FTSE International Limited, MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express orimplied warranties.
Notes: Recessions and expansions defined by Economic Cycle Research Institute business cycle peak-to-trough dates. Numbers in parentheses indicate the number of recessions and expansions experienced over the period.

Earnings growth and multiple re-rating vary more than dividends

Earnings growth detracted from performance during only one decade, which coincided with the Great Depression. Despite drastic volatility from decade to decade, earnings growth provided the top contribution to total returns over time (4.9%). Multiples (i.e., valuations) tend to expand or contract to mean-revert over the long term, which results in a negligible return attribution (0.2%). Dividends are a reliable source of return, contributing positively in every decade on record and nearly as much (4.3%) as earnings growth.

BREAKDOWN OF TOTAL RETURN AACR OVER TIME: US

1900–2018 • Percent (%)



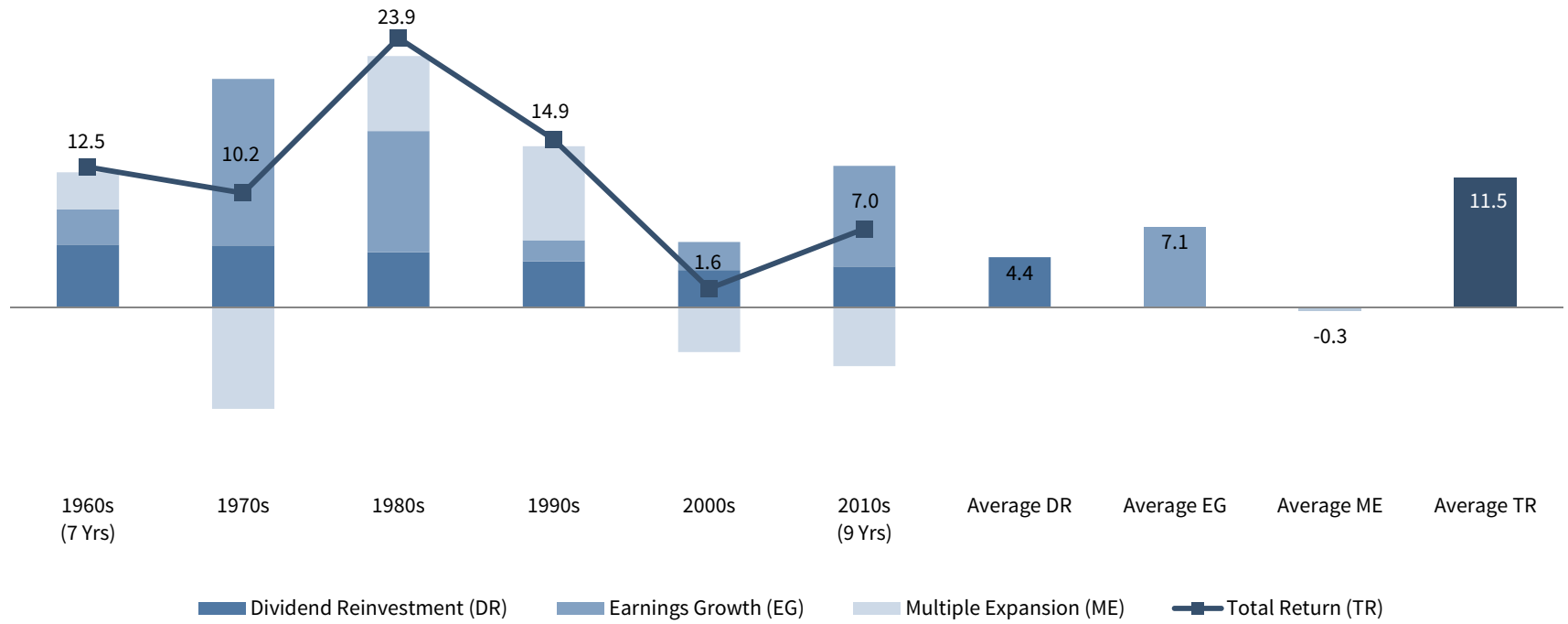
Sources: Global Financial Data, Inc., Standard & Poor's, and *The Wall Street Journal.*
Note: Figures will not sum exactly to total return calculation due to the effect of combining cross terms.

Earnings growth and multiple re-rating vary more than dividends

Earnings growth is the most significant contributor to total return in the UK (7.1%) and consistently positive since the 1960s. Multiples actually detracted from performance overall (-0.3%) with an even distribution over the six periods shown. Dividend reinvestment for UK stocks is particularly stable, but, unlike in the US, contributes meaningfully less to total return than earnings growth.

BREAKDOWN OF TOTAL RETURN AACR OVER TIME: UK

1963–2018 • Percent (%)



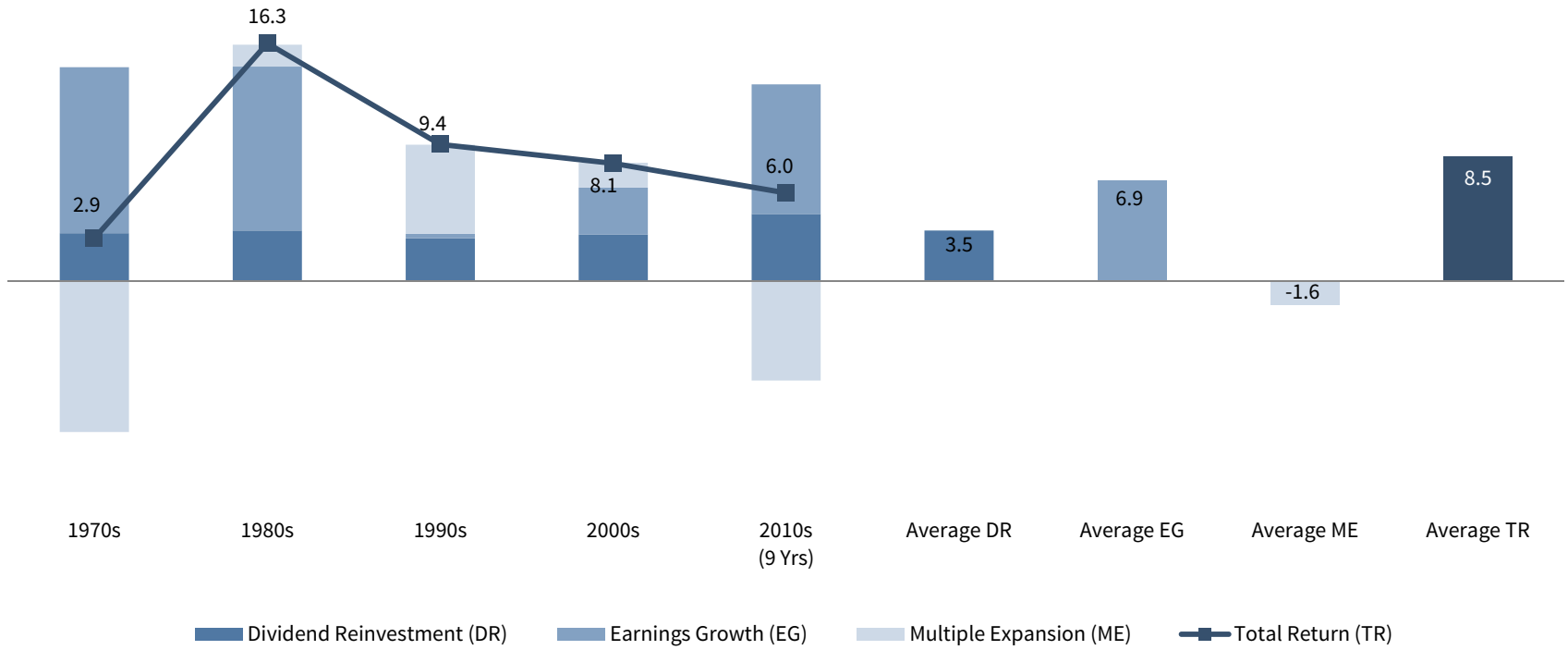
Sources: FTSE International Limited, Global Financial Data, Inc., and Thomson Reuters Datastream.
Note: Figures will not sum exactly to total return calculation due to the effect of combining cross terms.

Earnings growth and multiple re-rating vary more than dividends

In Australia, dividends and earnings growth consistently delivered positive returns over each period, though earnings are more volatile, as seen in other regions. Since 1970, dividend reinvestment averaged 3.5%, whereas earnings growth averaged nearly 7%. Multiple expansion detracted from performance overall on significant negative repricing this decade and in the 1970s.

BREAKDOWN OF TOTAL RETURN AACR OVER TIME: AUSTRALIA

1970–2018 • Percent (%)



Sources: MSCI Inc. and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.
Note: Figures will not sum exactly to total return calculation due to the effect of combining cross terms.

EQUITY MEAN REVERSION

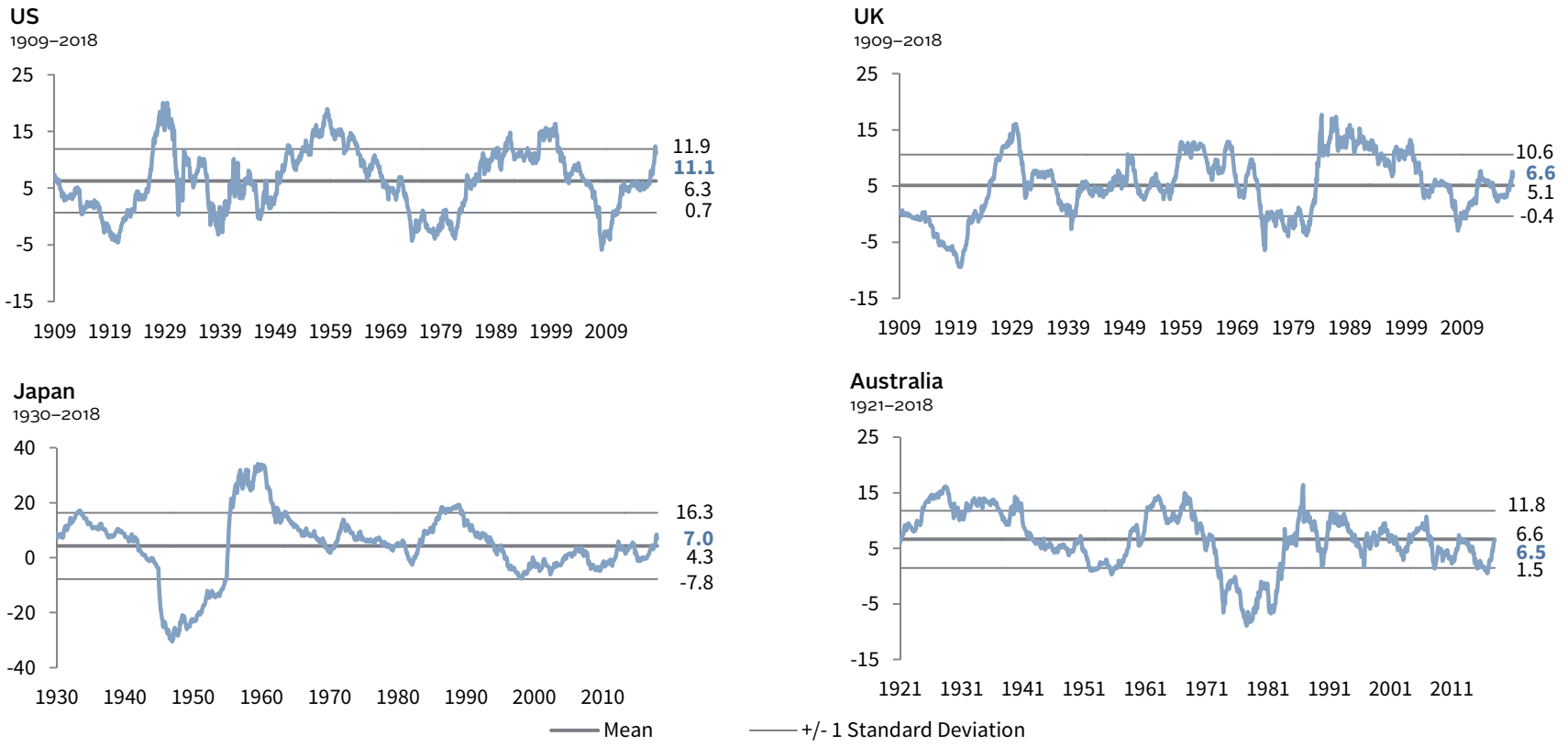
Equity returns tend to revert to a long-term average over time, although the process of mean reversion is not smooth and the impact of inflation matters more in some countries than others. Still, across regions, periods of outperformance tend to be followed by periods of underperformance through a process of mean reversion. While this pattern is evident over shorter time horizons, it is much more distinct over long time horizons.

Real returns tend to revert to long-term average over time

Rolling returns exhibit the qualities of a mean-reverting time series, though such reversion can be over very short or quite long periods. Across countries, ten-year AACRs above or below 1 standard deviation tend to signal the potential for a trend reversal, though timing varies considerably. At the end of 2018, the rolling monthly real ten-year AACR for the US approached 1 standard deviation above its mean, while real AACRs for the UK, Australia, and Japan were closer to their historical averages.

ROLLING MONTHLY TOTAL RETURN REAL 10-YR AACR

Percent (%)



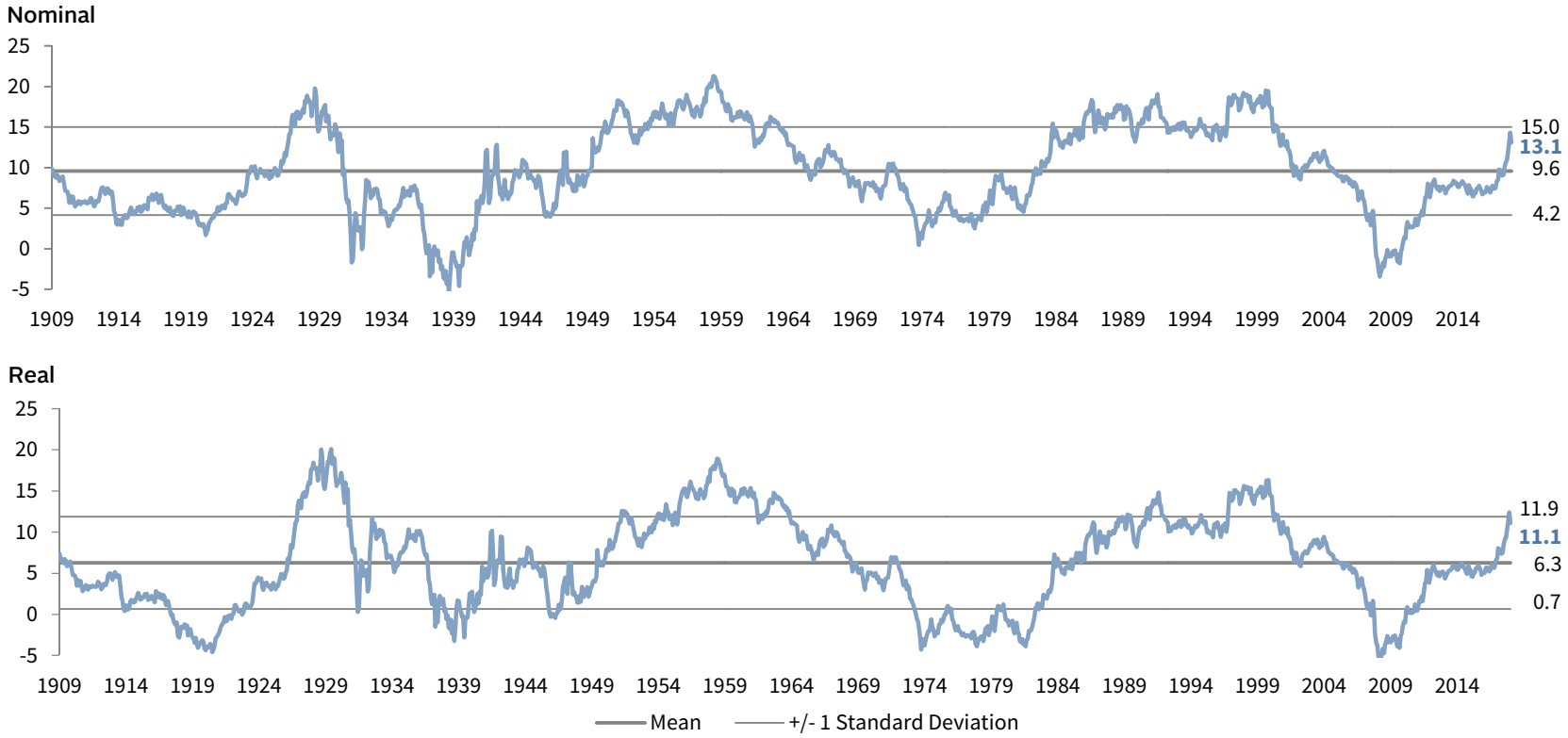
Sources: FTSE International Limited, Global Financial Data, Inc., MSCI Inc., Standard & Poor's, and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Performance mean reversion is not a smooth process

AACRs tend to revert toward their median, but can remain above and below average for extended periods of time. For example, from 1987–2001, nominal and real AACRs hovered around 1 standard deviation above mean. At the end of 2018, the nominal and real ten-year AACRs of 13.1% and 11.1% for US equities approached 1 standard deviation, as the poor performance of 2008 was excluded from the ten-year rolling time window.

ROLLING MONTHLY TOTAL RETURN 10-YR AACR: US

1909–2018 • Percent (%)



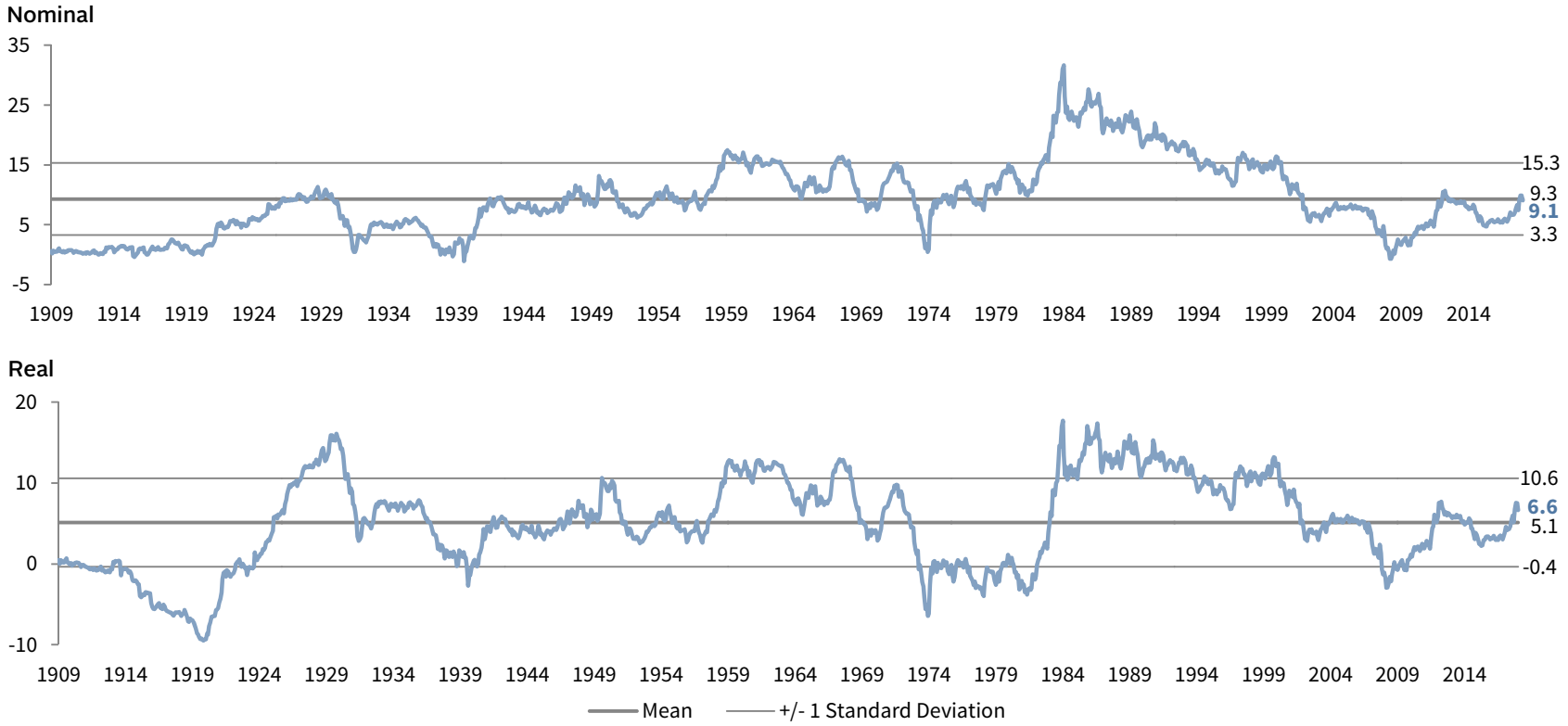
Sources: Global Financial Data, Inc., Standard & Poor's, and Thomson Reuters Datastream.

Performance mean reversion is not a smooth process

Mean performance can also shift dramatically over time. Prior to 1982, the average nominal ten-year AACR for UK equities was 7.5%, whereas the real AACR was only 3.9%. Since then, the average nominal ten-year AACR has been 12.7%, while the full period average is 9.3%. The nominal ten-year AACR of 9.1% as of 2018 is just below the full-period average ten-year AACR, but trails the average ten-year AACR since 1982 by roughly 360 bps.

ROLLING MONTHLY TOTAL RETURN 10-YR AACR: UK

1909–2018 • Percent (%)



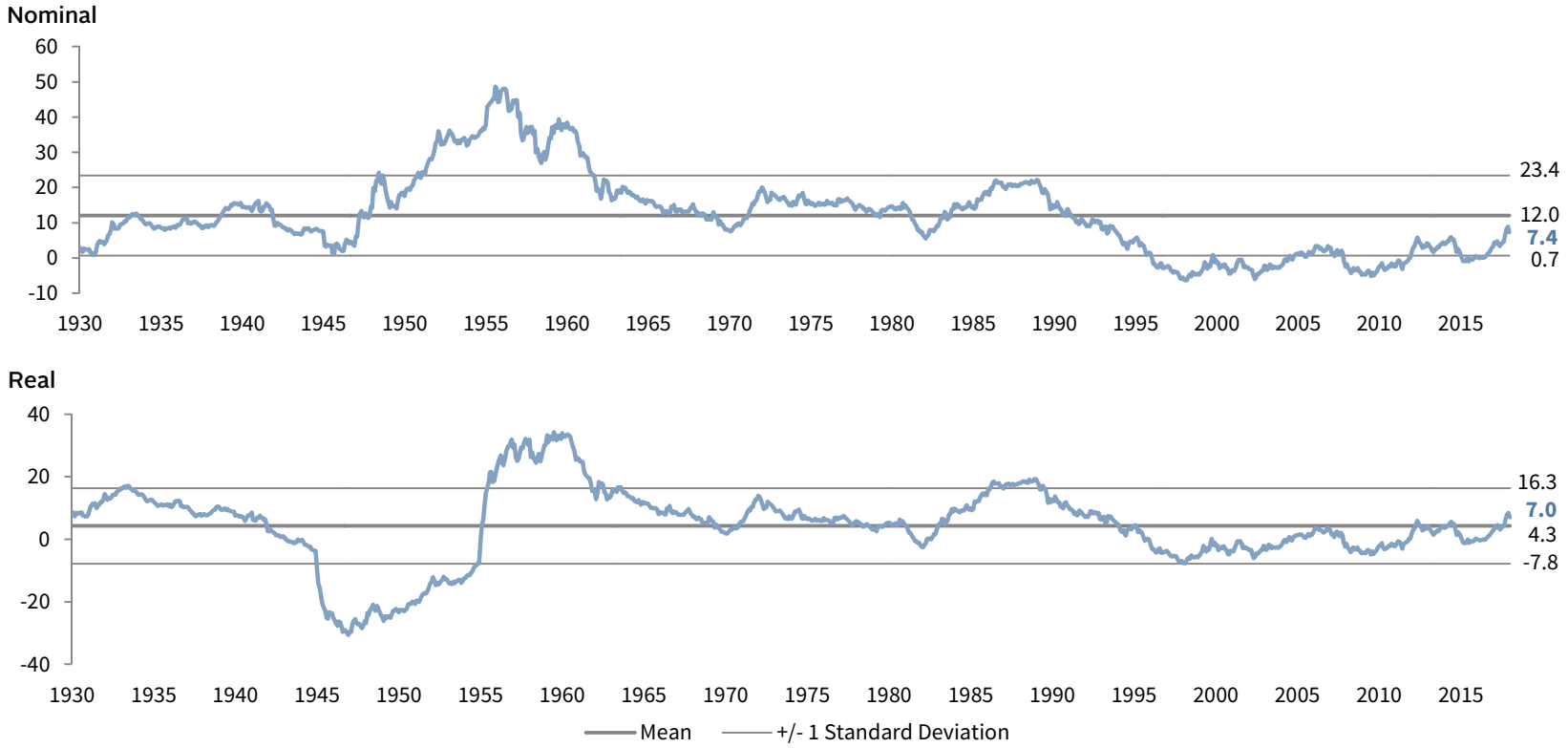
Sources: FTSE International Limited, Global Financial Data, Inc., and Thomson Reuters Datastream.

Performance mean reversion is not a smooth process

Japan's rampant inflation in the 1940s creates more dissonance between nominal and real returns compared to the other countries in this analysis. Its ten-year nominal AACRs really fall into two distinct periods: an average of 18.2% pre-1970 and an average of 7.1% from 1970 to today. Japan is an example of how mean reversion can be a painfully slow process. Nominal ten-year AACRs have been below the full period median for nearly 30 years.

ROLLING MONTHLY TOTAL RETURN 10-YR AACR: JAPAN

1930–2018 • Percent (%)



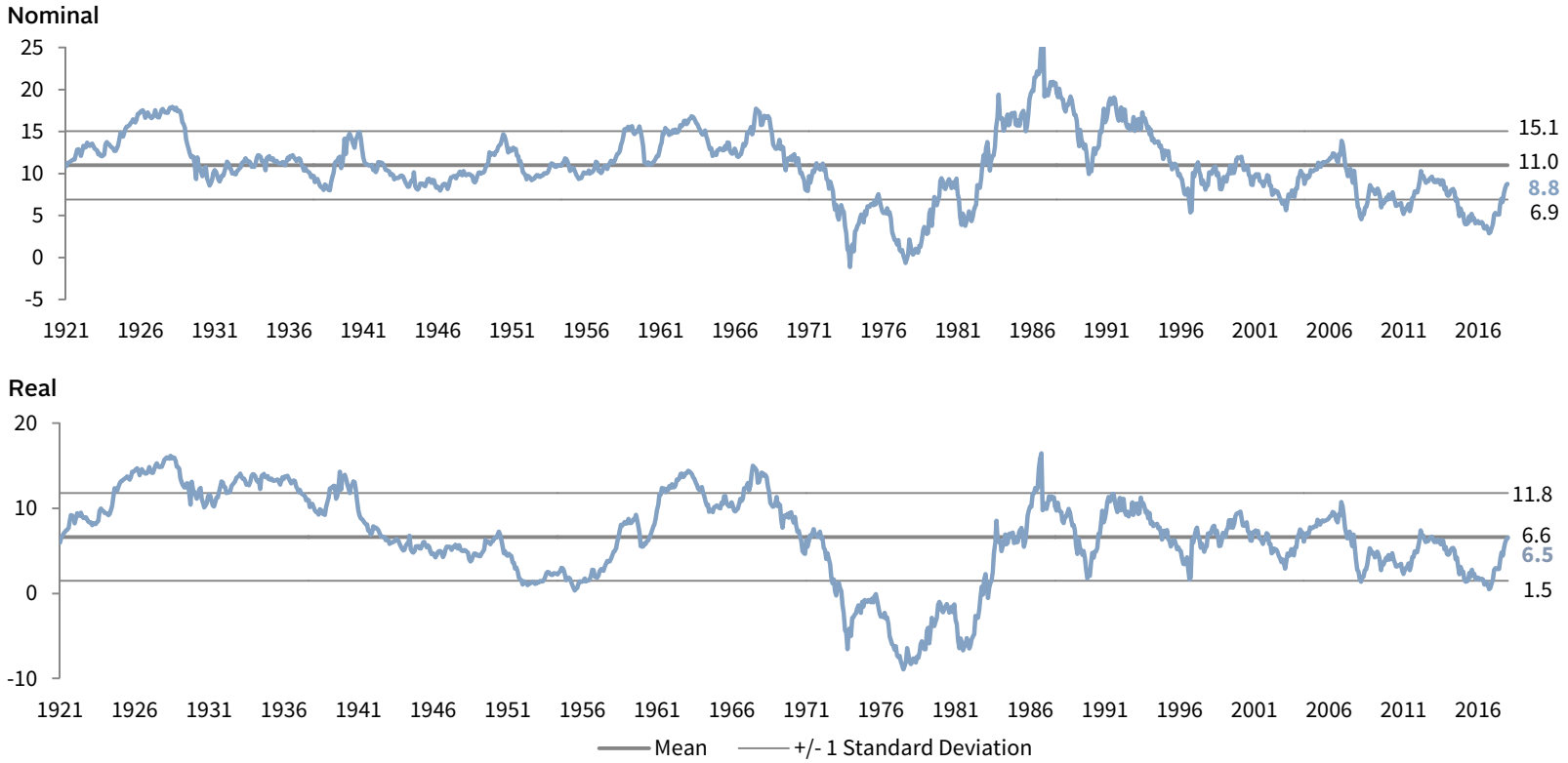
Sources: Global Financial Data, Inc., MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Performance mean reversion is not a smooth process

The range of real ten-year returns for Australian equities is the smallest among regions covered, and Australian equities tend to hover closer to mean than the US and UK. Real returns exceeded 1 standard deviation above or below mean only 33% of the time. Australian equities bounced back in recent years, with nominal returns now half a standard deviation below the historical mean.

