Decades of Data

Global Markets 1900–2016

CAMBRIDGE C|A ASSOCIATES

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In this edition of Decades of Data, we add yet another year of data to our long-term analysis of valuations and returns. 2016 contained several surprises, including populism staging a comeback in the UK and US, as well as market milestones: bond yields hit all-time lows and equity prices hit all-time highs across several markets. 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 included 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 seven sections:

- Recent trends in the macro environment
- Historical returns
- Components of equity returns
- Equity mean reversion
- Equity valuations
- Bond yields, rates, and future returns
- Business cycles

Two of these sections are new this year: recent trends in the macro environment and business cycles. New exhibits added to other sections include maximum drawdowns of equities and bonds, analysis of UK and US earnings recessions, our real equity return expectations over ten years given various earnings growth and ending valuation assumptions, and a look at cash, bond, and equity performance during periods of US Federal Reserve rate hikes.

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.
- **Coming off a muted year in 2015, global equities bounced back in 2016.** Strong performance was seen in the UK (16.8%), Australia (12.0%), and the US (12.0%). Japan was the exception, posting a disappointing nominal return of -0.7%. In the US, the 12.0% return marks the sixth double-digit equity return in the past eight years. During that time period (since 2009), US equities have seen annualized total returns of 14.5%. This marks the highest rolling eight-year US equity performance since 2000 (17.2%).
- **The post–global financial crisis 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 (1900–2016) earned a 9.5% nominal average annual compound return (AACR); UK equities (1900–2016), 8.8%; Australian equities (1912–2016), 10.8%; and Japanese equities (1921–2016), 11.2%. Over the past eight years post-crisis, US equities have posted a nominal AACR of 14.5% and UK equities, 11.1%. These returns are well above very long-term averages. Over the most recent ten-year period, which includes the crisis, AACRs are considerably lower, at 6.9% and 5.6%, respectively. For Australian and Japanese equities, the post-crisis and ten-year AACRs are 9.9% and 4.3%, and 9.1% and 0.3%, respectively. This highlights the impact of beginning and end point sensitivity, and reminds investors that even over periods as long as eight or ten years, the "average" is unlikely to be experienced.

Executive Summary

(continued)

- **Across regions, equities are most likely to post very long-term annualized returns greater than annual inflation.** Over the full historical period for each country, the return for equities was significantly higher than the AACR for benchmark government bonds (which ranged from 4.7% to 6.6%) and cash (which ranged from 3.8% to 4.9%), and also higher than the rate of inflation. The US has had the lowest level of inflation, averaging 3.0% annually, while the UK has averaged 3.7% annually, and Australia, 4.2%. Japan presents a special case for several reasons. For the full period (1921–2016), inflation has averaged 6.9% annually in Japan, but this includes a period of hyperinflation between 1944 and 1948, when prices rose a cumulative 6,000%. 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 have returned -1.1% annually, while the US, UK, and Australia have all realized AACRs more in line with their long-term historical averages.

- **Over the long term, equity investors are generally compensated for their risk taking, although regional variations exist.** Since 1900, US equity returns have exceeded bond returns during 76% 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 is less over the 25-year time horizon at 82%. Japan, where data begin in 1921, shows the lowest likelihood of equity outperformance in every period, with equities outperforming bonds 74% of the time in rolling monthly 25-year periods. Investors should also be cognizant that equities are subject to larger losses than bonds, particularly over shorter time horizons.

- **The most important factors for total return over time are growth in earnings and dividends, as the impact of multiple expansion/contraction is negligible given its mean-reverting nature.** Since 1900, two-thirds of US equities' real total return and more than 90% of UK equities' real total return has come from reinvesting dividends. Although dividends vary year to year, the compounding of dividends over time is incredibly important (especially during periods of economic decline), as it produces a steady stream of reliable income. For Australian equities, over the period for which we have the requisite component data (1970–2016), dividends contributed the entire total return as price returns were slightly negative in real terms. In Japan, low dividend yields for most of recent history have made dividends less impactful, accounting for just 36% of total real returns.

Executive Summary

(continued)

- **Starting valuations and subsequent equity returns are related, though for shorter periods (one, three, even five years), the relationship is weak.** Normalized valuations and subsequent returns show stronger relationships over longer time periods (e.g., 15-year subsequent returns), but in no case do starting valuations completely explain subsequent returns—many factors can influence equity returns. At December 31 valuations, the average subsequent 15-year real return for US equities has been about 2%; for UK equities, 5%; and for Australian equities, 5%.
- **Given that the presence of relatively high or low valuations alone does not cause markets to reverse course, waiting for valuations to revert to the 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, provide little room for error, informing the aggressiveness of one's investment stance. Though the timing and catalysts for change vary, the historical record across regions presented in this report is clear—periods of low valuations have been followed by higher long-term subsequent returns, while periods of high valuations have been followed by poorer long-term returns.
- **Dividend yields on stocks have also shown a relationship to subsequent returns, though not one as strong as valuations.** In Australia, Japan, and the US, the periods with dividend yields in the top decile have always been associated with above-average subsequent 15-year returns. This has not been true in the UK, where the relationship between dividend yields and subsequent returns is weakest. Dividend yields in the US are currently around the 22nd percentile of the historical distribution, where subsequent real 15-year returns have fallen within a range of 2.3% to 3.6%. 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.

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- **The entry yield is the strongest predictor of subsequent nominal ten-year bond returns**, and with bond yields at or near all-time 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-plus years, with bonds posting strong returns across all these markets (AACRs of 10.4%, 9.6%, and 8.3%, respectively, since 1981), future returns are likely to be capped. Japan's experience, where bond yields have been below 5% since November 1992, may serve as a guide. Since July 1993, no rolling monthly trailing nominal ten-year return on Japanese bonds has exceeded 5%, and nearly half of these 149 observations have been nominal trailing ten-year returns of less than 2%.
- **Although rising interest rates are popularly regarded as detrimental to equity prices, this is not necessarily so**—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. The very weak statistical link between short-term interest rates and subsequent five-year returns across all regions reinforces the conclusion that the reason for changes in rates matters more than the absolute level of rates. A closer look at the performance of US equities, US bonds, and cash during historical periods of US Federal Reserve rate hike cycles furthers the conclusion 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. Extreme valuations are a better predictor of subsequent returns than measures of economic growth.

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.

- **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.

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

(continued)

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 price-earnings (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.
- 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–adjusted earnings.

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[2] Page 60 of this report shows a Shiller P/E chart back to 1880 using data provided by Professor Robert J. Shiller before 1936.

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Bond Data

The long-term bond series for each region is calculated and provided by Global Financial Data, Inc. and in the case of the UK, Thomson Reuters Datastream (post 1980).

- **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.

(continued)

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

(continued)

Cash Data

- **US:** The money market instrument return series is composed of the Global Financial Data USA Total Return Commercial/T-Bill Index from 1900 to March 1970, which used commercial bills from 1900 to 1918 and Treasury bills from 1918 on. 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:** To calculate total returns, the index uses the yield on Treasury bills from 1900 on.

- **Japan:** 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:** To calculate total returns, the index uses the bank deposit rate from 1900 until June 1928 and Treasury bill yields thereafter.

Recent Trends in the Macro Environment

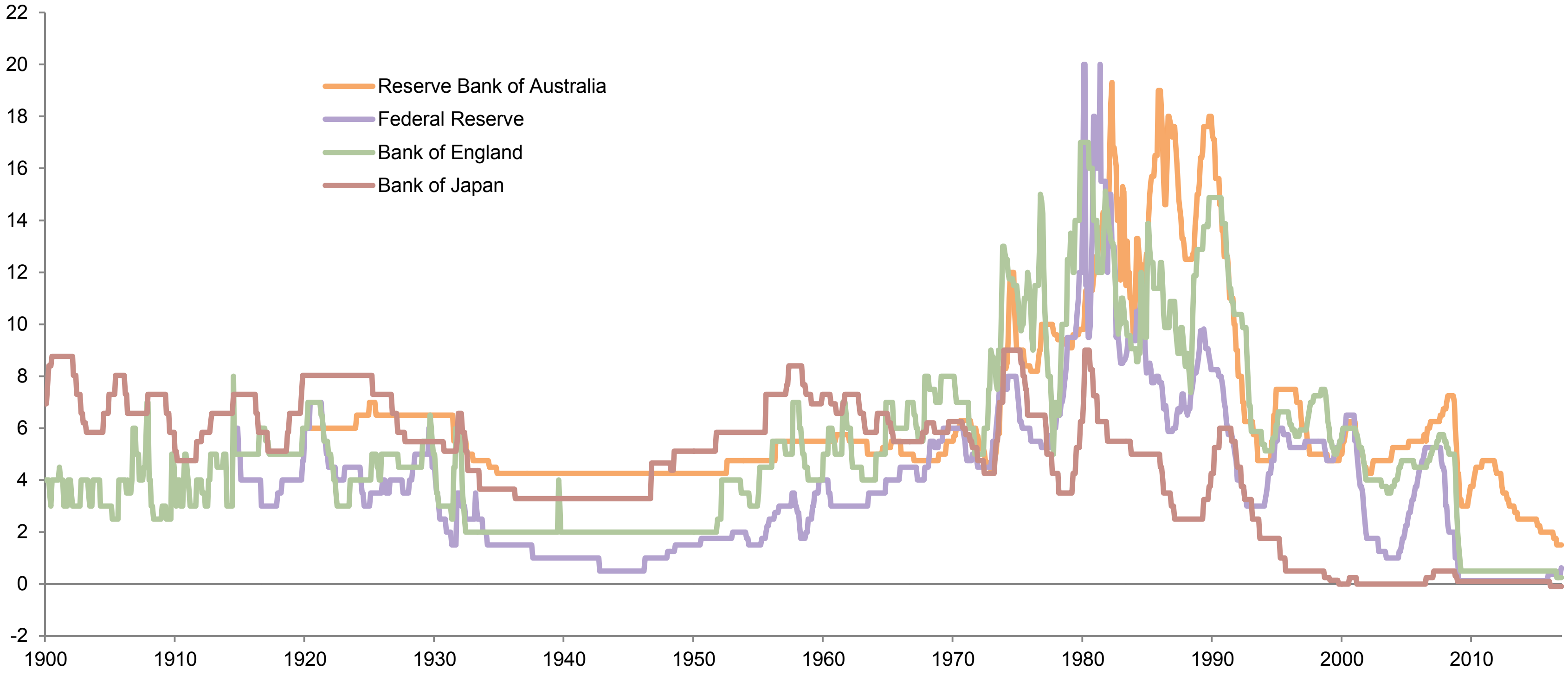
Did the macro and market environment turn a corner in 2016? Some prominent features of the investment landscape over the past several years, including record low policy rates, declining bond yields, and low inflation tilting toward deflation, began to reverse as the year closed. While it is far too soon to evaluate if 2016 will mark a new secular trend in several important market and economic indicators, on the following slides we look at these key metrics and examine how the recent environment has been different from (or similar to) historical environments.

Global policy rates in recent years have been uncommonly low

Since peaking in the early 1980s, policy rates have trended downward to near zero in several regions. Policy rates for Australia, Japan, and the UK hit unprecedented lows in 2016. The US, after maintaining its lowest policy rate on record for seven years, hiked rates by 25 bps at the end of 2015 and another 25 bps at the end of 2016. Still, rates across these markets remain far below average, and monetary policy, which has moved in sync in recent years, has started to diverge.

Global Policy Rates

January 31, 1900 – December 31, 2016 • Percent (%)



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

US rate hike cycles have seen varied macro conditions

With the Fed embarking on a rate hike cycle, we examined economic conditions in the past four cycles when the Fed hiked rates by 100 bps or more. Many factors influence the performance of risk assets, and key macro and market conditions—including GDP growth, inflation rate, bond spreads, corporate profit margins, and normalized valuations—have differed across these cycles, making it difficult to draw parallels.

Economic and Market Conditions in Last Four US Rate Hike Cycles versus Today

	Mar 1988 – May 1989	**Feb 1994 – Jun 1995**	**Jun 1999 – Dec 2000**	**Jun 2004 – Aug 2007**	**Dec 2015 – ?**
Rate Hike During Period	331 bps	300 bps	175 bps	425 bps	50 bps*
Length of Cycle (Months)	15	17	19	39	13*
Composite Normalized P/E:					
Start of Cycle	12.8	17.9	36.2	22.0	22.4
End of Cycle	14.0	19.0	32.1	22.7	--
Corporate Profit Margins:					
Start of Cycle	7.0% (below average)	8.1% (below average)	8.1% (below average)	11.2% (above average)	9.6% (above average)
End of Cycle	6.2% (below average)	8.5% (below average)	5.2.% (below average)	8.7% (below average)	--
2-Yr/10-Yr Treasury Spread:					
Start of Cycle	103 bps	158 bps	22 bps	212 bps	127 bps
End of Cycle	-22 bps	42 bps	1 bp	39 bps	--
GDP Growth:					
Start of Cycle	4.3% and flat	3.4% and rising	4.6% and flat	4.2% and falling	1.9% and falling
End of Cycle	3.8% and falling	2.4% and flat	2.9% and falling	2.3% and falling	--
Inflation Rate:					
Start of Cycle	3.95% and flat	2.52% and flat	2.09% and rising	3.05% and rising	0.50% and rising
End of Cycle	5.36% and falling	3.04% and falling	3.39% and flat	1.97% and rising	--

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

Notes: Chart shows the last four rate hike periods of at least 100 bps. GDP data based on quarterly data. GDP and inflation trends are based on overall trends at the time and might not reflect the actual point in time change.

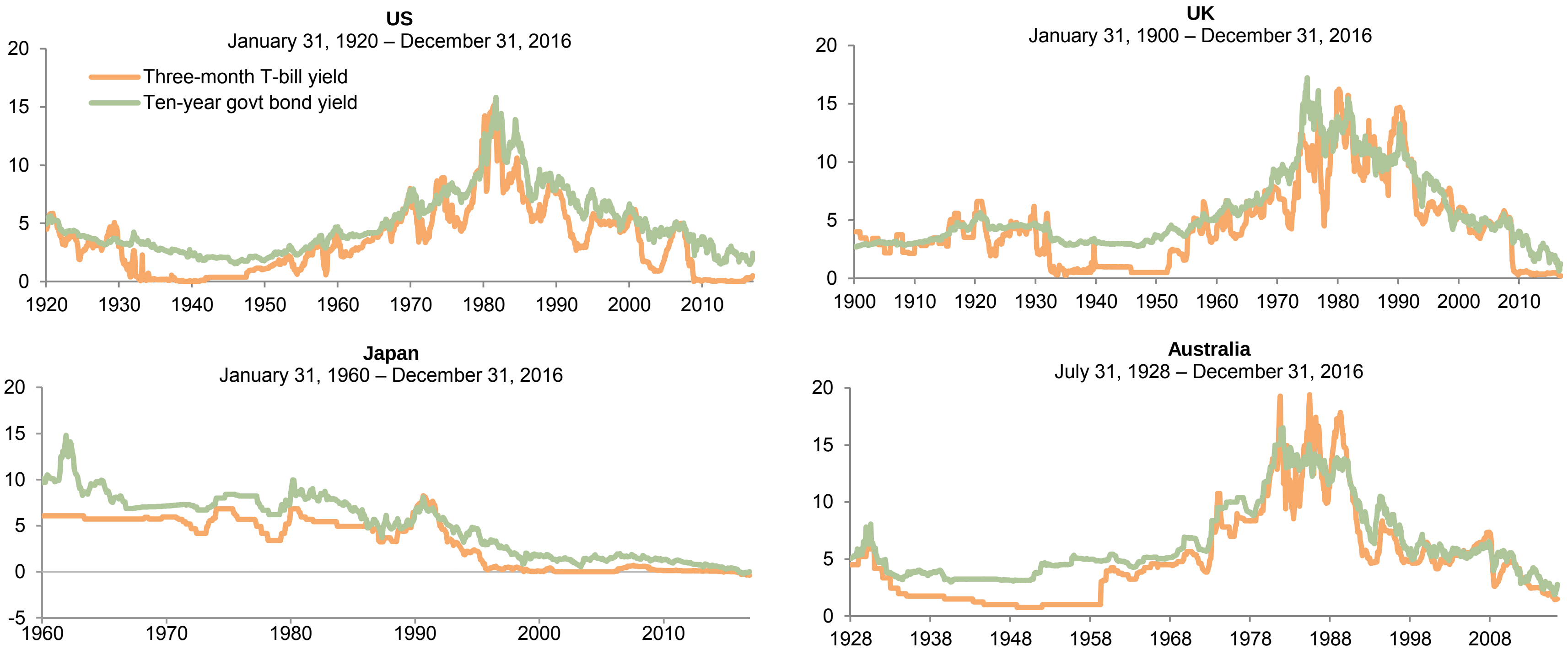
* Represents data through year-end 2016.

The bond rally of the past 30 years saw yields hit their lowest-ever levels in June

Ten-year government bonds hit their lowest-ever closing yields in mid-2016 across all four regions. The decline in yields since the 1980s in Australia, the UK, and the US represents a 30+ year bond bull market. Will the lows in 2016 have marked a secular shift? Following the November US presidential election, the ten-year Treasury bond yield reached its highest level in over two years. If recent trends in the US and other markets are sustained, a secular bear market in bonds could be forthcoming.

Three-Month Treasury Bill and Ten-Year Government Bond Yields

Percent (%)



US
January 31, 1920 – December 31, 2016

UK
January 31, 1900 – December 31, 2016

Japan
January 31, 1960 – December 31, 2016

Australia
July 31, 1928 – December 31, 2016

Source: Global Financial Data, Inc.
Note: Yield data are monthly.

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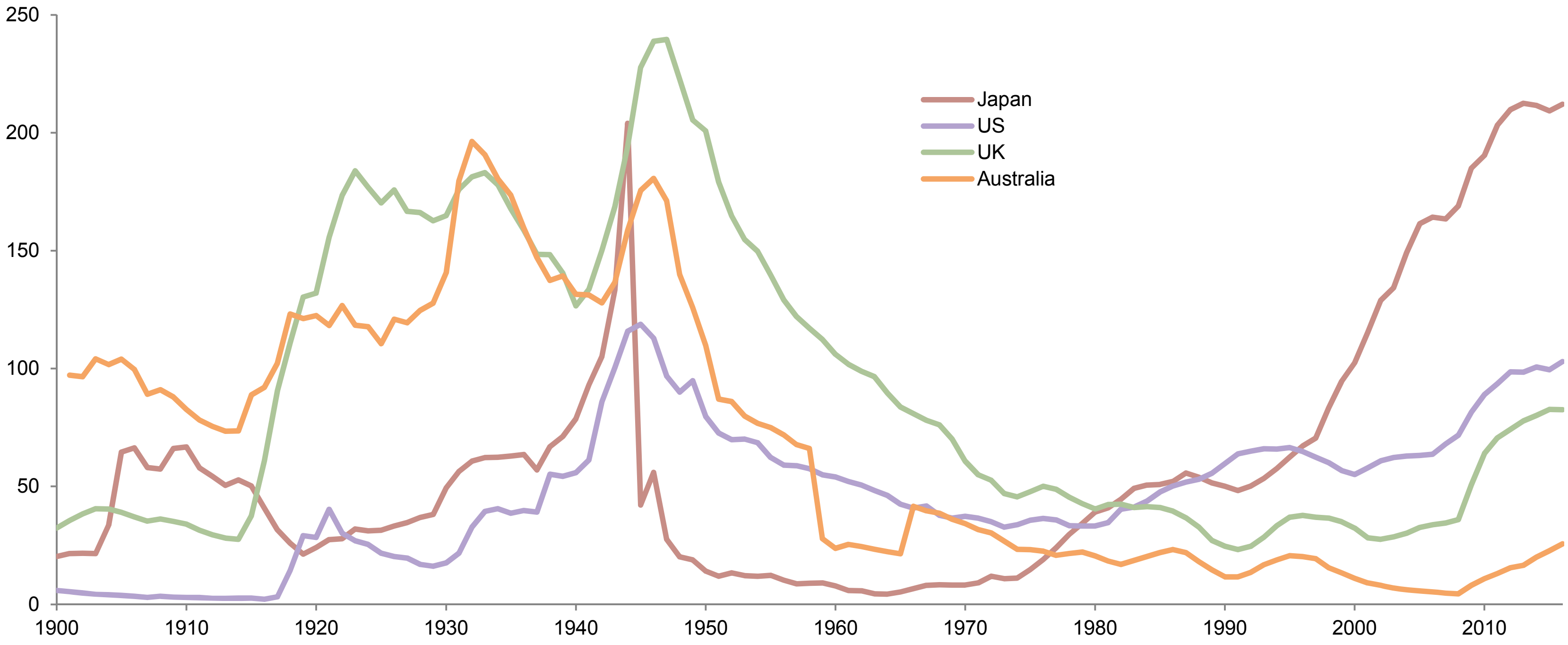
If monetary policy limits have been reached, expanded fiscal policy could be next

Rates of growth in government debt to GDP have accelerated since the global financial crisis, though outside of Japan, debt-to-GDP ratios are below their highest levels. As the limits of monetary policy may have been reached, fiscal policy could pick up the baton and future years may see debt to GDP continue to pick up, particularly if GDP growth remains as low as it has in recent years.

Central Government Gross Debt as Percent of GDP

1900 – 2016 • Percent (%)



Sources: Global Financial Data, Inc. and OECD.

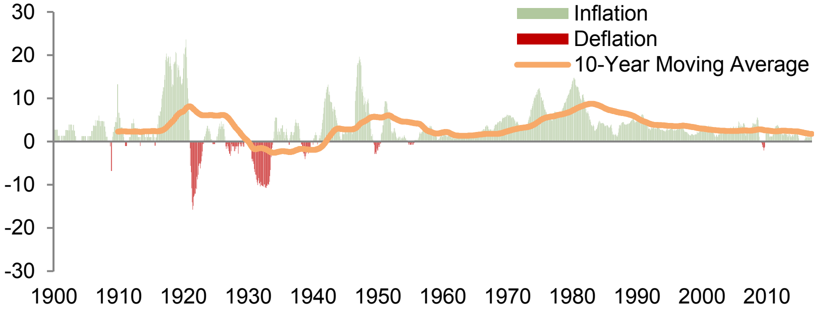
Notes: Data are annual and nominal. Australia data begin 1901. Australia, Japan, and UK fourth quarter 2016 GDP data are estimates from the November 2016 OECD Economic Outlook.

Inflation has stabilized at very low levels in recent decades

Across developed regions, inflation is very 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. Over the past five years, Australia, Japan, and the US have seen the lowest annualized price increases in half a century. The consensus expects global reflation in 2017, a potential turning point in the global economic landscape.

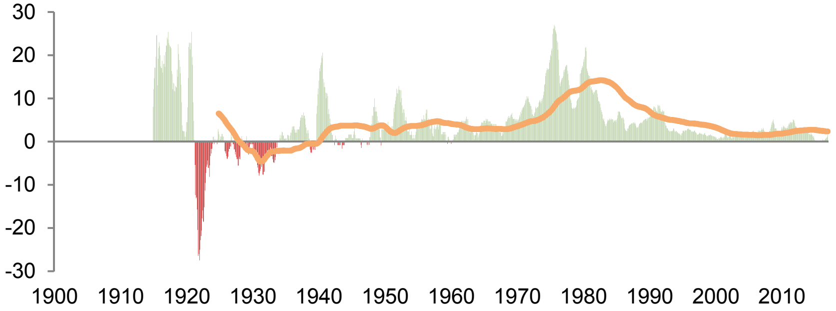
US Inflation

1900–2016 • Year-Over-Year (%)



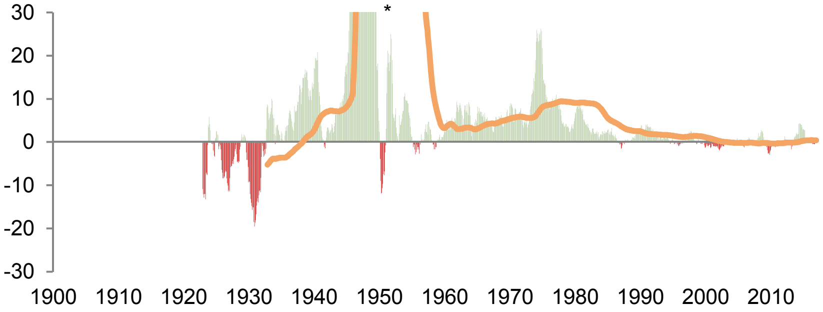
UK Inflation

1914–2016 • Year-Over-Year (%)



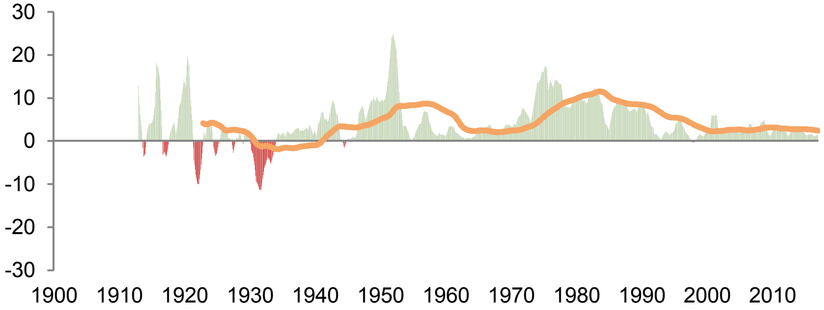
Japan Inflation

1922–2016 • Year-Over-Year (%)



Australia Inflation

1912–2016 • Year-Over-Year (%)



Source: Global Financial Data, Inc.

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.

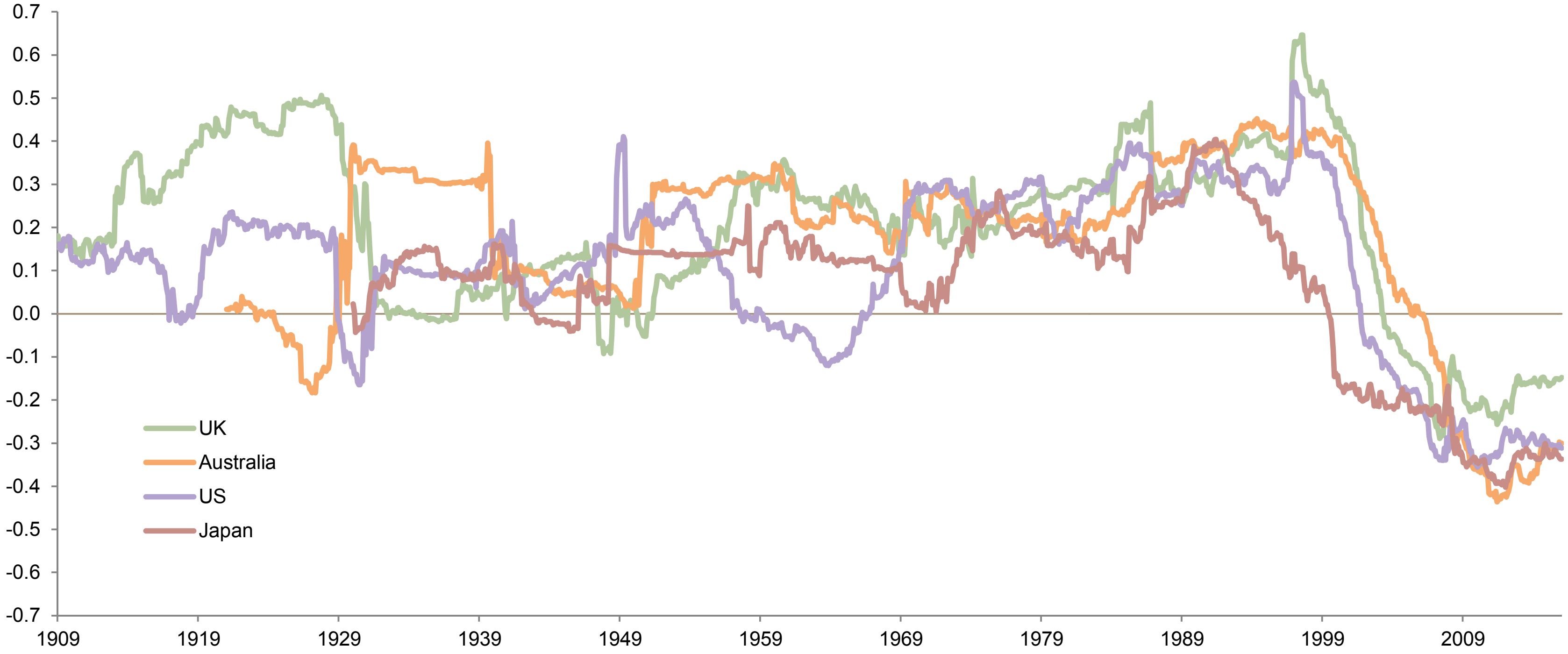
* Japan inflation data has been capped at 30%. Inflation peaked at 780% year-over-year in 1946.

Correlations of stocks and bonds are lower than ever

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 Ten-Year Correlations of Stock and Bond Returns

December 31, 1909 – December 31, 2016 • 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.

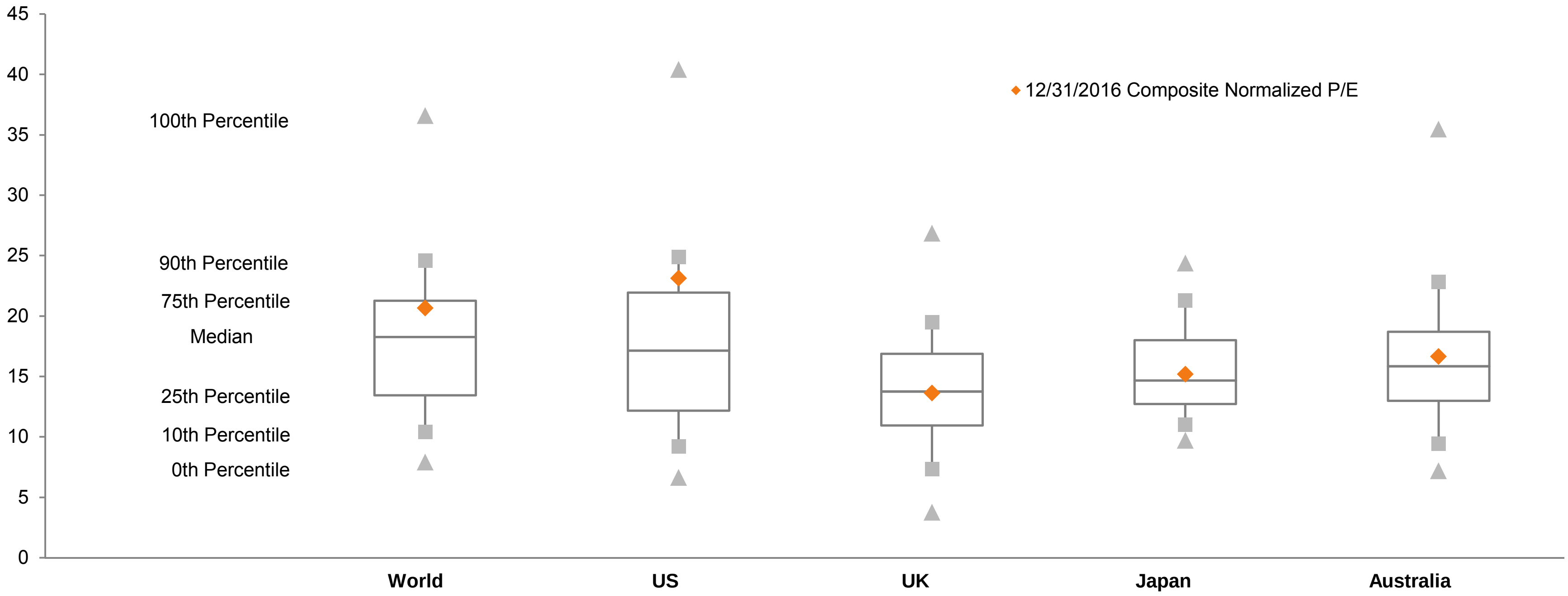
Notes: Data for the US and UK begin on January 31, 1900. Data for Australia begin on January 31, 1912. Data for Japan begin on January 31, 1921. All return data are monthly.

Though many factors distinguish the recent environment, valuations are not one

At the end of 2016 valuations for developed markets equities as a whole and for Australia, Japan, and the UK were within our fairly valued range. US valuations were more elevated, though the long tail in the US distribution is a reminder of just how extreme US valuations have been (40.4 in December 1999).

Composite Normalized Price-Earnings Ratios by Region

As of December 31, 2016



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 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. Comparing any Japanese equity valuation metric to its long-term median can be challenging given elevated valuations that persisted in the 1980s and 1990s, as well as extremely volatile index profits. Also, Japan's economy has seen significant structural changes since that time, making historical data less relevant to the current environment. As such, we use the post-2001 ROE-adjusted P/E for Japan.

Historical Returns

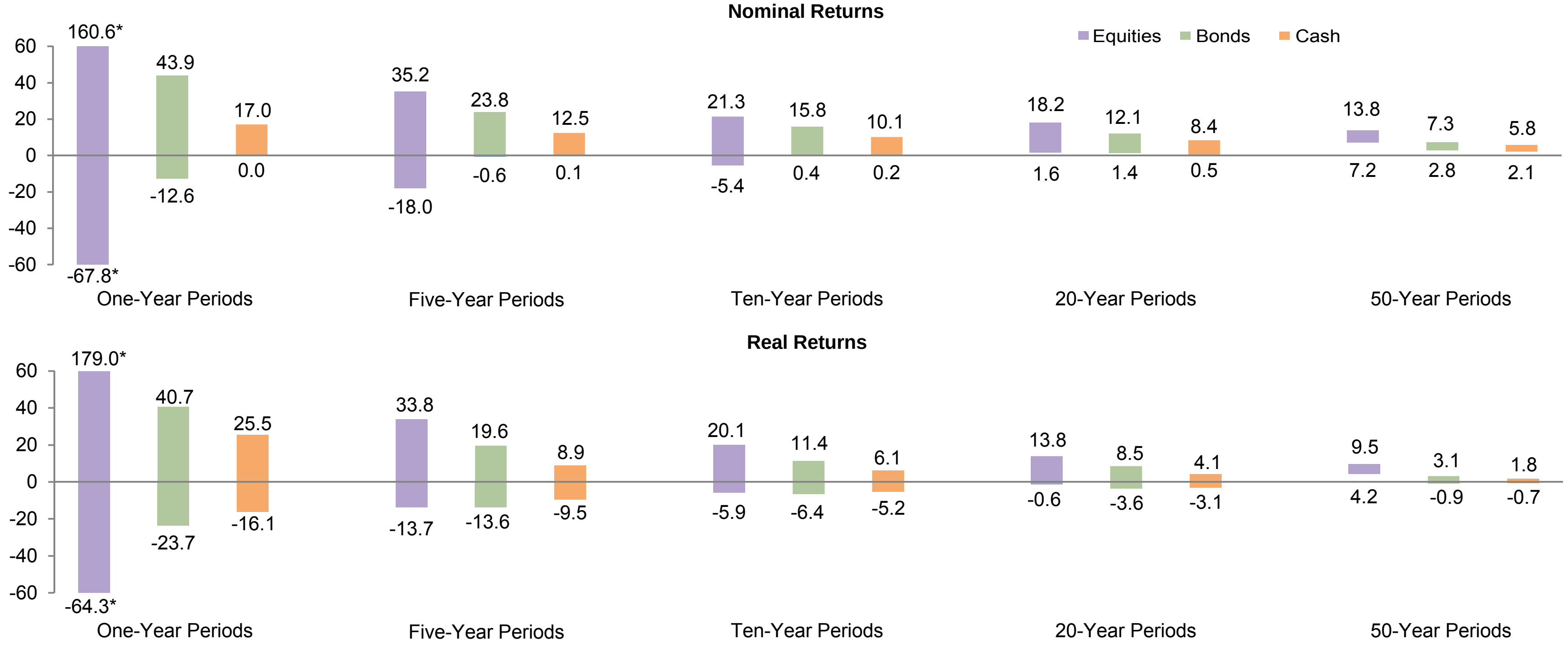
Equity, bond, and cash returns can vary dramatically from year to year, but no matter the asset class or the region, the range of returns narrows as the holding period increases. Equities are considered the riskiest of these three asset classes and therefore carry a risk premium, which varies over time and depending on the region. On a rolling three-year basis, average equity outperformance of bonds has ranged from 3.2% (UK) to 5.6% (Japan). Over the long term, equity returns have exceeded those of bonds and cash, though regional differences exist, with US and UK equities most likely to outperform bonds over long time horizons. Over rolling three-year periods, global bonds have outperformed cash by an average margin of between 0.9% (US) and 2.3% (Japan). However, cash can outperform bonds, particularly during periods of unexpected inflation and rising rates.

Investments become more range bound as holding periods increase

Time increases the probability of earning positive returns, and the range of possible returns narrows as the holding period increases. 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.

Range of Equity, Bond, and Cash Returns for Various Rolling Monthly Time Horizons: US

1900–2016 • Average Annual Compound Return (%)



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

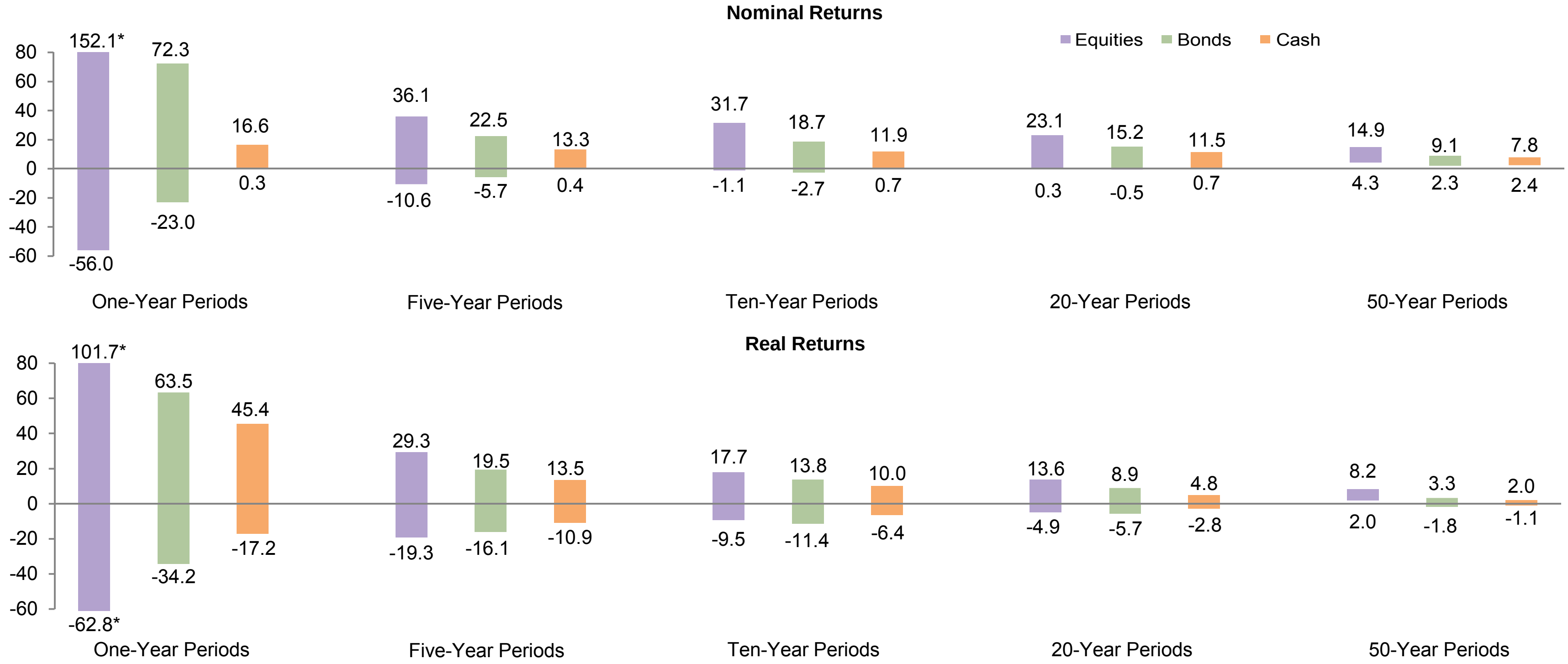
* Axis capped for scaling purposes.

Investments become more range bound as holding periods increase

In the UK, return ranges show similar outcomes to those of US investments. However, real UK equity returns are lower due to higher inflation. Over prolonged time periods, equities prevail; in every rolling 50-year period since 1900, UK equities have outperformed bonds and cash on a real annualized basis.

Range of Equity, Bond, and Cash Returns for Various Rolling Monthly Time Horizons: UK

1900–2016 • Average Annual Compound Return (%)



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.

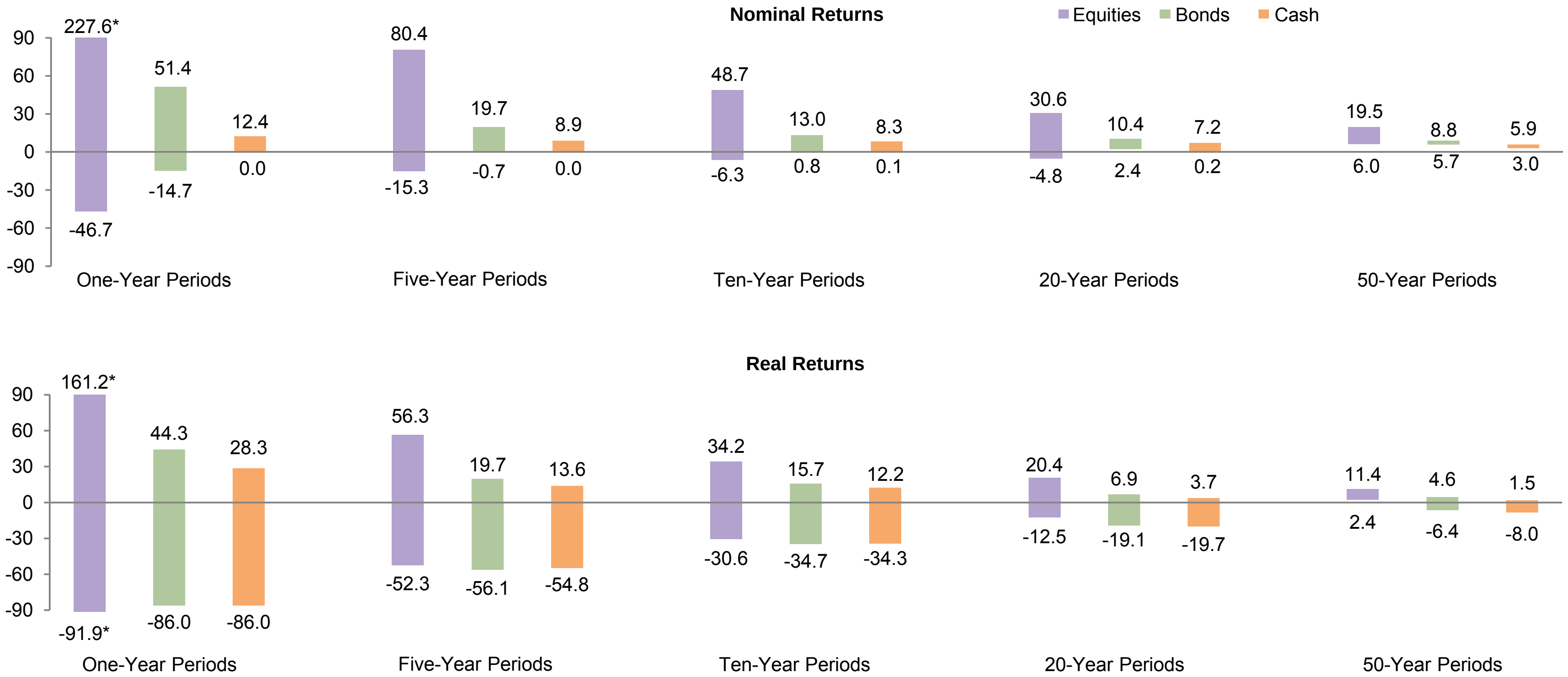
* Axis capped for scaling purposes.

Investments become more range bound 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 generally show lower troughs than the other countries for the same reason. While Japanese equities show the highest nominal and real AACRs of the four countries in our analysis, Japan is the only country where bonds have occasionally outperformed equities over 50-year periods.

Range of Equity, Bond, and Cash Returns for Various Rolling Monthly Time Horizons: Japan

1921–2016 • Average Annual Compound Return (%)



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

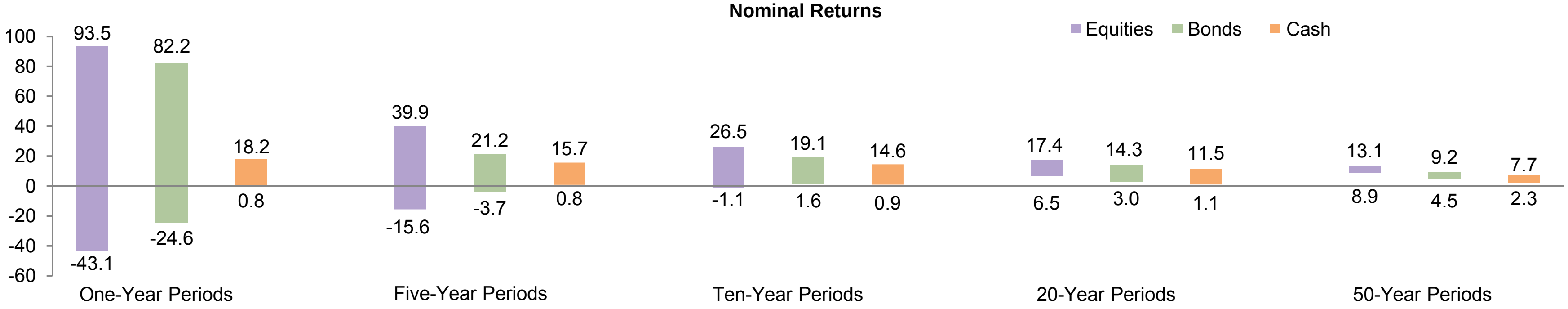
* Axis capped for scaling purposes.