ROLLING MONTHLY TOTAL RETURN 10-YR AACR: AUSTRALIA

1921–2018 • Percent (%)

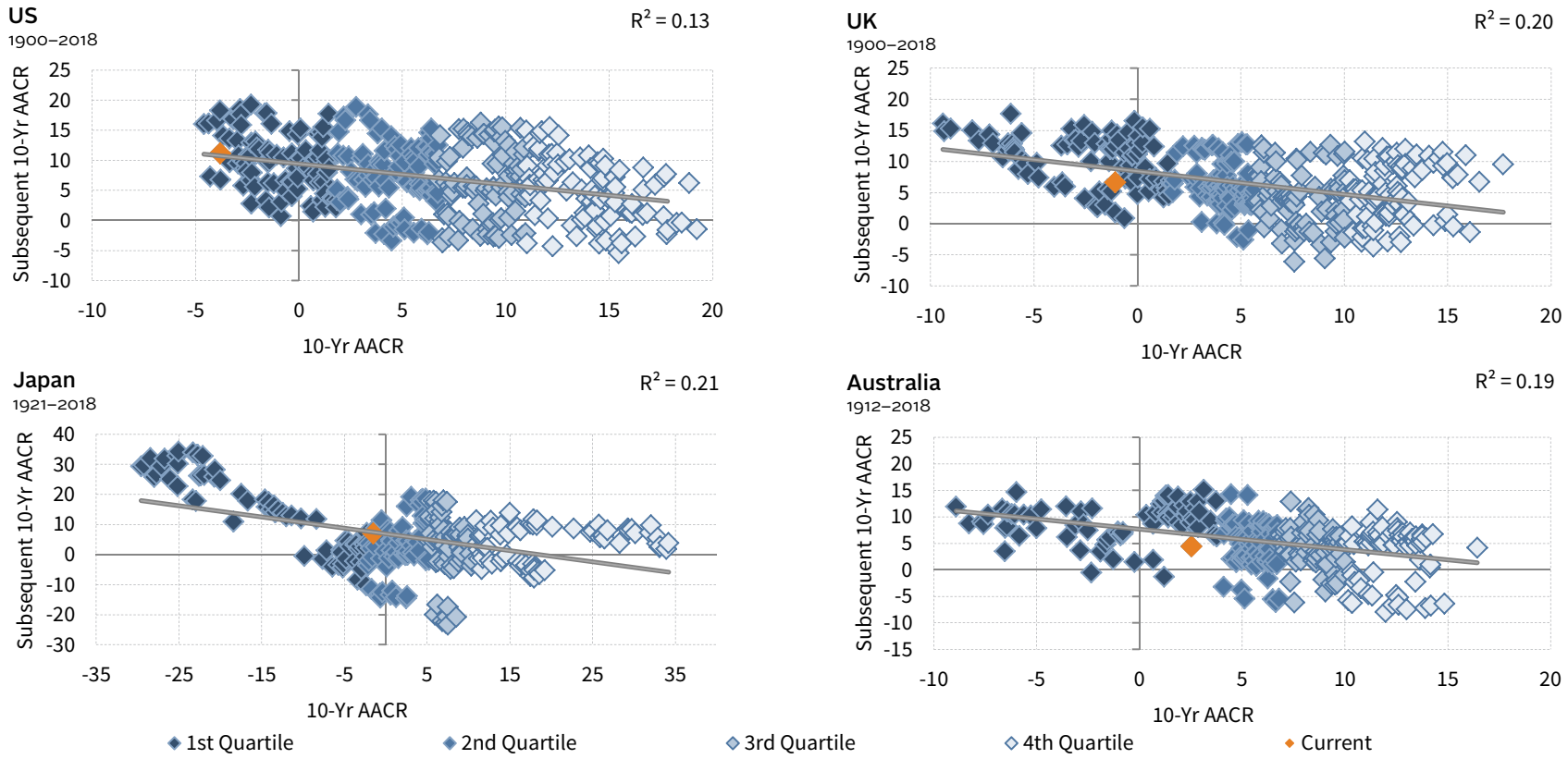


Sources: Global Financial Data, Inc., MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

There is a weak relationship between past and future equity performance

The negative slope of the regression between trailing and subsequent returns implies that periods of poor performance may be followed by periods of stronger returns, but the relationship is quite weak. Japanese equities show the strongest relationship with an R^2 of 0.21, whereas US equities exhibit the weakest with an R^2 of 0.13. Excluding Japan, when trailing returns were negative, subsequent returns were positive in all but one period. At the current values for ten-year real AACRs (between 6.5% and 11.2% for the four countries) historical data show a wide range of possible subsequent returns.

RELATIONSHIP BETWEEN ROLLING QUARTERLY 10-YR EQUITY REAL AACR AND SUBSEQUENT 10-YR EQUITY REAL AACR



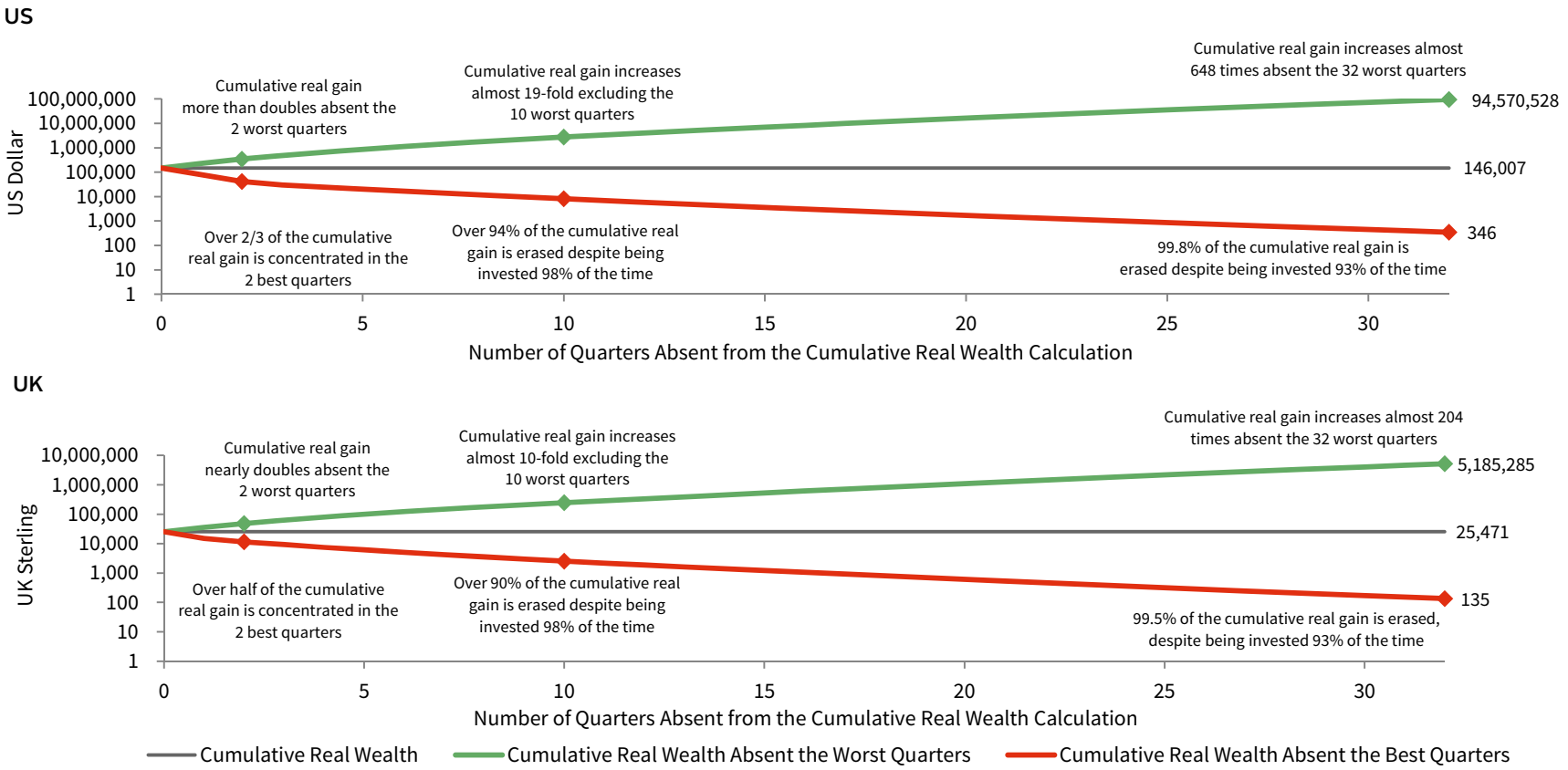
Sources: FTSE International Limited, Global Financial Data, Inc., MSCI Inc., Standard & Poor's, and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Attempting to time the market carries significant risk

Successfully avoiding the worst quarters over time has the potential to significantly improve cumulative results. Conversely, missing out on some of the best quarters can permanently diminish capital growth; missing only two of the best quarters in the US depletes the real gain by over two-thirds. The best periods of equity performance are typically concentrated just after the worst periods, further adding to the risk of a market-timing strategy.

CUMULATIVE REAL WEALTH ABSENT THE BEST AND WORST QUARTERS FOR EQUITIES

1900–2018 • January 1, 1900 = 100



Sources: FTSE International Limited, Global Financial Data, Inc., Standard & Poor's, and Thomson Reuters Datastream.

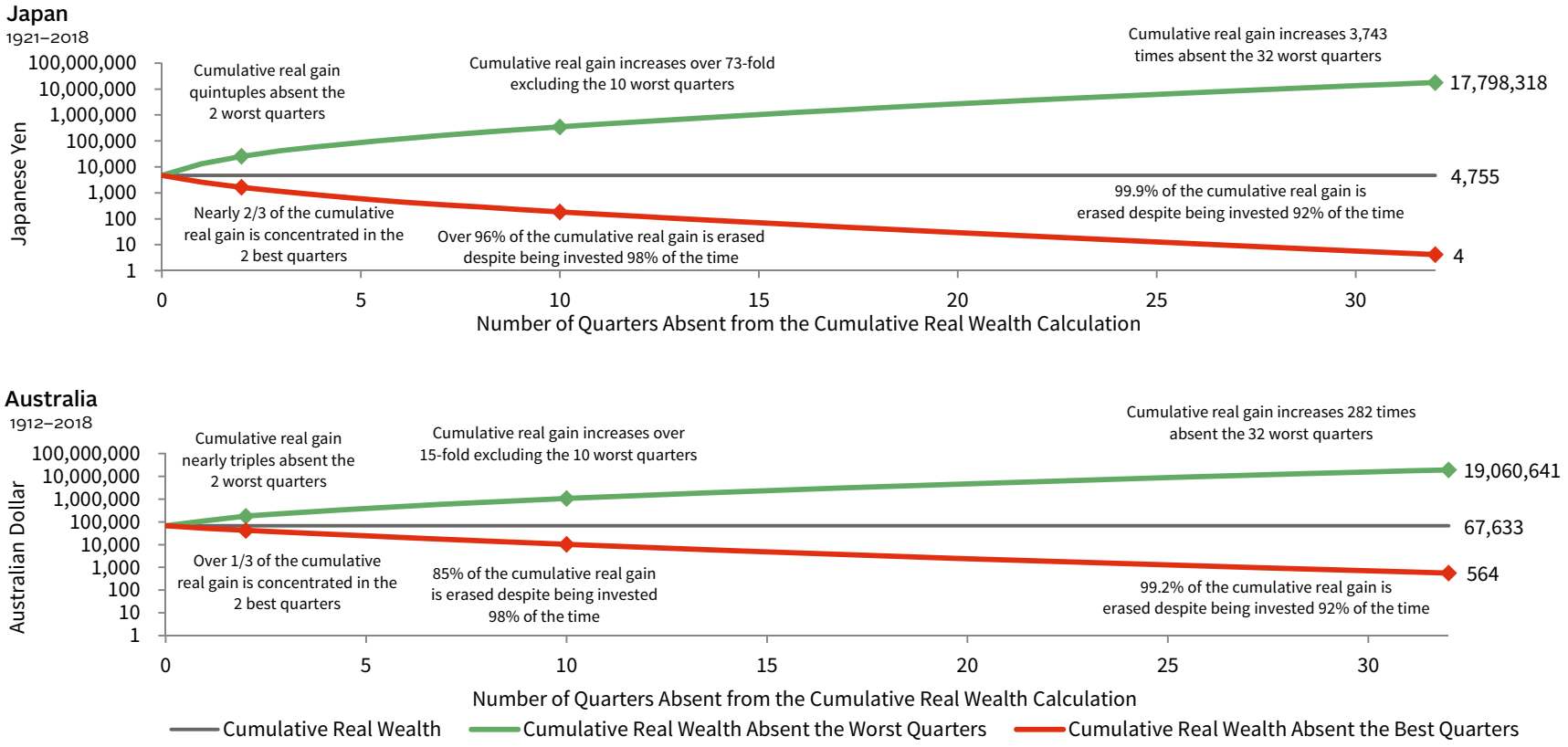
Note: Cumulative real wealth is shown on a logarithmic scale.

Attempting to time the market carries significant risk

Across all four countries, avoiding the worst two quarters would have improved cumulative returns between two and five fold. At the same time, missing the best two quarters would have reduced cumulative returns by around one-half. These effects quickly compound over successive quarters to the point where 85%+ of cumulative returns are driven by ten or fewer quarters.

CUMULATIVE REAL WEALTH ABSENT THE BEST AND WORST QUARTERS FOR EQUITIES

Index is rebased to 100 at initial time period measured for each region



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

Note: Cumulative real wealth is shown on a logarithmic scale.

EQUITY VALUATIONS

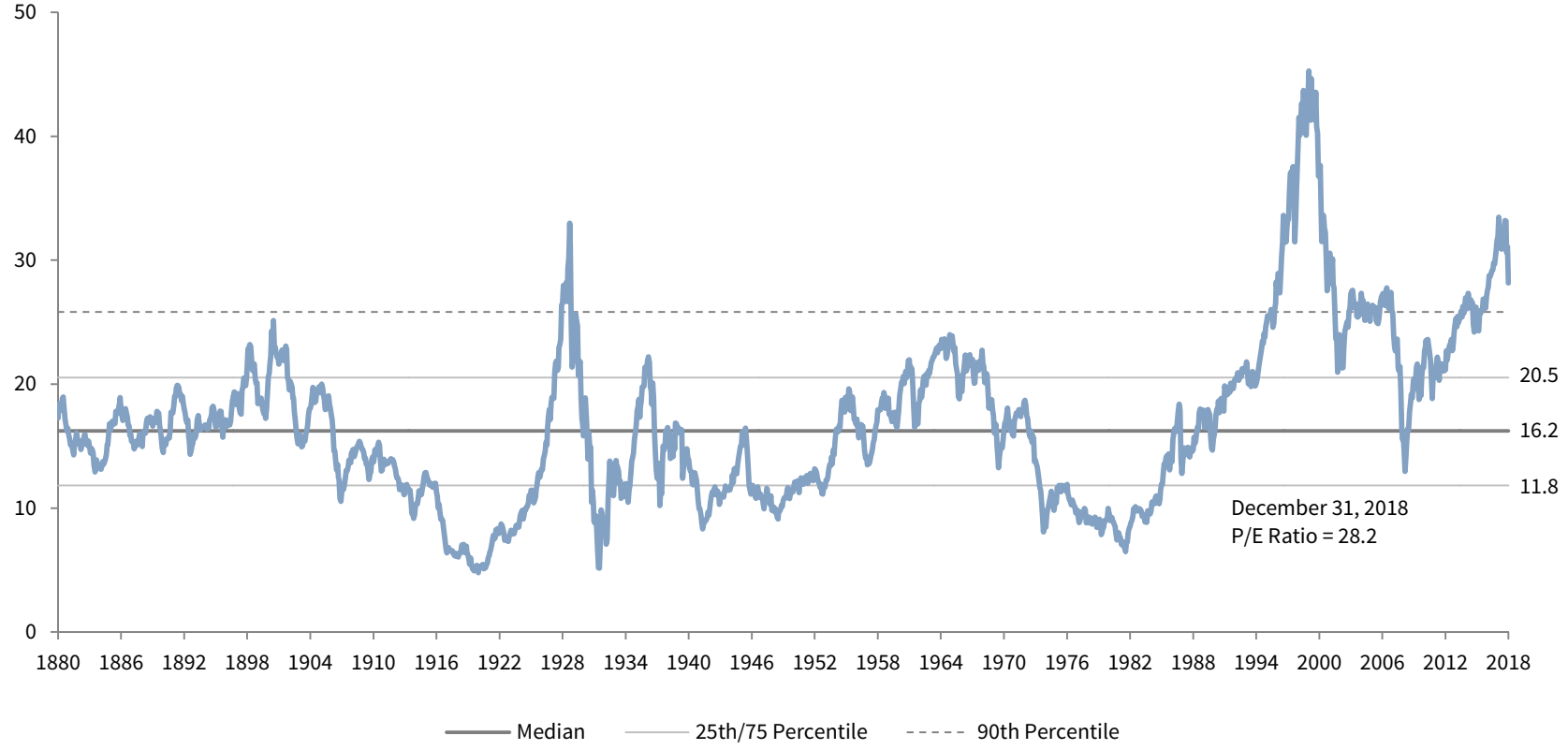
Equity valuations, though a mean-reverting series, rarely hover around their averages very long. Valuations can depart from the mean for extended periods of time, as seen consistently across the markets we analyzed, and the valuation adjustment can be relatively quick. Given this trending nature, lights flash and sirens wail only at the extremes. The longer unusually high or low valuations persist, the greater the probability investors will be caught off-guard when the cycle changes. Equity valuations are an important factor influencing long-term subsequent performance, providing a useful gauge of the expected direction of returns, but historical evidence shows a wide dispersion of realized results from various starting valuations.

We review the historical record of US equity valuations using both S&P and MSCI data. S&P has a much longer history, although this history is a compilation of historical data (as detailed in Notes on the Data) and underlying companies have changed over time, as have accounting standards and the macro environment. When comparing the US with other DM regions, we consistently use MSCI data that begin in 1969—nearly five decades of data.

P/E multiples cycle around their median, from depressed lows to excessive peaks

Our longest data set for normalized P/E ratios is the Shiller P/E for the S&P 500, which shows that valuations rarely hover around their historical medians for very long. From 1929 to 1932, the Shiller P/E cratered from 33.0 to 5.2, and from 1999 to 2002 it plunged from 45.2 to 21.0. Slow, grinding de-ratings (1901–20 and 1966–82) are also possible, as are multi-decade run-ups (1982–2000). In recent years, US equity valuations climbed to highs last seen in the great depression and technology, media and telecoms bubble of the late 1990s. The last time US equity valuations fell below the 25th percentile was in 1985.

S&P 500 NORMALIZED REAL PRICE-EARNINGS RATIOS
1880–2018



Sources: Robert J. Shiller, Standard & Poor's, and Thomson Reuters Datastream.
Notes: Graph is based on monthly data; most recent data point uses daily price change and interpolated monthly earnings. Normalized real P/E ratios (Shiller P/E ratio) for the S&P 500 Index are calculated by dividing the current index value by the rolling ten-year average of inflation-adjusted earnings. Monthly earnings are interpolated from actual quarterly reported earnings per share. Real earnings are deflated in terms of December 31, 2018, dollars. Current earnings are based on December 31, 2018, estimates from Standard & Poor's. Historical data before 1936 provided by Professor Robert Shiller.

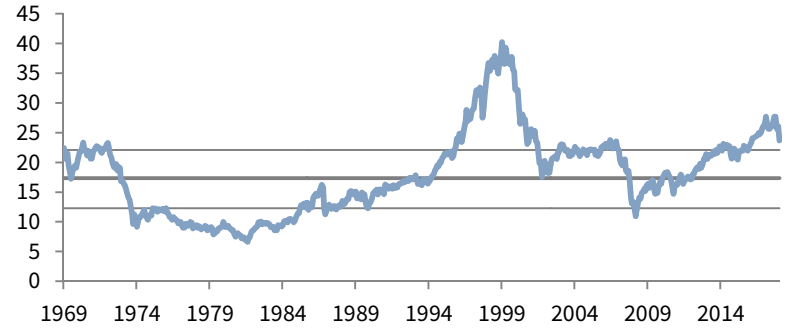
P/E multiples cycle around their median, from depressed lows to excessive peaks

Composite normalized P/E ratios using MSCI indexes allow us to compare similar data across markets. Since the 2008–09 GFC, US equity valuations climbed steadily and eclipsed the 75th percentile, whereas other DM hovered near median. Across regions, equity valuations trended upwards from the late 1970s, as bond yields and interest rates fell continually from relative peaks.

COMPOSITE NORMALIZED PRICE-EARNINGS RATIOS

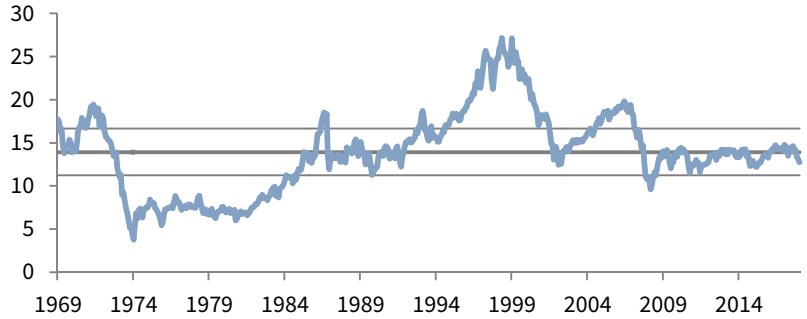
US

December 31, 1969 – December 31, 2018



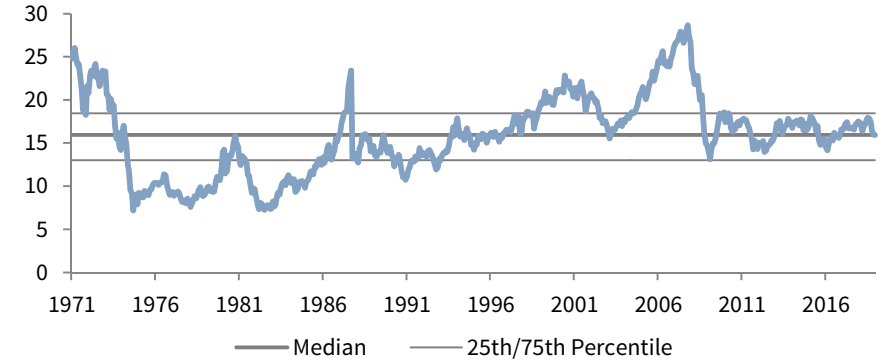
UK

December 31, 1969 – December 31, 2018



Australia

January 31, 1971 – December 31, 2018



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

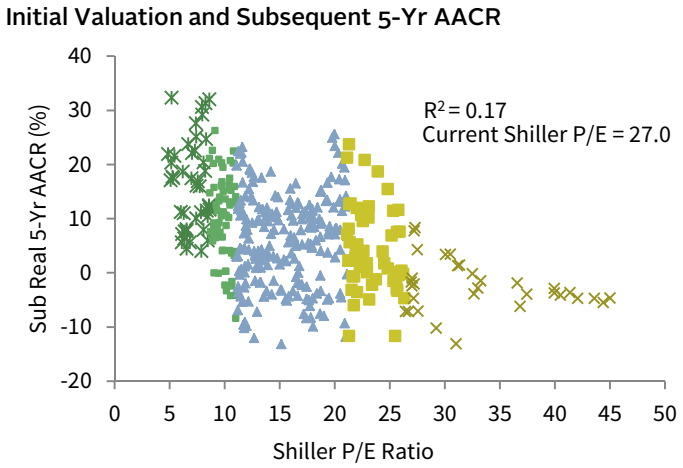
Notes: The composite normalized price-earnings (P/E) is calculated by dividing the inflation-adjusted index price by the simple average of three normalized earnings metrics: ten-year average real earnings (i.e., Shiller earnings), trend-line earnings, and return on equity–adjusted earnings.

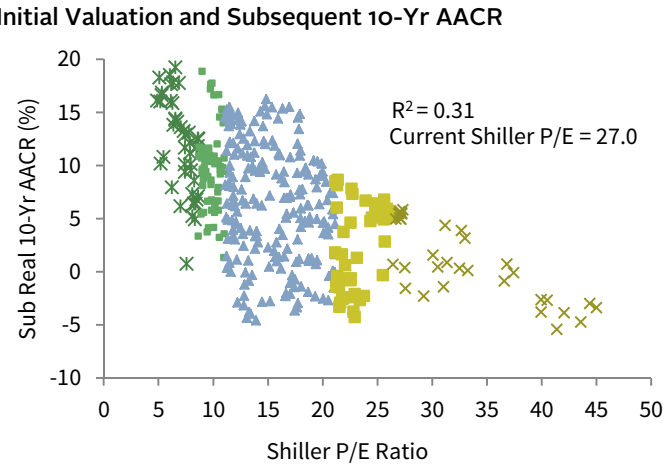
Starting valuations are more indicative of future long-term returns than short term

Valuations explain a greater degree of the variation in subsequent returns over longer time periods, exhibited by the increase in R^2 value from 0.17 to 0.31 between five- and ten-year periods. Over shorter time periods, other macroeconomic and market factors play a larger role in influencing equity returns. The relationship is most apparent at extremely high or low valuations, whereas many return outcomes are possible starting from valuations within the 25th to 75th percentiles—real returns range from -13.2% to 25.6% over five-year periods and -4.6% to 16.3% over ten-year periods from these mid-range valuations.

RELATIONSHIP BETWEEN SHILLER PRICE-EARNINGS RATIOS AND SUBSEQUENT REAL 5- AND 10-YR AACRS: US

Fourth Quarter 1909 – Fourth Quarter 2018





P/E Ratio Percentile	Begin Period Shiller US P/E Ratio			Subsequent Real 5-Yr AACR (%)			Begin Period Shiller US P/E Ratio			Subsequent Real 10-Yr AACR (%)		
	Median	High	Low	Median	High	Low	Median	High	Low	Median	High	Low
0–10	7.3	8.6	4.8	16.5	32.3	4.0	7.3	8.6	4.8	12.3	19.2	0.7
10–25	9.8	11.0	8.6	10.6	26.3	-8.4	9.8	11.0	8.6	9.9	18.9	1.3
25–75	15.5	21.1	11.1	6.7	25.6	-13.2	15.1	21.1	11.1	6.4	16.3	-4.6
75–90	22.8	26.3	21.2	2.5	23.7	-11.7	22.9	26.3	21.2	4.7	8.6	-4.3
90–100	31.3	45.0	26.4	-3.3	8.3	-13.1	31.3	45.0	26.4	0.4	5.8	-5.4
Overall	**14.7**	**45.0**	**4.8**	**7.1**	**32.3**	**-13.2**	**14.2**	**45.0**	**4.8**	**6.6**	**19.2**	**-5.4**

Sources: Robert J. Shiller, Standard & Poor's, Standard & Poor's Compustat, Thomson Reuters Datastream, and *The Wall Street Journal.*

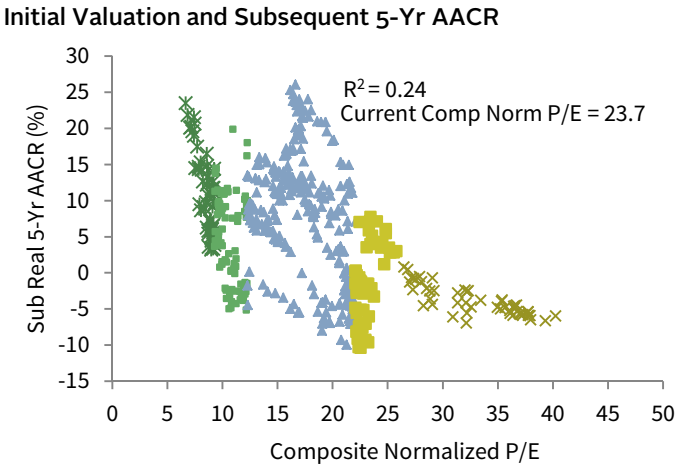
Notes: Data are quarterly. Shiller real price-earnings ratios for the S&P 500 Index are calculated by dividing the current inflation-adjusted index price by the rolling ten-year average of inflation-adjusted earnings. The last full five-year period was first quarter 2014 to fourth quarter 2018, and the last full ten-year period was first quarter 2009 to fourth quarter 2018.

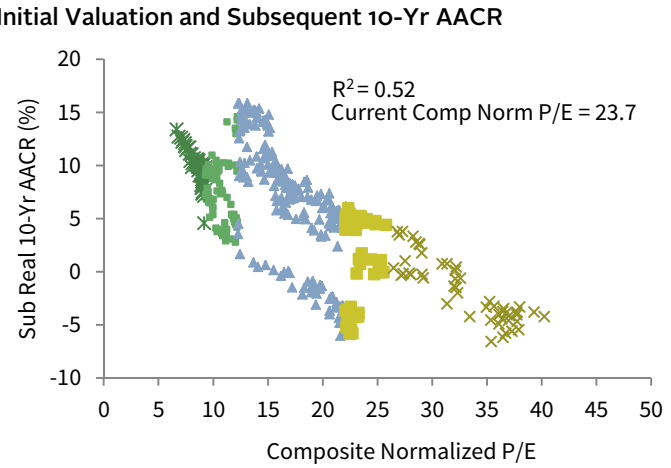
Negative correlation exists between normalized P/E ratios and subsequent performance

We see similar results when using the 49-year history of the MSCI US Index. In this case, the R^2 value more than doubles when the subsequent return horizon is increased from five to ten years. Extreme starting valuations tend to be a more reliable indicator of future equity performance, particularly at the upper end of the spectrum. Today's valuation of 23.7, which sits in the 86th percentile of historical observations, appears elevated (though not necessarily extreme); past subsequent returns from similar levels ranged from -10% to 8% over five-year periods and -4% to 5% over ten-year periods.

RELATIONSHIP BETWEEN COMPOSITE NORMALIZED PRICE-EARNINGS RATIOS AND SUBSEQUENT REAL 5- AND 10-YR AACRS: US

December 31, 1969 – December 31, 2018





P/E Ratio Percentile	Begin Period Comp Norm US P/E Ratio			Subsequent Real 5-Yr AACR (%)			Begin Period Comp Norm US P/E Ratio			Subsequent Real 10-Yr AACR (%)		
	Median	High	Low	Median	High	Low	Median	High	Low	Median	High	Low
0–10	8.7	9.3	6.6	10.6	23.5	3.2	8.7	9.3	6.6	9.9	13.4	4.6
10–25	10.5	12.3	9.3	4.6	19.9	-5.2	10.4	12.3	9.3	7.6	14.6	2.8
25–75	17.1	22.1	12.3	9.0	26.0	-10.0	17.1	22.1	12.3	6.8	15.9	-6.0
75–90	22.8	25.8	22.1	-1.9	7.7	-10.4	22.8	25.8	22.1	4.2	5.9	-5.9
90–100	32.5	40.2	26.5	-4.5	0.8	-7.0	32.5	40.2	26.5	-2.4	3.8	-6.6
Overall	**16.6**	**40.2**	**6.6**	**6.1**	**26.0**	**-10.4**	**16.5**	**40.2**	**6.6**	**6.0**	**15.9**	**-6.6**

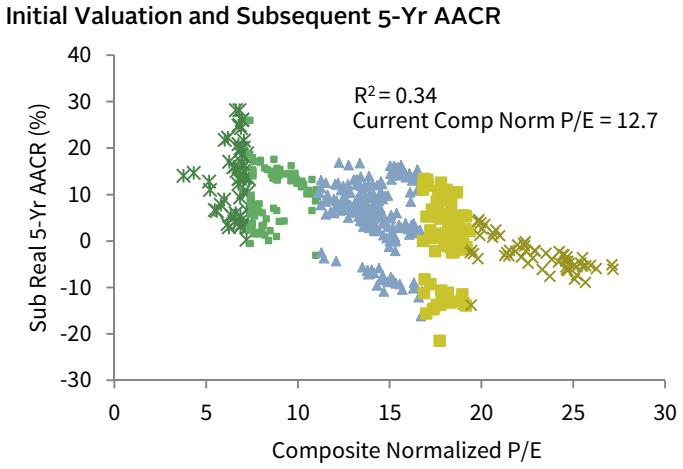
Sources: MSCI Inc. and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.
Notes: Data are monthly. The composite normalized price-earnings (P/E) is calculated by dividing the inflation-adjusted index price by the simple average of three normalized earnings metrics: ten-year average real earnings (i.e., Shiller earnings), trend-line earnings, and return on equity–adjusted earnings. The last full five-year period was January 1, 2014, to December 31, 2018, and the last full ten-year period was January 1, 2009, to December 31, 2018.