Investments become more range bound as holding periods increase

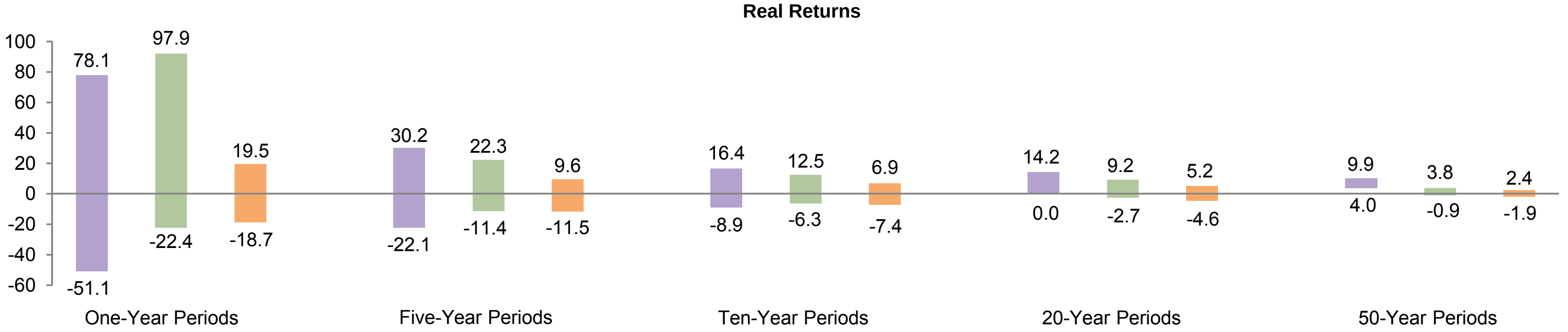
Australia is the only country in our analysis where the top one-year equity return was not higher than bonds and cash, with bonds returning 98% real from February 1931 to January 1932. Excluding this outlier or looking at medians, the return trends mimic those of other countries. Like in the US, real rolling 50-year periods show a minimum real equity AACR (4.0%) greater than both the maximum bond (3.8%) and cash (2.4%) AACRs.

Range of Equity, Bond, and Cash Returns for Various Rolling Monthly Time Horizons: Australia

1912–2016 • Average Annual Compound Return (%)



Nominal Returns



Real Returns

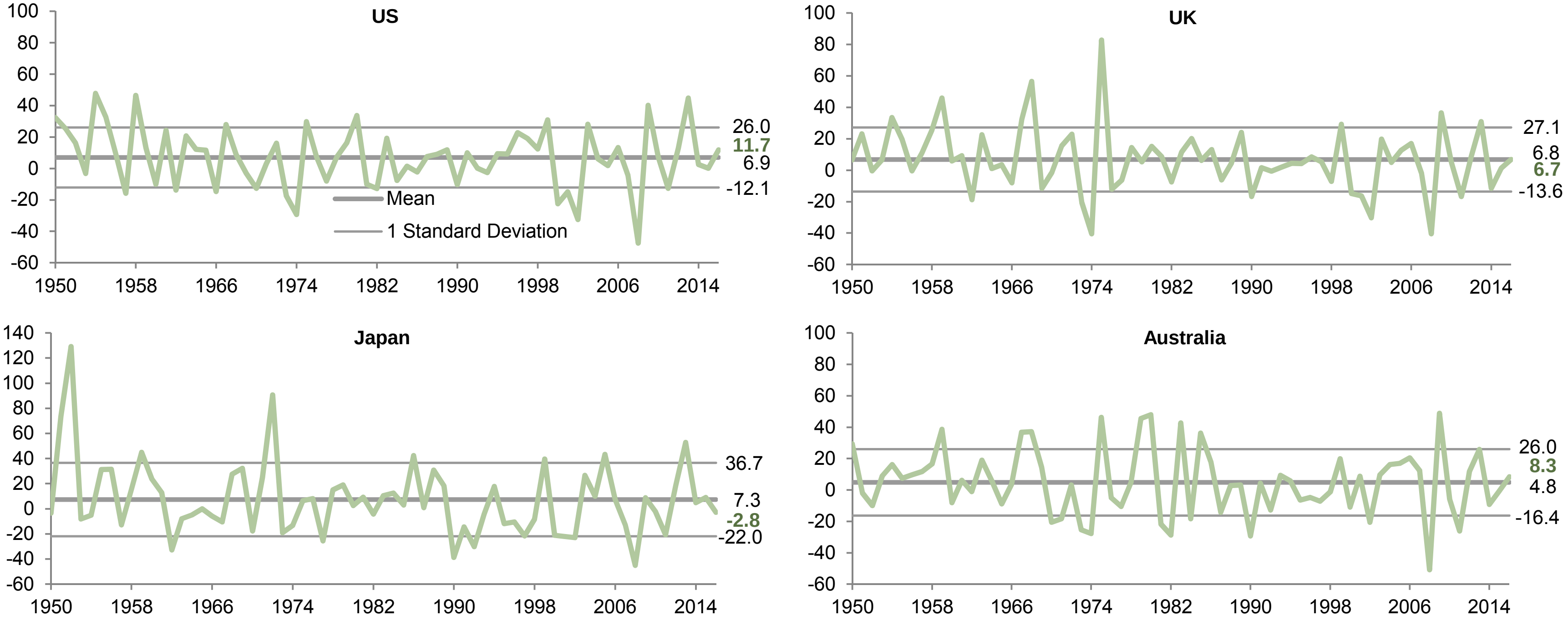
Sources: Global Financial Data, Inc., MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

The equity risk premium is volatile but mean reverting over time

Since 1950, equities have outperformed bonds by an average of ~5% to ~7% annually, depending on the region. This premium is quite volatile, particularly in periods of market stress. In the US, UK, and Australia, equities have outperformed bonds roughly two-thirds of the time. In Japan, that figure is lower at 54%.

Realized Annual Excess Returns of Equities Over Bonds

1950–2016 • 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.

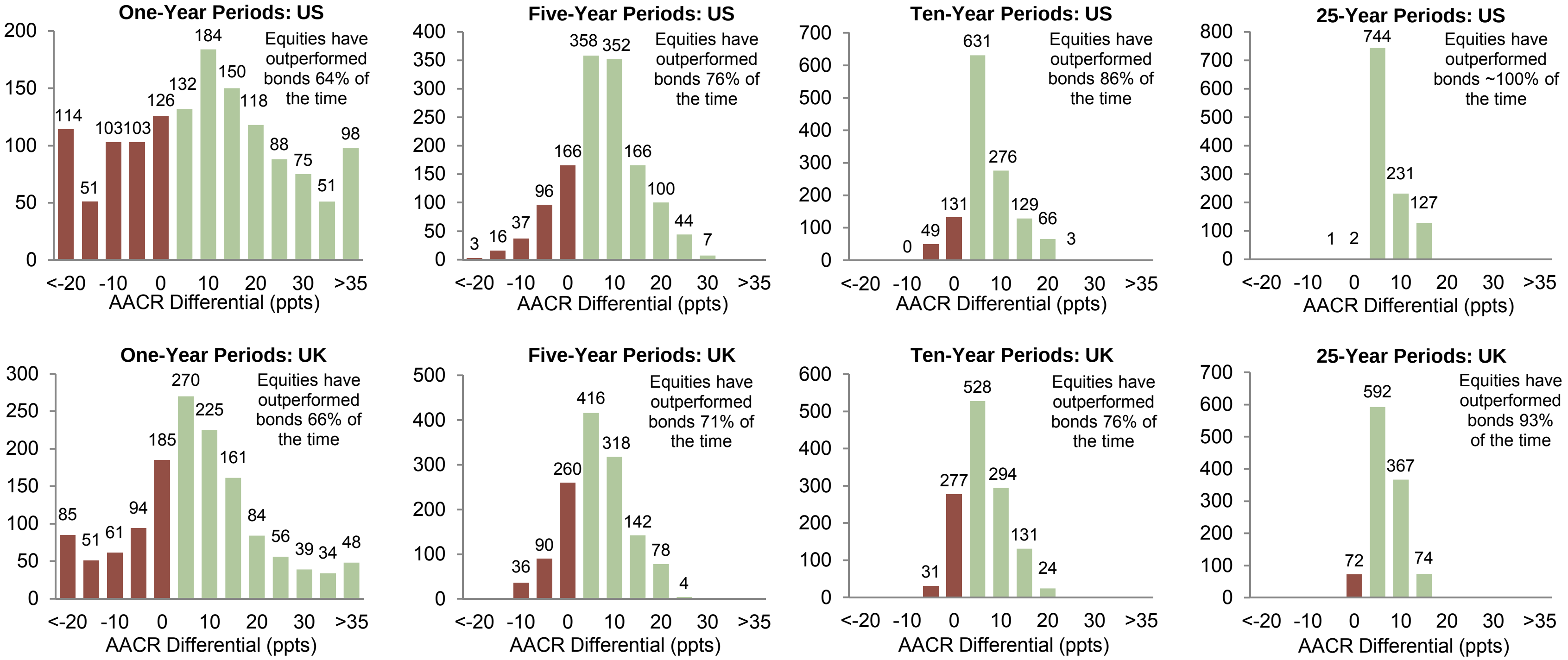
Note: Realized annual excess return is based on the geometric difference between equities and bonds.

Equities are consistently attractive relative to bonds over the long term

In the US, equities have outperformed bonds over the long term virtually 100% of the time. In the UK, the same strong outperformance occurs, at 93% of the time. Over five- and ten-year time horizons, excess equity returns tend to follow a normal distribution. However, over one-year time horizons, fat tails exist on both the left and right extremes, particularly in the US.

Excess Returns of Equities Over Bonds

1900–2016 • Number of Rolling Monthly Periods



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

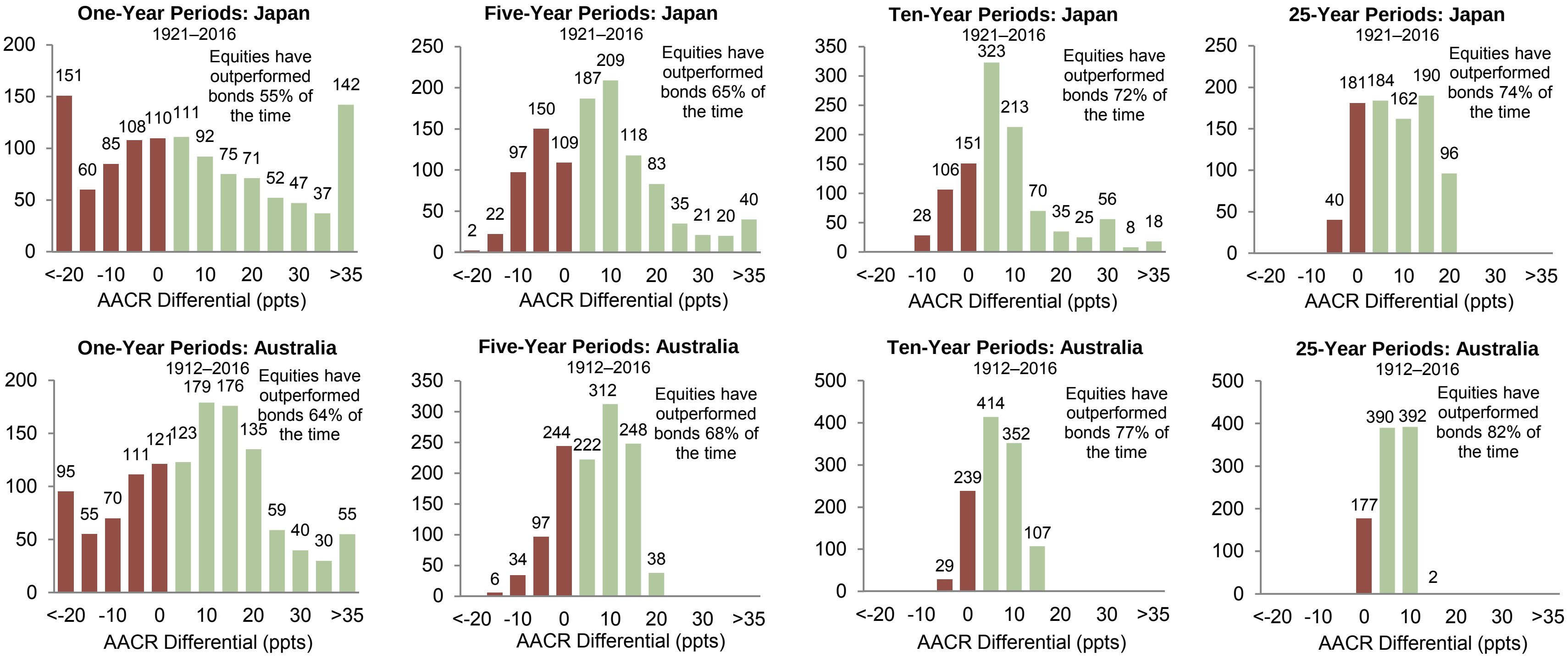
Notes: Buckets represent ranges of 5 ppts each with the label denoting the high end of the range, inclusive. For example, the "0" bucket corresponds to the number of rolling monthly periods in which the excess return of equities over bonds was greater than -5 but equal to or less than zero.

Equities are consistently attractive relative to bonds over the long term

Australian equity/bond excess returns have a similar profile to the UK and the US. Excess Japanese equity returns display greater upside and downside over the long term: over rolling monthly 25-year periods, equities underperformed bonds by more than 5 ppts nearly 5% of time and outperformed bonds by more than 15 ppts over 11% of the time, values not seen in other countries. Similarly, the left- and right-hand tails for one-year excess returns are much larger for Japan than for the other three countries.

Excess Returns of Equities Over Bonds

Number of Rolling Monthly Periods



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

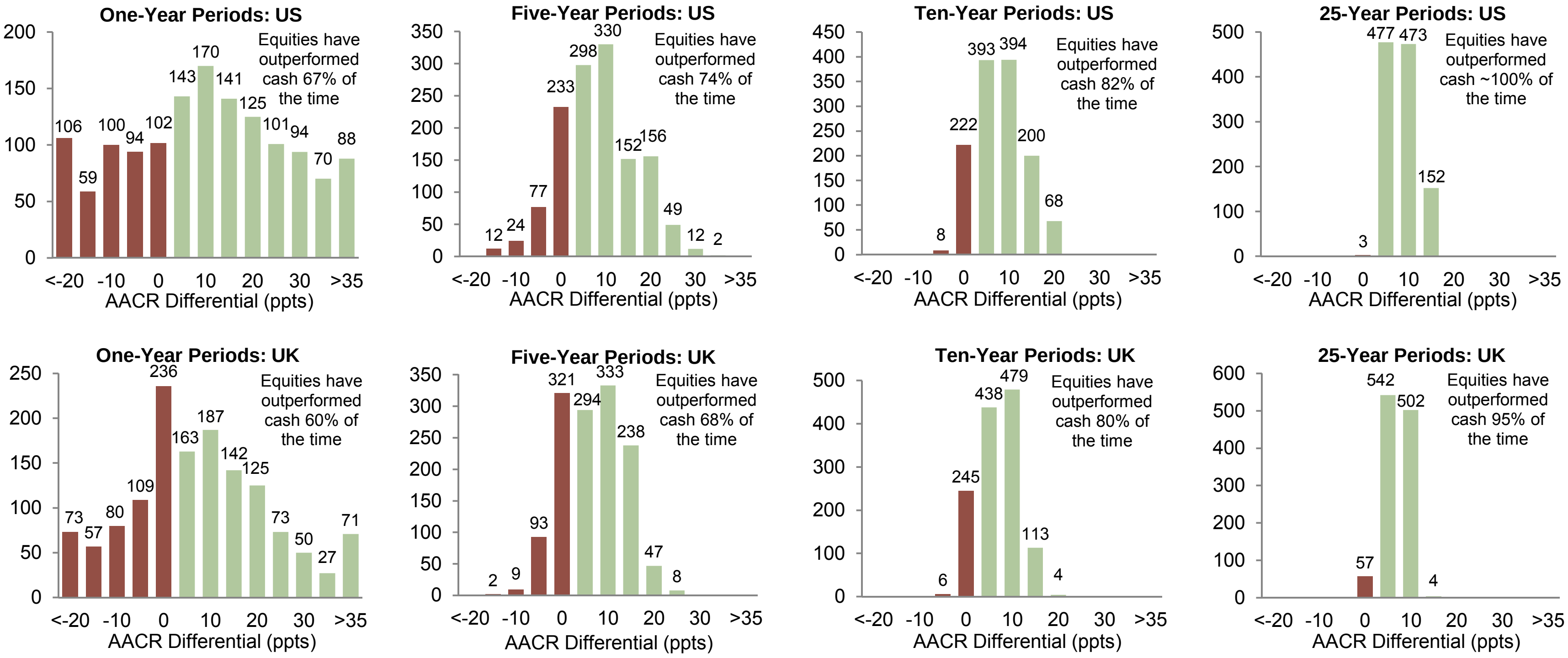
Notes: Buckets represent ranges of 5 ppts each with the label denoting the high end of the range, inclusive. For example, the "0" bucket corresponds to the number of rolling monthly periods in which the excess return of equities over bonds was greater than -5 but equal to or less than zero.

Equities are consistently attractive relative to cash over the long term

Excluding three periods in the first decade of the twentieth century, US equity returns have beaten cash in 100% of rolling monthly 25-year periods. In the UK, equity returns have exceeded cash returns in 95% of rolling monthly 25-year periods. This relationship weakens as the time frame shortens—over ten-year windows, US and UK equities outperform cash 82% and 80% of the time, respectively.

Excess Returns of Equities Over Cash

1900–2016 • Number of Rolling Monthly Periods



One-Year Periods: US

Equities have outperformed cash 67% of the time

Five-Year Periods: US

Equities have outperformed cash 74% of the time

Ten-Year Periods: US

Equities have outperformed cash 82% of the time

25-Year Periods: US

Equities have outperformed cash ~100% of the time

One-Year Periods: UK

Equities have outperformed cash 60% of the time

Five-Year Periods: UK

Equities have outperformed cash 68% of the time

Ten-Year Periods: UK

Equities have outperformed cash 80% of the time

25-Year Periods: UK

Equities have outperformed cash 95% of the time

Sources: Federal Reserve, FTSE International Limited, Global Financial Data, Inc., Standard & Poor's, Thomson Reuters Datastream, and UK Debt Management Office.

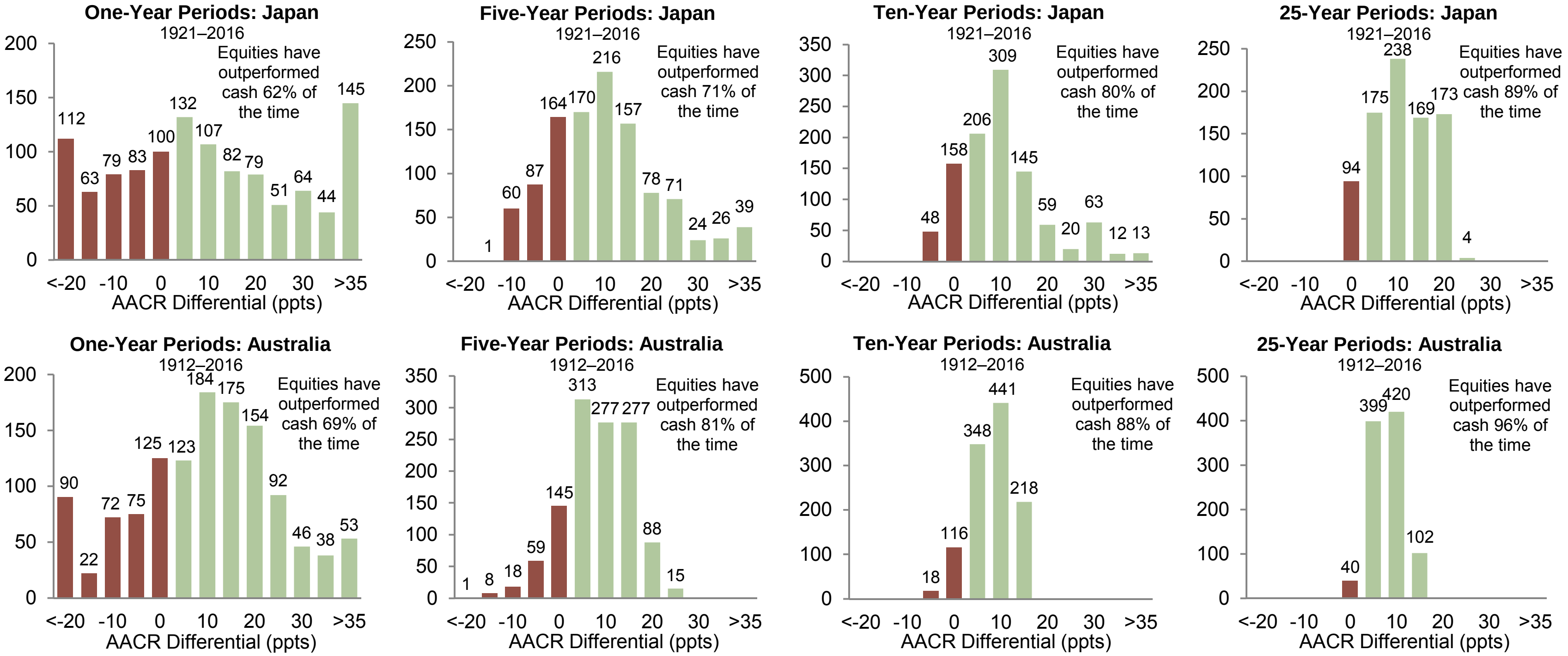
Notes: Buckets represent ranges of 5 ppts each with the label denoting the high end of the range, inclusive. For example, the "0" bucket corresponds to the number of rolling monthly periods in which the excess return of equities over cash was greater than -5 but equal to or less than zero.

Equities are consistently attractive relative to cash over the long term

Australian equity returns have beaten cash in 96% of rolling monthly 25-year periods. In Japan, equity returns have exceeded cash returns in 89% of rolling monthly 25-year periods. Japan again shows a distribution of excess equity returns over cash with greater upside and downside in both long and short time horizons.

Excess Returns of Equities Over Cash

Number of Rolling Monthly Periods



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

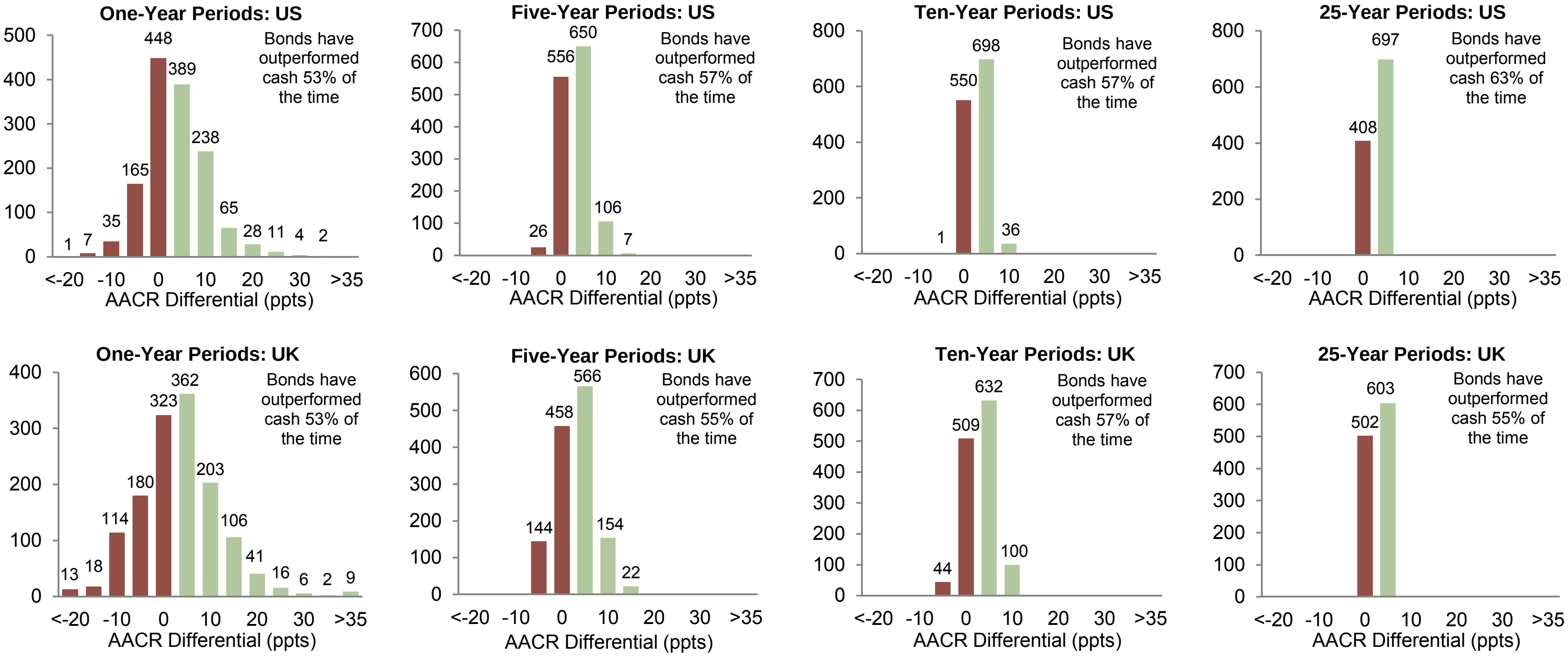
Notes: Buckets represent ranges of 5 ppts each with the label denoting the high end of the range, inclusive. For example, the "0" bucket corresponds to the number of rolling monthly periods in which the excess return of equities over cash was greater than -5 but equal to or less than zero.

Bonds’ outperformance of cash varies dramatically by country

In the US, bonds have outperformed cash about two-thirds of the time over 25-year rolling monthly time periods. However, in shorter term periods, this relationship is closer to 50/50. In the UK, the ~50/50 relationship holds across various time periods. While cash faces constant inflationary risks, bonds face interest rate risk that can impair their performance relative to cash.

Excess Returns of Bonds Over Cash

1900–2016 • Number of Rolling Monthly Periods



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

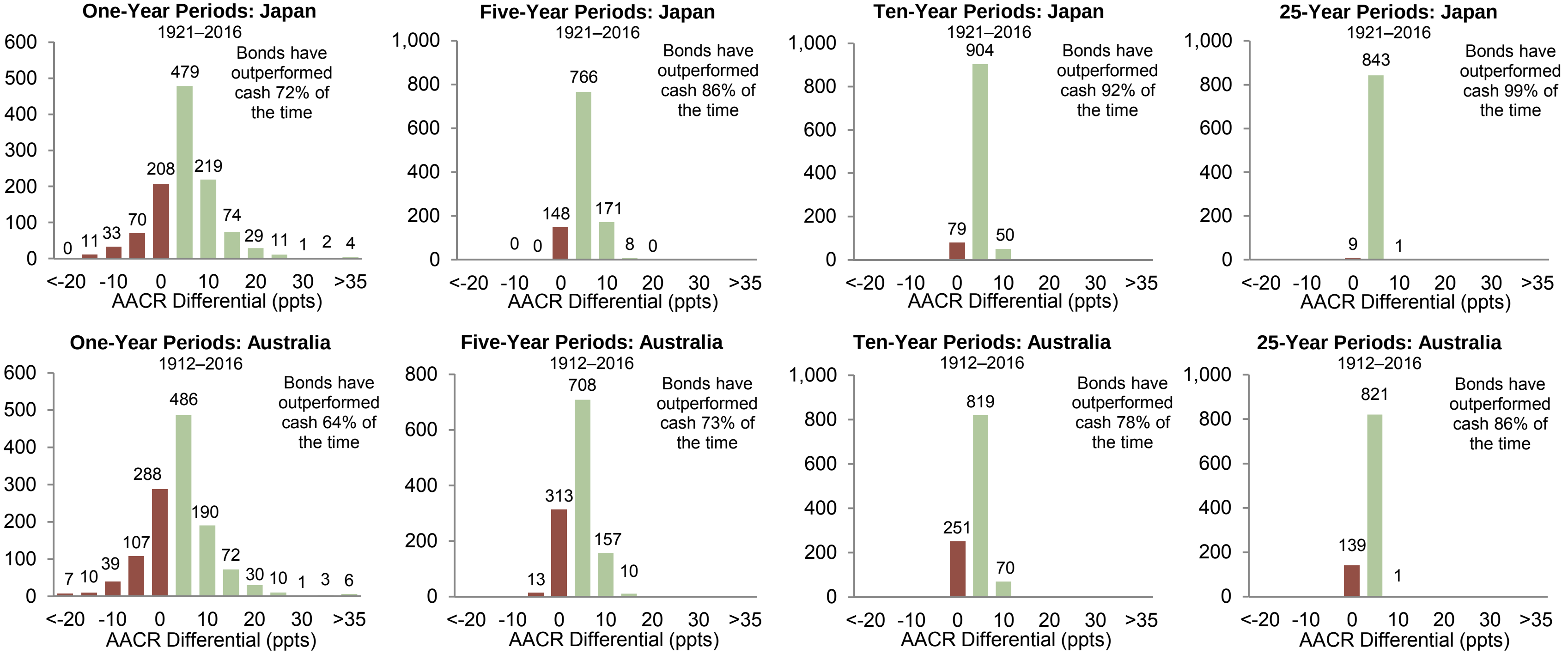
Notes: Buckets represent ranges of 5 ppts each with the label denoting the high end of the range, inclusive. For example, the "0" bucket corresponds to the number of rolling monthly periods in which the excess return of equities over cash was greater than -5 but equal to or less than zero.

Bonds’ outperformance of cash varies dramatically by country

Japan and Australia show a different experience from the UK and US. In Japan, bonds have outperformed cash in nearly 100% of all 25-year rolling monthly observations. High inflationary periods coupled with paltry cash yields have driven this dispersion. Australian investors have also been compensated for risk over long-term periods, as bonds have outperformed cash 86% of the time over rolling 25-year periods.

Excess Returns of Bonds Over Cash

Number of Rolling Monthly Periods



Source: Global Financial Data, Inc.

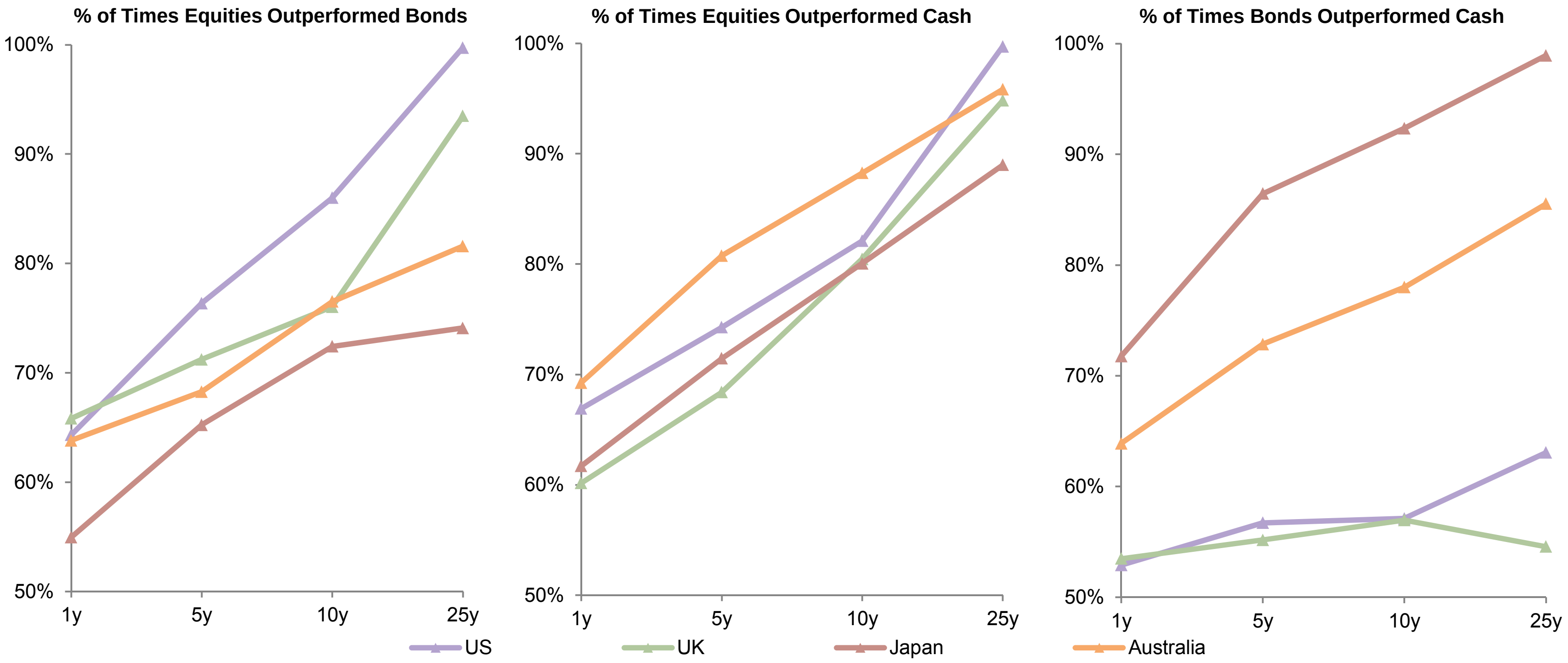
Notes: Buckets represent ranges of 5 ppts each with the label denoting the high end of the range, inclusive. For example, the "0" bucket corresponds to the number of rolling monthly periods in which the excess return of equities over cash was greater than -5 but equal to or less than zero.

Risk assets outperform more frequently in the long run

The benefits of holding equities over bonds and cash are clear in the long run. In the US, equities have outperformed bonds and cash in nearly 100% of rolling 25-year periods since 1900. In other regions, the outperformance is strong, but not a certainty. The relationship between bonds and cash, however, is not as clear. Shifting macroeconomic factors—particularly interest rates and inflation—affect the relative returns of bonds versus cash over time.

Relative Performance of Equities, Bonds, and Cash Across Regions

1900–2016

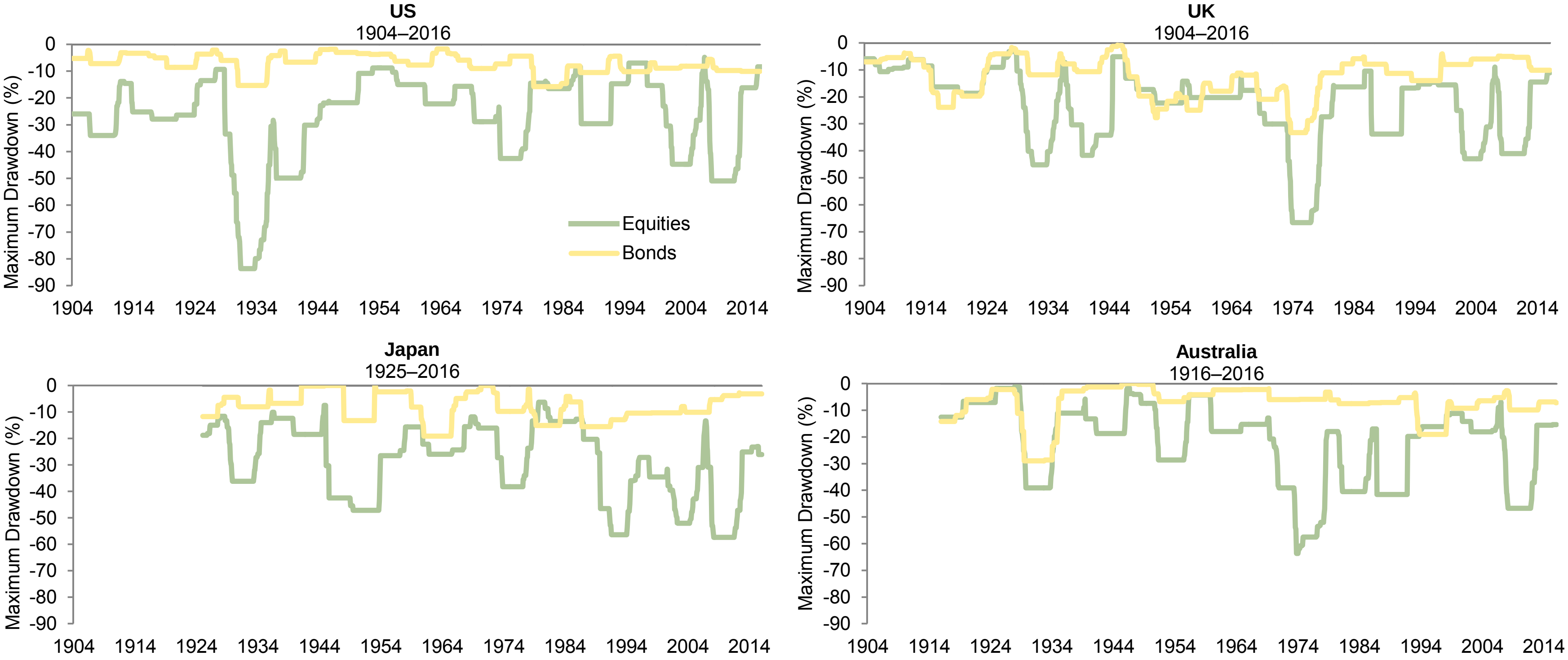


Sources: Federal Reserve, FTSE International Limited, Global Financial Data, Inc., MSCI Inc., Standard & Poor's, Thomson Reuters Datastream, and UK Debt Management Office. MSCI data provided "as is" without any express or implied warranties.

Equities are subject to larger drawdowns than bonds

Across countries, the maximum five-year drawdown in bonds is quite mild compared to equities—a range of 0% to -33% versus -1% to -84%. In the US, in 95% of rolling monthly five-year time periods since 1904, equities have experienced a greater drawdown than bonds. Similar patterns exist in Australia, Japan, and the UK, with equities experiencing a greater drawdown in 87%, 95%, and 80% of five-year periods, respectively.

Rolling Monthly Five-Year Maximum Drawdown of Equities and Bonds



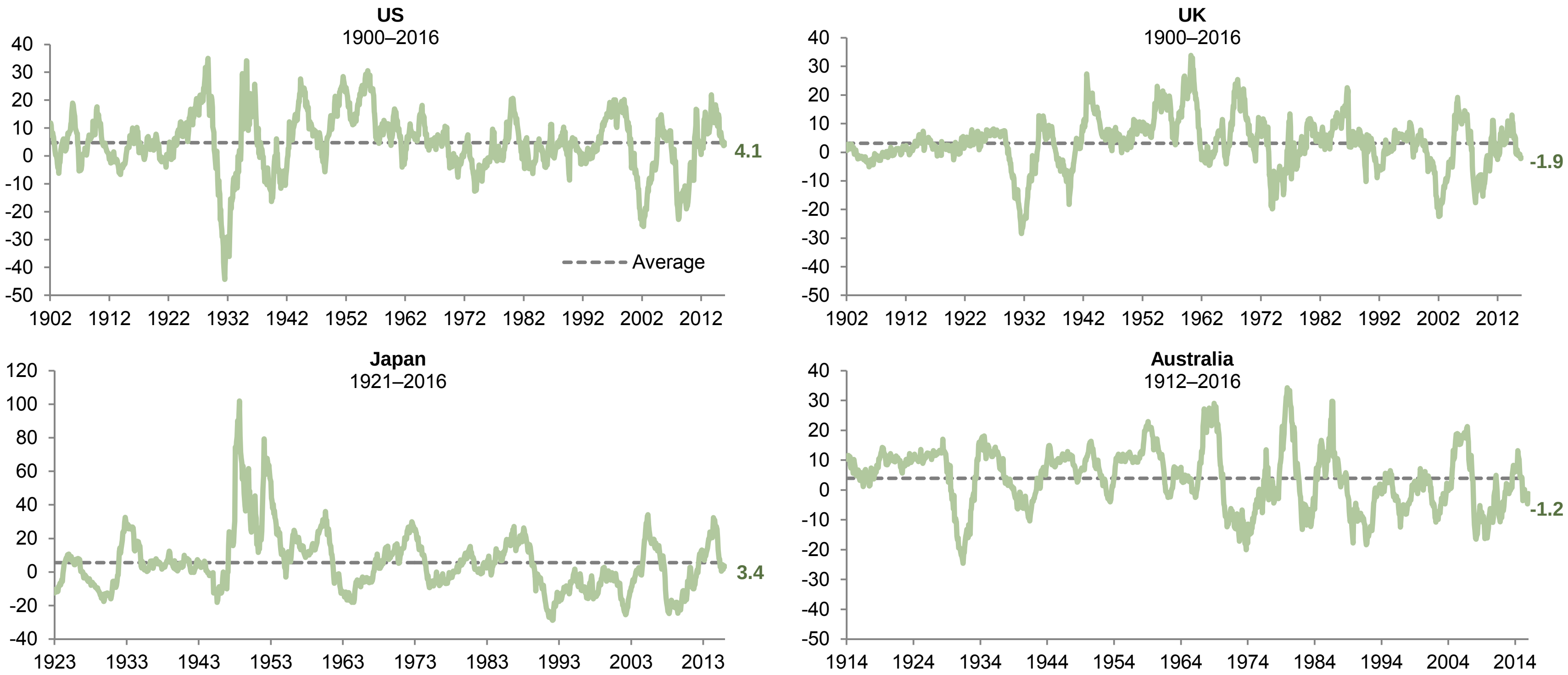
Sources: FTSE International Limited, Global Financial Data, Inc., MSCI Inc., Standard & Poor's, and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Notes: Data for US and UK begin on January 31, 1900. Data for Australia begin on January 31, 1912. Data for Japan begin on January 31, 1921.

Historically, equities have outperformed bonds by a wide margin

Over rolling three-year periods, global equities have outperformed bonds by an average annualized margin of between 3.2% (UK) and 5.6% (Japan). Compounded over 117 years, a 3.0% margin equates to an equity return 32 times that of bonds. That said, bonds can outperform equities for a sustained period of time. For example, for the 20-year period from 1989 through 2008, bonds outperformed equities on a cumulative basis across all regions.

AACR of Three-Year Rolling Return Differential Between Equity and Bond Returns

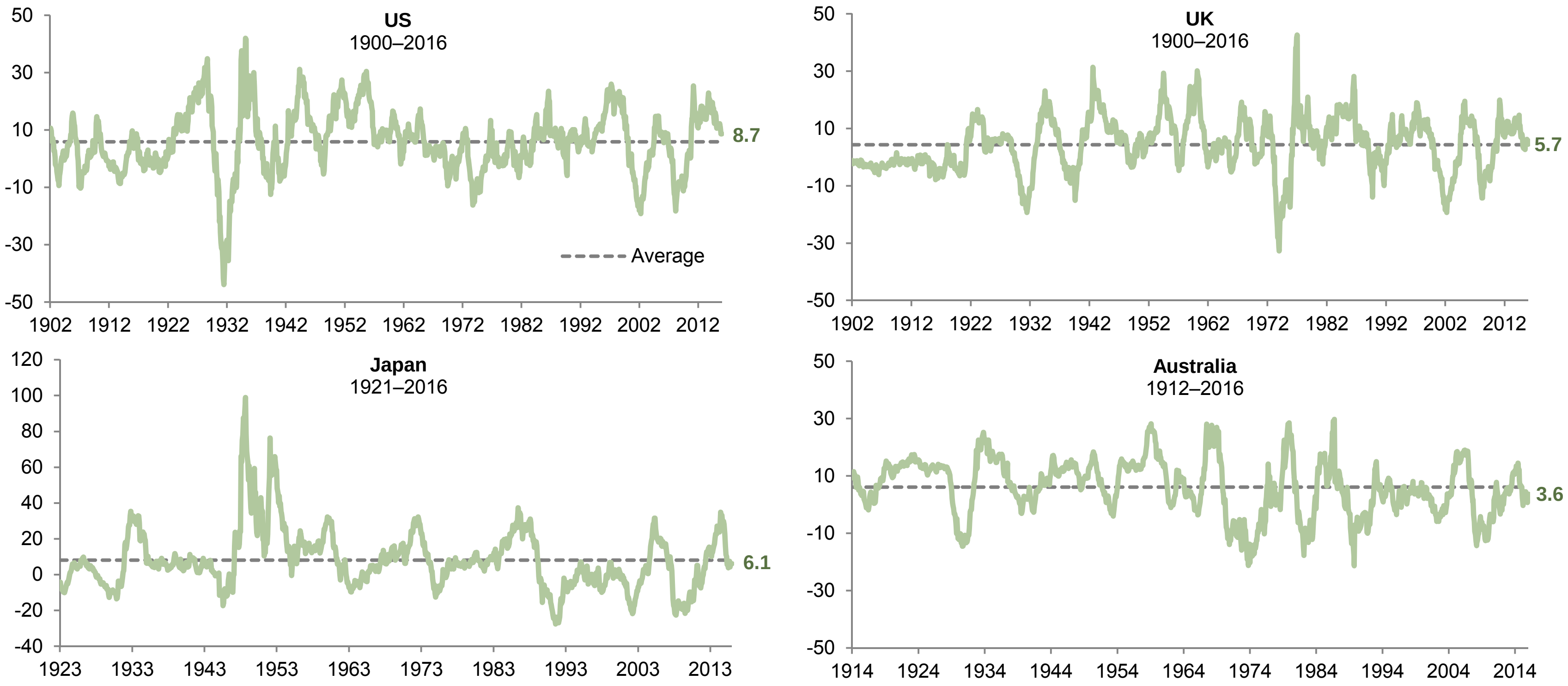


Sources: FTSE International Limited, Global Financial Data, Inc., MSCI Inc., Standard & Poor's, and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Historically, equities have also outperformed cash by a wide margin

The difference between equity and cash returns is even greater, ranging from an average annualized margin of 4.4% (UK) to 8.2% (Japan). Like bonds, cash can outperform equities, although the timeframes tend to be shorter due to the lower yield (and hence returns) associated with cash versus bonds.