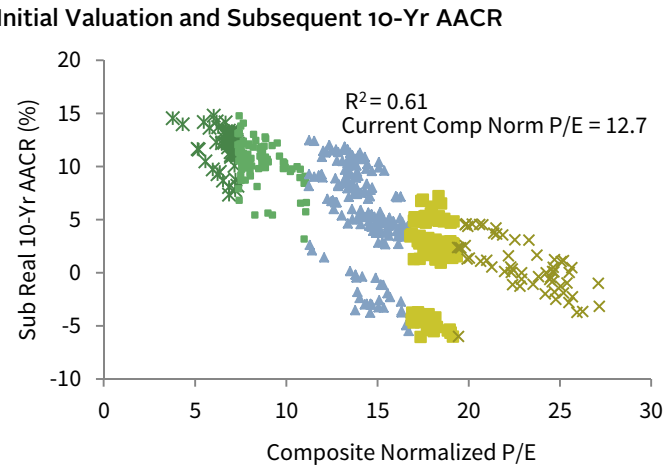
Near-median P/E ratios do not necessarily imply near-median realized returns

The trend in UK P/E ratios and subsequent performance is similar to that of the US. UK equities ended 2018 at a composite normalized P/E ratio of 12.7, closer to their historical median. Within the 25th to 75th percentile range; however, there is a wide array of historical outcomes and a decent probability of below-average returns.

RELATIONSHIP BETWEEN COMPOSITE NORMALIZED PRICE-EARNINGS RATIOS AND SUBSEQUENT REAL 5- AND 10-YR AACRS: UK

December 31, 1969 – December 31, 2018





P/E Ratio Percentile	Begin Period Comp Norm UK P/E Ratio			Subsequent Real 5-Yr AACR (%)			Begin Period Comp Norm UK P/E Ratio			Subsequent Real 10-Yr AACR (%)		
	Median	High	Low	Median	High	Low	Median	High	Low	Median	High	Low
0–10	6.9	7.3	3.8	13.6	28.2	0.2	6.9	7.3	3.8	12.3	14.8	7.3
10–25	8.2	11.1	7.4	9.1	26.0	-3.1	8.2	11.1	7.4	10.5	14.8	3.2
25–75	13.9	16.8	11.1	6.6	16.8	-16.2	14.4	16.8	11.2	5.4	12.5	-5.5
75–90	18.1	19.4	16.8	0.9	13.3	-21.5	18.1	19.4	16.8	2.6	7.2	-6.1
90–100	22.9	27.2	19.4	-3.3	4.6	-13.8	22.9	27.2	19.4	0.4	4.6	-6.0
Overall	**13.9**	**27.2**	**3.8**	**5.9**	**28.2**	**-21.5**	**14.4**	**27.2**	**3.8**	**5.5**	**14.8**	**-6.1**

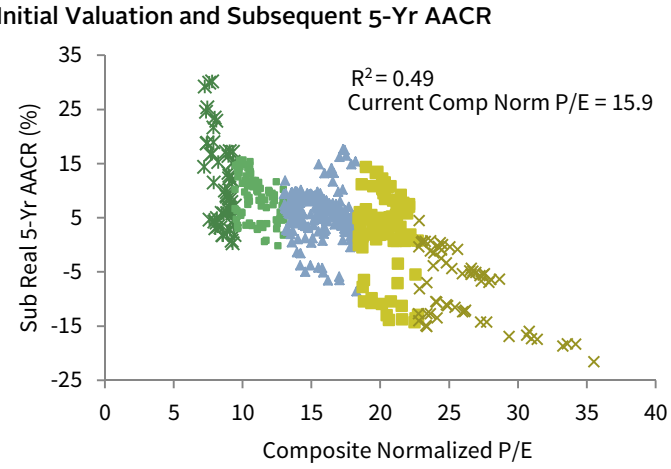
Sources: MSCI Inc. and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.
Notes: Data are monthly. The composite normalized price-earnings (P/E) is calculated by dividing the inflation-adjusted index price by the simple average of three normalized earnings metrics: ten-year average real earnings (i.e., Shiller earnings), trend-line earnings, and return on equity–adjusted earnings. The last full five-year period was January 1, 2014, to December 31, 2018, and the last full ten-year period was January 1, 2009, to December 31, 2018.

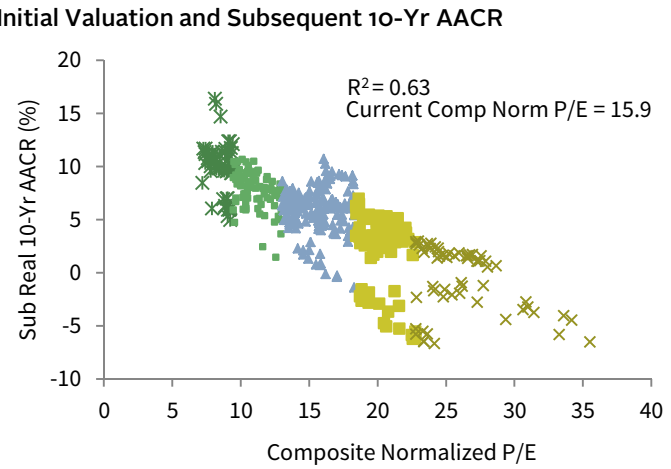
A wide range of returns are possible, even from low starting valuations

Australian equities ended 2018 at a normalized P/E ratio of 15.9, which set the median valuation. As we have shown, based on historical experience there is a wide range of possible subsequent outcomes from these valuation levels. But there can also be a high degree of variability from the lowest valuation levels. Albeit consistently positive, with starting valuations up to the 10th percentile, subsequent returns for Australian equities ranged from 0.3% to 30.2% over five-year periods, and 5.0% to 16.4% over ten-year periods.

RELATIONSHIP BETWEEN COMPOSITE NORMALIZED PRICE-EARNINGS RATIOS AND SUBSEQUENT REAL 5- AND 10-YR AACRS: AUSTRALIA

December 31, 1969 – December 31, 2018





P/E Ratio Percentile	Begin Period Comp Norm Australia P/E Ratio			Subsequent Real 5-Yr AACR (%)			Begin Period Comp Norm Australia P/E Ratio			Subsequent Real 10-Yr AACR (%)		
	Median	High	Low	Median	High	Low	Median	High	Low	Median	High	Low
0–10	8.8	9.4	7.2	9.1	30.2	0.3	8.8	9.4	7.2	10.2	16.4	5.0
10–25	11.0	13.0	9.4	8.6	15.6	-0.2	11.0	13.0	9.4	8.0	10.7	1.4
25–75	15.7	18.4	13.0	6.5	17.6	-8.6	15.6	18.4	13.0	6.2	10.7	-1.4
75–90	20.5	22.8	18.4	3.3	14.3	-14.3	20.5	22.8	18.4	3.5	6.9	-6.2
90–100	25.2	35.5	22.8	-6.7	4.4	-21.6	25.2	35.5	22.8	1.1	3.0	-6.7
Overall	**15.7**	**35.5**	**7.2**	**5.7**	**30.2**	**-21.6**	**15.6**	**35.5**	**7.2**	**6.0**	**16.4**	**-6.7**

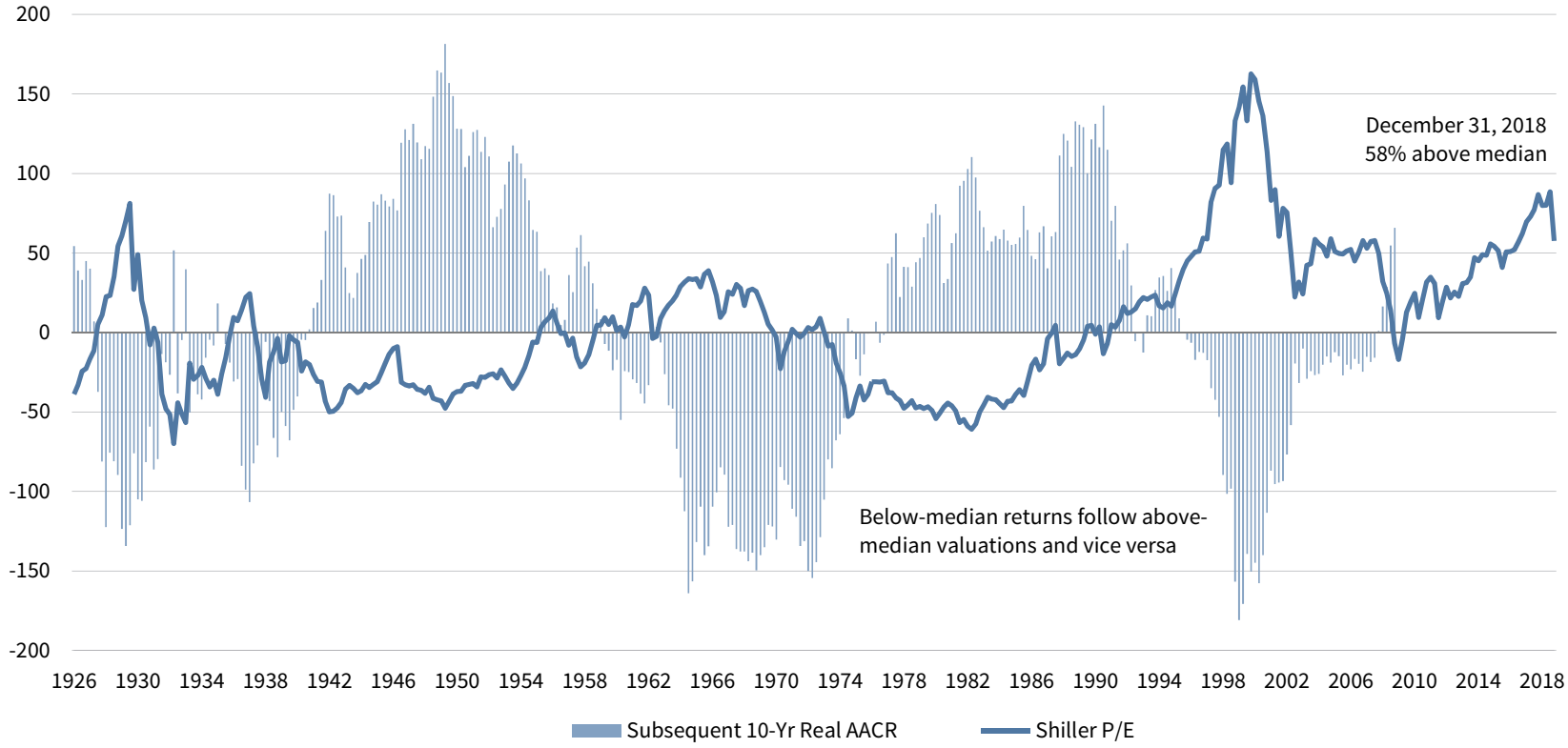
Sources: MSCI Inc. and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.
Notes: Data are monthly. The composite normalized price-earnings (P/E) is calculated by dividing the inflation-adjusted index price by the simple average of three normalized earnings metrics: ten-year average real earnings (i.e., Shiller earnings), trend-line earnings, and return on equity–adjusted earnings. The last full five-year period was January 1, 2014, to December 31, 2018, and the last full ten-year period was January 1, 2009, to December 31, 2018.

Lower subsequent returns follow elevated starting valuations

Historically, normalized P/E ratios above their long-term median typically led to below-median subsequent ten-year returns; normalized P/E ratios below the long-term median were associated with above-median subsequent ten-year returns. Using history as a guide, recent elevated valuations in the US imply ten-year returns from today could fall below median. But, US equity valuations have been above median since first quarter 1991 (save for a brief two-quarter stint in 2008–09), with implications for subsequent returns yet to be seen.

US SHILLER PRICE-EARNINGS RATIOS AND SUBSEQUENT REAL 10-YR AACRS

First Quarter 1926 – Fourth Quarter 2018 • Shown as Percent Above/Below Respective Long-Term Median (%)



Sources: Robert J. Shiller, Standard & Poor's, Thomson Reuters Datastream, and US Department of Labor - Bureau of Labor Statistics.

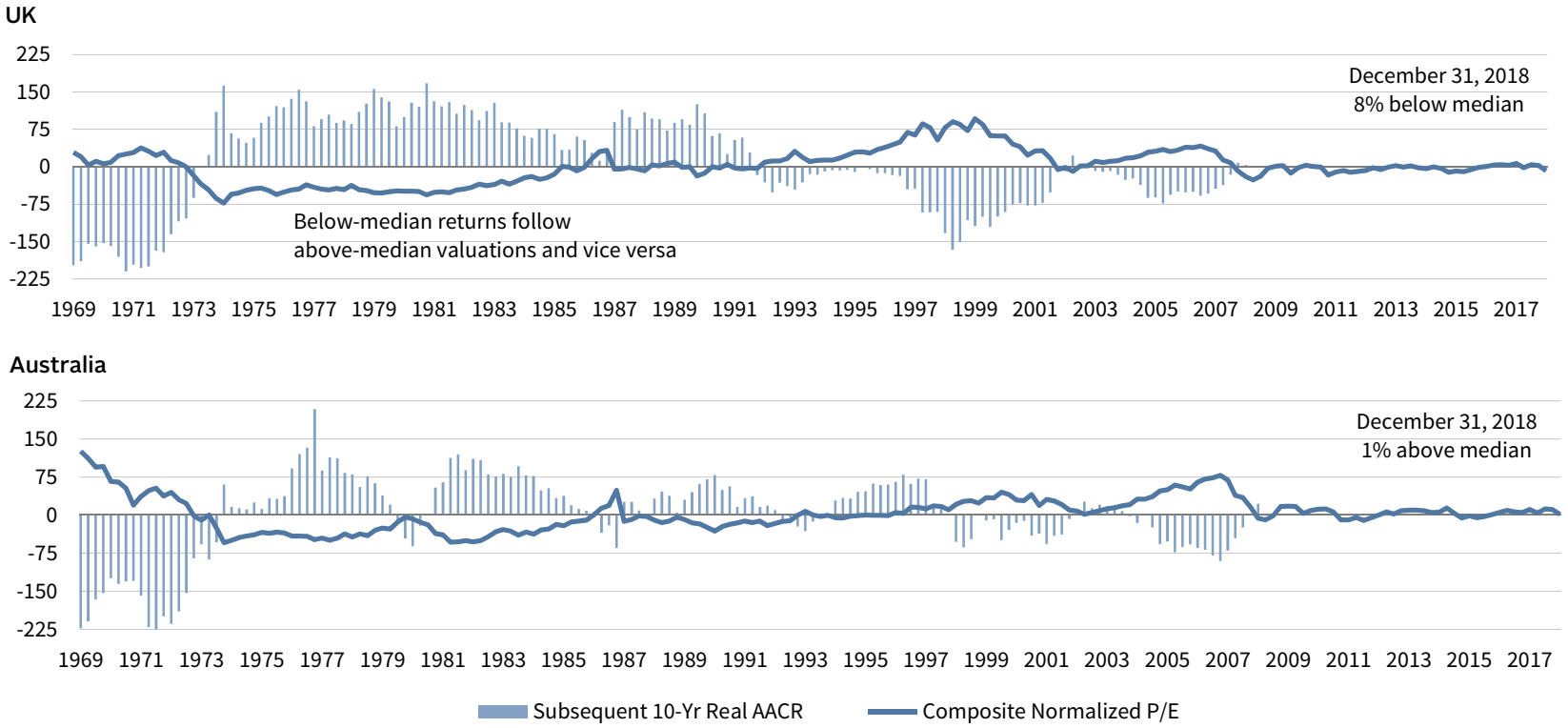
Notes: Graph shows percent above/below median for returns and valuations. Line shows point-in-time normalized real price-earnings (P/E) ratios. Normalized real P/E ratios for the S&P 500 Index are calculated by dividing the current index value by the rolling ten-year average of inflation-adjusted earnings. Bars are based on quarterly data and show subsequent rolling ten-year real average annual compound returns (AACRs) as a percentage above/below the long-term median ten-year real return of 6.7% since 1926. For example, the first data point shows that the real AACR for the period 1926–35 was 54.4% above the median ten-year real return.

Lower subsequent returns follow elevated starting valuations

Normalized valuations for UK and Australian equities also show how valuations are counter-indicators of future return trends. Based on their relatively median-level current valuations, investors may infer real returns around the historical median level over the coming decade are likely, but a wide range of outcomes is possible.

COMPOSITE NORMALIZED PRICE-EARNINGS RATIOS AND SUBSEQUENT REAL 10-YR AACRS

Fourth Quarter 1969 – Fourth Quarter 2018 • Shown as Percent (%) Above/Below Respective Long-Term Median



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

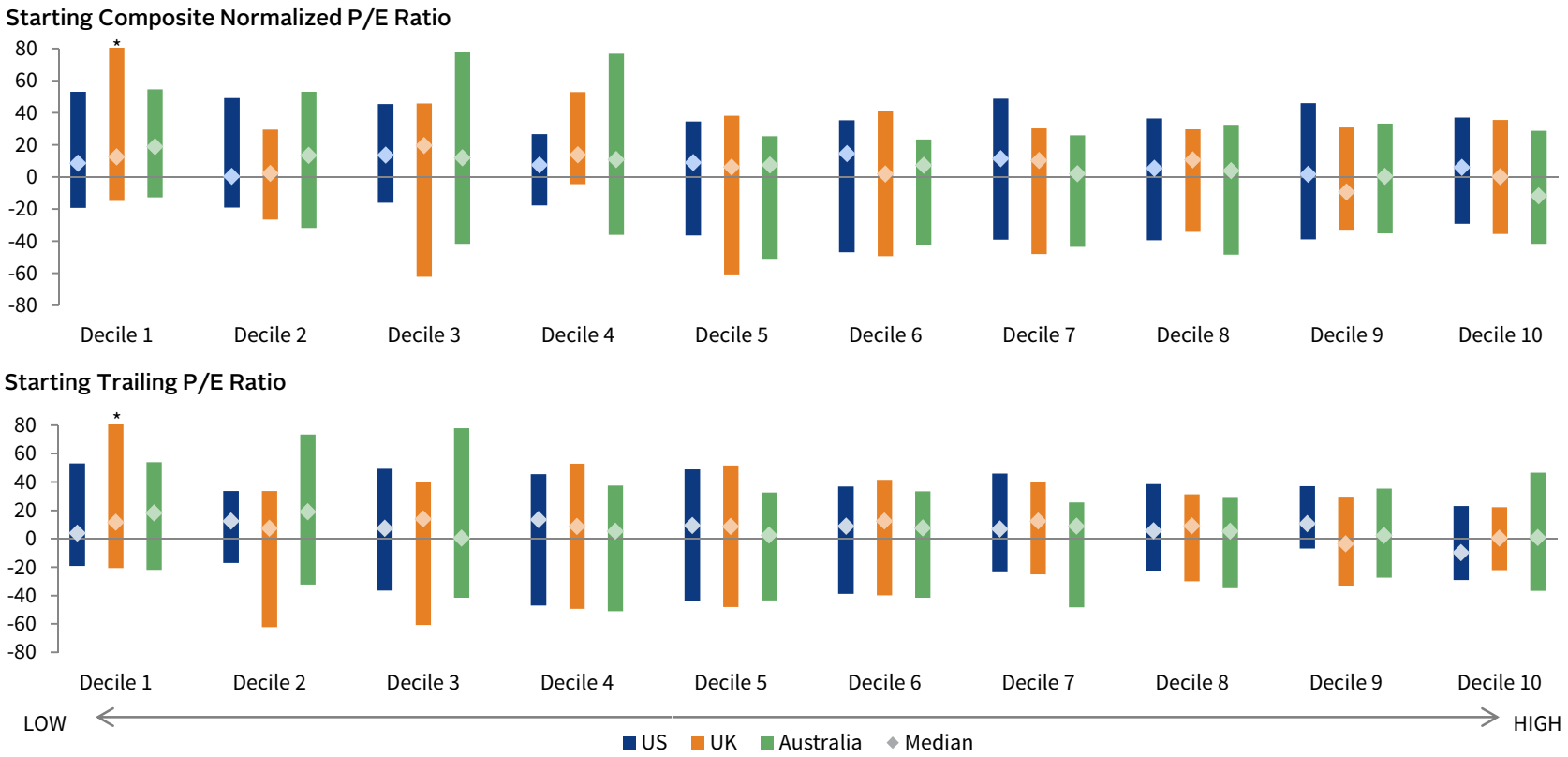
Notes: Graph shows percent above/below median for returns and valuations. Line shows point-in-time composite normalized real price-earnings (P/E) ratios. Bars are based on quarterly data and show subsequent rolling ten-year real average annual compound returns (AACRs) as a percentage above/below the long-term median ten-year real return of each region of 5.3% and 5.5% for Australia and the UK, respectively. For example, the first data point shows that the real AACR for the period 1970–79 was 222.4% below the median ten-year real return for Australia and was 197.7% below the median ten-year real return for the UK.

Valuations, normalized and trailing, are not a good guide to short-term returns

For investors with a one-year time horizon, starting valuations provide little guidance for future return expectations. High and low starting valuations are neither universally disastrous nor advantageous in the short run, as markets saw positive subsequent returns from the highest starting composite normalized P/E ratio decile and negative returns from the lowest decile. The wide return dispersion serves a reminder that valuations are a poor guide to subsequent short-term returns.

RANGE OF SUBSEQUENT 1-YR REAL RETURNS: US, UK, AND AUSTRALIA

December 31, 1969 – December 31, 2018 • Percent (%)



* Graph capped for scaling purposes. UK maximum return is 96.0%.

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

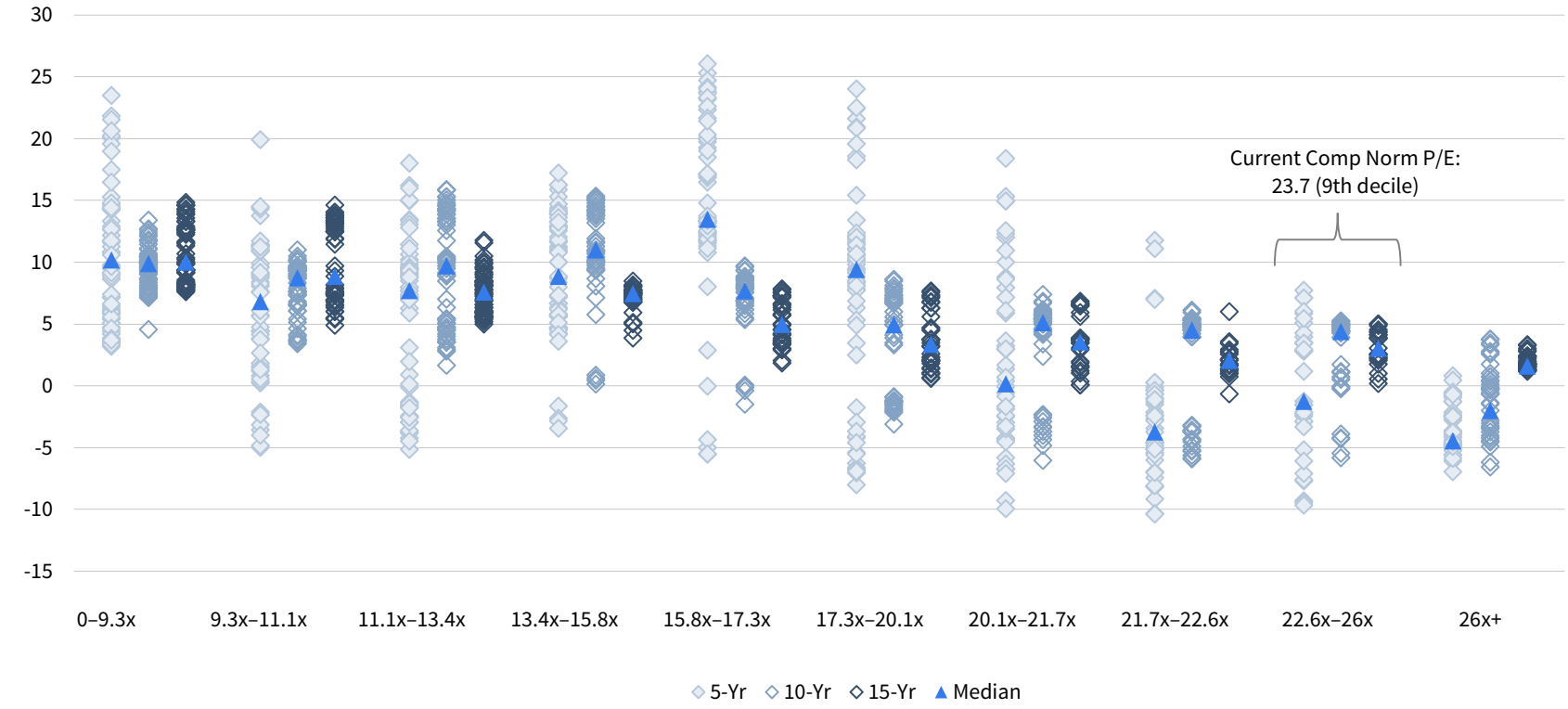
Notes: The composite normalized price-earnings (P/E) is calculated by dividing the inflation-adjusted index price by the simple average of three normalized earnings metrics: ten-year average real earnings (i.e., Shiller earnings), trend-line earnings, and return on equity–adjusted earnings. Total return data for all MSCI indexes are net of dividend taxes. All data are monthly.

Starting valuations are more meaningful as holding periods increase

The impact of starting valuations on subsequent returns gains in significance as holding periods increase. Similarly, over sufficiently long time horizons, higher valuations tend to lead to lower realized returns, and vice versa. In the US, the year-end 2018 composite normalized P/E ratio of 23.7 fell in the 9th decile of historical observations. From here, 15-year real returns typically range from about 0% to 5%, but with much greater uncertainty over a five-year horizon.

DISTRIBUTION OF SUBSEQUENT REAL RETURNS FROM STARTING COMPOSITE NORMALIZED P/E DECILES: US

December 31, 1969 – December 31, 2018 • Subsequent Real Return AACR (%)



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

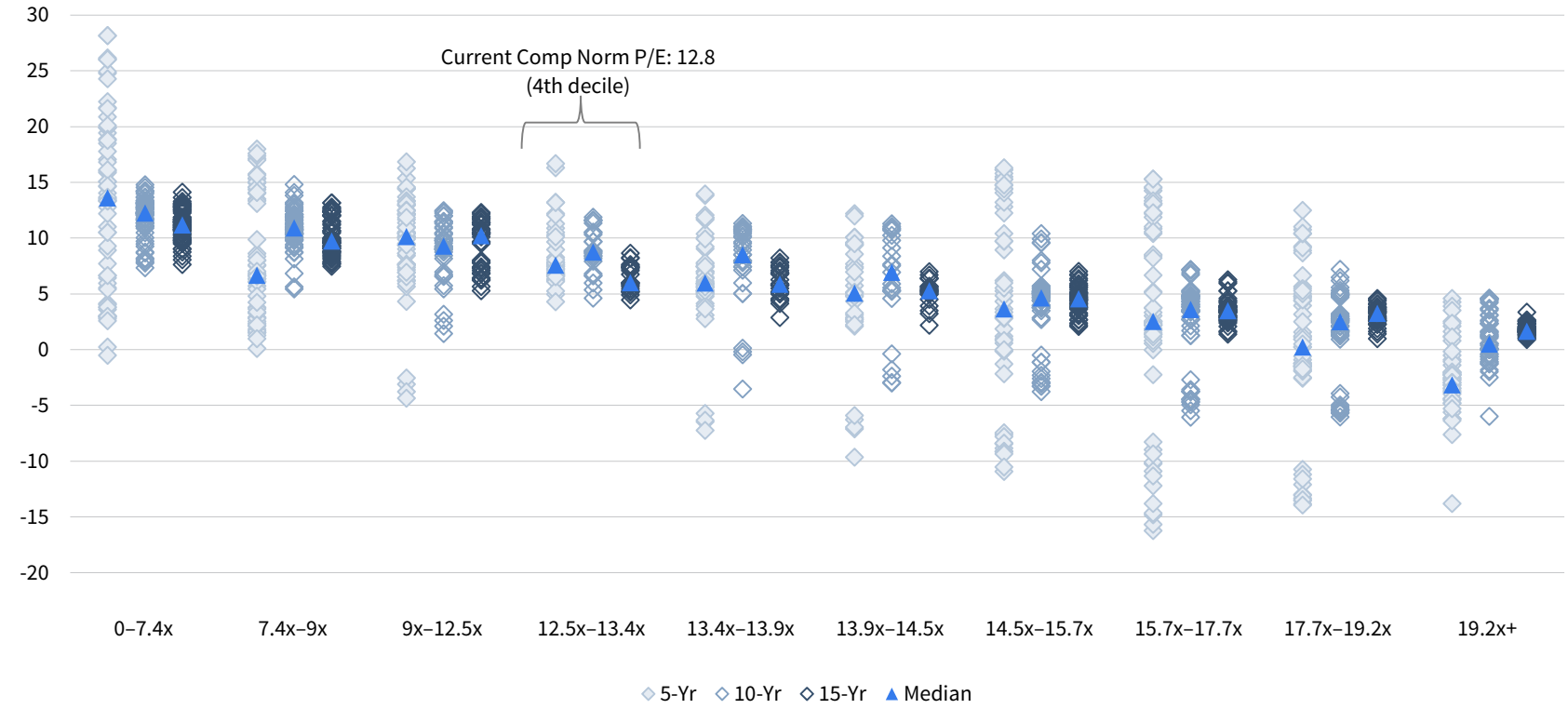
Note: The composite normalized price-earnings (P/E) is calculated by dividing the inflation-adjusted index price by the simple average of three normalized earnings metrics: ten-year average real earnings (i.e., Shiller earnings), trend-line earnings, and return on equity–adjusted earnings.

Starting valuations are more meaningful as holding periods increase

In the UK, the narrower range of outcomes at longer horizons and relationship between valuations and subsequent returns is pronounced. The current composite normalized P/E ratio of 12.8 lies in the 4th decile of historical observations. From this decile, the range of subsequent returns is relatively small across time horizons, rarely falling below 5%.