AACR of Three-Year Rolling Return Differential Between Equity and Cash Returns

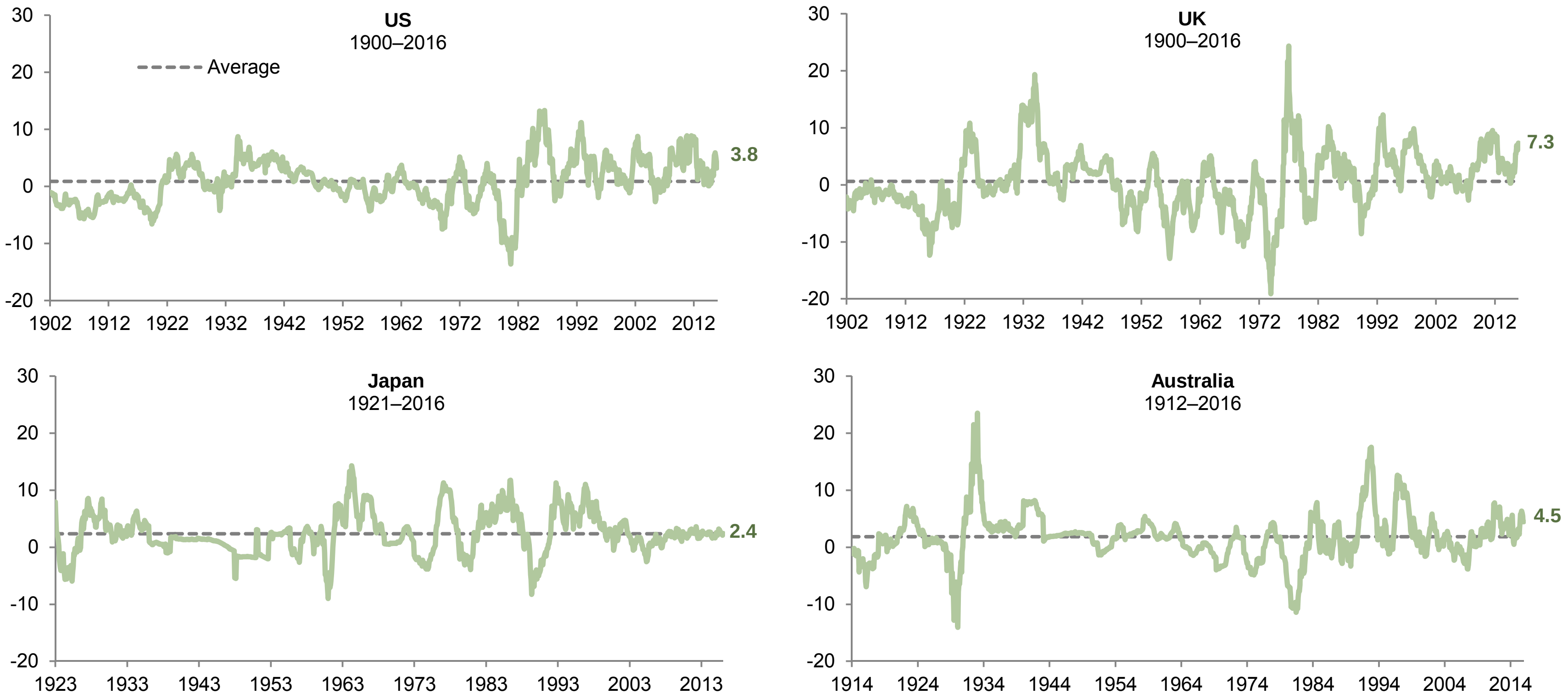


Sources: Federal Reserve, FTSE International Limited, Global Financial Data, Inc., MSCI Inc., Standard & Poor's, Thomson Reuters Datastream, and UK Debt Management Office. MSCI data provided "as is" without any express or implied warranties.

Bonds have outperformed cash, but less dramatically

Over rolling three-year periods, bonds have outperformed cash by an average annualized margin of between 0.9% (US) and 2.3% (Japan). With cash yields so low and a strong bond bull market, the US and UK have seen particularly pronounced bond outperformance in recent years. However, cash can outperform bonds for sustained periods of time, particularly driven by unexpected inflation and rising rates.

AACR of Three-Year Rolling Return Differential Between Bond and Cash Returns



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

Components of Equity Returns

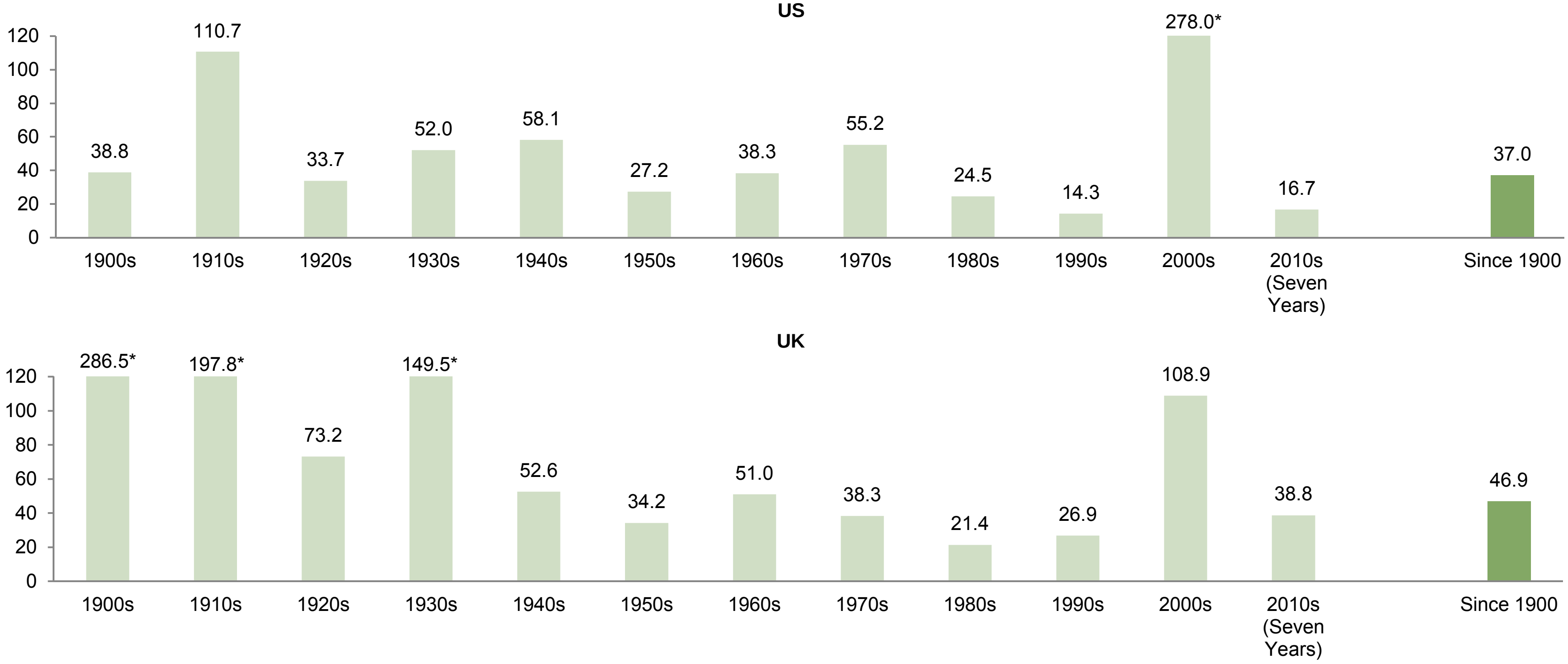
The outlook for future equity returns is a function of earnings growth, dividends, and changes in valuations, with the first two the most important over the very long term as the impact of multiple expansion is negligible given its mean-reverting nature. While dividends may vary from year to year, they are the only contributor to returns that is always positive. Thus, the compounding of dividends provides a steady stream of income when compared to the volatile nature 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 an important component of total return

In the US and UK, over one-third to nearly one-half of nominal returns has come from the reinvestment of dividends since 1900. In a number of decades, dividends were the only driver of positive total returns, with price declines seen throughout the ten-year period.

Dividend Income as a Percentage of Total Return

1900–2016 • Percent (%)



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

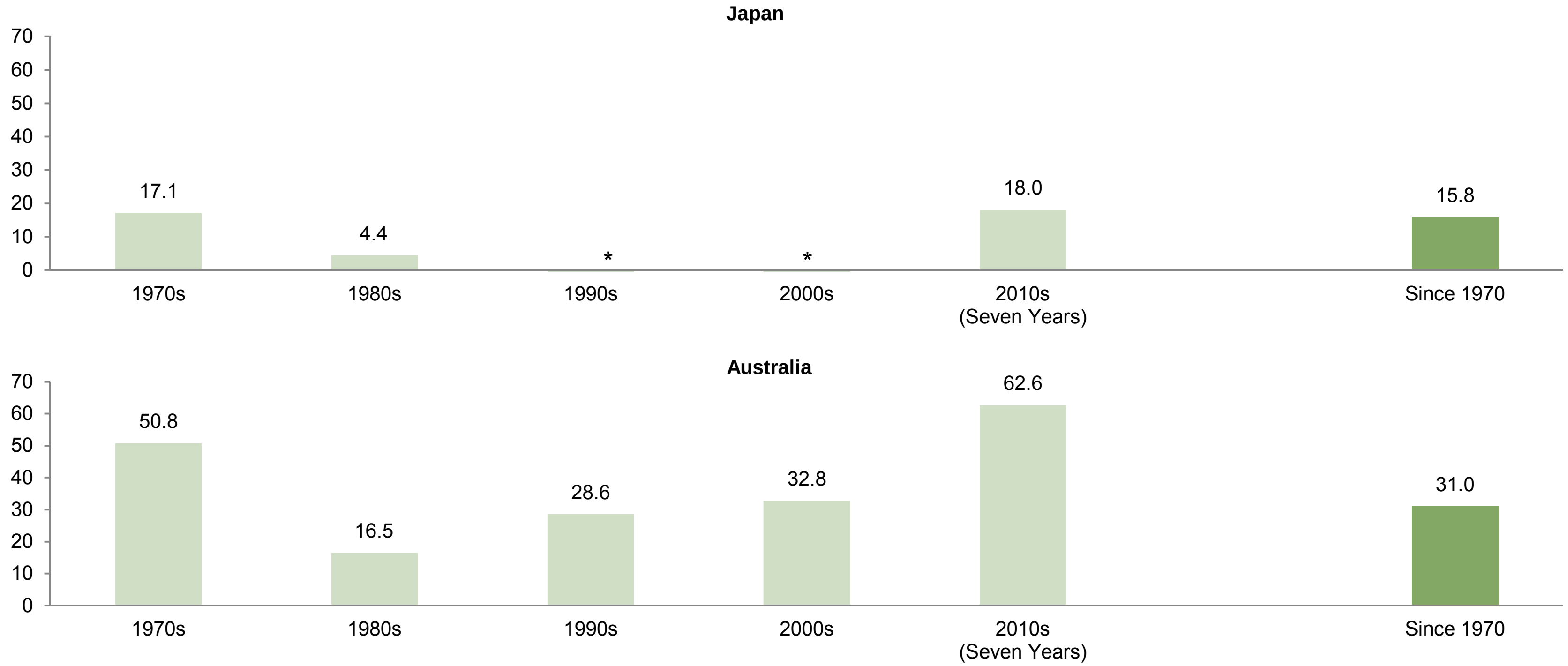
* Graph capped at 120% for scale purposes.

Dividends are an important component of total return

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

Dividend Income as a Percentage of Total Return

1970–2016 • Percent (%)



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

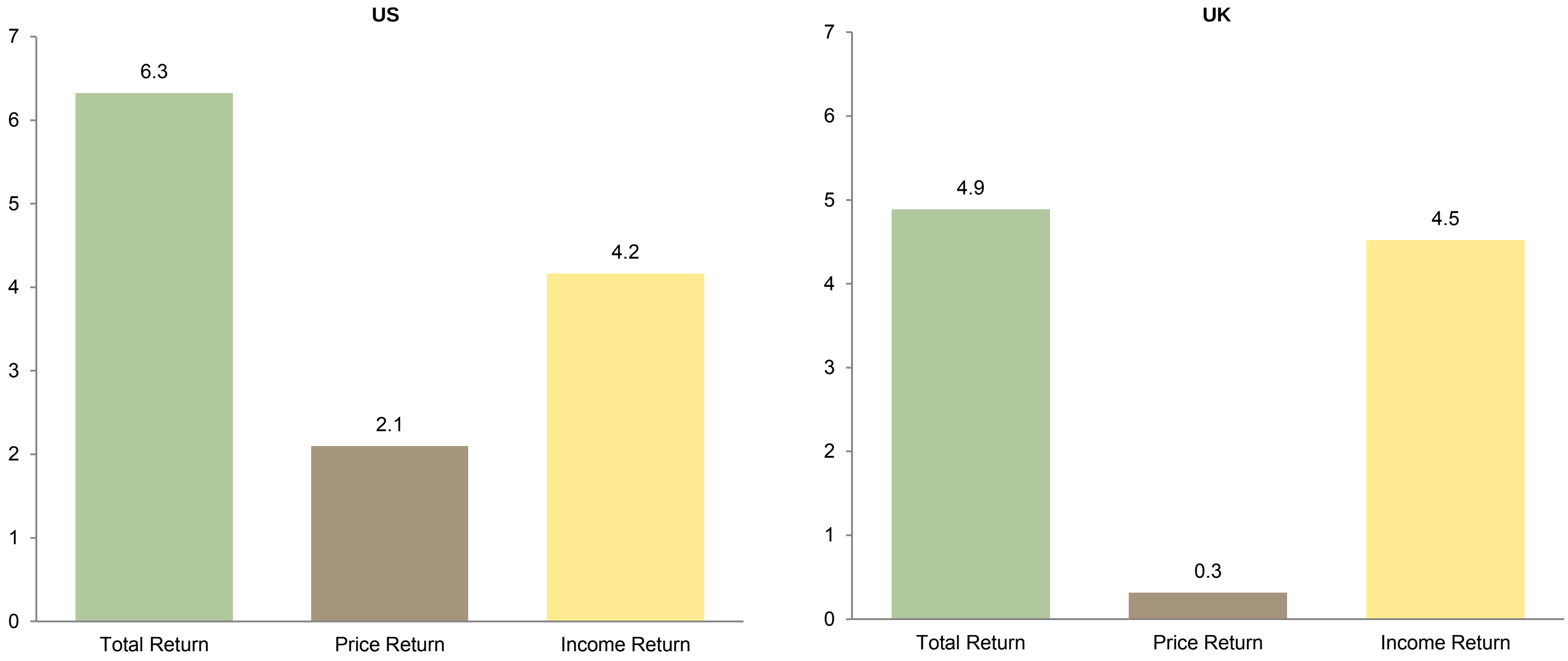
* Average quarterly dividend income for Japan for the 1990s and 2000s was 0.16% and 0.27%, respectively, but average quarterly total returns for each decade were negative.

The compounding of dividends noticeably boosts total returns

Without reinvesting dividends, the S&P 500 would only have returned 2.1% (real) per year since 1900 versus 6.3% when including dividends. In the UK, dividends have had an even more pronounced effect, contributing over 90% of the real AACR of equities.

Real Average Annual Compound Returns of Equities

1900–2016 • Percent (%)



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

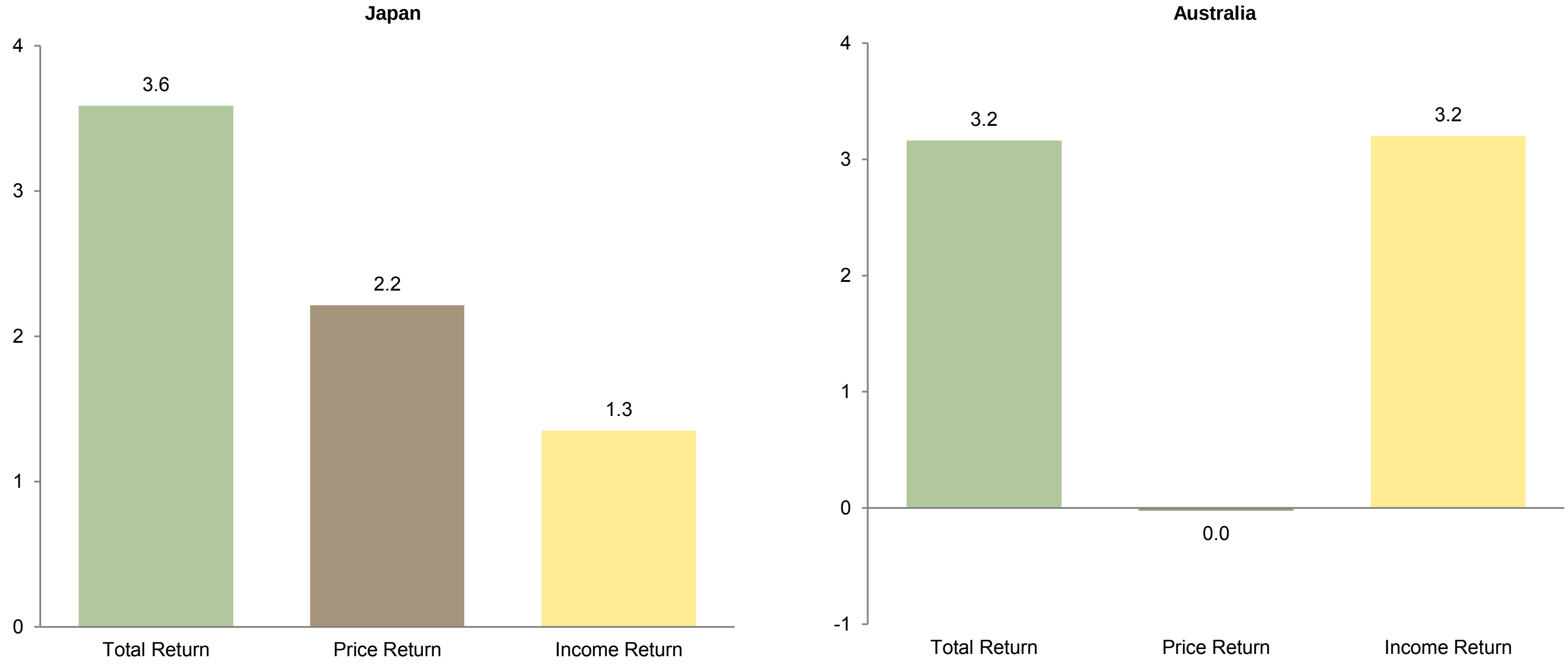
Notes: All data are quarterly. Data for United Kingdom start in second quarter 1900.

The compounding of dividends noticeably boosts total returns

Of the four developed countries we analyzed, only in Japan (where our data begin in 1970) have real price returns outstripped dividend returns. Japanese dividend yields spent much of the 1980s, 1990s, and 2000s below 1.0%. In Australia, cumulative real price returns were slightly negative over the last 47 years, with all positive real returns attributable to dividends.

Real Average Annual Compound Returns of Equities

1970–2016 • Percent (%)



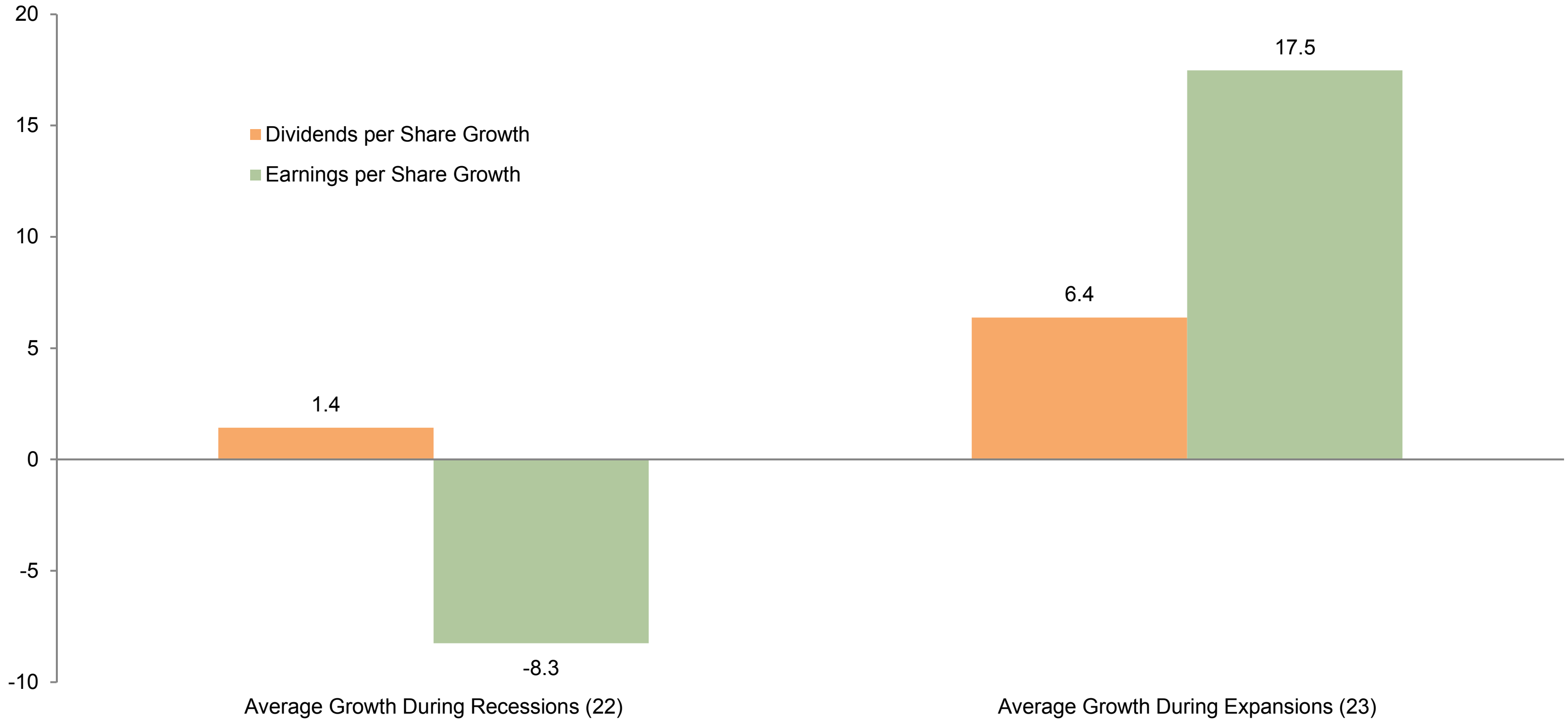
Sources: MSCI Inc. and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Dividends provide an extra boost during recessions or economic downturns

During periods of economic contraction, earnings generally decline first, preceding any decline in dividends, a reactionary move as companies adjust to diminishing fiscal health. Since 1900, US companies have managed to maintain a net positive average dividend growth rate during recessions, albeit one much lower than that seen during economic expansions.