DISTRIBUTION OF SUBSEQUENT REAL RETURNS FROM STARTING COMPOSITE NORMALIZED P/E DECILES: UK

December 31, 1969 – December 31, 2018 • Subsequent Real Return AACR (%)



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

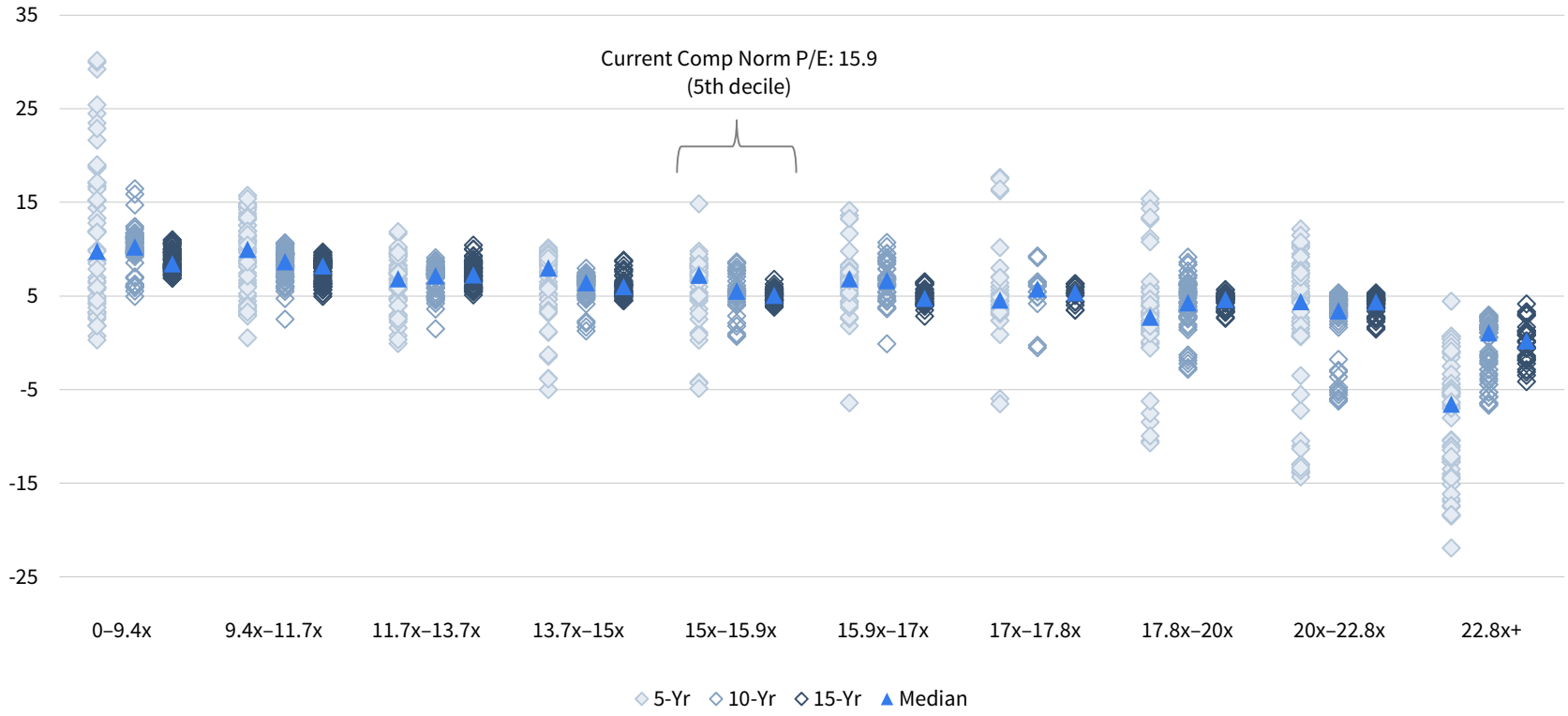
Note: The composite normalized price-earnings (P/E) is calculated by dividing the inflation-adjusted index price by the simple average of three normalized earnings metrics: ten-year average real earnings (i.e., Shiller earnings), trend-line earnings, and return on equity–adjusted earnings.

Starting valuations are more meaningful as holding periods increase

In Australia, the current composite normalized P/E ratio of 15.9 sits in the 5th decile of historical observations. From this decile, the median subsequent real 15-year AACR was about 5%.

DISTRIBUTION OF SUBSEQUENT REAL RETURNS FROM STARTING COMPOSITE NORMALIZED P/E DECILES: AUSTRALIA

December 31, 1969 – December 31, 2018 • Subsequent Real Return AACR (%)



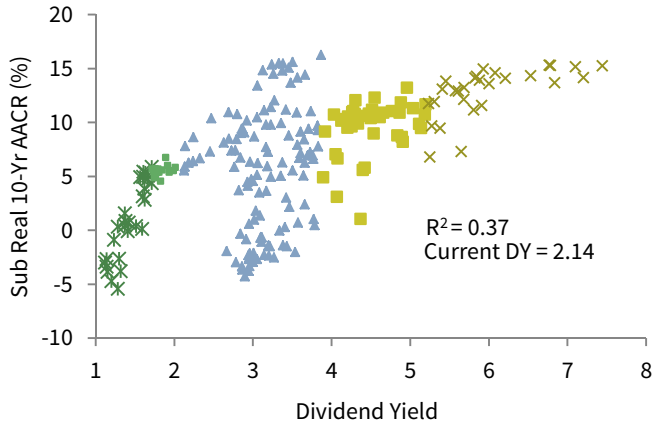
Sources: MSCI Inc. and Thomson Reuters Datastream. MSCI data provided "as is" without and express or implied warranties.
Note: The composite normalized price-earnings (P/E) is calculated by dividing the inflation-adjusted index price by the simple average of three normalized earnings metrics: ten-year average real earnings (i.e., Shiller earnings), trend-line earnings, and return on equity–adjusted earnings.

Dividend yields provide some insight into subsequent equity returns

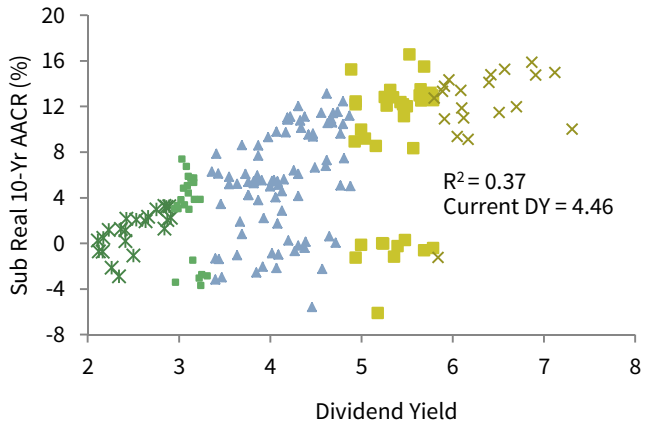
Dividend yields exhibit a positive relationship with subsequent returns, as higher starting dividend yields tend to lead to higher subsequent returns. In the US and UK, top decile dividend yields are typically associated with above-average subsequent 15-year real returns, except for one errant period in the UK. Since the late 1990s, US dividend yields rarely rose above 2%, which may weaken the relationship between yields and subsequent returns in future periods.

RELATIONSHIP BETWEEN DIVIDEND YIELDS AND SUBSEQUENT REAL 10-YR AACRS

US
First Quarter 1950 – Fourth Quarter 2018



UK
Second Quarter 1962 – Fourth Quarter 2018



Dividend Yield Percentile	Begin Period US Dividend Yield (%)			Subsequent Real 10-Yr AACR (%)			Begin Period UK Dividend Yield (%)			Subsequent Real 10-Yr AACR (%)		
	Median	High	Low	Median	High	Low	Median	High	Low	Median	High	Low
0–10	1.4	1.7	1.1	0.6	5.9	-5.4	2.5	2.9	2.1	1.3	3.3	-2.9
10–25	1.8	2.0	1.7	5.5	6.8	4.6	3.1	3.3	3.0	3.8	7.4	-3.7
25–75	3.1	3.9	2.1	6.3	16.3	-4.3	4.1	4.9	3.4	5.5	13.1	-5.6
75–90	4.4	5.2	3.9	10.4	13.2	1.0	5.4	5.8	4.9	12.0	16.5	-6.1
90–100	5.8	7.4	5.2	13.6	15.3	6.8	6.3	11.7	5.8	13.4	17.7	-1.2
Overall	**3.2**	**7.4**	**1.1**	**6.7**	**16.3**	**-5.4**	**4.2**	**11.7**	**2.1**	**5.5**	**17.7**	**-6.1**

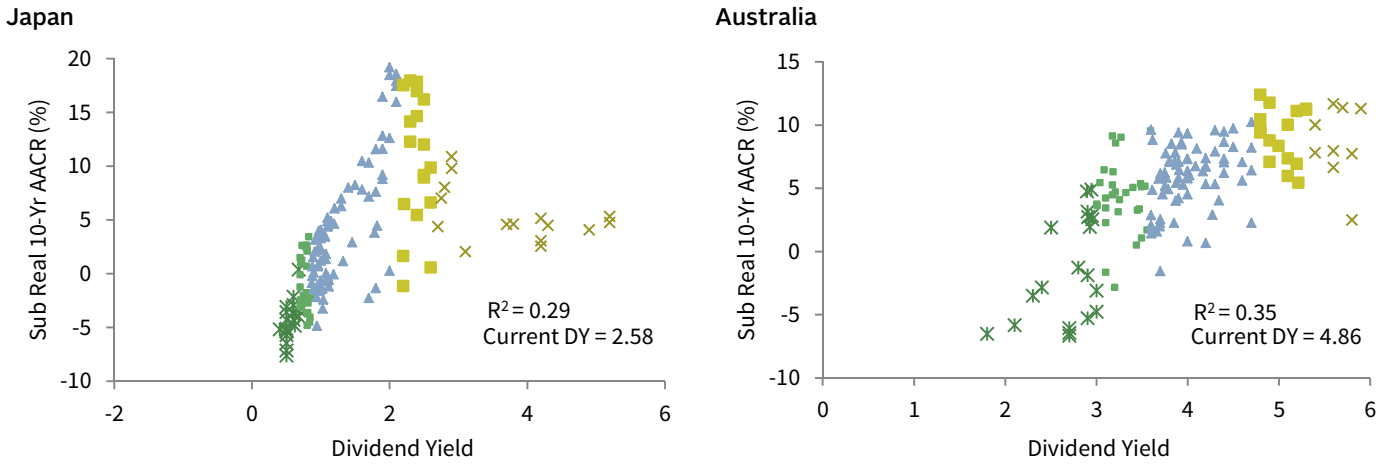
Sources: FTSE International Limited, Global Financial Data, Inc., Standard & Poor's, Thomson Reuters Datastream, US Department of Labor - Bureau of Labor Statistics, and *The Wall Street Journal.*
Notes: Data are quarterly. The last full ten-year period was first quarter 2009 through fourth quarter 2018. Outliers are not shown on graph but are included in R^2.

Dividend yields provide some insight into subsequent equity returns

Japanese dividend yields explain the lowest degree of variability in ten-year subsequent equity returns with an R^2 of 0.29, likely a result of a roughly 20 year period of sustained low yields around 1% from mid-1980 to mid-2000. Subsequent returns from Japan's current dividend yield of 2.6% range from about 0% to 18%, while Australia's current dividend yield of 4.9% is in the 80th percentile.

RELATIONSHIP BETWEEN DIVIDEND YIELDS AND SUBSEQUENT REAL 10-YR AACRS

Fourth Quarter 1969 – Fourth Quarter 2018



Dividend Yield Percentile	Begin Period Japan Dividend Yield (%)			Subsequent Real 10-Yr AACR (%)			Begin Period Australia Dividend Yield (%)			Subsequent Real 10-Yr AACR (%)		
	Median	High	Low	Median	High	Low	Median	High	Low	Median	High	Low
0–10	0.5	0.7	0.4	-4.3	0.4	-7.6	2.9	3.0	1.8	-2.4	4.9	-6.7
10–25	0.8	0.9	0.7	-2.1	3.4	-4.8	3.2	3.6	3.0	4.5	9.6	-2.8
25–75	1.1	2.1	0.9	3.4	19.2	-4.9	3.9	4.7	3.6	6.2	10.2	-1.6
75–90	2.4	2.6	2.2	12.0	17.9	-1.2	5.0	5.3	4.8	9.4	12.4	5.4
90–100	3.8	5.2	2.7	4.6	10.9	2.1	5.9	9.2	5.4	8.2	16.4	2.5
Overall	**1.1**	**5.2**	**0.4**	**2.1**	**19.2**	**-7.6**	**3.9**	**9.2**	**1.8**	**6.0**	**16.4**	**-6.7**

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

Notes: Data are quarterly. The last full ten-year period was first quarter 2009 through fourth quarter 2018. Outliers are not shown on graph but are included in R^2.

Current valuations pose a potential headwind for US equities, less so for other regions

Using the three main drivers of equity returns discussed in this report (earnings growth, dividends, and multiple repricing), we can model future returns across an array of scenarios. In the US, if equity valuations revert to median from today's levels, our model estimates poor equity performance even with an optimistic 4% earnings growth assumption. There are very few scenarios in which US equities would meet most institution's real return targets. The UK, Japan, and Australia show potentially better outcomes based on today's less demanding valuations.

REAL RETURN EXPECTATIONS GIVEN VARIOUS EARNINGS GROWTH AND ENDING NORMALIZED P/E ASSUMPTIONS

As of December 31, 2018 • 10-Yr Average Annual Compound Return Expectations (%)

US

Ending Comp		Annualized Real Earnings Growth (%)			
Norm P/E		*-2.0*	0.0	**2.0**	4.0
10th %ile	*9.3*	-8.2	-6.4	-4.5	-2.7
25th %ile	*12.3*	-5.9	-4.0	-2.2	-0.3
Median	*17.3*	-3.0	-1.0	0.9	2.8
75th %ile	*22.1*	-0.8	1.2	3.1	5.1
90th %ile	*26.0*	0.7	2.7	4.7	6.7

UK

Ending Comp		Annualized Real Earnings Growth (%)			
Norm P/E		*-2.0*	0.0	**2.0**	4.0
10th %ile	*7.4*	-1.8	0.1	2.1	4.1
25th %ile	*11.3*	1.4	3.4	5.4	7.4
Median	*13.9*	3.0	5.1	7.2	9.2
75th %ile	*16.7*	4.5	6.6	8.7	10.8
90th %ile	*19.2*	5.8	7.9	10.0	12.1

Japan

Ending Comp		Annualized Real Earnings Growth (%)			
Norm P/E		*-2.0*	0.0	**2.0**	4.0
10th %ile	*12.8*	-0.4	1.6	3.5	5.5
25th %ile	*14.6*	0.7	2.7	4.7	6.7
Median	*16.7*	1.8	3.9	5.9	7.9
75th %ile	*20.2*	3.6	5.6	7.7	9.8
90th %ile	*24.0*	5.2	7.3	9.4	11.5

Australia

Ending Comp		Annualized Real Earnings Growth (%)			
Norm P/E		*-2.0*	0.0	**2.0**	4.0
10th %ile	*9.4*	-2.7	-0.8	1.2	3.1
25th %ile	*13.0*	-0.1	1.8	3.8	5.8
Median	*15.9*	1.5	3.6	5.6	7.6
75th %ile	*18.4*	2.8	4.8	6.9	8.9
90th %ile	*22.8*	4.6	6.7	8.8	10.9

Negative 5% or Higher

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

Notes: Dividends are assumed to be reinvested each year at current yields. Payout ratios are assumed to revert to long-term averages over the period. For the US, the UK, and Australia the ending P/E represents reverting to various levels of the composite normalized P/E ratio for the relevant MSCI index, with history from December 31, 1969. The Japan ending P/E represents returning to various levels of the ROE-adjusted P/E ratio for the MSCI Japan Index. This exhibit highlights returns that exceed a 5% real threshold, which many institutions target. The long-term average real normalized earnings growth across all regions has been roughly 2%.

BOND YIELDS, RATES, AND FUTURE RETURNS

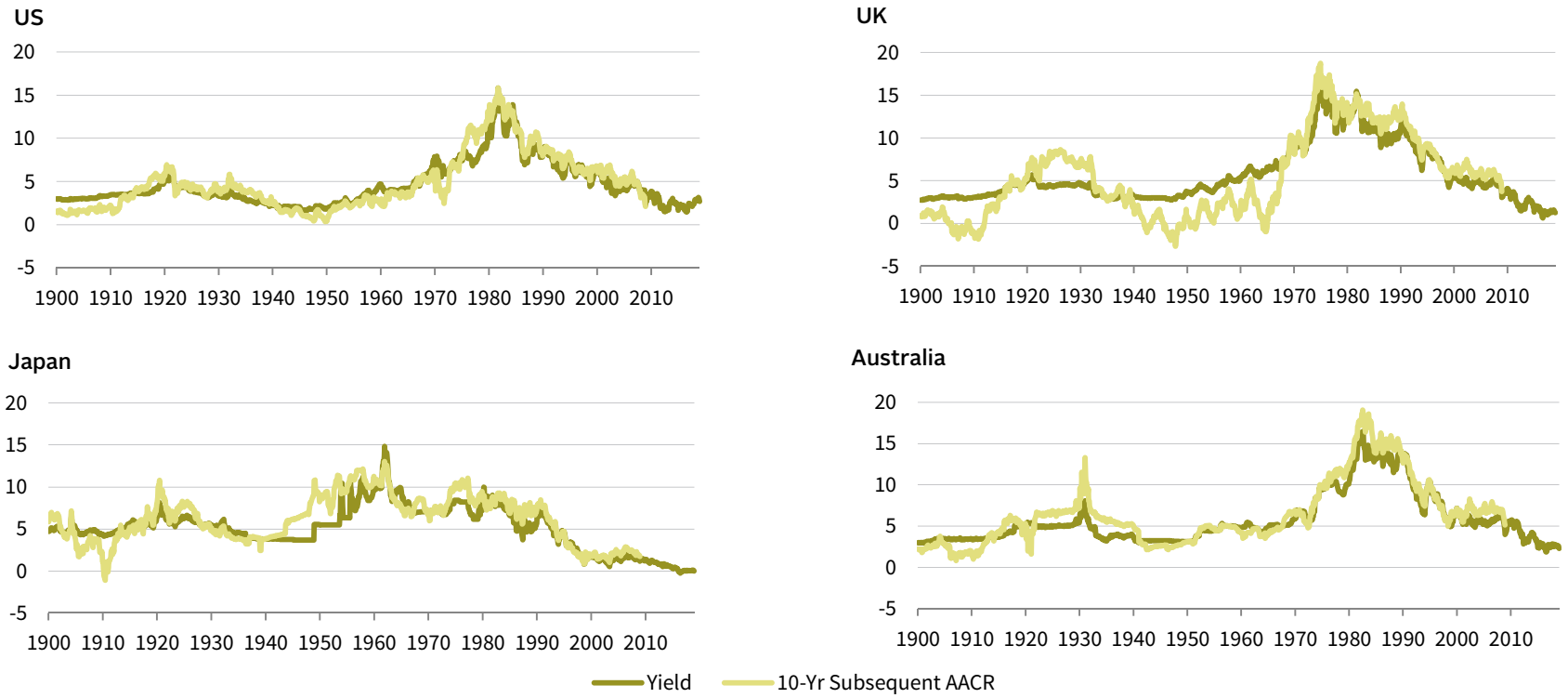
While many factors can influence short-term bond performance, it is perhaps most informative to look at the starting yield. History and basic bond math have shown that the entry yield of a bond or portfolio of bonds is likely to be the overwhelming determinant of future returns. This relationship breaks down somewhat when returns are observed in real terms, given the uncertain nature of inflation. From today's low-yield environment—in some cases record low yield—the outlook for future bond returns is muted at best. Japan's experience, where bond yields have been below 5% since November 1992, may serve as a guide. Since July 1993, no rolling monthly nominal ten-year return on Japanese bonds has exceeded 5%, and nearly half of these 185 observations have been nominal ten-year returns of less than 2%.

Starting bond yields inform subsequent return expectations

Historically, current bond yields have been a very good predictor of future returns, with correlations near 90% and higher for the US, UK, and Australia. In Japan, the correlation is only slightly weaker at 83%. With current yields at or near all-time lows, the outlook for future bond returns is decidedly low.

RELATIONSHIP BETWEEN GOVERNMENT BOND YIELDS AND SUBSEQUENT 10-YR AACRS

1900–2018 • Percent (%)



Source: Global Financial Data, Inc.

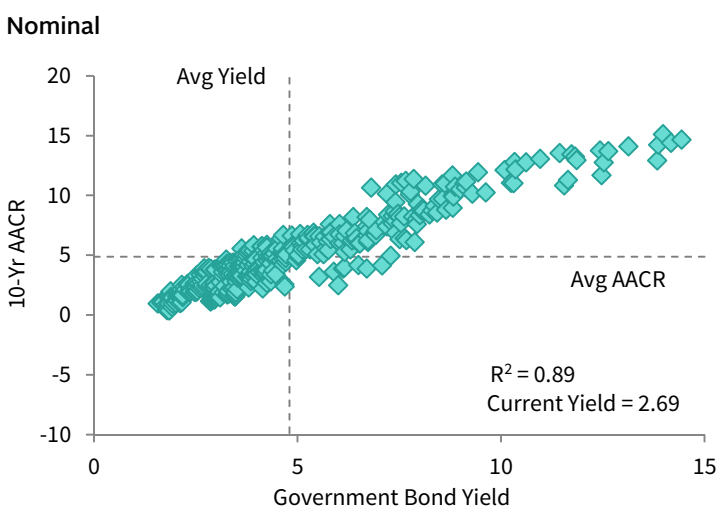
Notes: Data are monthly. The last full ten-year period was January 1, 2009, to December 31, 2018.

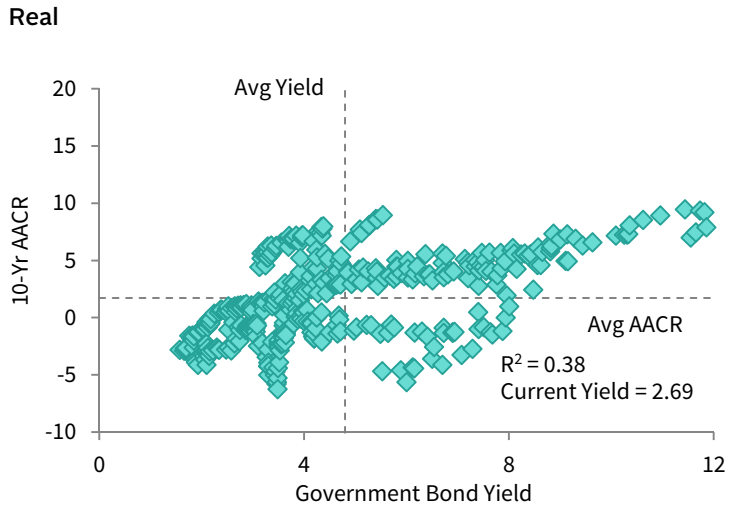
Initial bond yields have a strong positive correlation with subsequent nominal returns

Initial yields and subsequent nominal ten-year returns on US government bonds have an R^2 value of 0.89. This is largely due to the effect of rising bond prices offsetting lower interest payments during periods of falling yields and vice versa. While inflation weakens this relationship, initial yields are still a decent predictor of real returns over time.

RELATIONSHIP BETWEEN GOVERNMENT BOND YIELDS AND SUBSEQUENT 10-YR AACRS: US

1900–2018 • Percent (%)





Yield Quartiles	Beginning Period Government Bond Yields			Subsequent Nominal 10-Yr AACR (%)			
	Mean	High	Low	Mean	High	Low	Std Dev
First	2.43	3.01	1.57	1.95	3.92	0.37	0.87
Second	3.47	3.92	3.01	3.36	5.55	1.47	1.11
Third	4.73	6.03	3.92	4.95	7.60	2.22	1.26
Fourth	8.57	15.84	6.12	9.22	15.82	3.86	2.78
Overall	**4.80**	**15.84**	**1.57**	**4.87**	**15.82**	**0.37**	**3.20**

	Beginning Period Government Bond Yields			Subsequent Real 10-Yr AACR (%)			
	Mean	High	Low	Mean	High	Low	Std Dev
First	2.43	3.01	1.57	-1.07	1.16	-4.14	1.51
Second	3.47	3.92	3.01	0.82	7.15	-6.26	3.67
Third	4.73	6.03	3.92	2.79	8.93	-5.65	3.23
Fourth	8.57	15.84	6.12	4.32	11.43	-4.46	3.72
Overall	**4.80**	**15.84**	**1.57**	**1.71**	**11.43**	**-6.26**	**3.75**

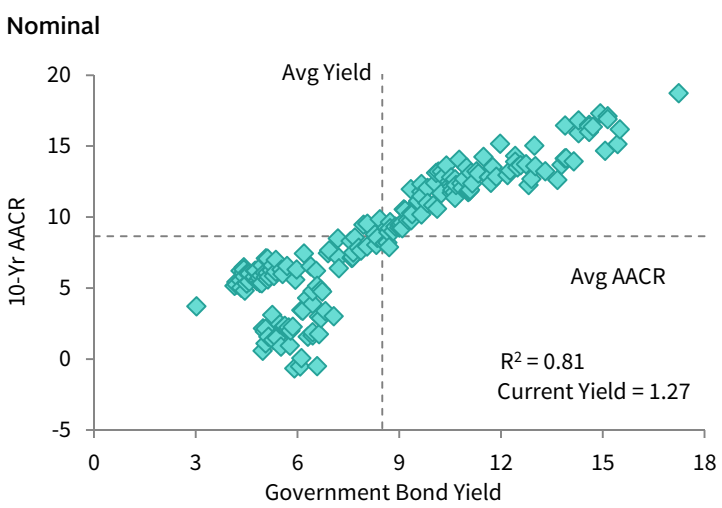
Sources: Global Financial Data, Inc. and Thomson Reuters Datastream.
Notes: Data are quarterly. The last full ten-year period was first quarter 2009 through fourth quarter 2018.

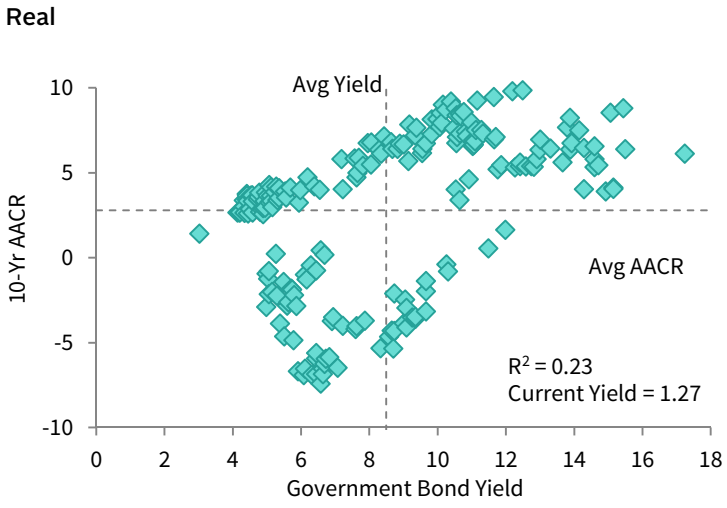
Initial bond yields have a strong positive correlation with subsequent nominal returns

UK bond yields have been a strong predictor of future nominal ten-year returns, but less so for real returns, given relatively volatile inflation. The R^2 value is slightly lower than the US, however, likely due to a periods of low subsequent bond returns from 5% to 6% yields concentrated in the 1960s. With the year-end nominal yield of 1.3% (lower than historical observations shown here), future returns for UK bonds are highly likely to be below historical averages.

RELATIONSHIP BETWEEN GOVERNMENT BOND YIELDS AND SUBSEQUENT 10-YR AACRS: UK

1958–2018 • Percent (%)





Yield Quartiles	Beginning Period Government Bond Yields			Subsequent Nominal 10-Yr AACR (%)			
	Mean	High	Low	Mean	High	Low	Std Dev
First	4.84	5.54	3.02	4.96	7.08	0.57	1.85
Second	6.68	8.29	5.56	4.80	9.53	-0.66	2.87
Third	9.58	10.67	8.33	10.78	13.63	7.89	1.57
Fourth	12.87	17.24	10.77	14.08	18.72	11.76	1.72
Overall	**8.50**	**17.24**	**3.02**	**8.65**	**18.72**	**-0.66**	**4.46**

	Beginning Period Government Bond Yields			Subsequent Real 10-Yr AACR (%)			
	Mean	High	Low	Mean	High	Low	Std Dev
First	4.84	5.54	3.02	2.14	4.27	-4.64	2.34
Second	6.68	8.29	5.56	-0.91	6.77	-7.42	4.84
Third	9.58	10.67	8.33	3.54	9.19	-5.35	5.21
Fourth	12.87	17.24	10.77	6.38	9.84	0.54	1.82
Overall	**8.50**	**17.24**	**3.02**	**2.79**	**9.84**	**-7.42**	**4.64**

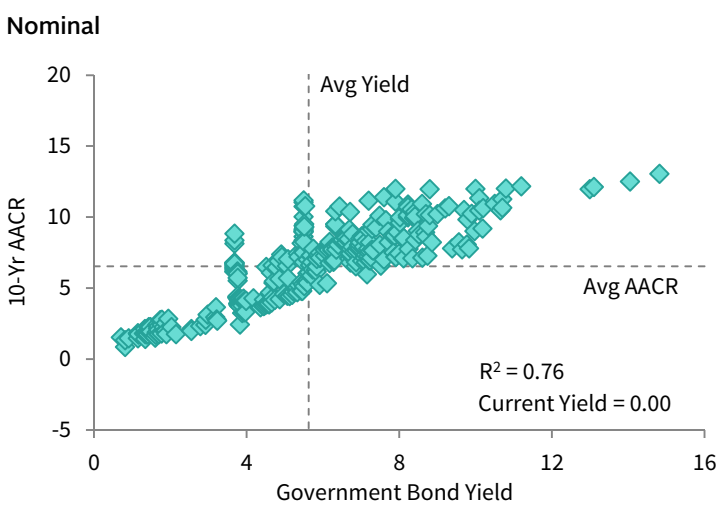
Sources: Global Financial Data, Inc. and Thomson Reuters Datastream.
Notes: Data are quarterly. The last full ten-year period was first quarter 2009 through fourth quarter 2018.

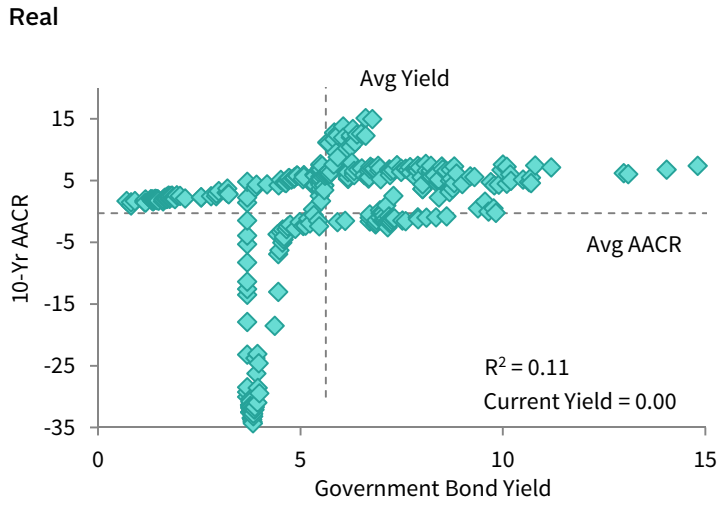
Initial bond yields have a strong positive correlation with subsequent nominal returns

While still high at 0.76, the R^2 of Japanese nominal bond yields to subsequent nominal ten-year returns is lower than that for the other countries in our analysis. On a real basis, the R^2 came out at a low 0.11. Japan's triple-digit annual inflation in the years following World War II pushed real returns into deep negative territory. Nonetheless, even stripping out these particular returns results in a weaker relationship than that seen in the other countries.

RELATIONSHIP BETWEEN GOVERNMENT BOND YIELDS AND SUBSEQUENT 10-YR AACRS: JAPAN

1921–2018 • Percent (%)





Yield Quartiles	Beginning Period Government Bond Yields			Subsequent Nominal 10-Yr AACR (%)			
	Mean	High	Low	Mean	High	Low	Std Dev
First	2.49	3.81	0.71	3.42	8.83	0.84	2.00
Second	4.81	5.56	3.81	5.71	11.18	2.43	2.19
Third	6.42	7.21	5.59	7.63	11.14	5.23	1.16
Fourth	8.80	14.82	7.21	9.41	13.04	6.58	1.59
Overall	**5.63**	**14.82**	**0.71**	**6.54**	**13.04**	**0.84**	**2.85**

	Beginning Period Government Bond Yields			Subsequent Real 10-Yr AACR (%)			
	Mean	High	Low	Mean	High	Low	Std Dev
First	2.49	3.81	0.71	-6.89	4.75	-33.45	14.25
Second	4.81	5.56	3.81	-4.45	7.59	-34.34	14.11
Third	6.42	7.21	5.59	5.75	15.04	-2.61	4.96
Fourth	8.80	14.82	7.21	4.43	7.64	-1.98	2.94
Overall	**5.63**	**14.82**	**0.71**	**-0.29**	**15.04**	**-34.34**	**11.74**

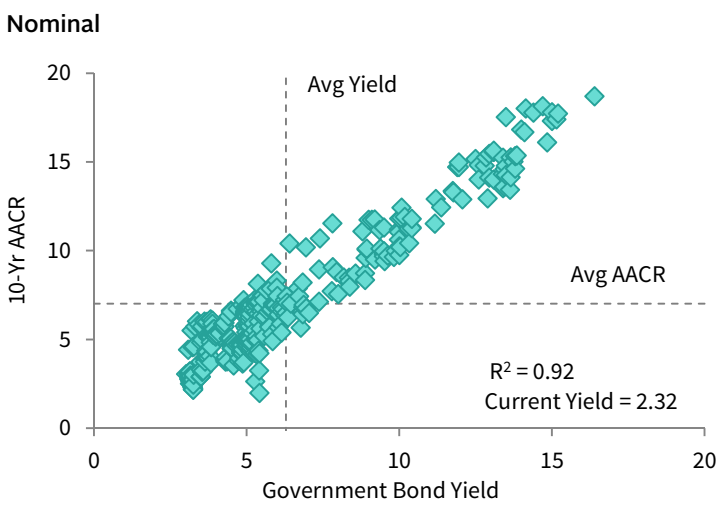
Sources: Global Financial Data, Inc. and Thomson Reuters Datastream.
Notes: Data are quarterly. The last full ten-year period was first quarter 2009 through fourth quarter 2018.