S&P 500 Earnings per Share and Dividends per Share Year-Over-Year Change

1900–2016 • Percent (%)



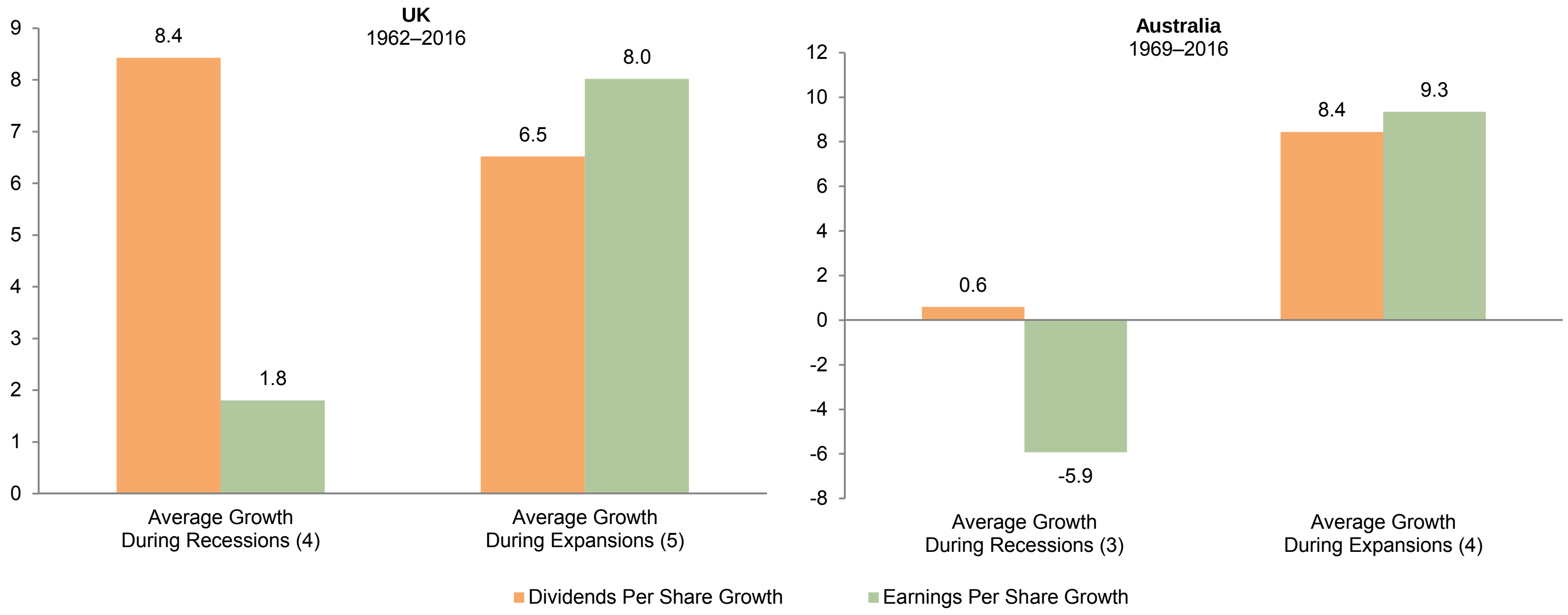
Sources: Ned Davis Research, Inc., Standard & Poor's, and *The Wall Street Journal.*

Dividends provide an extra boost during recessions or economic downturns

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 or implied warranties.

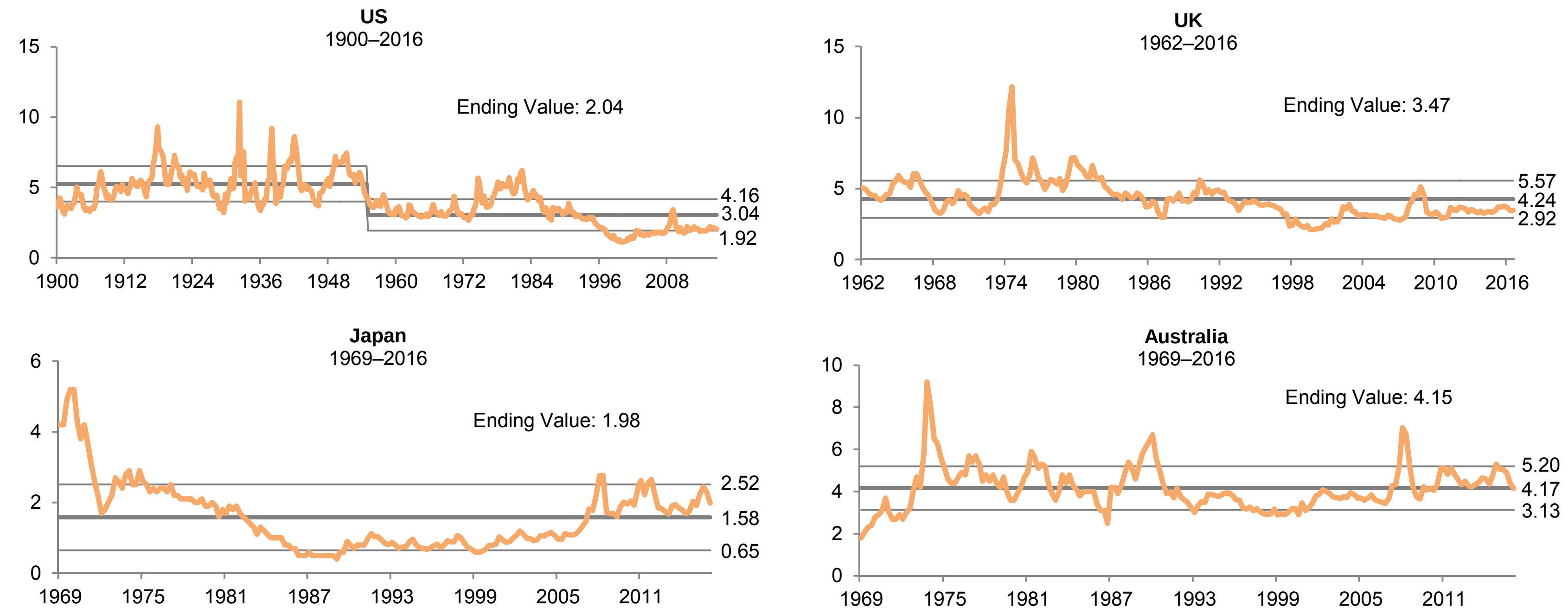
Note: Recessions and expansions defined by Economic Cycle Research Institute business cycle peak to trough dates.

Current dividend yields are in line with more recent history

US and UK dividend yields are both nearly 1 standard deviation below their averages since 1955 and 1962, respectively, although their current levels are in line with their more recent 20-year averages. After spending the better part of two decades below 1%, Japanese yields began to rise in the mid-2000s and are now slightly above their long-term average. Outside of a blip in 2008, Australian dividend yields have largely been range bound for the last 20+ years.

Trailing 12-Month Dividend Yields

Percent (%)



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

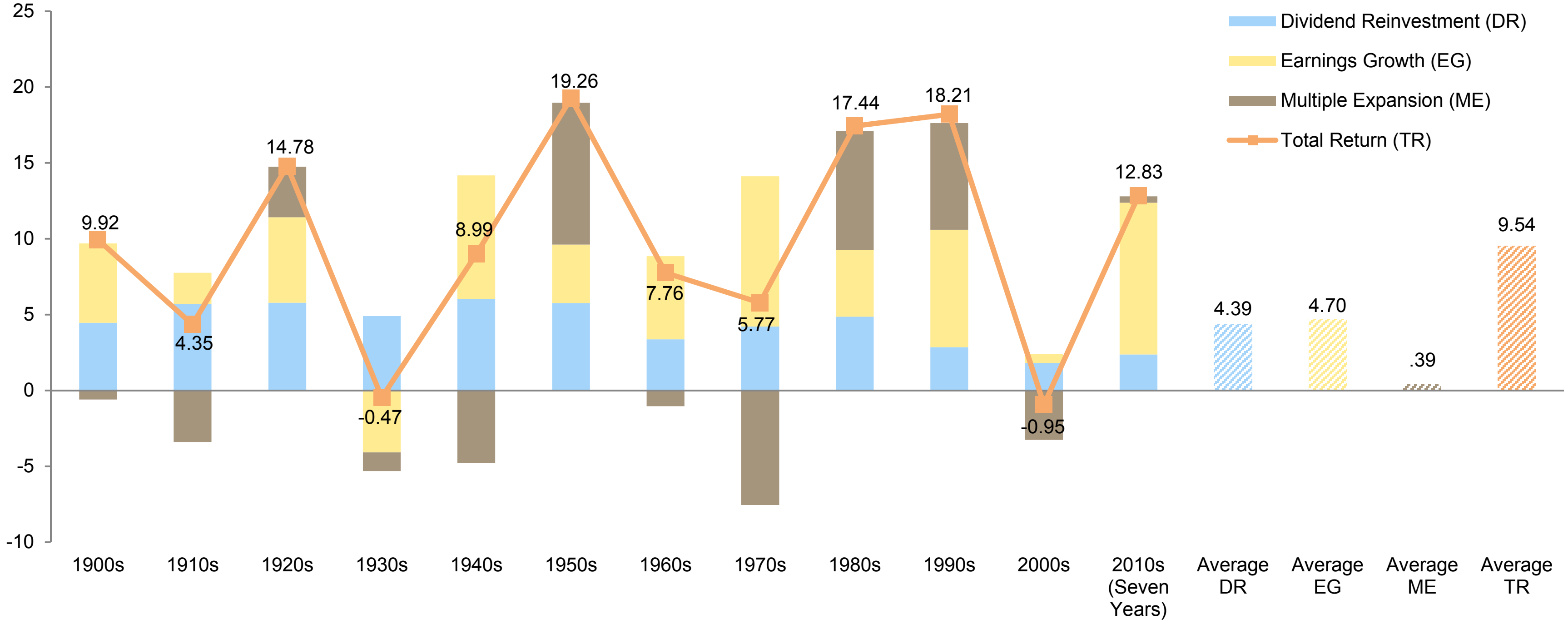
Notes: For the United States, the calculated mean from 1900 to 1954 is 5.26 with 1 standard deviation above and below at 6.53 and 4.00, respectively. A secular shift occurred in US dividend yields in the mid-1950s as investors stopped demanding equity risk premium for bonds in the form of DY.

Impact of earnings growth and multiple changes less consistent than dividends

Dividends remain the most consistent positive influence on total returns, while the importance of earnings has swung wildly. Although multiple expansion has played a role in driving returns, over the long term the impact becomes negligible as multiple expansion is a mean-reverting time series. In the US, dividends (4.4%) have contributed nearly as much to total annualized returns as earnings growth has (4.7%).

Breakdown of Total Return AACR Over Time: US

1900–2016 • Percent (%)



Sources: Global Financial Data, Inc., Standard & Poor's, and *The Wall Street Journal.*

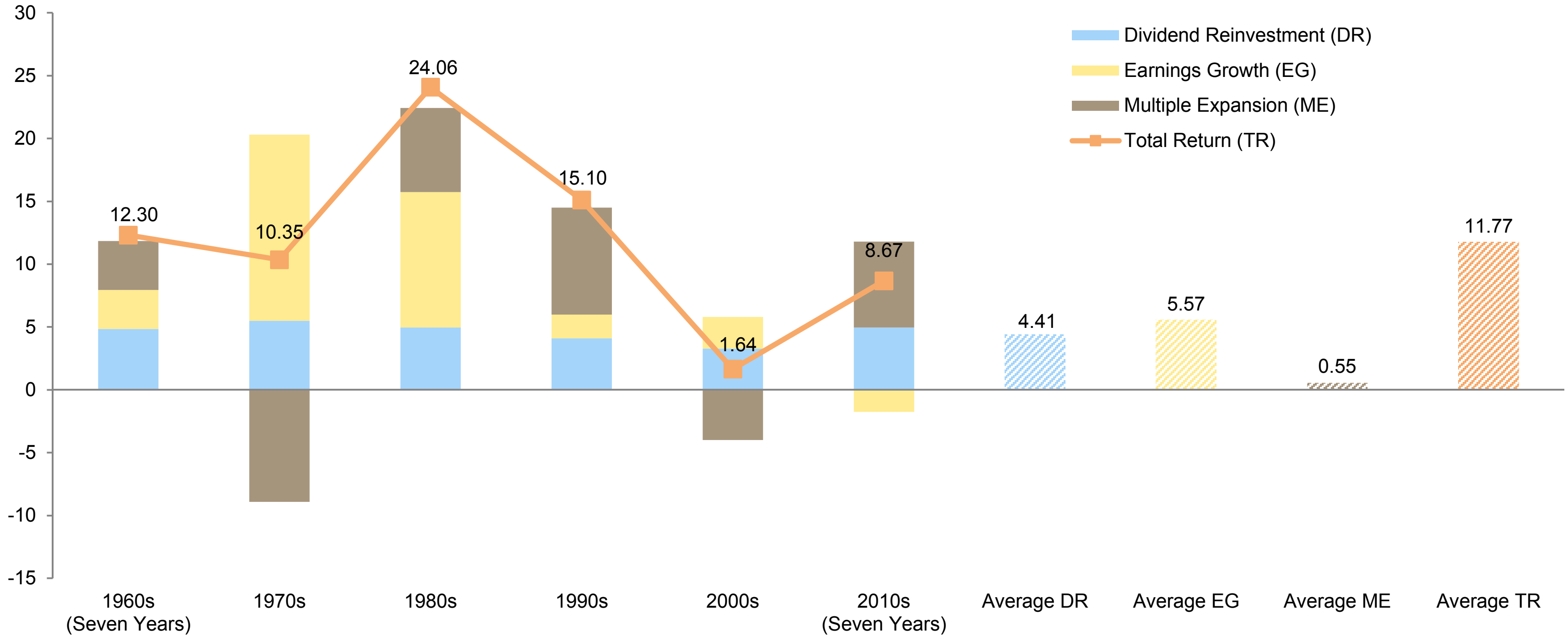
Note: Figures will not sum exactly to total return calculation due to the effect of combining cross terms.

Impact of earnings growth and multiple changes less consistent than dividends

UK dividends have consistently contributed 3.3 ppts to 5.5 ppts of return annually each decade. On average, earnings growth has been the most meaningful contributor to total return for the UK. However, the 2015–16 earnings recession has detracted from total returns during the current decade. After a tumultuous 2016 in the UK, which included "Brexit," multiple expansion is now the biggest contributor to total returns for the current decade.

Breakdown of Total Return AACR Over Time: UK

1963–2016 • Percent (%)



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

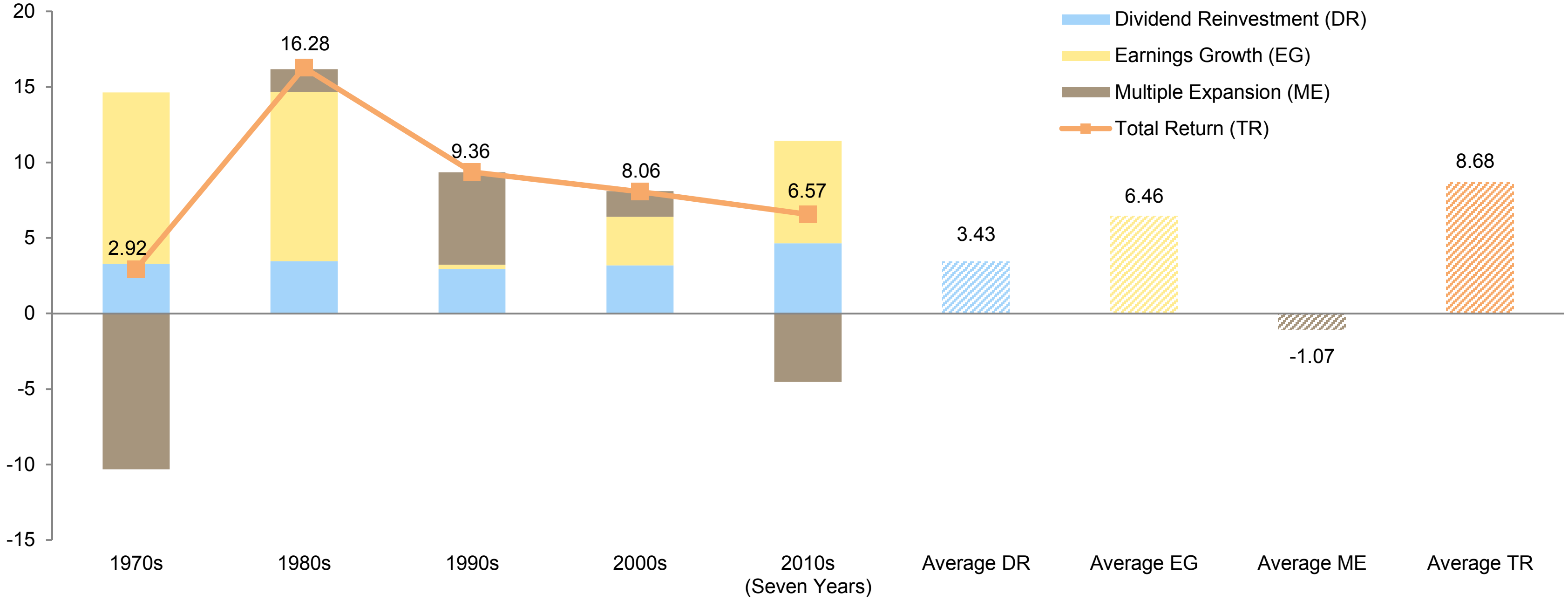
Note: Figures will not sum exactly to total return calculation due to the effect of combining cross terms.

Impact of earnings growth and multiple changes less consistent than dividends

In Australia, dividends and earnings growth have consistently helped deliver positive returns measured over each period. Since 1970, dividends have steadily contributed 2.9% to 3.5% annually of each decade’s total return. For the seven years so far this decade, dividends have contributed 4.7%.

Breakdown of Total Return AACR Over Time: Australia

1970–2016 • 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.

Earnings recessions weigh on equities

The US has had 15 earnings recessions since 1950, most of which have coincided with economic recessions. Earnings recessions during economic expansions are typically less severe. The most recent earnings cycle saw earnings peak in third quarter 2014 and hit a trough in first quarter 2016. Compared to the average earnings recession in a non-recessionary period, the fall in earnings was much greater, though the decline in equities was slightly less than average.

S&P 500 Earnings Recessions and Associated S&P 500 Price Index Declines

1950–2016

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

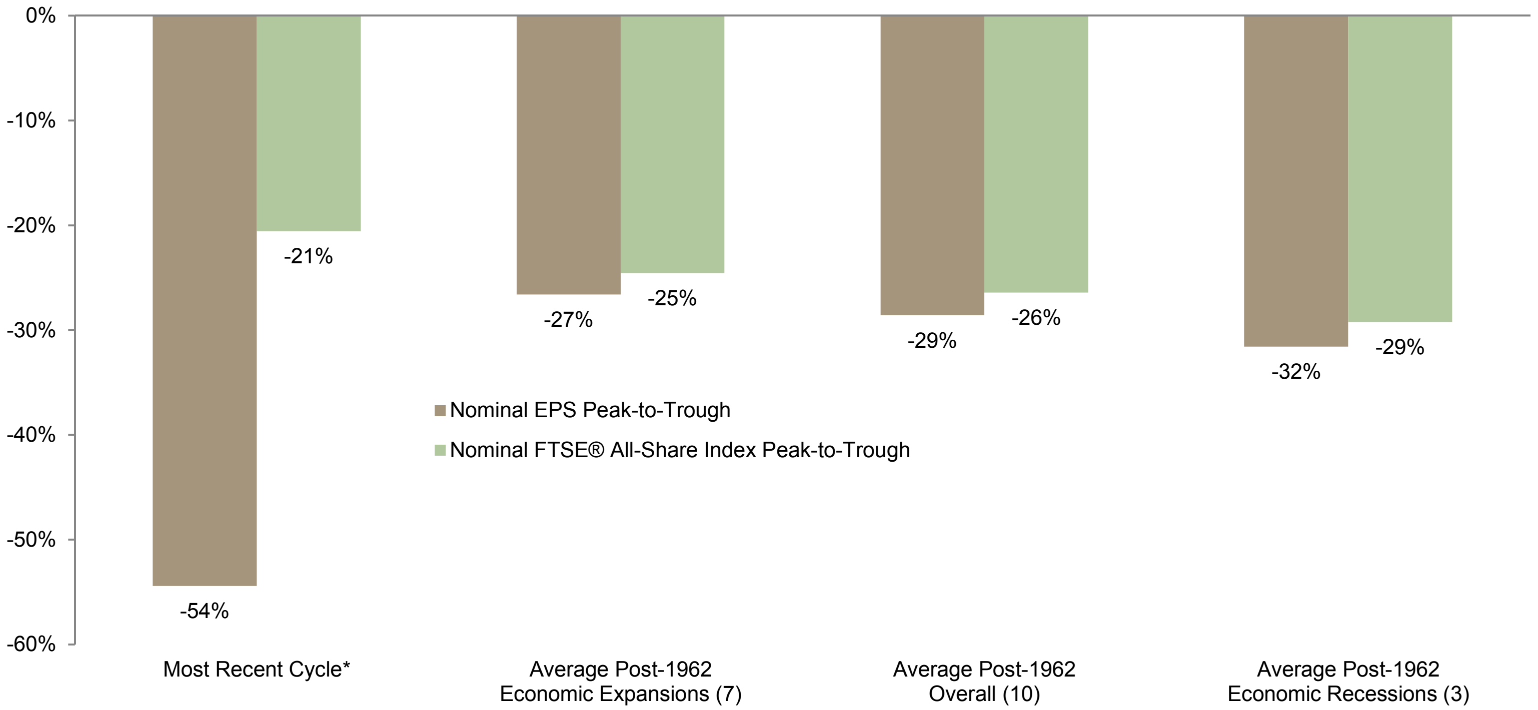
* The most recent cycle peaked in Q3 2014 and hit a quarterly trough in Q1 2016.

Earnings recessions weigh on equities

The UK has had 10 earnings recessions since 1962, a period which has seen only four economic recessions, and only three earnings recessions coincident with these. The earnings decline in the current cycle, which hit a trough in second quarter 2016, represents the largest earnings drawdown on record, though so far equities have done slightly better than average.

FTSE® All Share Earnings Recessions and Associated FTSE® All Share Price Index Declines

1962–2016



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

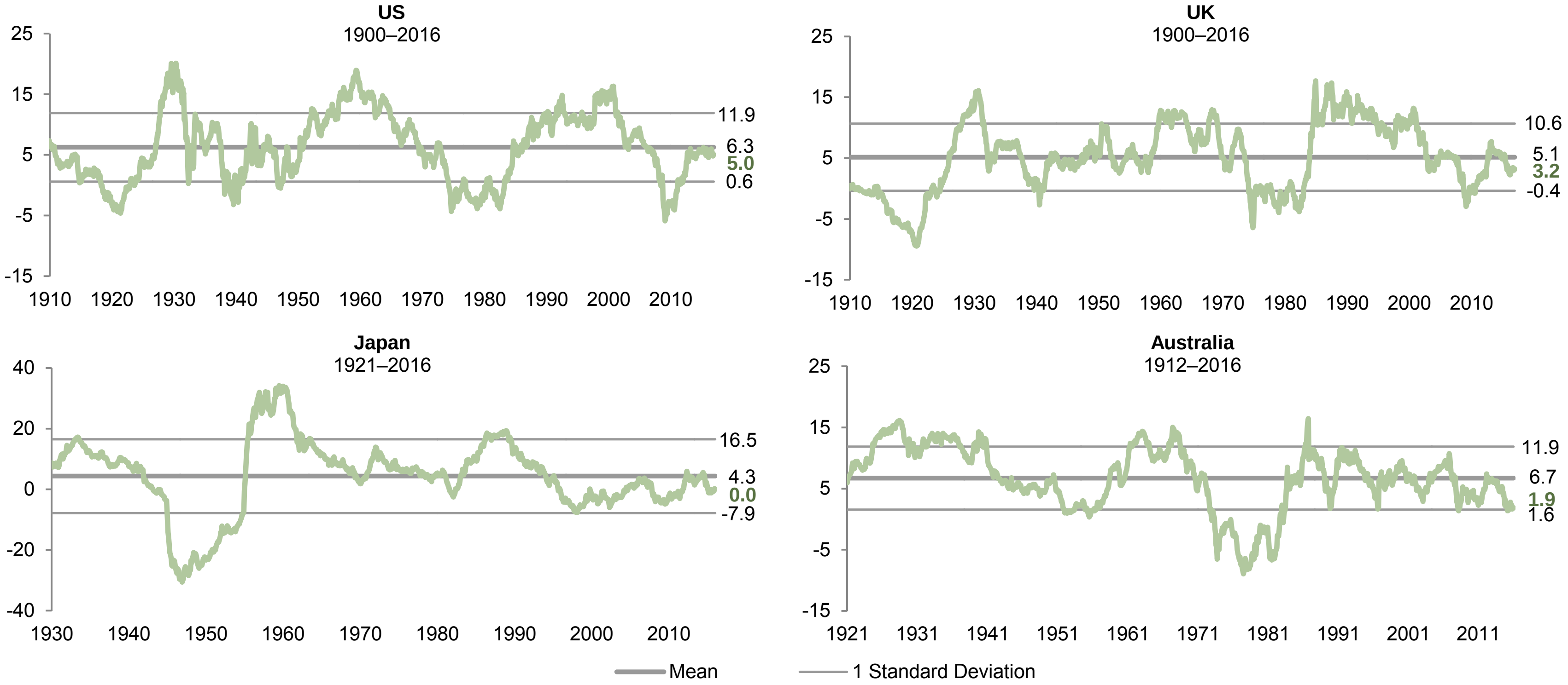
* The most recent cycle peaked in third quarter 2014 and hit a quarterly trough in second quarter 2016. However, this does not imply a final trough for this cycle.

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 underperformance relative to the mean follow periods of outperformance and vice versa. While this pattern is evident over shorter time horizons, it is much more distinct over long time horizons.

Real returns revert to their long-term averages 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. At the end of 2016, rolling monthly real ten-year AACRs for the UK and US were slightly below their historical averages, while the AACRs for Australia and Japan were much further below average.



Rolling Monthly Total Return Real Ten-Year AACR

Percent (%)

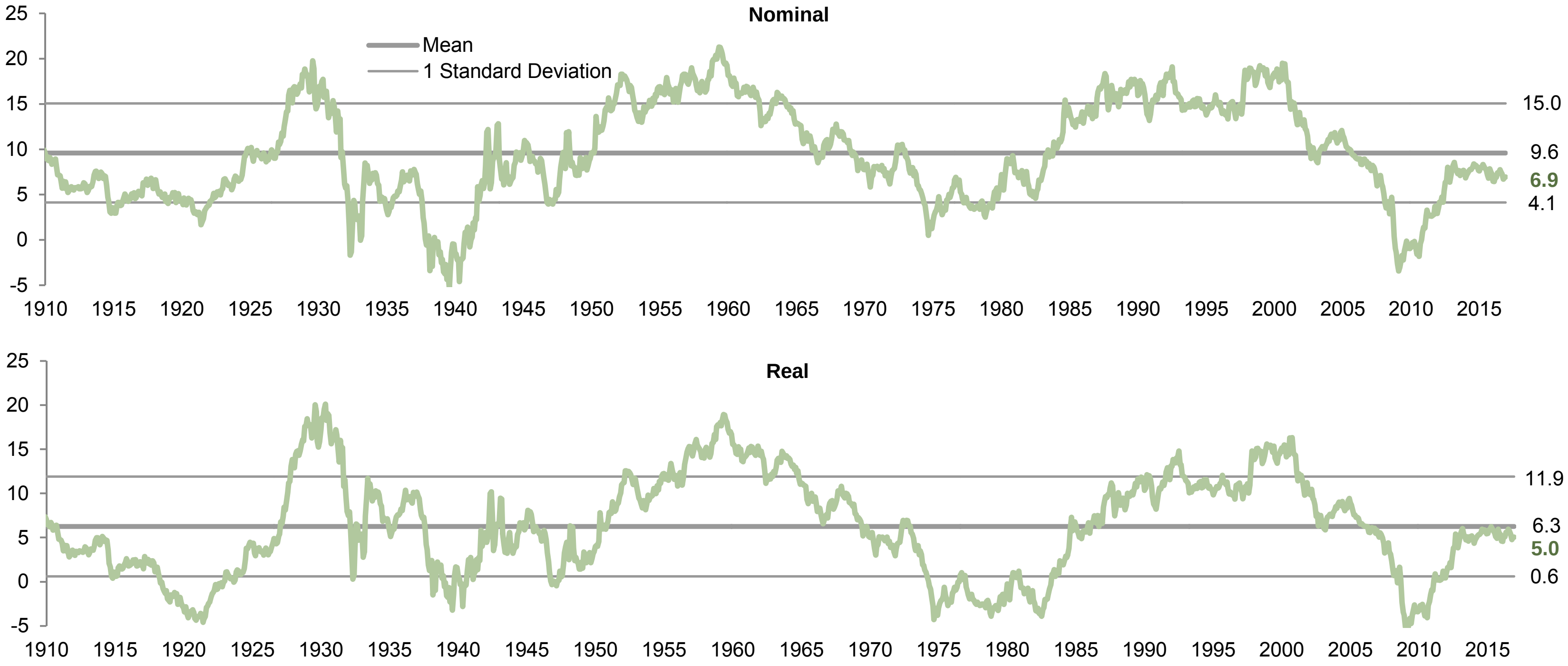
Sources: FTSE International Limited, Global Financial Data, Inc., MSCI, Inc., Standard & Poor's, and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Mean reversion is not a smooth process

AACRs have remained above and below average for extended periods. At the end of 2016, the nominal ten-year AACR of 6.9% for US equities remained well below average, while the real ten-year AACR of 5.0% was closer to the historical average.

Rolling Monthly Total Return Ten-Year AACR: US

1910–2016 • Percent (%)



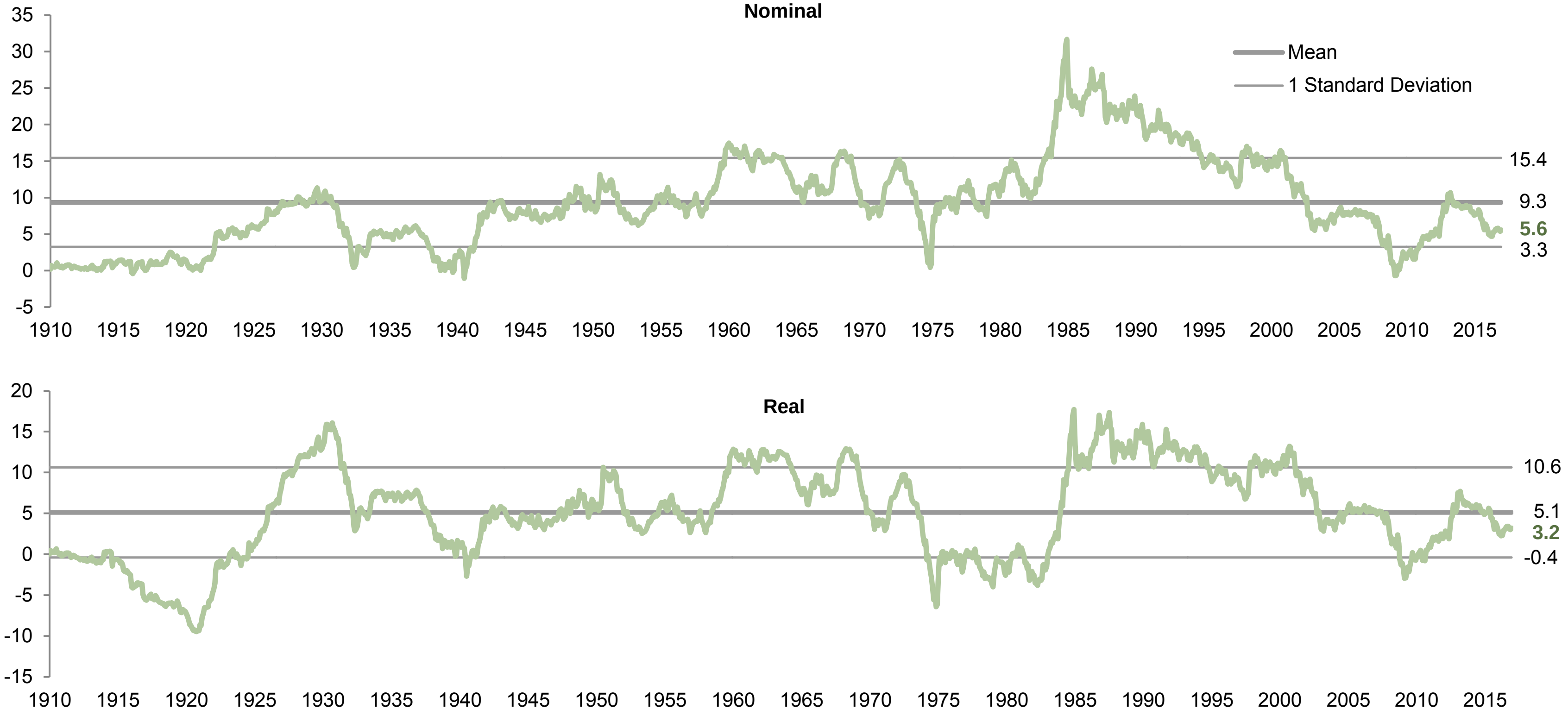
Sources: Global Financial Data, Inc., Standard & Poor's, and Thomson Reuters Datastream.

Mean reversion is not a smooth process

Means can also shift dramatically over time. Prior to 1982, the average nominal ten-year AACR for UK equities was 7.5%. Since then, the average nominal ten-year AACR has been 13.1%, while the full period average is 9.3%. The nominal ten-year AACR of 5.6% as of 2015 is less than half the average AACR since 1982.

Rolling Monthly Total Return Ten-Year AACR: UK

1910–2016 • Percent (%)



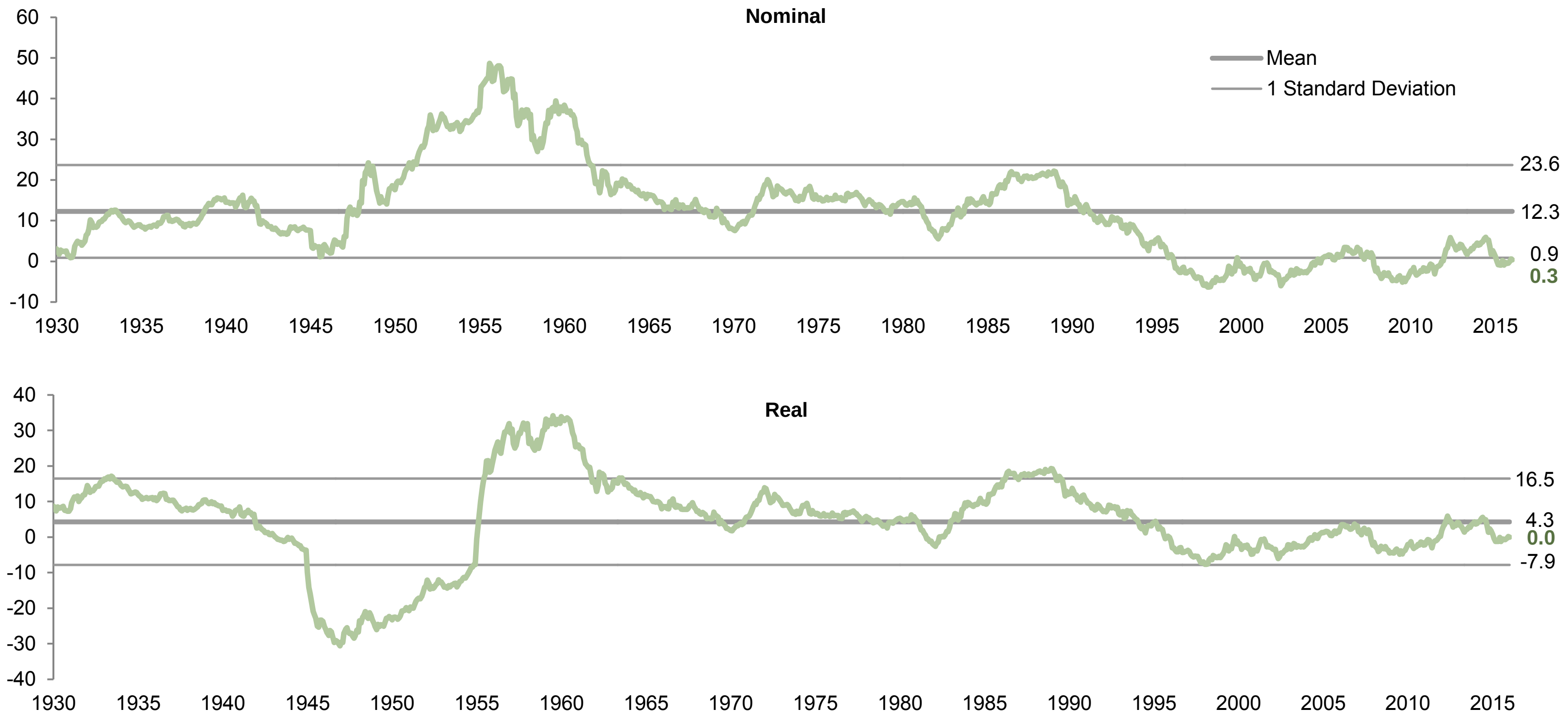
Sources: FTSE International Limited, Global Financial Data, Inc., and Thomson Reuters Datastream.

Mean reversion is not a smooth process

Japan’s experience with inflation creates more dissonance between its returns in nominal and real terms compared to the other countries in this analysis. And its ten-year nominal AACRs really fall into two distinct periods: an average of 18.2% pre-1970 and an average of 7.3% from 1970 to today. On a real basis the average has been just above 4%.

Rolling Monthly Total Return Ten-Year AACR: Japan

1930–2016 • Percent (%)



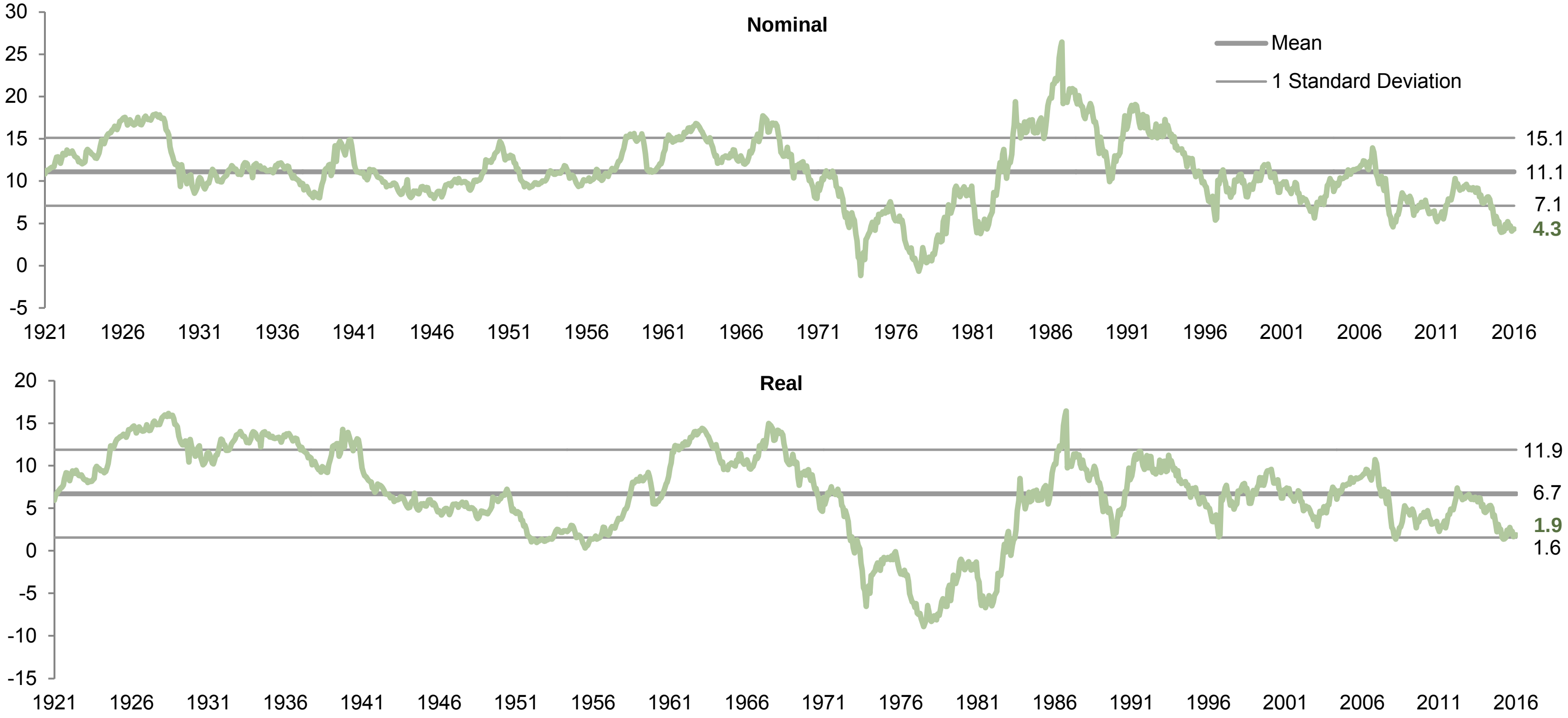
Sources: Global Financial Data, Inc., MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Mean reversion is not a smooth process

Australia's most recent nominal ten-year AACR is the furthest below average of the four countries in this analysis. At 4.3%, the current value is 1.7 standard deviations below its historical average of 11.1%. Real returns for Australian equities are similarly furthest below average on a standard deviation basis of the four regions.

Rolling Monthly Total Return Ten-Year AACR: Australia

1921–2016 • Percent (%)

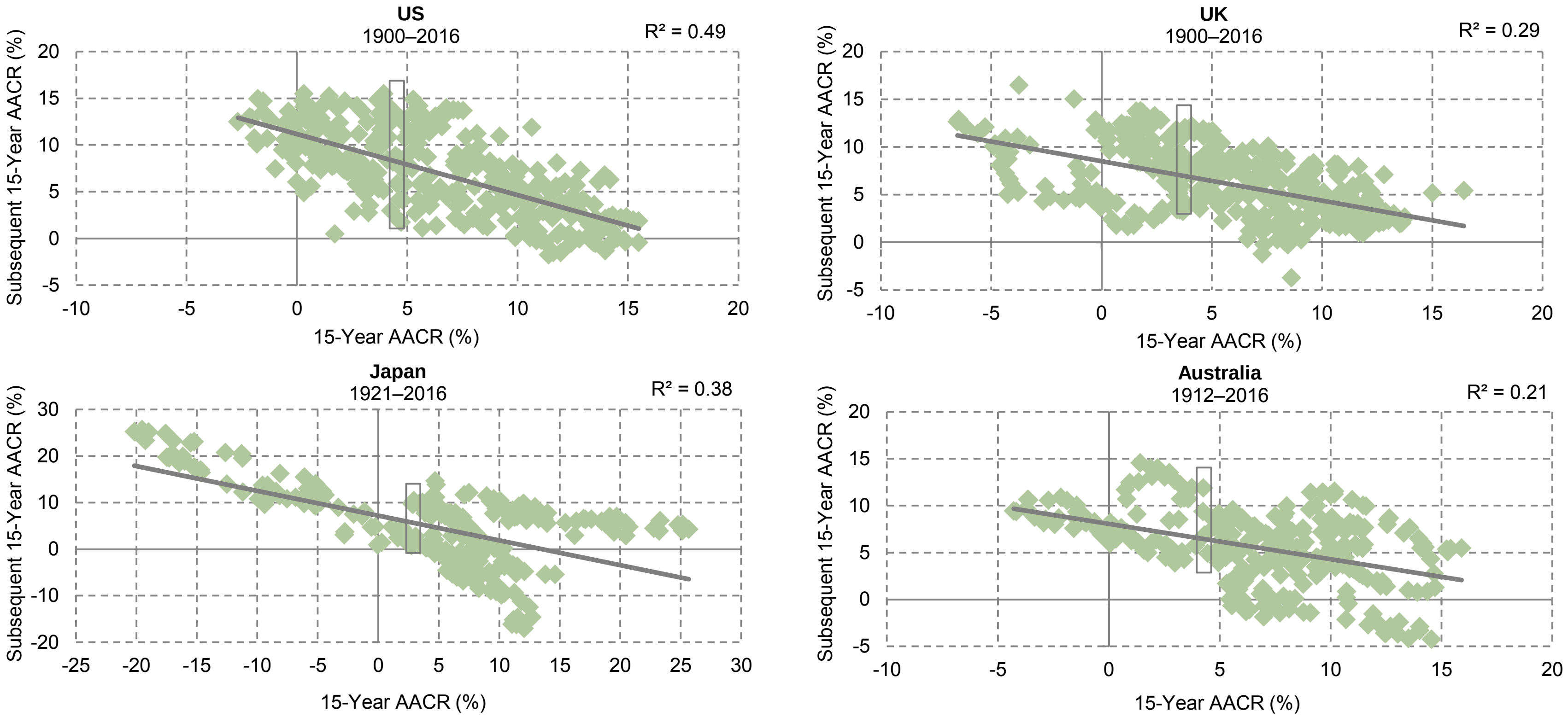


Sources: Global Financial Data, Inc., MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Periods of poor performance generally followed by better returns and vice versa

The relationship is weak, with US equities showing the strongest relationship at an R^2 of 0.49. However, it is much stronger at the extremes. Across all four countries, periods of double-digit returns are followed by double-digit returns around 2% of the time. At the current values for 15-year real AACRs (between 2% and 5% for the four countries), historical data show a wide range of possible subsequent returns.