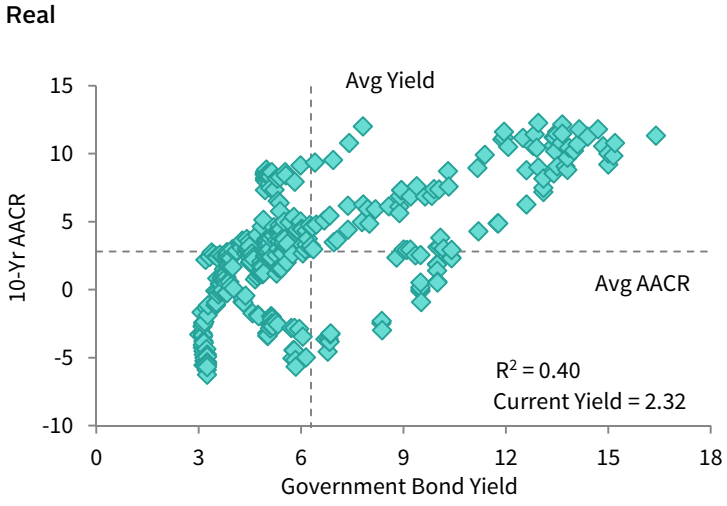
Initial bond yields have a strong positive correlation with subsequent nominal returns

Bond yields and nominal ten-year returns showed the highest R^2 for Australia at 0.92. This result falls to 0.40 on a real return basis, but is still the highest of the four regions examined. With Australian government bonds yielding just 2.3%, which stands as an out-of-sample observation, future returns are likely to be subpar.

RELATIONSHIP BETWEEN GOVERNMENT BOND YIELDS AND SUBSEQUENT 10-YR AACRS: AUSTRALIA

1912–2018 • Percent (%)





Yield Quartiles	Beginning Period Government Bond Yields			Subsequent Nominal 10-Yr AACR (%)			
	Mean	High	Low	Mean	High	Low	Std Dev
First	3.50	4.24	3.02	3.93	6.12	2.15	1.28
Second	4.83	5.10	4.26	5.43	7.20	3.53	1.01
Third	5.73	6.94	5.11	6.30	10.39	1.98	1.38
Fourth	11.11	16.40	6.96	12.39	18.68	6.49	3.04
Overall	**6.29**	**16.40**	**3.02**	**7.01**	**18.68**	**1.98**	**3.72**

	Beginning Period Government Bond Yields			Subsequent Real 10-Yr AACR (%)			
	Mean	High	Low	Mean	High	Low	Std Dev
First	3.50	4.24	3.02	-1.33	3.37	-6.27	3.14
Second	4.83	5.10	4.26	3.52	8.83	-3.41	3.40
Third	5.73	6.94	5.11	2.33	9.53	-5.67	4.08
Fourth	11.11	16.40	6.96	6.75	12.25	-3.00	4.01
Overall	**6.29**	**16.40**	**3.02**	**2.82**	**12.25**	**-6.27**	**4.67**

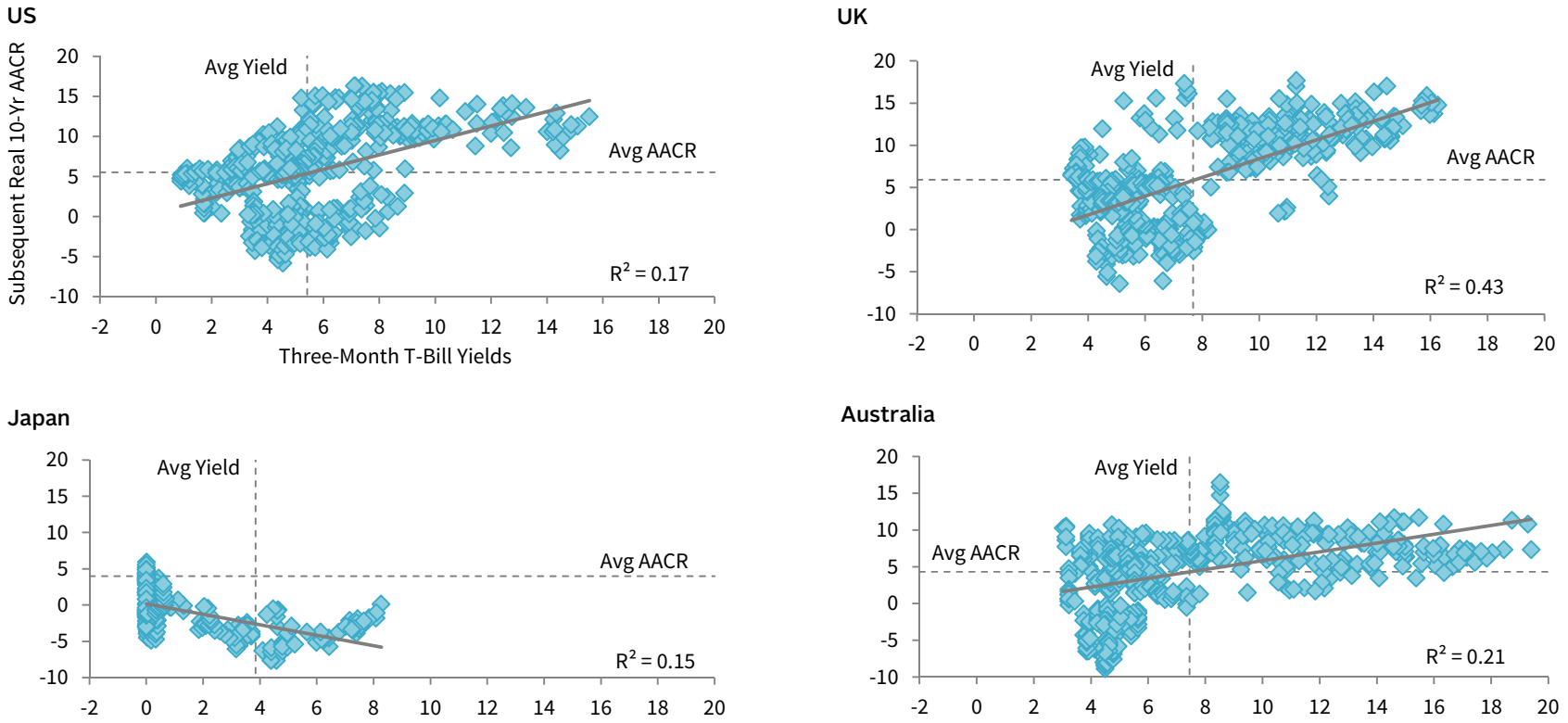
Sources: Global Financial Data, Inc. and Thomson Reuters Datastream.
Notes: Data are quarterly. The last full ten-year period was first quarter 2009 through fourth quarter 2018.

The relationship between interest rate levels and equity returns varies

The observed R^2 values range from 0.15 (Japan) to 0.43 (UK), and there is a positive correlation in the US, UK, and Australia. This relationship may be overly influenced by the high inflation and interest rate environment of the late 1970s/early 1980s; excluding this period, R^2 values fall across regions. In Japan, the sustained period of low cash yields distorts the data relative to other regions and results in a negative correlation between interest rates and subsequent returns.

RELATIONSHIP BETWEEN TREASURY BILL YIELDS AND SUBSEQUENT REAL 10-YR EQUITY AACRS

January 31, 1960 – December 31, 2018 • Percent (%)



Sources: Global Financial Data, Inc. and Thomson Reuters Datastream.

Notes: Data are monthly. Japan data begin January 1, 1987. The last full ten-year period was first quarter 2009 to fourth quarter 2018.

EMERGING MARKETS

EM returns have limited observable history, but show similar equity return patterns relative to DM despite major shifts in composition over time. For example, China, which did not exist in the MSCI Emerging Markets Index upon inception, now holds a massive 30%+ weight. Like DM, in EM the range of returns narrows as the holding period increases. However, EM have experienced more volatile performance and have suffered from greater drawdowns historically. EM show evidence of mean reversion over time, both in absolute terms and relative to DM. Starting valuations in EM have shown an inverse relationship with subsequent returns over mid-term periods.

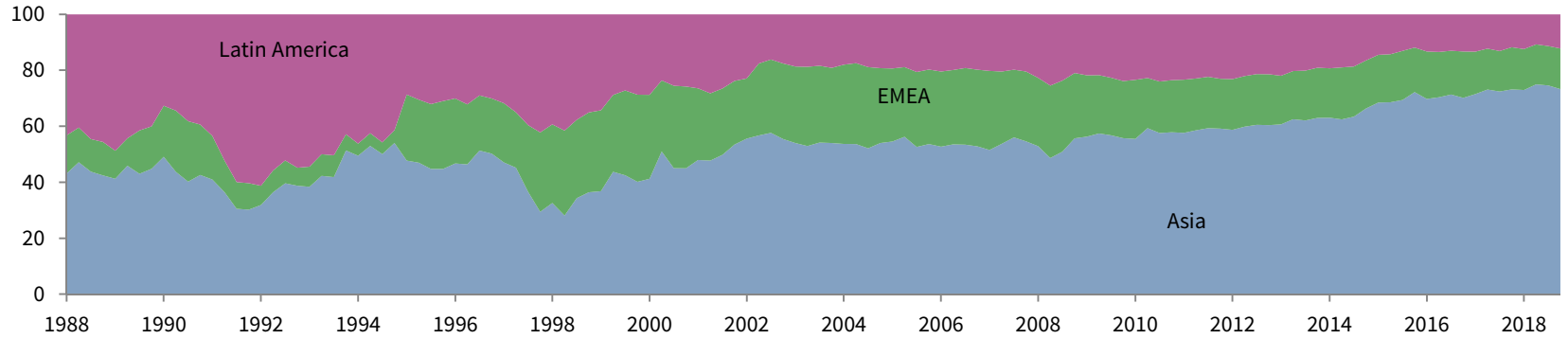
Using MSCI data, we compare EM to DM in USD terms—covering 31 years of return history. Valuation history is more limited with 23 years of historical observations. To assess the relationship of starting valuations and subsequent returns, we use local currency returns.

EM composition is structurally dynamic over time

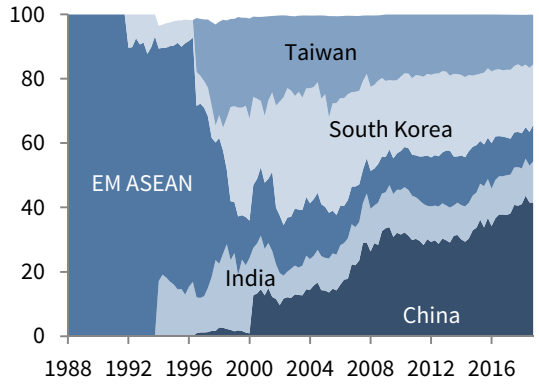
The Asia sub region dominates the MSCI Emerging Markets Index with a nearly 75% weight. The largest countries in the Asia region—China (30%), Korea (14%), and Taiwan (11%)—are also the largest in the overall index. Just ten years ago, China made up only 18% of the index. Latin America's weight fell substantially to 12% in 2018 from over 40% in 1988. Changes in the Emerging Markets Index have been prone to structural changes over time as markets open to international investors. A prime example is China, which recently had domestically listed A-shares added to the MSCI Emerging Markets Index.

GEOGRAPHIC EXPOSURES OVER TIME: EMERGING MARKETS

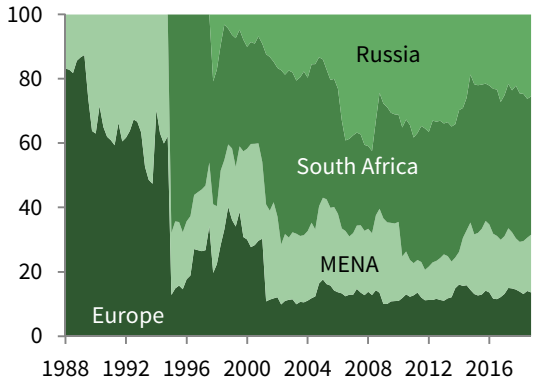
1988–2018 • Percent (%)



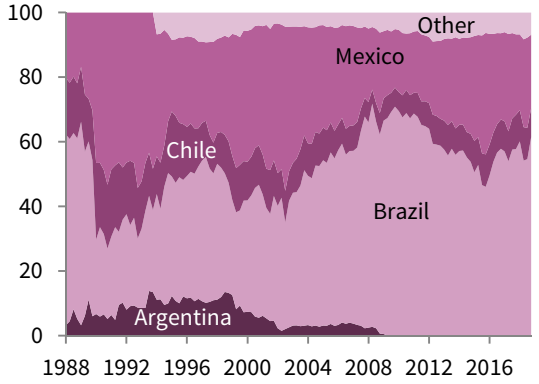
EM Asia



EM Europe, Middle East, and Africa



EM Latin America



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

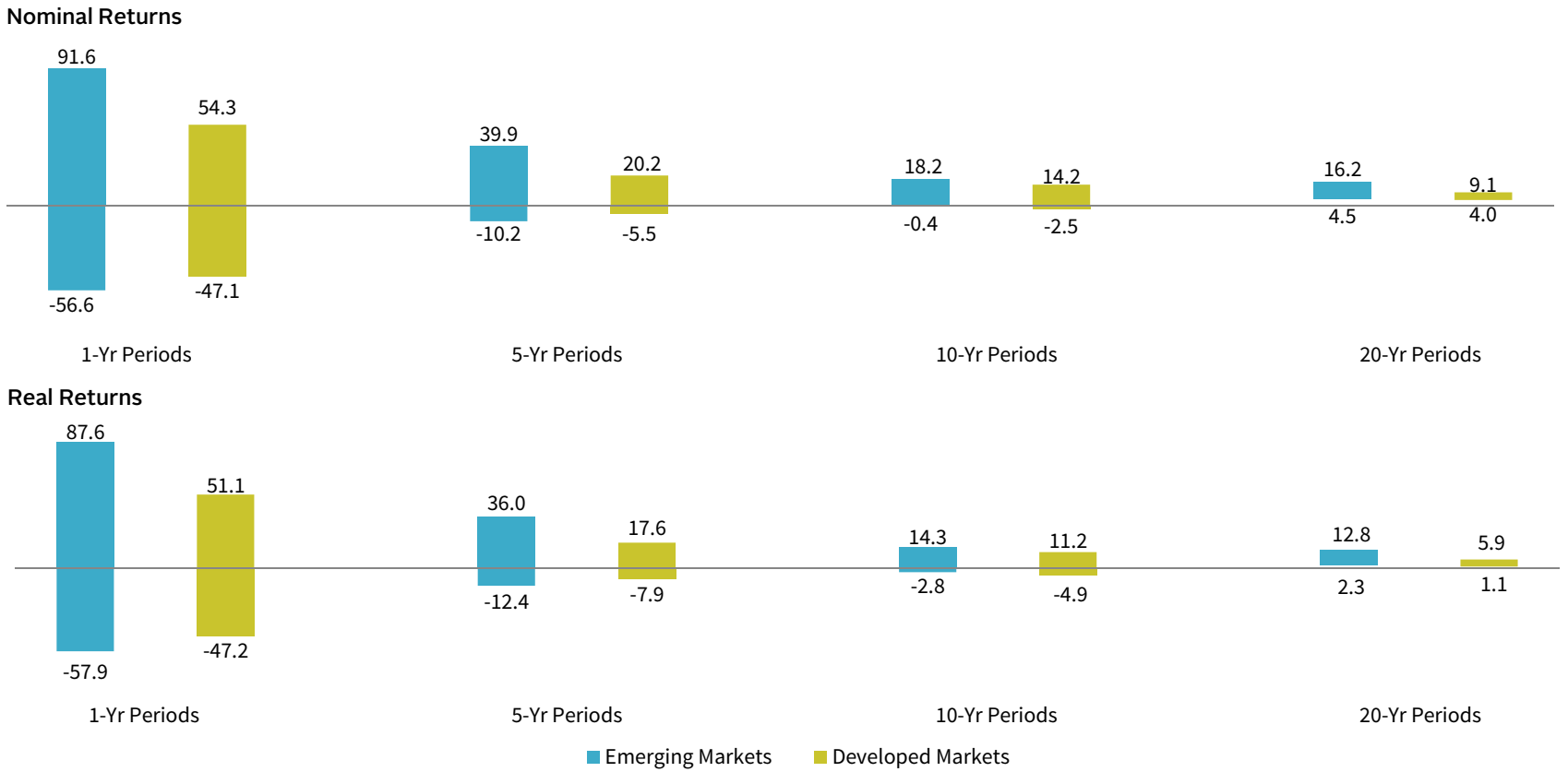
Notes: EM ASEAN includes: Indonesia, Malaysia, the Philippines, and Thailand. Europe includes: Czech Republic, Greece, Hungary, Poland, and Portugal. MENA includes: Egypt, Israel, Jordan, Morocco, Qatar, Turkey, and UAE. Other in the Latin America graph include: Colombia, Peru, and Venezuela. Percentage may not total to 100 due to rounding or exclusion of countries carrying marginal index weights. Data are quarterly. Argentina, Israel, Jordan, Morocco, Portugal, Sri Lanka, and Venezuela were all once included in the index, but have since been reclassified.

The EM return distribution is wider than that of DM

As shown in other regions, when the holding period increases, the range of realized returns tightens. EM experienced more upside in every holding period, but actually exhibit less downside over longer (ten- to 20-year periods) horizons than DM. For investors that can stomach short-term volatility, EM allocations proved fruitful in the long run.

RANGE OF EQUITY RETURNS FOR VARIOUS ROLLING MONTHLY TIME HORIZONS: EM VS DM

1987–2018 • Average Annual Compound Return (%) • US Dollar



Sources: MSCI Inc., Thomson Reuters Datastream, and US Department of Labor - Bureau of Labor Statistics. MSCI data provided "as is" without any express or implied warranties.
Notes: Total return data prior to January 1, 2001, are gross of dividend taxes. From January 1, 2001, to present total return data are net of dividend taxes.

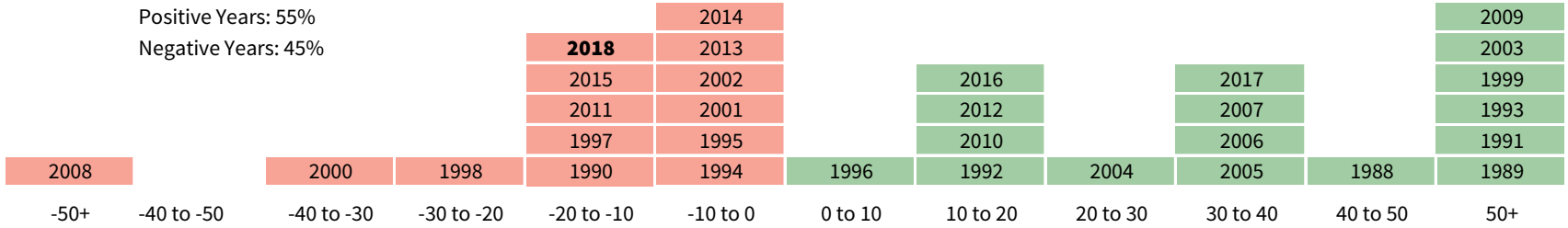
Annual returns distribution in EM is wider than DM

EM volatility relative to DM leads to a wider annual returns distribution. While EM provide significant upside in certain periods (50%+ in six different years since 1988), negative returns appear more frequently and with greater severity than DM. Equity volatility in 2018 led to negative returns in EM and DM alike, which caught investors off-guard following a calm 2017, but still remained near the center of the historical returns distribution.

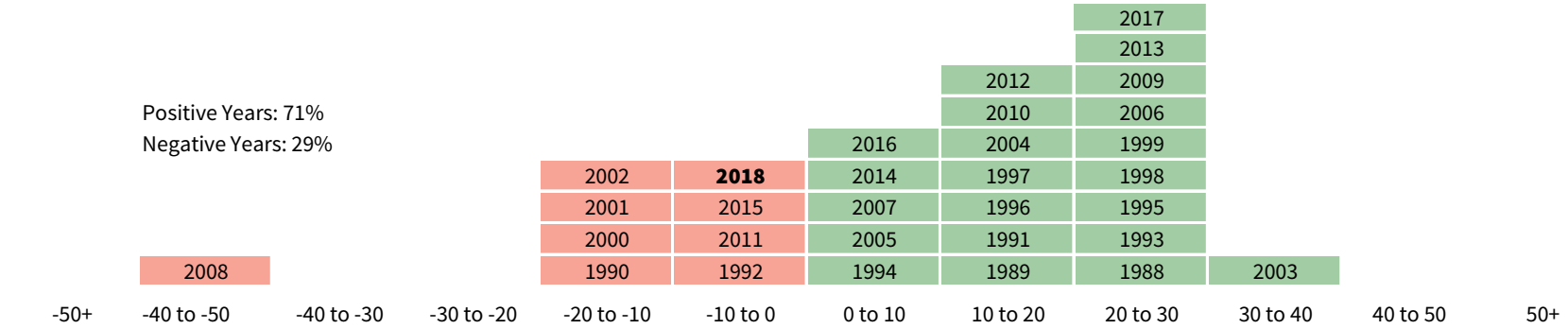
DISTRIBUTION OF CALENDAR YEAR RETURNS

1988–2018 • US Dollar

Emerging Markets



Developed Markets



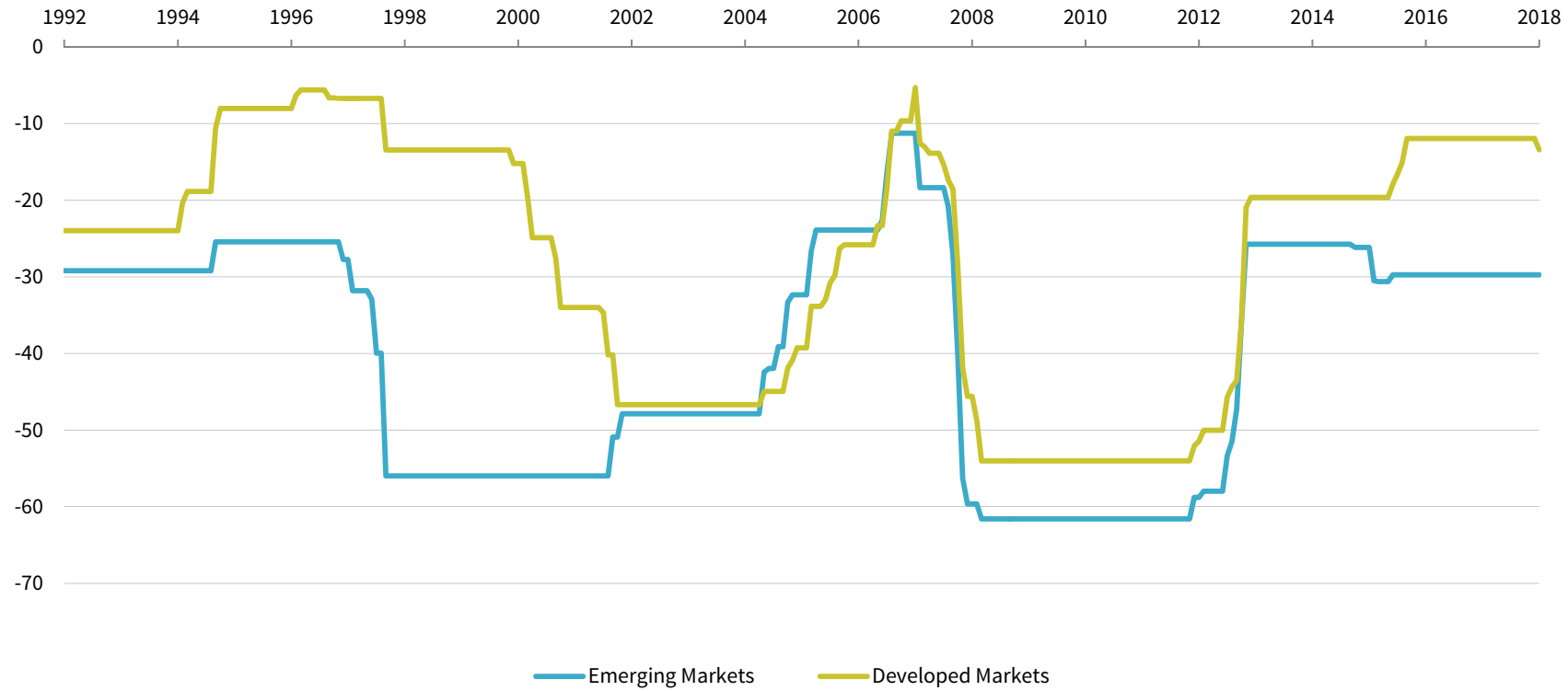
Sources: MSCI Inc. and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.
Notes: Total return data prior to January 1, 2001, are gross of dividend taxes. From January 1, 2001, to present total return data are net of dividend taxes.

EM drawdowns tend to be deeper than DM

Over five-year periods, EM can see significant drawdowns relative to DM. The 1997–98 Asian financial crisis and the 2008–2009 GFC had pronounced impact on EM equity drawdowns. Drawdowns of greater than 10% over five-year periods, however, are fairly common in EM and DM alike.

ROLLING MONTHLY 5-YR MAXIMUM DRAWDOWN OF EQUITIES: EM VS DM

1992–2018 • Percent (%) • US Dollar



Sources: MSCI Inc. and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.
Notes: Data are monthly and begin on January 31, 1988. Total return data prior to January 1, 2001, are gross of dividend taxes. From January 1, 2001, to present total return data are net of dividend taxes.

Dividends contribute more in EM than in DM

Higher yields in EM translated to a higher return contribution relative to DM. Despite the nascent nature of EM (and thus the expectation of higher earnings growth), earnings contribution lagged that of DM over the common period. Multiples contracted on average for both EM and DM, but detracted nearly 2% from EM performance.

BREAKDOWN OF TOTAL RETURN AACR OVER TIME

1996–2018 • Percent (%) • US Dollar

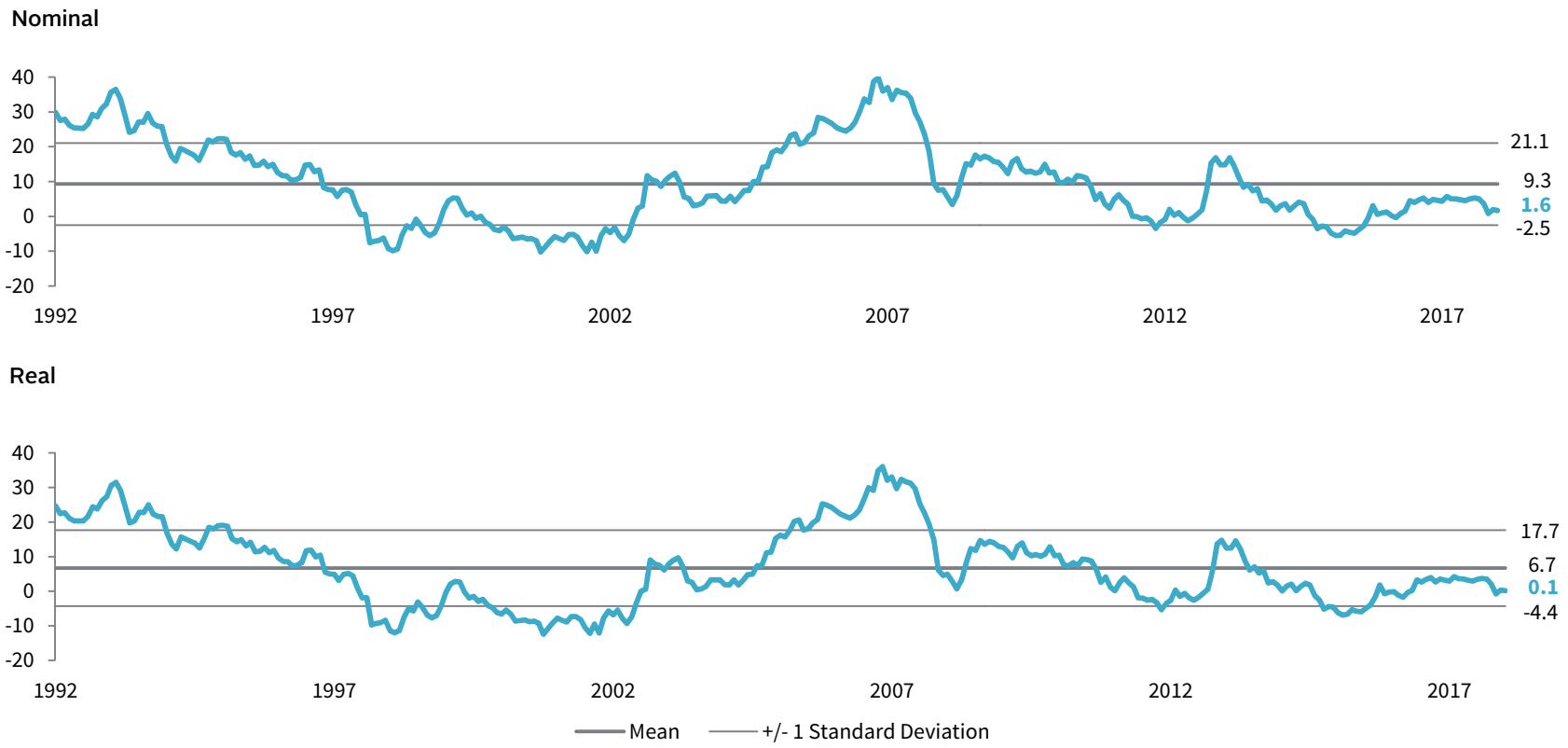
Sources: MSCI Inc. and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.
Notes: Figures will not sum exactly to total return calculation due to the effect of combining cross terms. Averages are geometrically annualized over the data period. Total return data prior to January 1, 2001, are gross of dividend taxes. From January 1, 2001, to present total return data are net of dividend taxes.

EM returns revert to mean, though not smoothly

Based on the limited available history, EM tend to cycle about their mean return over five-year periods. The latest five-year period did not bode well for EM. At the end of 2018, nominal and real five-year rolling AACRs were 1.6% and 0.1%, respectively, well below average returns of 9.3% (nominal) and 6.7% (real).

ROLLING MONTHLY TOTAL RETURN 5-YR AACR: EM

1992–2018 • Percent (%) • US Dollar



Sources: MSCI Inc., Thomson Reuters Datastream, and US Department of Labor - Bureau of Labor Statistics. MSCI data provided "as is" without any express or implied warranties.
Notes: Total return data prior to January 1, 2001, are gross of dividend taxes. From January 1, 2001, to present total return data are net of dividend taxes.

Relative performance versus DM displays cyclicality

A commodity boom cycle in the 2000s boosted earnings per share (EPS) in heavily resource-exposed EM and helped to drive outperformance versus developed counterparts. EM then experienced a sustained drawdown relative to DM after the GFC. The cumulative underperformance since the GFC (50%) has not been as severe as the cycle ended in early 1999 (73%). EM appeared to reverse course in 2018 before losing their edge towards the end of the year.

RELATIVE PERFORMANCE: EM VS DM

December 31, 1987 – December 31, 2018 • December 31, 1987 = 1.0 • US Dollar

Sources: MSCI Inc. and Research Affiliates. MSCI data provided "as is" without express or implied warranties.
Notes: Data are monthly. Total return data prior to January 1, 2001, are gross of dividend taxes. From January 1, 2001, to present total return data are net of dividend taxes.

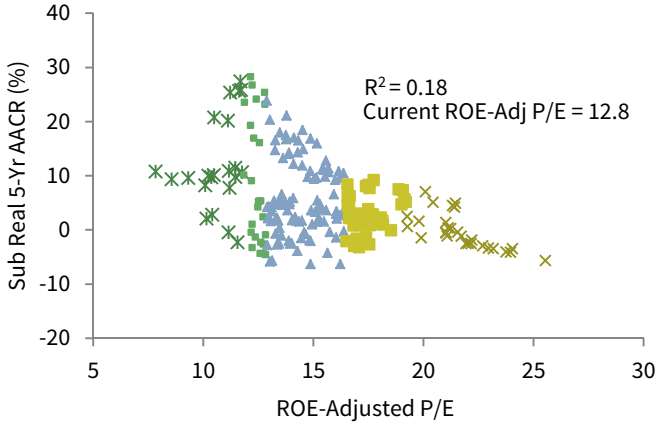
Starting valuations influence long-term subsequent returns

In EM, initial valuations do little in explaining subsequent short-term returns, with an R^2 of just 0.17 during five-year periods. Over ten-year periods, however, the relationship shows a much higher R^2 of 0.72. However, it should be noted that all normalized P/E ratios in the top percentile occurred during the 2006–2007 lead up to the GFC, whereas other percentile ranges show a wider returns distribution.

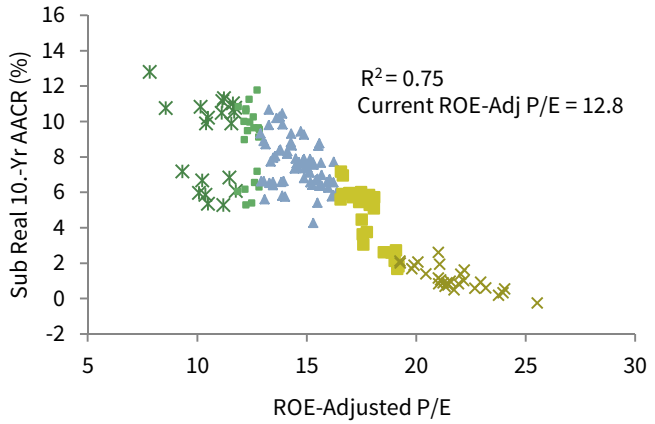
RELATIONSHIP BETWEEN ROE-ADJUSTED PRICE-EARNINGS RATIOS AND SUBSEQUENT REAL 5- AND 10-YR AACRS: EM

September 30, 1995 – December 31, 2018 • Returns in Local Currency

Initial Valuation and Subsequent 5-Yr AACR



Initial Valuation and Subsequent 10-Yr AACR



P/E Ratio Percentile	Begin Period EM ROE-Adjusted P/E Ratio			Subsequent Real 5-Yr AACR (%)			Begin Period EM ROE-Adjusted P/E Ratio			Subsequent Real 10-Yr AACR (%)		
	Median	High	Low	Median	High	Low	Median	High	Low	Median	High	Low
0–10	11.1	11.8	7.8	10.0	27.4	-2.3	10.8	11.8	7.8	10.1	12.8	5.3
10–25	12.5	12.8	11.8	5.3	28.3	-4.6	12.4	12.8	11.8	9.6	11.8	5.3
25–75	14.3	16.4	12.9	4.3	23.8	-6.3	14.6	16.4	12.9	7.4	10.7	4.3
75–90	17.4	19.2	16.5	2.2	9.1	-3.2	17.7	19.2	16.6	5.2	7.2	1.7
90–100	21.4	25.5	19.3	-0.9	7.0	-5.7	21.4	25.5	19.3	0.9	2.6	-0.3
Overall	**14.9**	**25.5**	**7.8**	**3.6**	**28.3**	**-6.3**	**14.9**	**25.5**	**7.8**	**6.6**	**12.8**	**-0.3**

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

Notes: Data are monthly. The return on equity (ROE)–adjusted price-earnings (P/E) is calculated by multiplying the current P/E ratio by the ratio of current ROE to long-term median ROE. The last full five-year period was January 1, 2014, to December 31, 2018, and the last full ten-year period was January 1, 2009, to December 31, 2018. Total return data prior to January 1, 2001, are gross of dividend taxes. From January 1, 2001, to present total return data are net of dividend taxes. Data are in local currency terms. In USD terms, the R^2 are lower with 5-yr = 0.07 and 10-yr = 0.56.

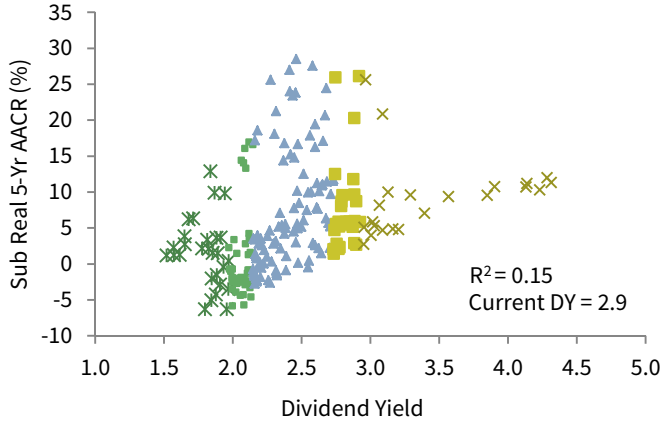
There is little to no relationship between dividend yields and subsequent returns in EM

Dividend yields do not explain much of the variability in subsequent EM performance, based on 23 years of available history. However, since 2008, the relationship between starting dividend yields and five-year subsequent returns has been tighter. The marginally tighter relationship at the five-year return horizon may give credence to perceived shorter cycles in EM relative to DM.

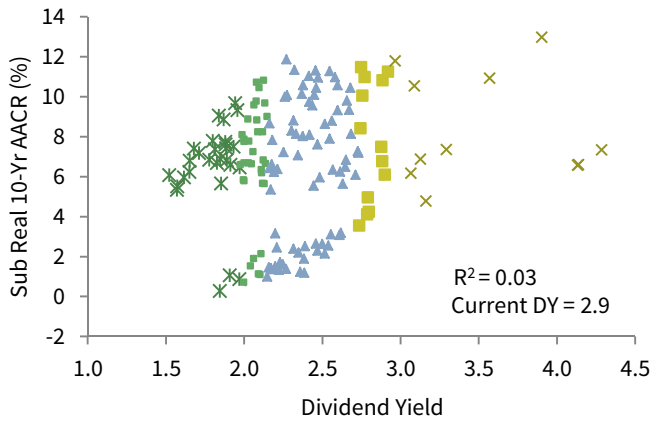
RELATIONSHIP BETWEEN DIVIDEND YIELDS AND SUBSEQUENT REAL 5- AND 10-YR AACRS: EM

September 30, 1995 – December 31, 2018 • Returns in Local Currency

5-Yr



10-Yr



Dividend Yield Percentile	Begin Period Dividend Yield (%)			Subsequent Real 5-Yr AACR (%)		
	Median	High	Low	Median	High	Low
0–10	1.8	2.0	1.5	1.5	12.9	-6.3
10–25	2.1	2.1	2.0	-1.9	17.0	-5.8
25–75	2.4	2.7	2.1	5.0	28.5	-2.7
75–90	2.8	2.9	2.7	5.8	26.1	1.4
90–100	3.2	4.3	3.0	9.4	25.6	2.7
Overall	**2.3**	**4.3**	**1.5**	**3.9**	**28.5**	**-6.3**

	Begin Period Dividend Yield (%)			Subsequent Real 10-Yr AACR (%)		
	Median	High	Low	Median	High	Low
0–10	1.8	2.0	1.5	6.8	9.7	0.3
10–25	2.1	2.1	2.0	6.8	10.8	0.7
25–75	2.4	2.7	2.1	6.7	11.9	1.0
75–90	2.8	2.9	2.7	7.5	11.5	3.5
90–100	3.3	4.3	3.0	7.3	13.0	4.8
Overall	**2.3**	**4.3**	**1.5**	**6.8**	**13.0**	**0.3**

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

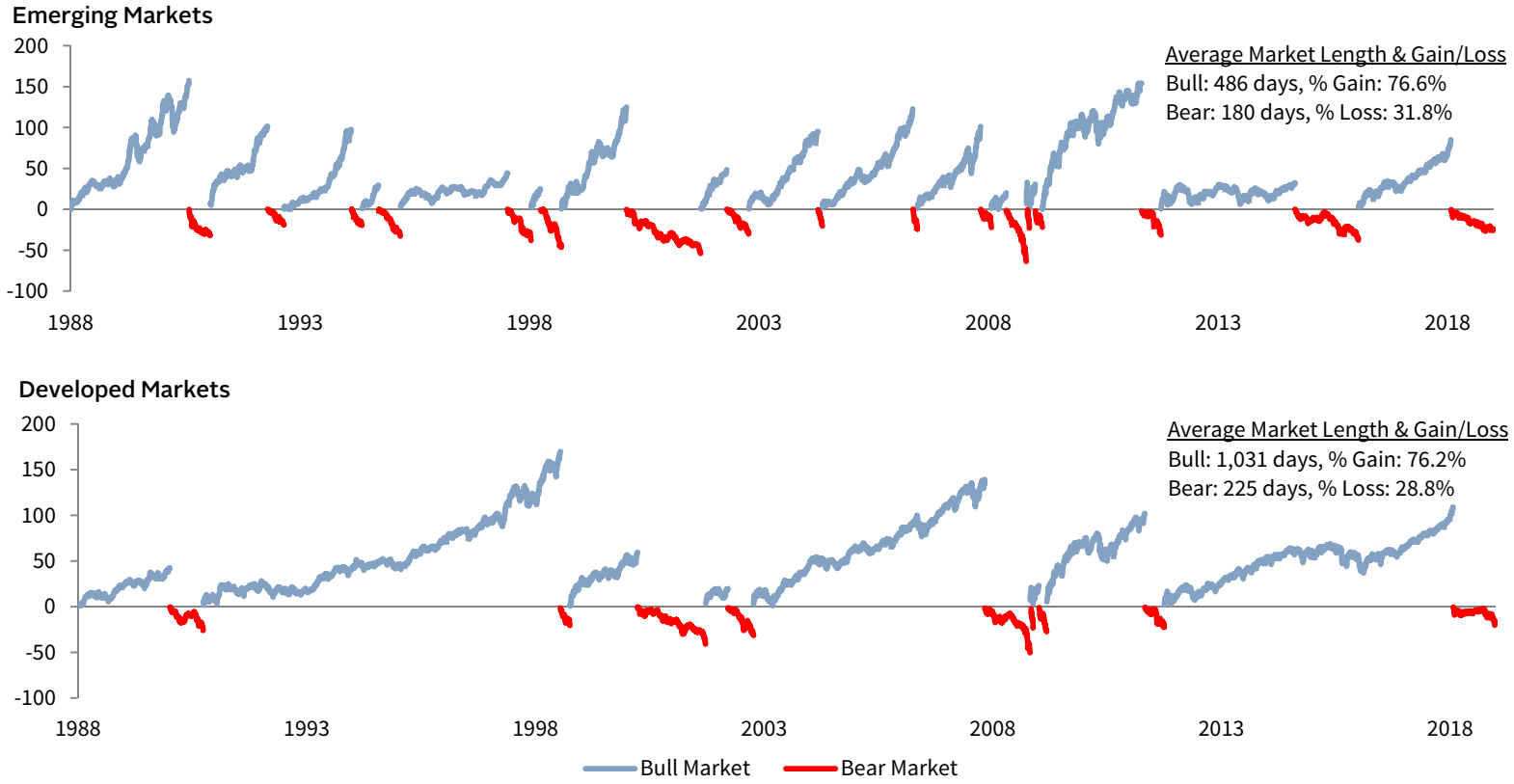
Notes: Data are monthly. The last full five-year period was January 1, 2014, through December 31, 2018. The last full ten-year periods was January 1, 2009, through December 31, 2018. Total return data prior to January 1, 2001, are gross of dividend taxes. From January 1, 2001, to present total return data are net of dividend taxes. Data are in local currency terms. In USD terms, the R^2 are 0.12 (5-yr) and 0.03 (10-yr).

Bull markets are longer than bears in both EM and DM

The average bear market length in EM and DM is roughly the same, whereas bull market lifespans in DM are about twice as long as those in EM. One common characteristic of bull markets is that they are, on average, longer in duration than bear markets and tend to have a higher magnitude in absolute terms than bear markets. This is consistent with the observation that equity markets are generally upwardly trending over time.

HISTORICAL LENGTH OF BULL/BEAR MARKET CYCLES

January 1, 1988 – December 31, 2018 • US Dollar • Percent (%)



Sources: MSCI Inc., Ned Davis Research Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.
Notes: Bull/bear markets are based on price return data and cumulative. Bull/Bear markets are defined by +19%/-19% return periods.

BUSINESS CYCLES

Investors never really know in real time whether the economy has entered an "official" recession, as it is not uncommon for the institutions responsible for giving the official decree to designate the beginning or end of a recession well after the recession has come and gone.* For example, in the last US recession, the National Bureau of Economic Research announced in December 2008 that the US was in a recession, but it marked the beginning of the downturn as December 2007.

In the US, since the end of World War II, the average business cycle (expansion and contraction) has lasted just less than six years, but cycles have varied greatly in duration and intensity. This is even more true in other regions. While many investors assume periods of strong economic growth provide attractive investment opportunities, economic growth and equity returns are uncorrelated. And while it is typical for a recession to be accompanied by a sharp sell-off in equities, equities do not always turn down once earnings growth slows, nor is every downturn in earnings the result of economic weakness.

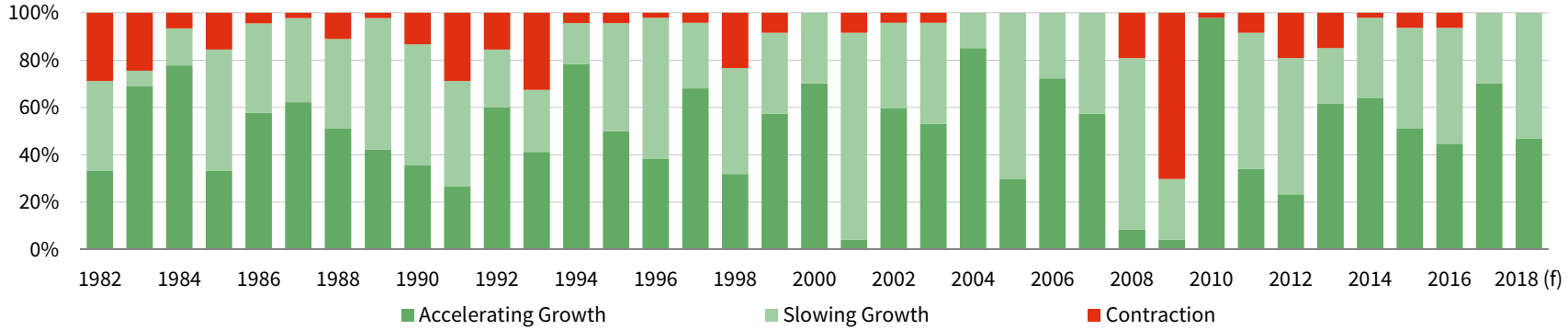
* A common definition for a recession is two or more quarters of declining real GDP. However, GDP is not the only factor used by major economic research organizations when identifying recessions. For instance, the US experienced a recession in 2001, even without experiencing two consecutive quarters of declining real GDP.

Global growth synchronization is uncommon

For the second year in a row, none of 47 countries in the MSCI Developed and Emerging Market Indexes contracted in 2018 based on annual data. In terms of recessions, data from the Economic Cycle Research Institute show that none of the top ten contributors to global GDP growth experienced recession in 2018. Despite the healthy economic backdrop, markets fell across the globe last year as the pace of growth fell.

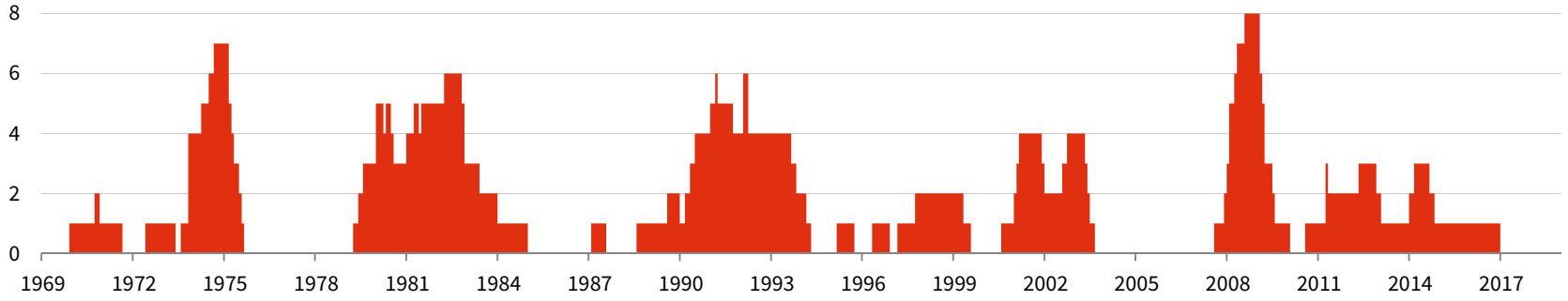
PERCENT OF GLOBAL ECONOMIES EXPANDING VS CONTRACTING ANNUALLY

1982–2018



NUMBER OF COUNTRIES IN RECESSION

1969–2018 • Top 10 Contributors to Global GDP Growth in 2018



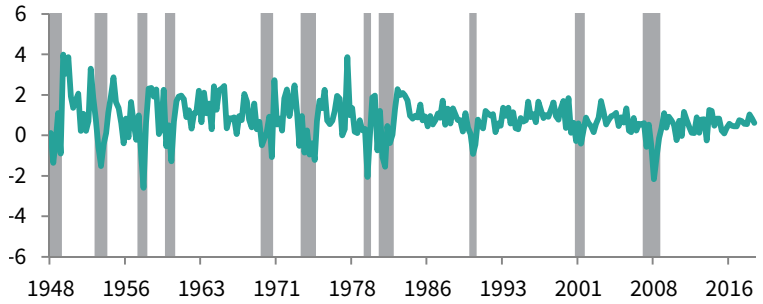
Sources: Economic Cycle Research Institute (ECRI), FactSet Research Systems, International Monetary Fund - World Economic Outlooks Database (October 2018), and MSCI Inc. MSCI data provided "as is" without any express or implied warranties.

Notes: In the top chart, global growth analysis are based on year-over-year real GDP growth in local currency terms. Included in the global growth analysis are the 23 developed markets economies in the MSCI World Index and the 24 emerging markets economies in the MSCI Emerging Markets Index. Growth for 2018 are forecasts. Bottom chart dates represent peak-to-trough business cycles as defined by the ECRI. Analysis includes top ten current contributors to global GDP: the US, China, Japan, Germany, India, the UK, France, Brazil, Italy, and Russia. China data start January 1984.

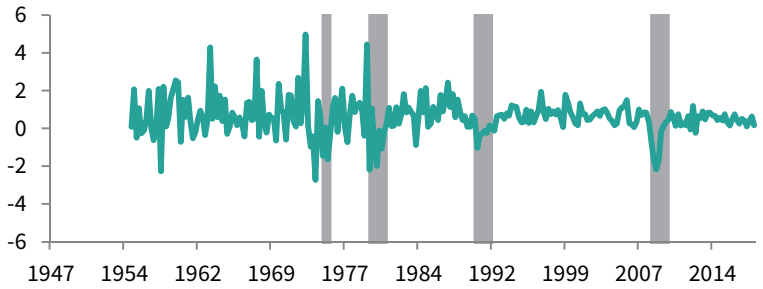
Steady economic growth of recent years not unprecedented

According to NBER data, in 2018 the current US expansion (114 months) became the second longest on record, trailing only the economic expansion of the 1990s, which lasted 120 months. History would suggest that the odds of continued economic expansion are diminishing, but economic cycles do not die of old age. This is clearly shown in Australia, which has not experienced a recession in 25+ years. Japan, on the other hand, has seen seven recessions over the same period.

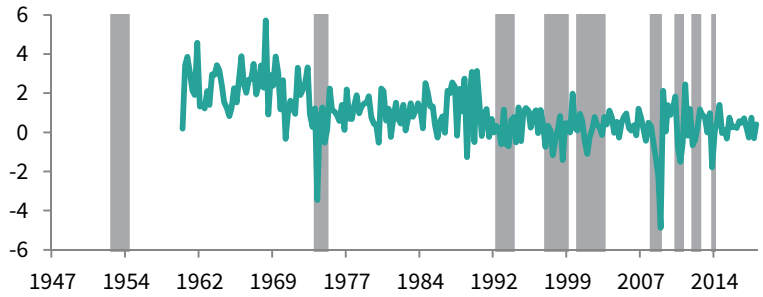
US GDP
1947–2018 • Quarter-Over-Quarter (%)



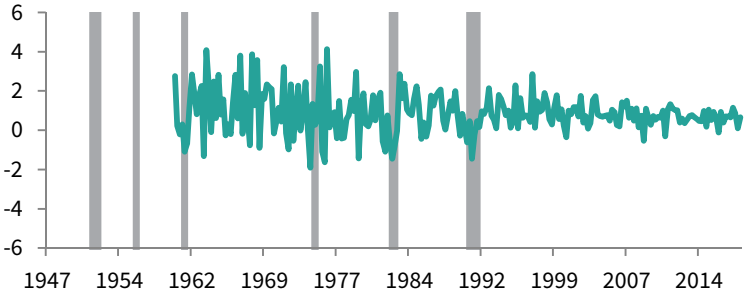
UK GDP
1955–2018 • Quarter-Over-Quarter (%)



Japan GDP
1960–2018 • Quarter-Over-Quarter (%)



Australia GDP
1960–2018 • Quarter-Over-Quarter (%)



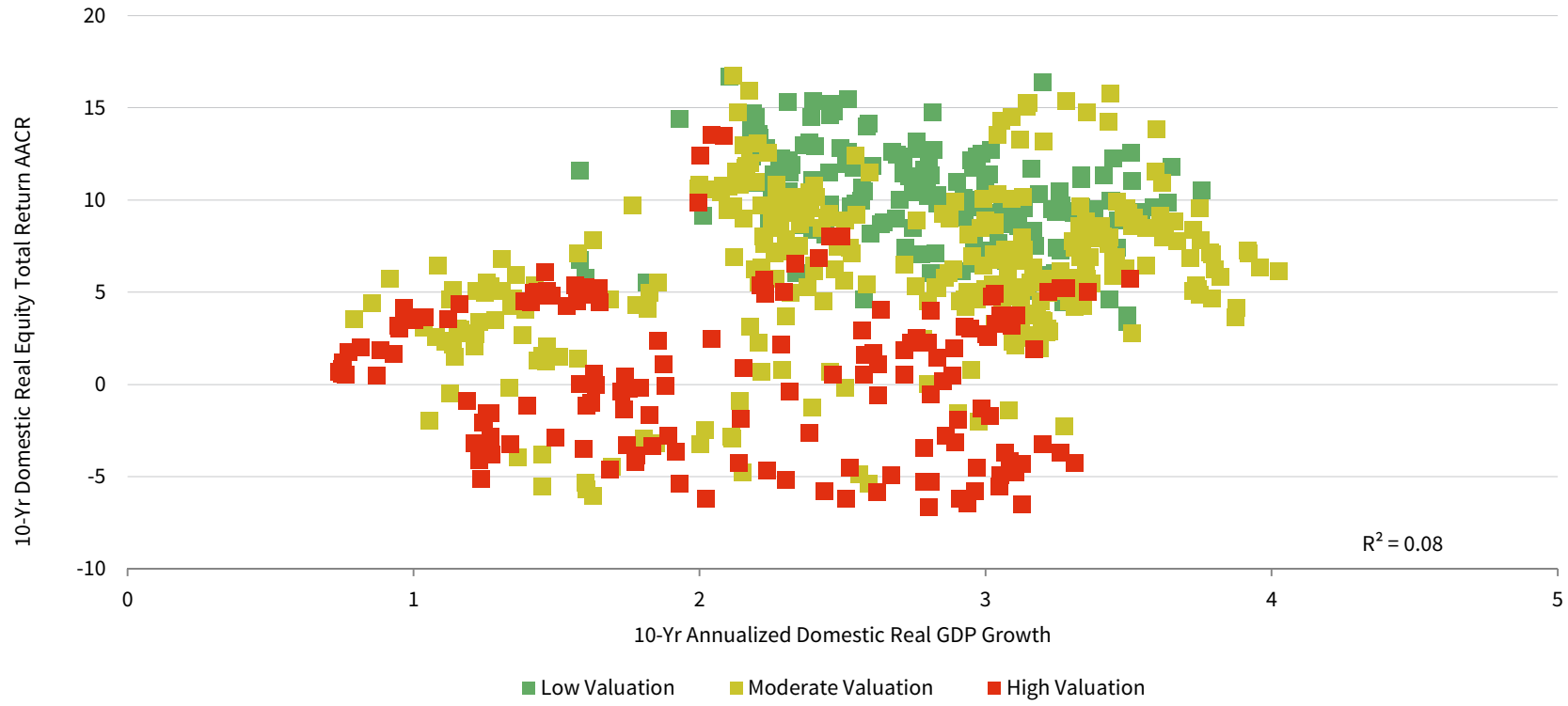
Sources: Economic Cycle Research Institute, Global Financial Data, Inc., National Bureau of Economic Research, OECD, Oxford Economics, Thomson Reuters Datastream, and UK Office for National Statistics.
Notes: Gray bars for the US represent NBER-defined recessions. Gray bars for other countries are defined by Economic Cycle Research Institute business cycle peak-to-trough dates. Japan and Australia GDP are from OECD and fourth quarter 2018 growth is estimated. UK data are preliminary. US fourth quarter 2018 growth are based on OECD estimate.

Effectively there is no relationship between GDP growth and equity returns

Strong economic growth alone does not justify expectations for strong equity returns. When comparing ten-year annualized GDP growth and concurrent ten-year real equity AACRs from four DM over nearly 50 years, we find no meaningful relationship between economic growth and equity performance. Poor equity returns can occur in high- and low-growth environments alike.

RELATIONSHIP OF EQUITY RETURNS WITH ECONOMIC GROWTH AND VALUATION: DM

Fourth Quarter 1969 – Fourth Quarter 2018 • Local Currency • Percent (%)



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

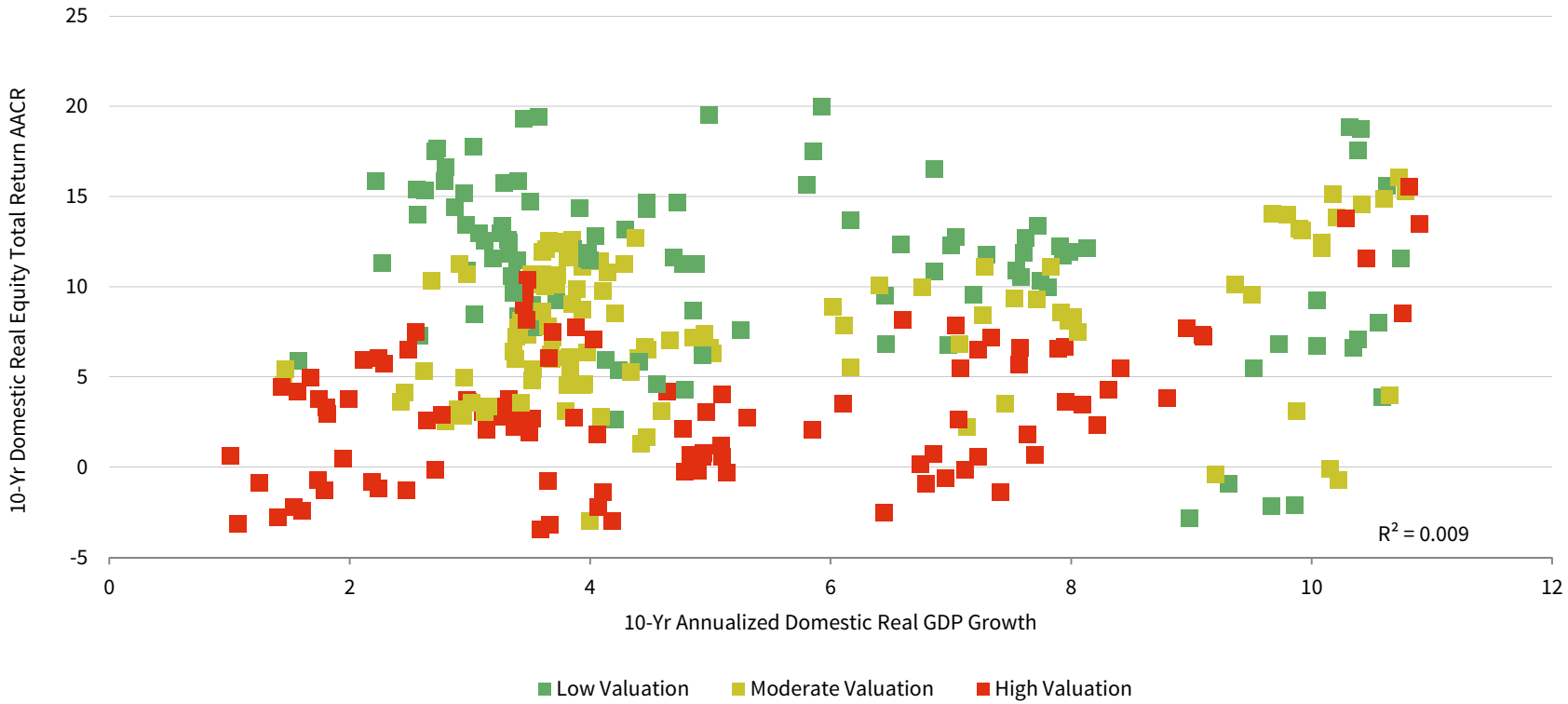
Notes: Data are quarterly. The following countries are included in the analysis: Australia, France, the UK, and the US. The composite normalized P/E is calculated by dividing the inflation-adjusted index price level by the simple average of three normalized earnings metrics: ten-year average real earnings (i.e., Shiller earnings), trend-line earnings, and return on equity–adjusted earnings. Low initial valuation represents the bottom 25% of all composite normalized P/E observations, moderate represents the middle 50%, and high represents the top 25%. Total return data for all MSCI indexes are net of dividend taxes. Australia fourth quarter 2018 GDP data are based on estimate from Oxford Economics. Fourth quarter 2018 GDP data for France and the UK are preliminary. Fourth quarter 2018 GDP data are based on OECD estimates.

Effectively there is no relationship between GDP growth and equity returns

The relationship between economic growth and equity performance in EM shows a similar outcome to that seen in DM. While there have been ten-year periods of accelerated growth in EM—in some cases in excess of 10%—equity returns have not always moved in the same direction. Likewise, in relatively low-growth periods (2% to 4% GDP growth), returns ranged from roughly -5% to 20% in real terms.

RELATIONSHIP OF EQUITY RETURNS WITH ECONOMIC GROWTH AND VALUATION: EM

Third Quarter 1994 – Fourth Quarter 2018 • Percent (%) • Local Currency



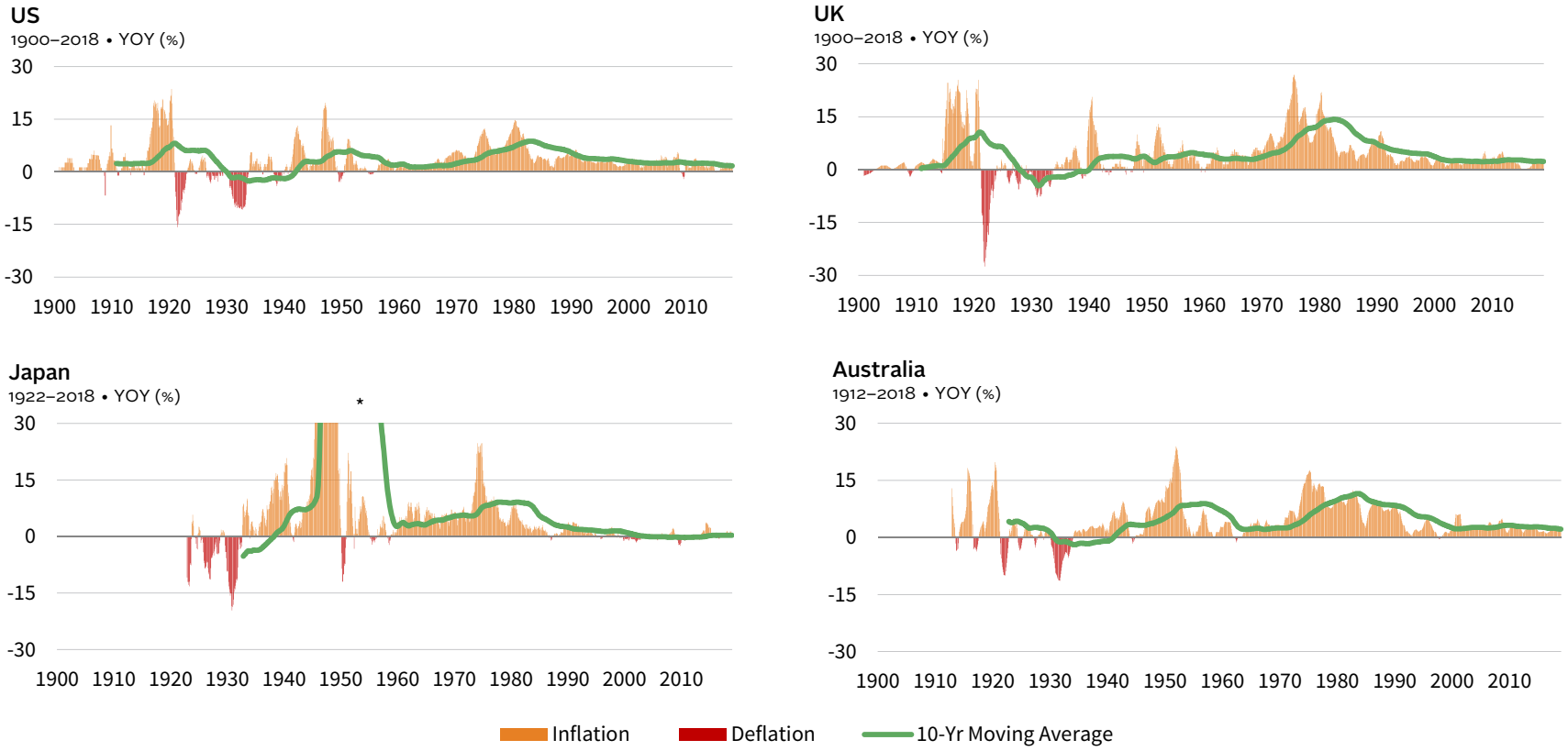
Sources: MSCI Inc., Oxford Economics, and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Notes: Data are quarterly. The following countries are included in the analysis: Brazil, China, India, South Africa, South Korea, and Taiwan. Equity returns refer to the subsequent ten-year real average annual compound total return. Economic growth refers to the subsequent ten-year real compound annual GDP growth rate (CAGR). Valuation refers to the initial ROE-adjusted price-earnings (P/E) ratio. Total return data until December 31, 2000, are gross of dividend taxes, and net of dividend taxes thereafter. Fourth quarter 2018 GDP are estimated and based on Oxford Economics forecasts.

Inflation stabilized at very low levels in recent decades

Across developed regions, current inflation rates are low by historical standards. On a year-over-year basis, inflation has been trending downward since the 1970s and ten-year moving averages have stabilized at low levels since 2000. There are signs that inflation may be picking up. In 2018, US, UK, and Japan monthly year-over-year inflation rates were above their ten-year moving average levels in all but one month combined, which is somewhat rare based on data since the 1980s.

INFLATION



*Japan inflation data have been capped at 30%. Inflation peaked at 639% year-over-year in 1946.

Sources: Global Financial Data, Inc. and Thomson Reuters Datastream.

Notes: Data are monthly. Inflation data for Australia reported on a quarterly basis. Intra-quarter monthly values for Australia are interpolated using beginning and end of quarter levels. Japan inflation data start in 1922 and Australia inflation data start in 1912. Moving averages begin ten years after the first monthly observation in each region.

CURRENT MARKET ENVIRONMENT

Central banks dialed back crisis-era monetary stimulus in 2018. The Fed raised rates 1 percentage point during the year (with the benchmark policy rate now above those of other regions in this study) and continued to wind down its balance sheet. The Bank of England (BOE) was the only other major central bank to raise rates last year, but both the European Central Bank (ECB) and Bank of Japan (BOJ) slowed their rate of asset purchases, the former ending its Asset Purchase Program. In the US, rising short-term rates relative to long term led to yield curve flattening, stoking fears of a potential forthcoming recession.

US corporate profit growth exceeded that of other regions last year, due in part to a one-off tax-cut boost, but earnings growth in other regions remained healthy. Underlying profitability metrics ended the year stretched relative to history, prompting speculation over whether earnings have peaked this cycle, while downgrades to forward estimates impacted equity performance late in the year. Valuations improved in most regions, lifting the longer-term forward outlook for equity returns.

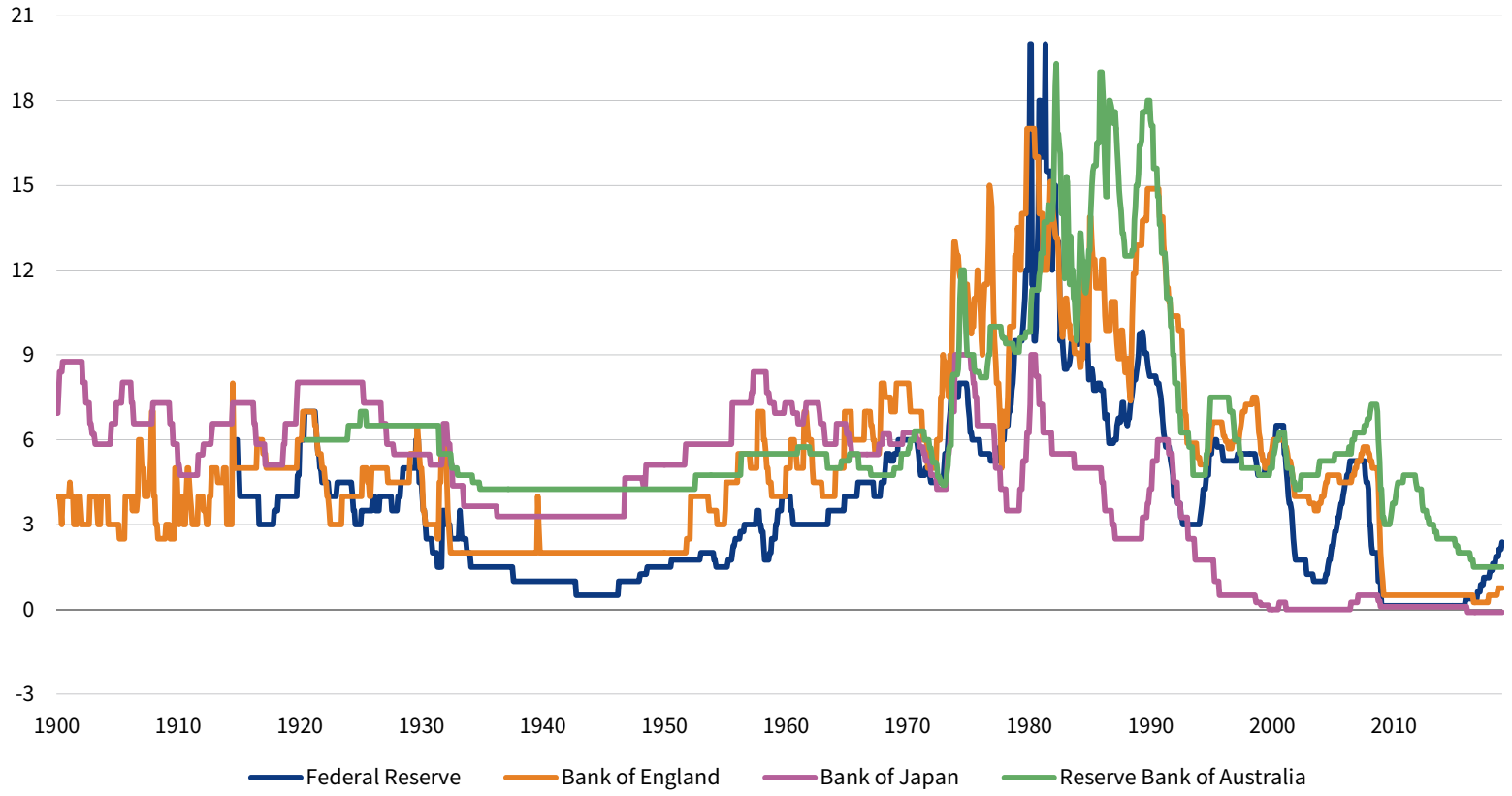
In this section, we look at some key market themes of recent years, including monetary policy and its impact on markets, the relationship between equities and bonds in the low interest rate environment, and the current state of equity valuations and fundamentals.

US policy rates in 2018 surpassed those of other major developed central banks

The Fed raised rates four times in 2018 to a target upper bound of 2.50%—a full percentage point above the level one year ago. The policy rate divergence of the past few years continued as the BOE was the only other major central bank to raise rates in 2018. Still, monetary stimulus globally waned given the BOJ's asset purchase "stealth taper" and the ECB's decision to end the Asset Purchase Program. In 2018, US policy rates rose above those of other developed peers, which only occurred roughly 10% of the time historically.

GLOBAL POLICY RATES

January 31, 1900 – December 31, 2018 • Percent (%)



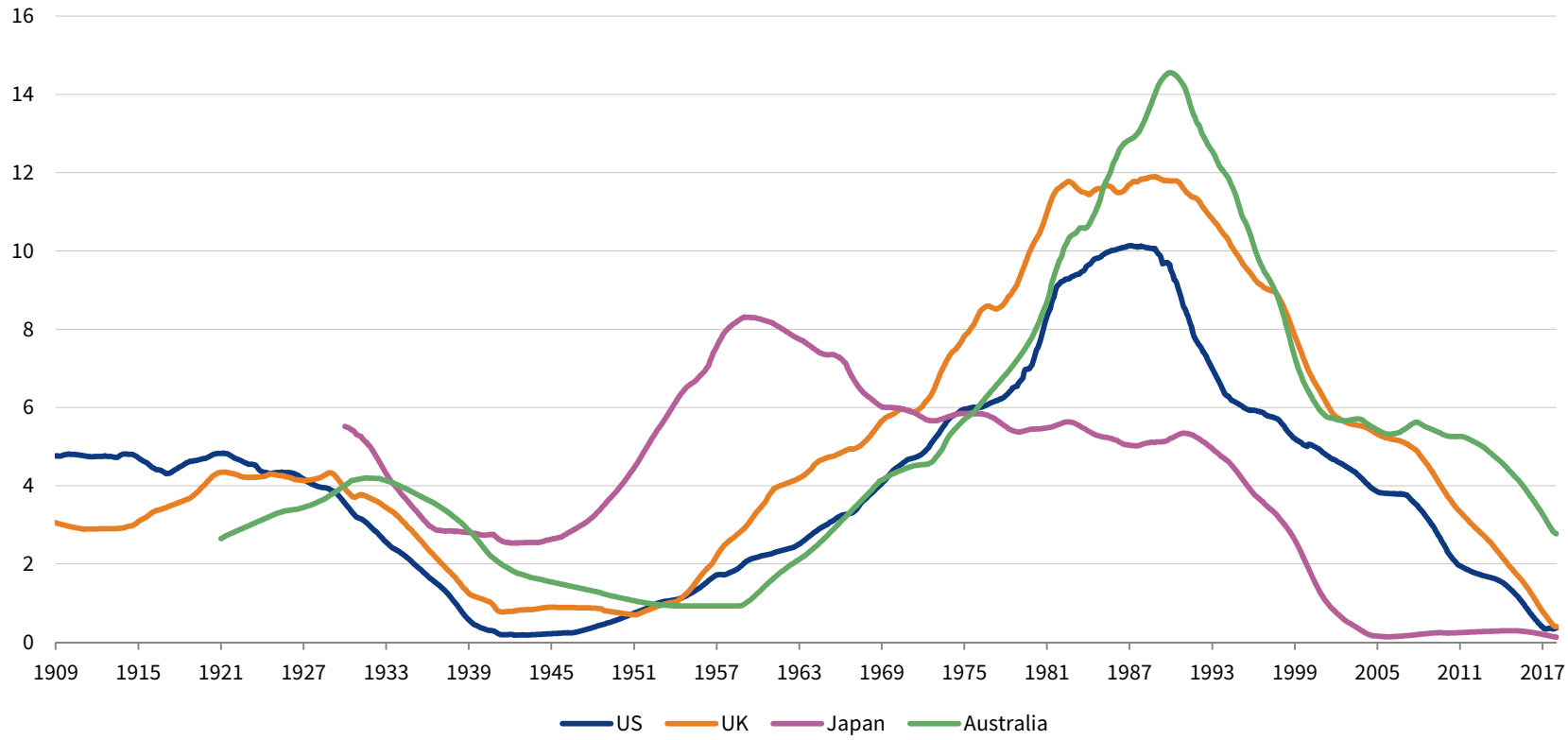
Sources: Global Financial Data, Inc. and Thomson Reuters Datastream.

Low rates translated to near-zero cash returns over the past ten years for most markets

Zero- and negative-interest rate policies in the aftermath of the GFC translated to menial trailing ten-year cash returns in recent periods for the US and the UK. Ten-year cash returns in Japan, on the other hand, have hovered near zero for roughly 15 years. Recent results are not unprecedented given a similar environment during the WWII years. In 2018, US cash outperformed all other asset classes.

GLOBAL CASH RETURNS: ROLLING 10-YR NOMINAL AACR

December 31, 1909 – December 31, 2018 • Percent (%)



Sources: Global Financial Data, Inc. and Thomson Reuters Datastream

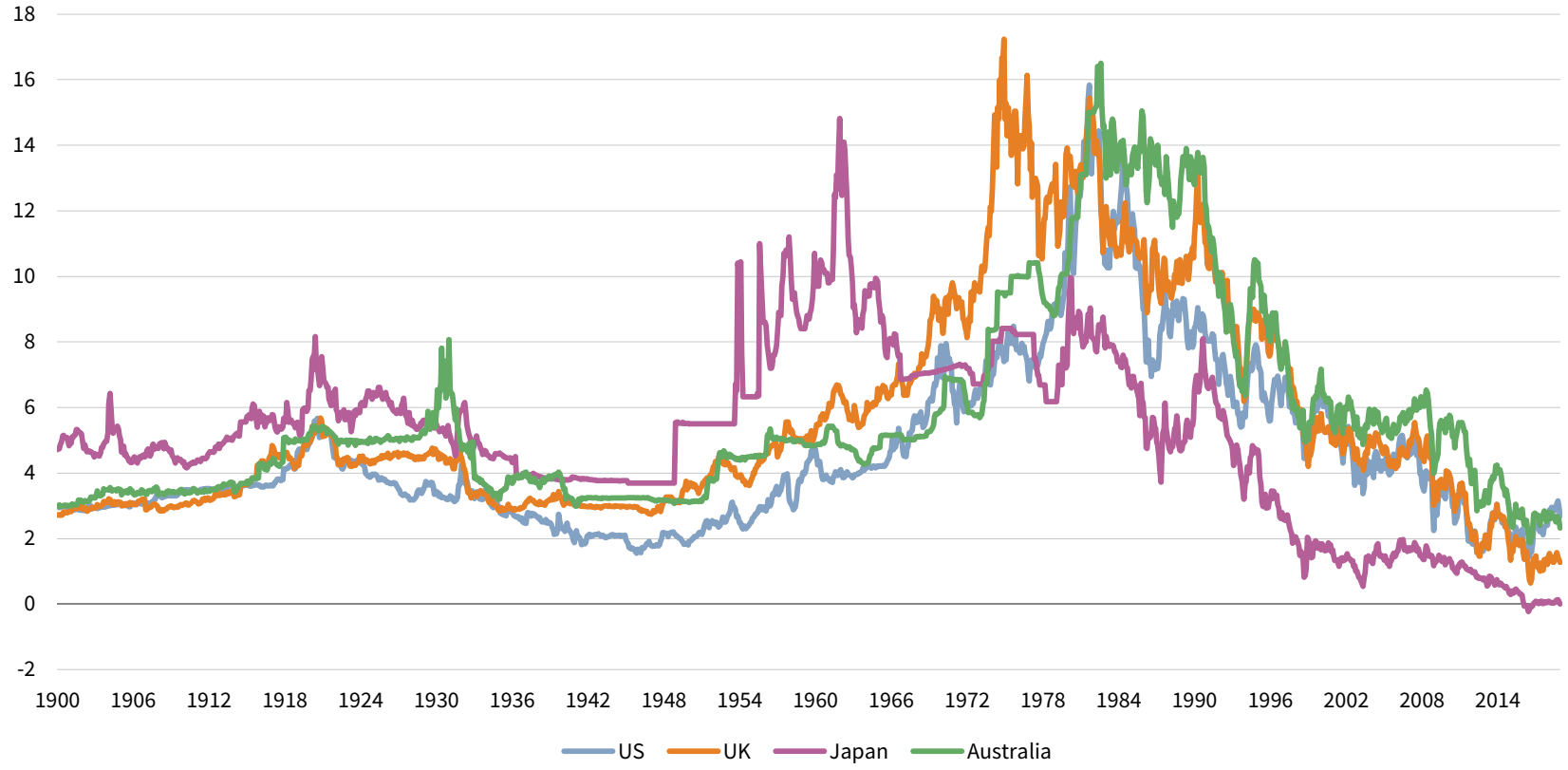
Notes: Rolling ten-year AACR data are monthly and calculated with data beginning on January 31, 1900 (US & UK), January 31, 1912 (Australia), and January 31, 1921 (Japan).

US ten-year Treasury yields rose above other sovereign counterparts

Ten-year government bond yields trended downwards after peaking in the 1980s, resulting in a 30-year bond bull market. Government yields climbed higher in recent years (save for Japan, which has a 0% yield target on ten-year JGBs) and US yields ended 2018 higher than the UK, Japan, and Australia. Over the full time period, US yields concurrently exceeded those of the other three countries only 1.3% of the time.

10-YR GOVERNMENT BOND YIELDS

January 31, 1900 – December 31, 2018 • Percent (%)



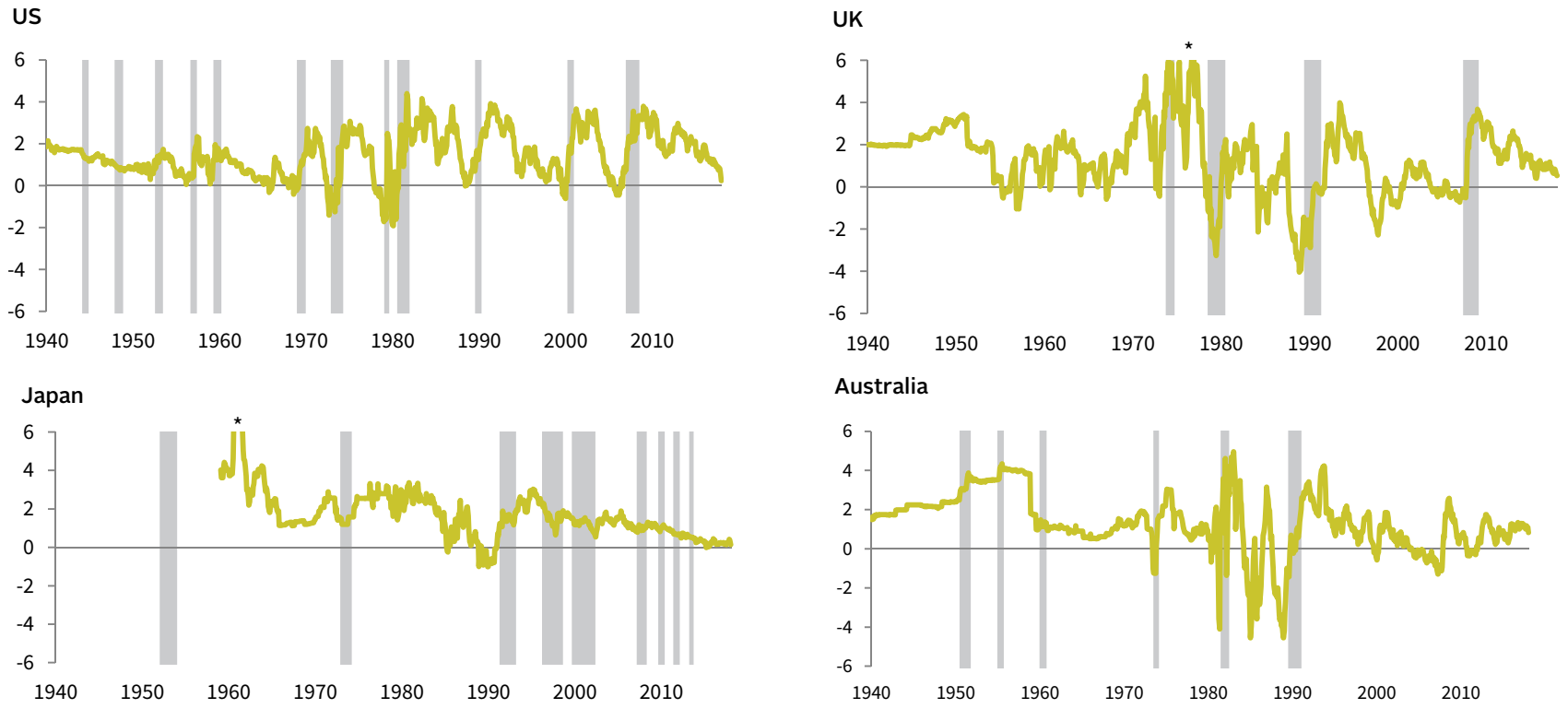
Source: Global Financial Data, Inc.

The US yield curve, a consistent recession indicator, flattened further

The US yield curve has inverted before every recession in the past 50 years, based on the ten-year/three-month yield spread. Outside of the US, the yield curve inversion also gives meaningful signals for Australia and UK recessionary environments. At year-end 2018, the US yield curve had flattened to a mere 24 bps, its lowest level since 2007. The ten-year/three-month spread is a reliable recession indicator, but less so for recession-related bear markets. The ten-year/two-year, another widely followed term spread, consistently inverts prior to recession-related bear markets.

10-YR/3-MONTH YIELD SPREAD

1940–2018 • Percent (%)



* Japan's ten-yr/three-month spread in 1961 and 1962 exceeded 6.0 ppts and peaked at 8.7 ppts. UK's ten-yr/three-month spread in 1977 exceeded 6.0 ppts and peaked at 6.3 ppts.

Sources: Economic Cycle Research Institute, Global Financial Data, Inc., and National Bureau of Economic Research.

Notes: Gray bars for the US represent NBER-defined US recessions. Gray bars for other countries are defined by Economic Cycle Research Institute business cycle peak-to-trough dates. Data are monthly.

Federal Reserve rate tightening cycles do not predict asset class outperformance

Fed rate hikes alone are not a reliable indicator of which cash, bond, or equity market will deliver top performance. Bond categories delivered top returns during six periods, while equities outperformed during five. Bonds tended to exhibit rotation between US and global ex US counterparts, whereas global equities were more correlated. Currency effects are an important driver for non-US assets; dollar strength during the early- to mid-1980s led to weak unhedged USD performance for ex US bonds and equities alike. With inflation largely in check since the 1980s, asset returns were generally positive in recent periods, as tight labor markets and above-trend GDP growth were the primary factors informing the Fed's decision to hike rates.

BOND & EQUITY RETURNS DURING PERIODS WHEN TARGET FED FUNDS RATE INCREASED BY 100 BPS OR MORE

As of December 31, 2018

Period of ≥100 bps Target Fed Rate Increase			Months	Target Fed Funds Rate Change (bps)	Cumulative Return (%)					
					T-Bills	10-Yr US Govt Bonds	Global ex US Bonds	DM ex US Equities	EM Equities	S&P 500
7/1/1971	to	10/31/1971	4	150	1.60	8.57	8.83	-3.60	NA	-4.55
3/1/1972	to	6/30/1974	28	700	16.35	4.27	-2.20	4.56	NA	-13.20
8/1/1977	to	3/31/1980	32	1,175	24.97	-8.66	38.60	51.16	NA	18.39
10/1/1980	to	2/28/1981	5	650	5.70	-3.54	20.91	-2.41	NA	6.60
5/1/1981	to	6/30/1981	2	350	2.64	3.68	-9.23	-3.51	NA	-0.43
2/1/1982	to	4/30/1982	3	200	3.49	5.06	-0.78	-6.55	NA	-1.74
3/1/1984	to	8/31/1984	6	206	5.40	2.30	-5.68	-2.46	NA	8.87
3/1/1988	to	5/31/1989	15	331	9.80	8.64	-5.84	13.23	79.58	25.32
2/1/1994	to	6/30/1995	17	300	7.03	6.51	26.68	1.99	-11.97	17.80
6/1/1999	to	12/31/2000	19	175	9.32	14.31	-0.72	10.19	-8.07	3.33
6/1/2004	to	8/31/2007	39	425	12.89	16.96	15.79	83.69	173.13	39.65
12/1/2015	to	Present	37	225	3.12	3.01	11.89	7.67	27.48	28.37

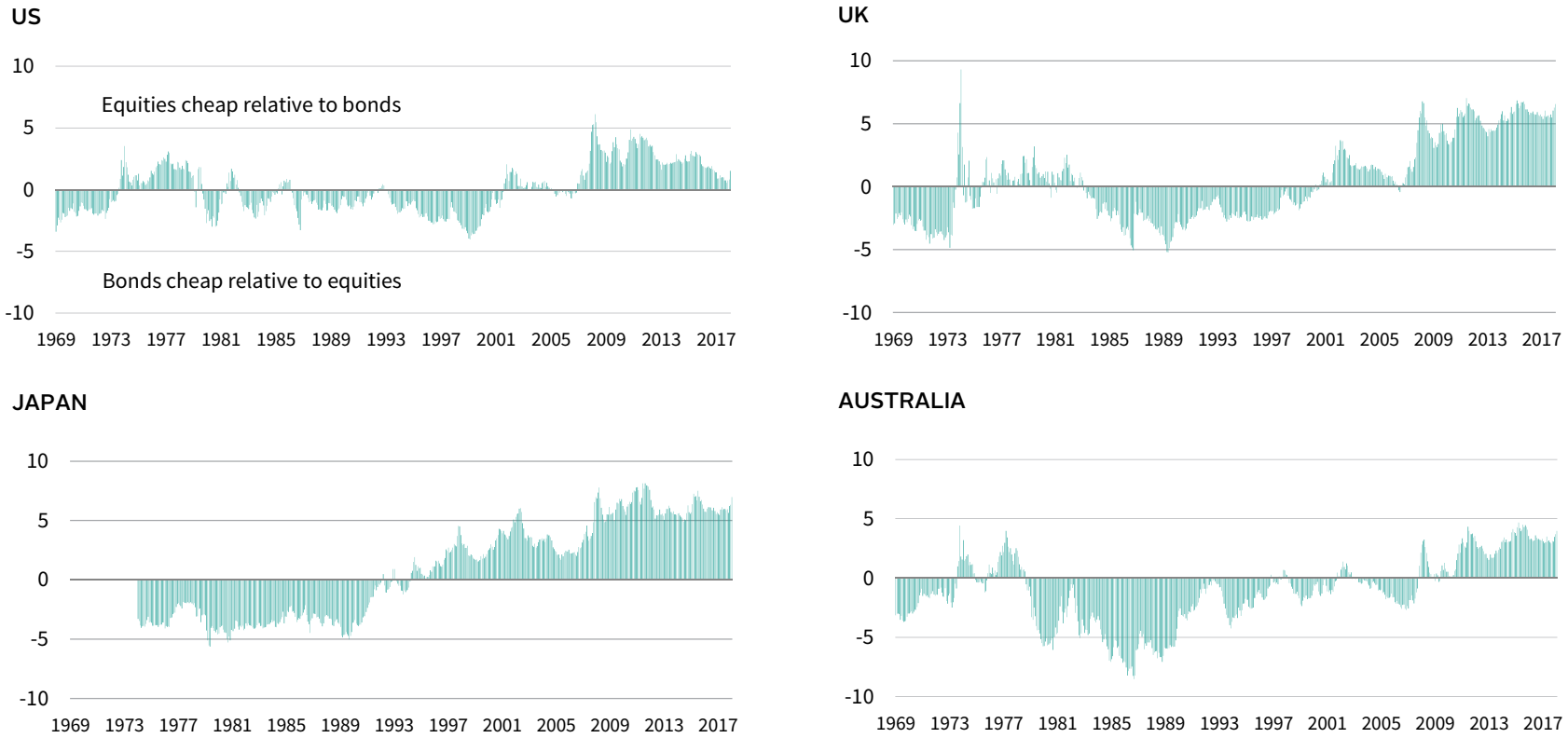
Sources: Federal Reserve, FTSE Fixed Income LLC, Global Financial Data, Inc., MSCI Inc., Standard & Poor's, and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

US equity risk premium diminished but remained elevated in other regions

The spread between the earnings yield and bond yields can be thought of as an equity risk premium, reflecting the market's assessment about the relative risk of equities and bonds. Rising bond yields in 2018 brought down the US premium as equity valuations remained elevated. Relatively stable yields outside the US and falling valuations meant the equity risk premium in other regions remained high. Yield differential models in positive territory tend to presage equity outperformance, but generally have little relationship with subsequent absolute equity and bond returns based on low R^2 values.

NORMALIZED EARNINGS YIELDS VERSUS 10-YR BOND YIELDS

1969–2018



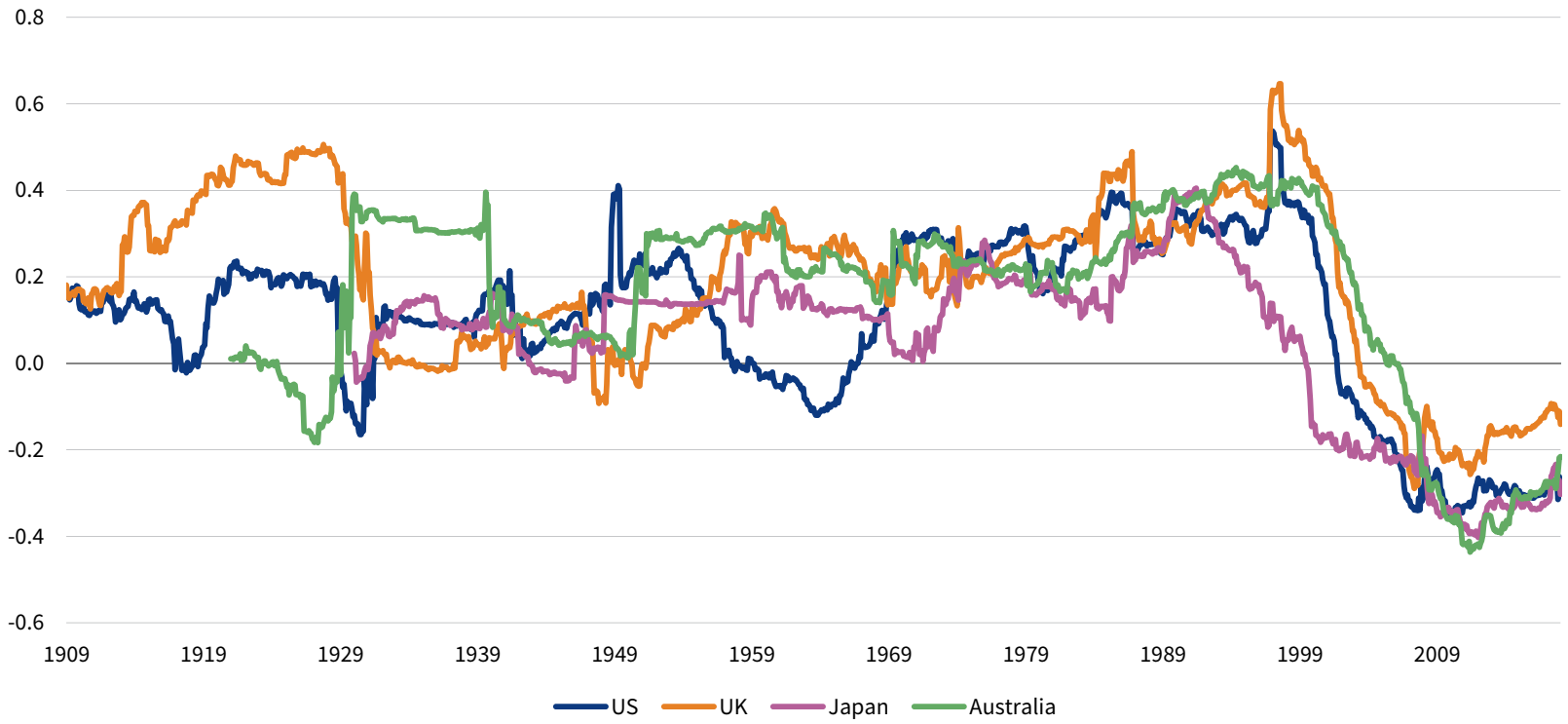
Sources: Global Financial Data, Inc., MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.
Notes: Charts show the spread between the normalized earnings yields and ten-year bond yields calculated as earnings yield minus bond yield. Normalized earnings yields are based on the composite normalized P/E ratio for the US, UK, and Australia, and based on the ROE-adjusted P/E ratio for Japan, which begin on December 31, 1974.

Stock and bond correlations ticked up from historically low levels

Since the late 1990s, stock and bond correlations across markets have trended downward. These correlations are largely driven by macroeconomic factors. Over the long run, rising inflation, economic growth, and interest rates tend to drive the stock/bond correlation in the same direction. Periods of low inflation tend to see low stock bond correlations, and vice versa. Risks of higher inflation moving forward could signal a change in this trend, pushing correlations back to positive territory.

ROLLING 10-YR CORRELATIONS OF STOCK AND BOND RETURNS

December 31, 1909 – December 31, 2018 • Correlation Coefficient



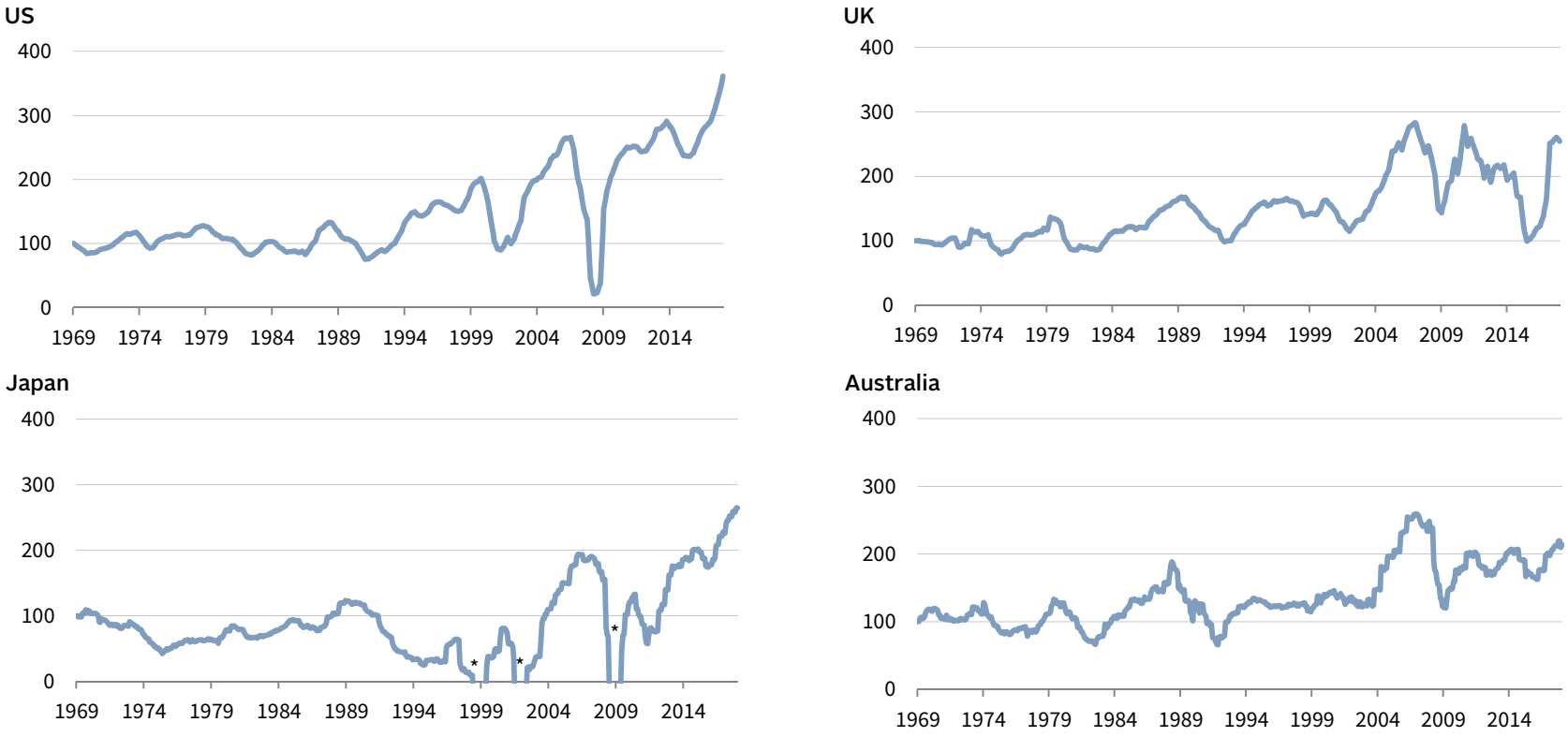
Sources: FTSE International Limited, Global Financial Data, MSCI Inc., Standard & Poor's, and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.
Notes: Data for the US and UK begin on January 31, 1900. Data for Australia begin on January 31, 1912. Data for Japan begin on January 31, 1921. All return data are monthly.

Strong growth pushed EPS levels higher in recent years

Global earnings trended higher in recent years on the back of a synchronized economic upswing, which pushed US and Japan EPS levels to new peaks. Economic and corporate governance reforms helped drive earnings in Japan, while highly profitable technology stocks and loose fiscal policy were a boon to US corporate results. Earnings for the UK and Australia lagged due in part to outsized weights to the financials and commodity-related energy and materials sectors. Both struggled to retrace prior peaks from the GFC and commodity-price boom of the early- to mid-2000s.

REAL EARNINGS PER SHARE OVER TIME

December 31, 1969 – December 31, 2018 • December 31, 1969 Cumulative Wealth = 100



*Japan has three periods of negative EPS from 1999–2000, 2002–03, and 2009–10.

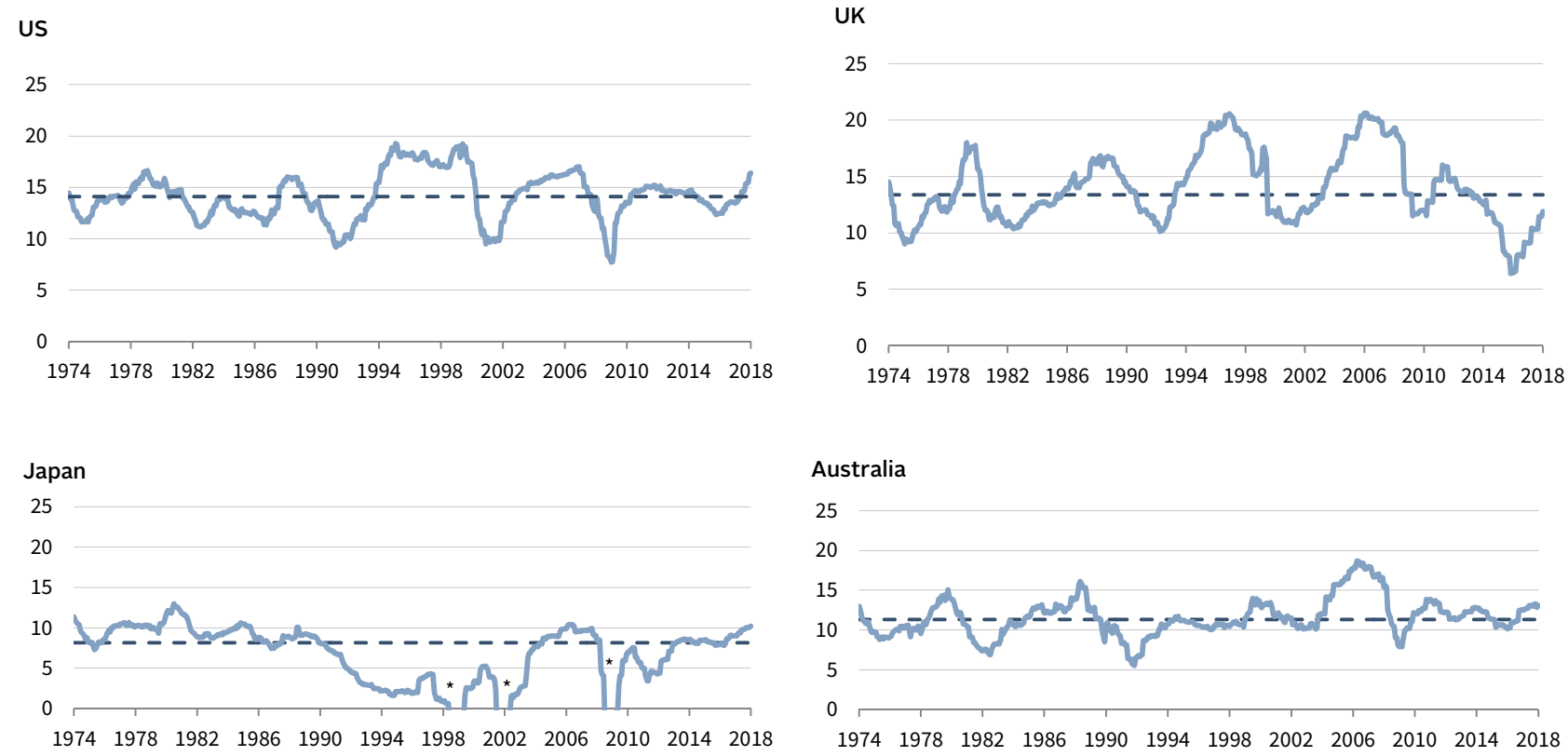
Sources: FTSE International Limited, MSCI Inc., Standard & Poor's, and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Profitability reached the top quartile for all regions, save for the UK

Profitability looks stretched relative to history, based on the return on equity (ROE) metric. Several dynamics have pushed regional ROE metrics higher in recent years. The US is heavily weighted to highly profitable technology and communications firms. In Japan, recent corporate governance reforms improved profitability metrics, and the efficiencies from such reforms could continue to support elevated ROE going forward.

RETURN ON EQUITY BY REGION

December 31, 1974 – December 31, 2018 • Percent (%)



*Japan has three periods of negative EPS from 1999–2000, 2002–03, and 2009–10. All data are monthly.

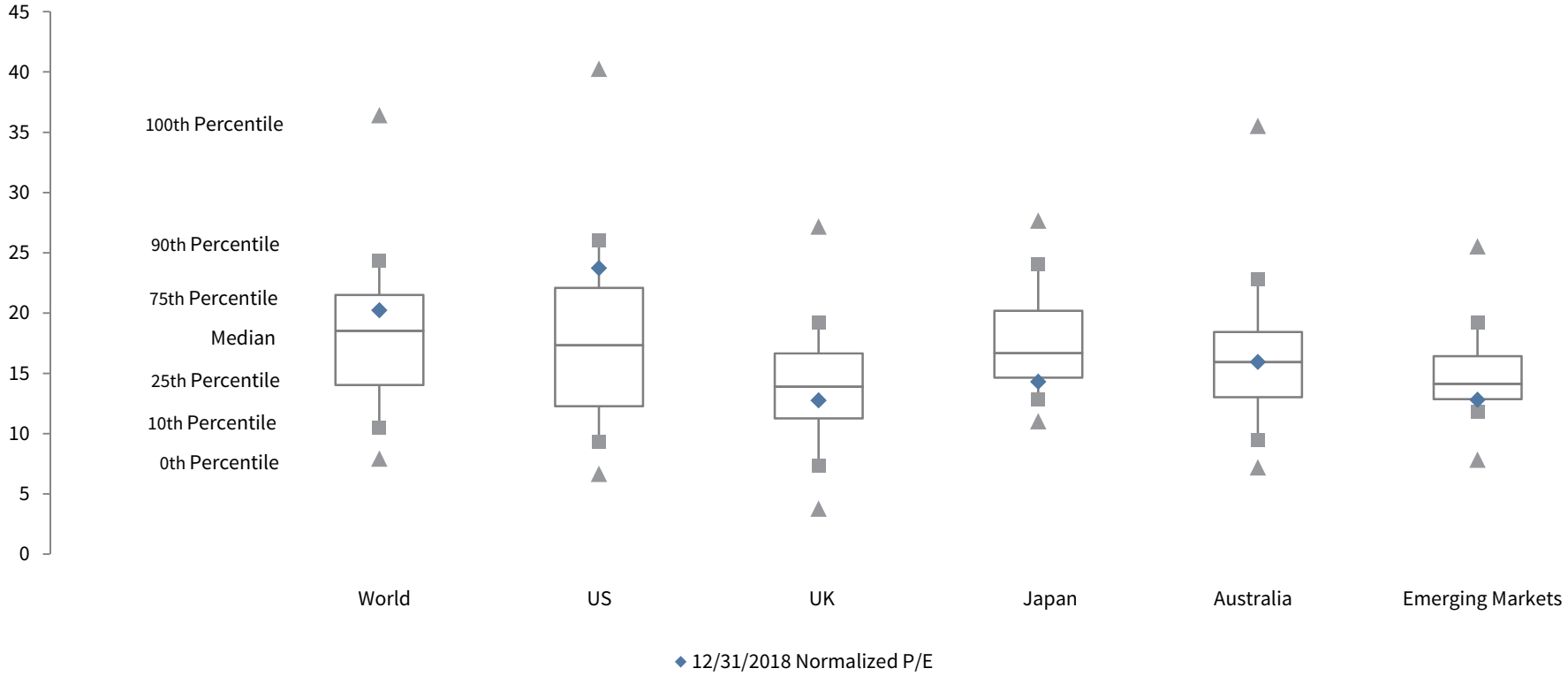
Sources: MSCI Inc. and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Equity valuations remained elevated in the US, more reasonable in other markets

Valuations fell across regions in 2018 as regions outside the US ended the year at or below their historical median. US equity valuations fell slightly during the year, but remained elevated in the 86th percentile as of year end, and buoyed the valuation for global equities in aggregate. Given the meaningful relationship between valuations and subsequent returns, the implied forward outlook for US equity returns is below that of other regions.

NORMALIZED PRICE-EARNINGS RATIOS BY REGION

As of December 31, 2018



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

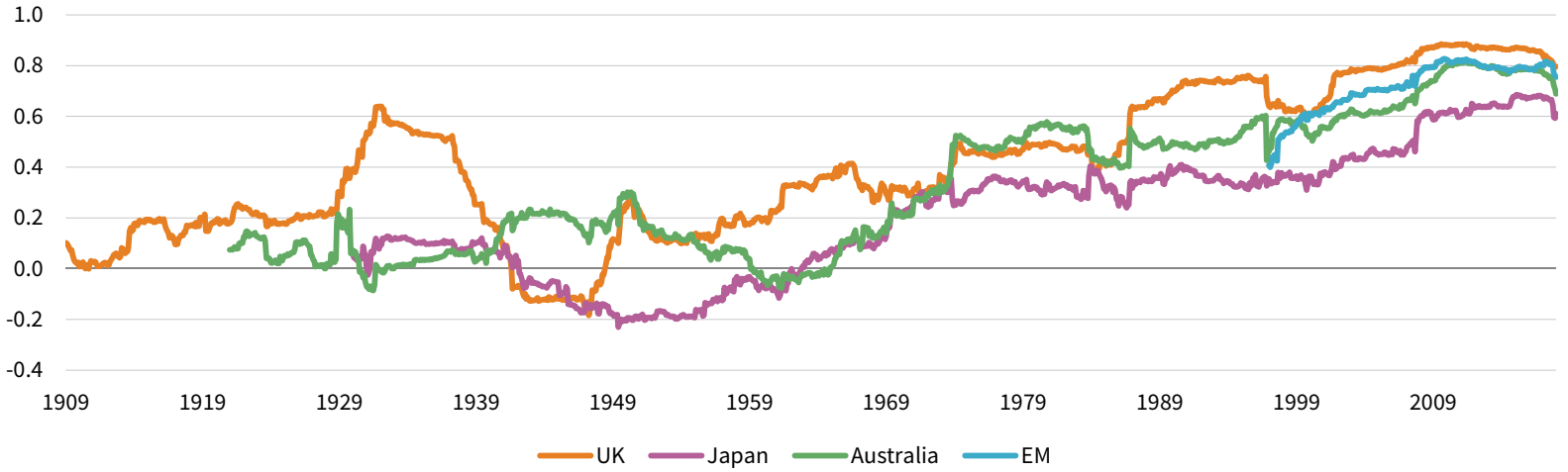
Notes: The composite normalized price-earnings (P/E) ratio is used for all regions except for Japan and EM, where the return on equity (ROE)–adjusted P/E is used. The composite normalized P/E ratio is calculated by dividing the inflation-adjusted index price by the simple average of three normalized earnings metrics: ten-year average real earnings (i.e., Shiller earnings), trend-line earnings, and ROE–adjusted earnings. The ROE P/E ratio is calculated by multiplying the current P/E ratio by the ratio of current ROE to long-term median ROE. We use the post-2001 ROE-adjusted P/E for Japan, with long-term median ROE based on the full period since December 31, 1974. EM data begin on September 30, 1995.

Global equity market correlations are elevated relative to history

Correlations among various equity markets trended upward since the 1970s, implying that the benefits of global equity diversification may have declined. Globalization and the opening of equity markets to international investors likely contributed to this phenomenon. Correlation coefficients averaged 0.09 prior to the 1970s, but increased to 0.52 over the past half century. Results are largely the same in USD terms, as a ten-year smoothing period eliminates any currency impacts.

ROLLING 10-YR CORRELATIONS: US EQUITY VS GLOBAL PEERS

December 31, 1909 – December 31, 2018 • Correlation Coefficient



CORRELATION MATRIX

January 31, 1921 – December 31, 1969

	US	UK	Japan	Australia
US	1.00			
UK	0.21	1.00		
Japan	-0.02	0.01	1.00	
Australia	0.08	0.25	0.02	1.00

CORRELATION MATRIX

January 31, 1970 – December 31, 2018

	US	UK	Japan	Australia	EM
US	1.00				
UK	0.62	1.00			
Japan	0.44	0.38	1.00		
Australia	0.55	0.52	0.34	1.00	
EM	0.66	0.62	0.50	0.59	1.00

Sources: FTSE International Limited, Global Financial Data, MSCI Inc., Standard & Poor's, and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.
Notes: Data for the US and UK begin on January 31, 1900. Data for Australia begin on January 31, 1912. Data for Japan begin on January 31, 1921. Data for EM begin on January 31, 1988. All return data are monthly. EM returns are in USD terms. All other returns are in local currency.

Notes on the Data

Equity Returns Data

- **US:** From 1900 to 1968, US equity series returns come from the Global Financial Data S&P 500 Index. This uses data from the Cowles/Standard & Poor's Index of stocks through 1918 and then the Standard Composite after 1918. This index was calculated by the Standard Statistics Company and initially consisted of a 90-stock average, which included 50 industrials, 20 rails, and 20 utilities. The 90-share index was used through 1957, when S&P introduced the S&P 500 stock average, including 425 industrials, 25 rails, and 50 utilities. From 1969 to the present, the data cited come directly from the S&P 500 Index.[1]
- **UK:** Data from 1900 to June 1962 are based on the historical total return index of UK shares compiled by Global Financial Data, Inc. Returns from September 1962 to December 1964 are calculated for the FT-500 Non-Financials Index provided by data from the FT Actuaries Library. Total returns from January 1965 to December 1992 are based on the FTSE® Total Non-Financial Index calculated by Thomson Reuters Datastream, while from 1993 to the present, returns are based on the FTSE® All-Share Index, as calculated by FTSE®.
- **Japan:** From 1921 to 1968, Japan equity series returns come from Global Financial Data, Inc. The National Bank Index is used from January 1921 through December 1932, and the Oriental Economist Index is used from 1933 through September 1948. The Fisher Index is used from September 1948 through April 1949. The Tokyo stock exchange officially reopened in May 1949, and the Nikkei 225 Index is used from May 1949 until 1969. From 1969 on, the MSCI Japan Index is used and the data cited come from MSCI Inc. Total return data for the MSCI Japan Index are net of dividend taxes.
- **Australia:** From 1912 to 1968, Australia equity series returns come from Global Financial Data, Inc. The All Ordinaries Index is used over this time frame as it is Australia's premier market indicator. The index represents the 500 largest companies listed on the Australian Stock Exchange. From 1969 on, the MSCI Australia Index is used and the data cited come from MSCI Inc. Total return data for the MSCI Australia Index are net of dividend taxes.

[1] As of January 1, 1988, S&P 500 total return calculations are based on daily reinvestment of accrued dividends on ex-date.

Equity Returns Data (continued)

- **Emerging Markets:** Data are sourced from the MSCI Emerging Markets Index from 1987, the index inception date. Returns used in exhibits are based on a spliced series of gross and net of dividend tax returns due to availability of the net return series. From 1987 through 2000, gross returns are used. From 2001 onward, net returns are used. For graphs showing EM compared to DM, the gross/net splicing methodology is also used for DM, and data are shown in USD terms for comparative purposes. For initial valuation and subsequent return charts, EM returns are shown in local currency terms.

Notes on the Data

Equity Valuations Data

- **US:** Earnings data and dividend yields from 1900 to 1926 are provided by Professor Robert J. Shiller.[2] Earnings and dividend yields after 1927 are provided by Standard & Poor's. Graphs using MSCI price-earnings (P/E) ratios come from MSCI Inc. from 1969 to present.

- **UK:** Earnings and dividend yield data from 1962 through the present are calculated based on data provided by FTSE International Limited. Graphs using MSCI P/E ratios come from MSCI Inc. from 1969 to present.

- **Japan:** Earnings and dividend yield data from 1969 through the present are calculated based on data provided by MSCI Inc.

- **Australia:** Earnings and dividend yield data from 1969 through the present are calculated based on data provided by MSCI Inc.

- **Emerging Markets:** Earnings and dividend yield data from 1995 through the present are calculated based on data provided by MSCI Inc.

- When analyzing equity markets, a common valuation metric is the normalized P/E ratio. One well-known normalized P/E ratio is the Shiller P/E, which is calculated by dividing the real index price level by the ten-year average real earnings.[2] For most equity markets, Cambridge Associates evaluates valuations using our composite normalized P/E ratio, which is calculated by dividing the inflation-adjusted index price by the simple average of three normalized earnings metrics: ten-year average real earnings (i.e., Shiller earnings), trend-line earnings, and return on equity (ROE)–adjusted earnings. The ROE P/E ratio, used in several regions, is calculated by multiplying the current P/E ratio by the ratio of current ROE to long-term median ROE.

[2] Page 43 of this report shows a Shiller P/E chart back to 1880 using data provided by Professor Robert J. Shiller before 1936.

Bond Data

The long-term bond series for each region is calculated and provided by Global Financial Data, Inc.

- **US:** From 1900 to September 1917, the 4% US Government Bonds of 1925 are used. Where no trades were recorded during a given month, the previous month's yield was used. The sources for this data is William B. Dana Co., *The Financial Review*, New York: William B. Dana Co. (1872–1921), which reprinted data published by *The Commercial and Financial Chronicle*. The 4% Liberty Bonds are used from October 1917 through December 1918, and beginning in 1919, the Federal Reserve Board's 10–15 Year Treasury Bond Index is used. Ten-year bonds are used beginning in 1941.

- **UK:** The British consol is used from 1900 until 1934. The United Kingdom 3% Funding Loan of 1934 (Redeemable 1959–1969) is used from July 1934 until July 1947 and the United Kingdom 2.50% Treasury Bonds of 1947 (Redeemable after 1975) is used from August 1947 until December 1978. The Bank of England's index of ten-year bonds is used from January 1979 on. The benchmark bond is used for this series. The benchmark bond is the bond that is closest to the stated maturity without exceeding it. When the government issues a new bond of the stated maturity, it replaces the bond used for the index to keep the maturity as close to the stated time period as possible. Depending on how much of a difference there is in maturities, there may be some adjustment in the yield when the new bond is introduced.

Bond Data (continued)

- **Japan:** The Empire of Japan 4% Sterling Bonds of 1899 is used from 1900 to 1930. Tokyo quotes begin in 1931. Tokyo quotes for the 5% Japanese Bond are used from 1931 through 1946. No data are available from January 1947 until November 1948. The data from 1948 until September 1961 represent the yields on bonds newly issued during that month. When no bonds were issued, the previous month's yield was used. The series beginning from October 1961 to December 1971 is for seven-year government bonds. Data from January 1972 to present uses the yield on the ten-year government bond. The benchmark bond is used for this series. The benchmark bond is the bond that is closest to the stated maturity without exceeding it. When the government issues a new bond of the stated maturity, it replaces the bond used for the index to keep the maturity as close to the stated time period as possible. Depending on how much of a difference there is in maturities, there may be some adjustment in the yield when the new bond is introduced.

- **Australia:** The New South Wales 3% Inscribed Bond due 1935 is used from January 1900 to November 1917, the Australia 5.50% External Debt of 1917 (Redeemable 1922–1927) is used from December 1917 to June 1922, the Australia 5% Registered Bond of 1922 (Redeemable 1935–1945) is used from July 1922 to August 1933. From 1933 until 1936, 4% bonds are used. Starting in 1937, a weighted average of bonds of 10 years through 1940, 12 years from 1941 to May 1959, 20 years from June 1959 through 1980, 15 years from 1981 through 1990, and 10 years since 1991 is used to produce the theoretical yield on a perpetual ten-year bond.

Notes on the Data

Cash Data

- **US:** The money market instrument return series is composed of the Global Financial Data USA AA-Rated 3-Month Non-Financial Commercial Paper Index from 1900 through 1918. From 1919 to March 1970, the Global Financial Data USA T-Bill Index is used. From April 1970 to December 1977, T-bill data were sourced directly from the Federal Reserve. From January 1978 to the present, the BofA Merrill Lynch 91-Day Treasury Bill Index total return is used.

- **UK:** The Global Financial Data United Kingdom Total Return Bills Index is used from 1900 through January 1985. To calculate total returns, the index uses the yield on Treasury bills. The United Kingdom 3-Month Treasury Bill Index is used from February 1985 to the present, as sourced from the UK Debt Management Office via Thomson Reuters Datastream.

- **Japan:** The Global Financial Data Japan Total Return Bills Index is used. To calculate total returns, the Bank of Japan Discount Rate is used from 1900 to 1913, the Overnight Call Money rate from 1914 to January 1945, the Bank of Japan Discount Rate from February 1945 to 1948, the overnight call money rate from 1949 to 1959 and Treasury bill yields from 1960 on.

- **Australia:** The Global Financial Data Australia Total Return Bills Index is used. To calculate total returns, the index uses the bank deposit rate from 1900 until June 1928 and Treasury bill yields thereafter.

Notes on the Data

Inflation Data

- **US:** From January 1900 to January 1913, the Global Financial Data US BLS Consumer Price Index is used. From February 1913 to present the US Department of Labor - Bureau of Labor Statistics Consumer Price Index, All Urban Consumers (CPI-U) is used. Data for both series are non-seasonally adjusted.

- **UK:** From January 1900 to February 1956, the Global Financial Data United Kingdom Consumer Price Index is used. From March 1956 to November 2003, the UK Retail Price Index is used. From December 2003 to present, the UK Consumer Price Index is used. Retail and Consumer Price Index data are sourced from the Office for National Statistics and are based on the non-seasonally adjusted series.

- **Japan:** From January 1922 to January 1957, the Global Financial Data Japan Consumer Price Index series is used. From February 1957 to present, the Japan Consumer Price Index is used, as sourced from the Japan Statistics Bureau, Ministry of Internal Affairs & Communication. Data are non-seasonally adjusted.

- **Australia:** From January 1912 to March 1950, the Global Financial Data Australia Consumer Price Index is used. From June 1950 to present, the Australia Consumer Price Index, as sourced from the Australian Bureau of Statistics, is used. Data are non-seasonally adjusted. Australia CPI data are only reported on a quarterly basis. For intra-quarter months we calculate CPI levels using a linear interpolation based on the reported quarter-end data points.

- **Emerging Markets:** Where USD returns are used, as with the US data, we use the US Department of Labor – Bureau of Labor Statistics CPI-U inflation measure. Where local currency returns are used, we use a proprietary basket inflation measure based on the prevailing country exposures and weights of the MSCI Emerging Markets Index at each given period. The inflation basket is calculated as the weighted average of each country's official non-seasonally adjusted consumer price index, with weights derived from the country's allocation in the index. The constituency of the inflation series is dynamic over time as countries are reclassified into and out of the EM index.

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