Relationship Between Rolling Quarterly 15-Year Equity Real AACR and Subsequent 15-Year 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.

Periods of poor performance generally followed by better returns and vice versa

Current trailing 15-year real AACRs for the US (4.5%), UK (4.1%), Japan (3.7%), and Australia (4.7%) fall within their respective second quartiles, meaning real returns over the next 15 years for these regions may be above average, though the range of returns is wide.

Relationship Between Rolling Quarterly 15-Year Equity Real AACR and Subsequent 15-Year Equity Real AACR

US 1900–2016

AACR Quartiles	Beginning Period 15-Year AACR (%)				Subsequent 15-Year AACR (%)			
	Mean	High	Low	Std Dev	Mean	High	Low	Std Dev
First	0.58	2.59	-2.67	1.27	10.31	15.49	0.49	2.84
Second	4.35	6.01	2.66	1.03	8.81	15.49	1.09	3.74
Third	8.31	10.42	6.03	1.23	6.10	13.97	0.08	3.39
Fourth	12.66	15.49	10.43	1.36	2.50	11.88	-1.76	2.54
Overall	**6.49**	**15.49**	**-2.67**	**4.67**	**6.92**	**15.49**	**-1.76**	**4.34**

UK 1900–2016

AACR Quartiles	Beginning Period 15-Year AACR (%)				Subsequent 15-Year AACR (%)			
	Mean	High	Low	Std Dev	Mean	High	Low	Std Dev
First	-0.75	2.05	-6.52	2.52	8.72	16.44	1.64	3.69
Second	3.67	5.14	2.08	0.90	7.85	13.26	2.35	2.87
Third	7.20	8.70	5.17	1.04	4.69	10.68	-3.73	3.17
Fourth	11.16	16.44	8.75	1.52	3.98	8.32	0.26	2.12
Overall	**5.34**	**16.44**	**-6.52**	**4.69**	**6.31**	**16.44**	**-3.73**	**3.62**

Japan 1921–2016

AACR Quartiles	Beginning Period 15-Year AACR (%)				Subsequent 15-Year AACR (%)			
	Mean	High	Low	Std Dev	Mean	High	Low	Std Dev
First	-9.00	2.70	-20.15	6.50	13.45	25.66	0.90	6.69
Second	5.15	6.76	2.75	1.19	3.63	14.63	-6.02	5.37
Third	8.29	10.30	6.79	1.13	-0.39	12.09	-9.89	5.82
Fourth	15.20	25.66	10.36	4.60	1.58	9.82	-17.00	7.77
Overall	**4.95**	**25.66**	**-20.15**	**9.72**	**4.56**	**25.66**	**-17.00**	**8.36**

Australia 1912–2016

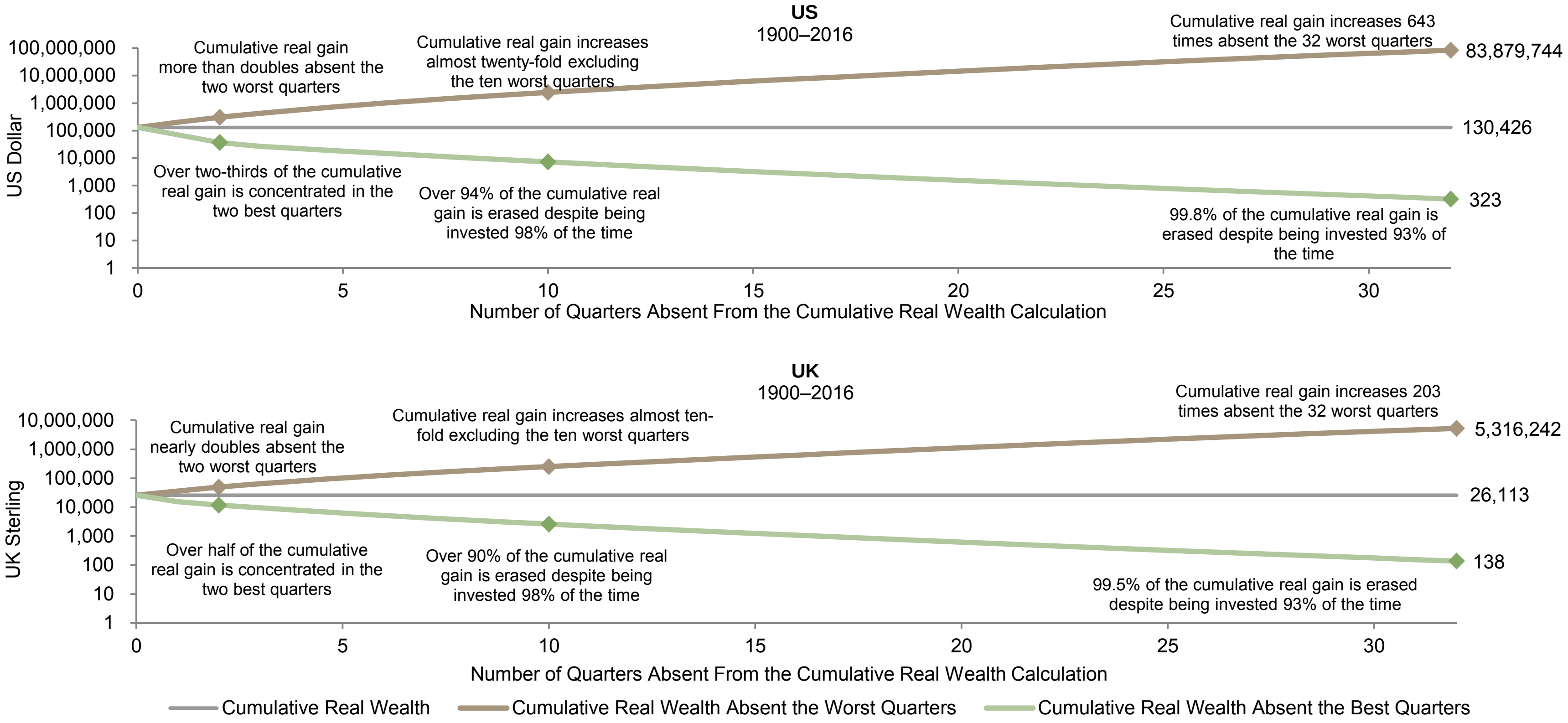
AACR Quartiles	Beginning Period 15-Year AACR (%)				Subsequent 15-Year AACR (%)			
	Mean	High	Low	Std Dev	Mean	High	Low	Std Dev
First	0.40	3.75	-4.28	2.22	8.57	14.55	3.87	2.61
Second	5.79	7.25	3.90	0.79	4.70	11.90	-1.87	3.25
Third	8.59	10.12	7.26	0.85	5.01	11.45	-1.44	2.99
Fourth	12.31	15.91	10.17	1.59	3.75	11.53	-4.28	4.19
Overall	**6.79**	**15.91**	**-4.28**	**4.60**	**5.50**	**14.55**	**-4.28**	**3.77**

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.

Market returns: the best and worst case scenarios

One of the interesting uses of historical data is to calculate the degree to which a successful market-timing strategy could have added to achieved returns during particular periods. While it is hard to estimate what an “average” market timer might achieve, the risks are apparent: missing out on some of the best quarters of any market’s performance severely diminishes returns.

Cumulative Real Wealth Absent the Best and Worst Quarters for Equities



US: Cumulative real gain more than doubles absent the two worst quarters

Cumulative real gain increases almost twenty-fold excluding the ten worst quarters

Cumulative real gain increases 643 times absent the 32 worst quarters

Over two-thirds of the cumulative real gain is concentrated in the two best quarters

Over 94% of the cumulative real gain is erased despite being invested 98% of the time

99.8% of the cumulative real gain is erased despite being invested 93% of the time

UK: Cumulative real gain nearly doubles absent the two worst quarters

Cumulative real gain increases almost ten-fold excluding the ten worst quarters

Cumulative real gain increases 203 times absent the 32 worst quarters

Over half of the cumulative real gain is concentrated in the two best quarters

Over 90% of the cumulative real gain is erased despite being invested 98% of the time

99.5% of the cumulative real gain is erased despite being invested 93% of the time

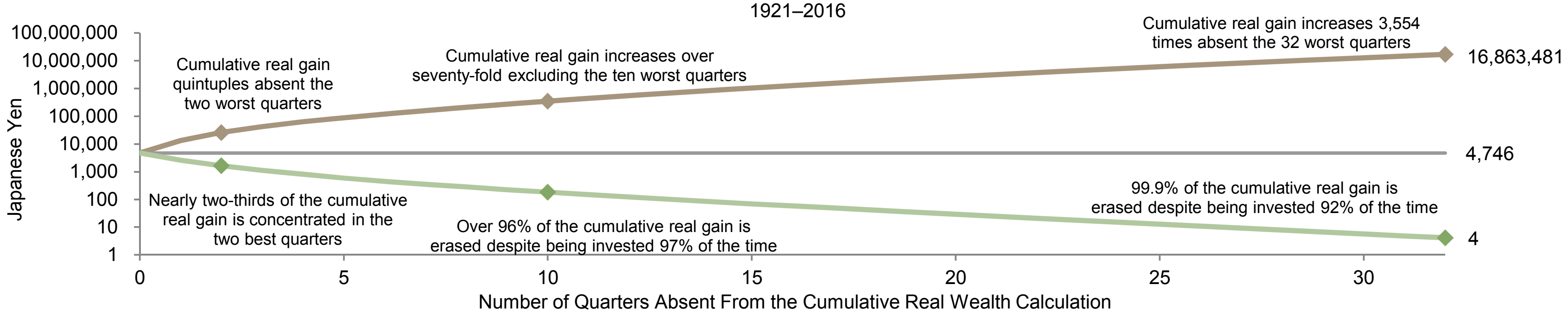
Sources: FTSE International Limited, Global Financial Data, Inc., Standard & Poor's, and Thomson Reuters Datastream.
Notes: Index rebased to 100 as of January 1, 1900. Cumulative real wealth is shown on a logarithmic scale.

Market returns: the best and worst case scenarios

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

Japan
1921–2016



Cumulative real gain quintuples absent the two worst quarters

Cumulative real gain increases over seventy-fold excluding the ten worst quarters

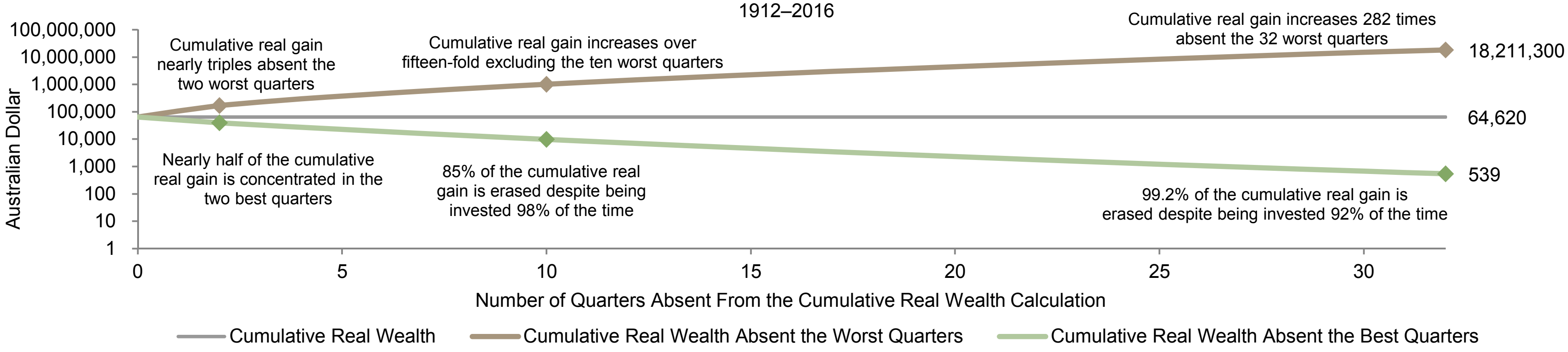
Cumulative real gain increases 3,554 times absent the 32 worst quarters

Nearly two-thirds of the cumulative real gain is concentrated in the two best quarters

Over 96% of the cumulative real gain is erased despite being invested 97% of the time

99.9% of the cumulative real gain is erased despite being invested 92% of the time

Australia
1912–2016



Cumulative real gain nearly triples absent the two worst quarters

Cumulative real gain increases over fifteen-fold excluding the ten worst quarters

Cumulative real gain increases 282 times absent the 32 worst quarters

Nearly half of the cumulative real gain is concentrated in the two best quarters

85% of the cumulative real gain is erased despite being invested 98% of the time

99.2% of the cumulative real gain is erased despite being invested 92% of the time

Sources: Global Financial Data, Inc., MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.
Notes: Index rebased to 100 as of January 1, 1921, for Japan and January 1, 1912, for Australia. 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, 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.

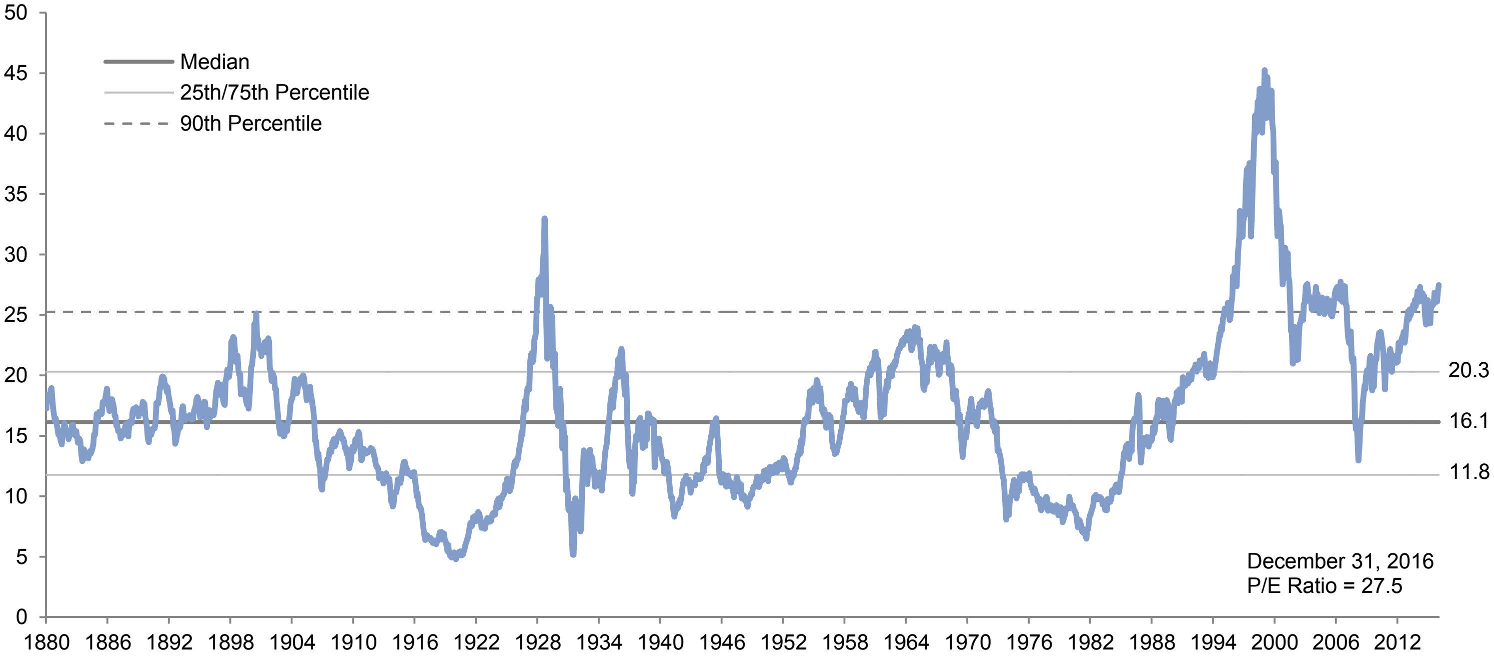
We review the historical record of US equity valuations using both S&P and MSCI data. S&P has a much longer history, although this history is a compilation of historical data (as detailed in Notes on the Data) and underlying companies have changed over time, as have accounting standards and the macro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

P/E multiples trend from depressed lows to overvalued 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).

S&P 500 Normalized Real Price-Earnings Ratios

1880–2016



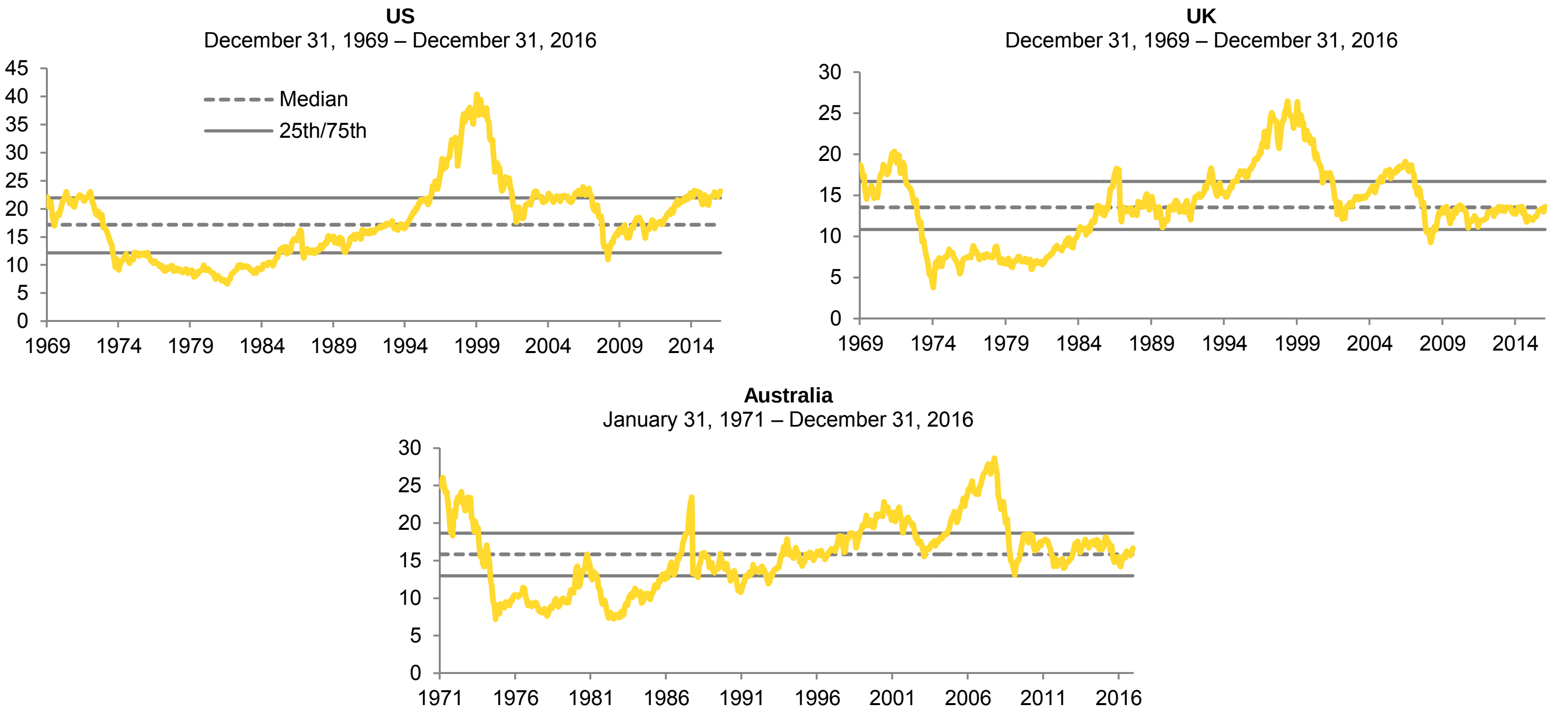
Sources: Robert J. Shiller, Standard & Poor's, and Thomson Reuters Datastream.

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 November 30, 2016 dollars. Current earnings are based on November 30, 2016, estimates from Standard & Poor's. Historical data before 1936 provided by Professor Robert Shiller.

P/E multiples trend from depressed lows to overvalued peaks

Composite normalized P/E ratios using MSCI indexes allow us to compare similar data across markets. In the US, the longest continual streak in which the composite normalized P/E remained within our fair value range (25th–75th percentile) was for just over eight years, from 1988 to 1996. Such streaks have been shorter for both the UK and Australia; however, given the nature of percentiles, each region will cumulatively spend the same amount of time in the “fair value” category.

Composite Normalized Price-Earnings Ratios



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

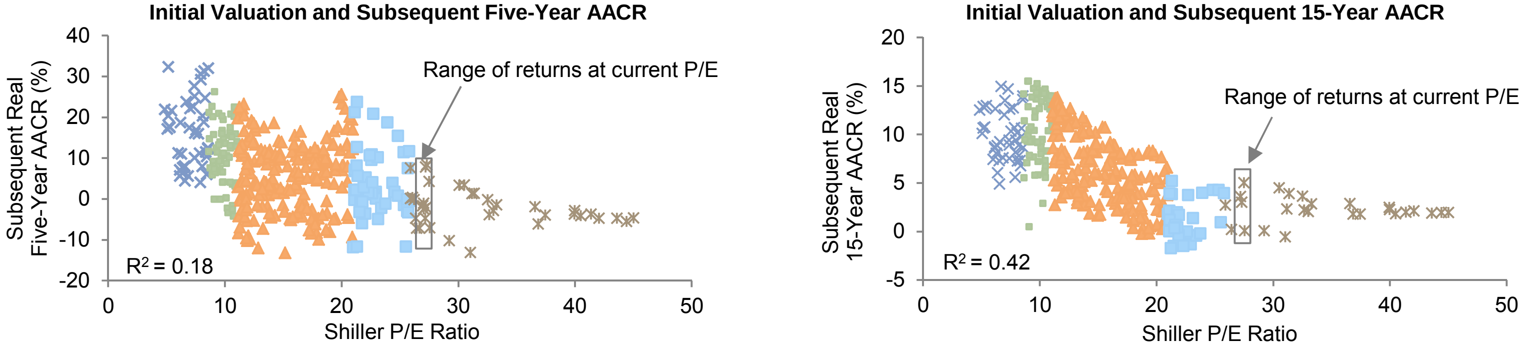
Notes: The composite normalized price-earnings (P/E) is calculated by dividing the inflation-adjusted index price by the simple average of three normalized earnings metrics: ten-year average real earnings (i.e., Shiller earnings), trend-line earnings, and return on equity–adjusted earnings.

Valuations influence returns over long time horizons

While valuations (and mean reversion) can hold sway on subsequent returns in periods as short as five years, the longer the holding period, the more likely that starting valuations will impact realized real returns. Between five- and 15-year periods for data based on the S&P 500, the R^2 more than doubles from 0.18 to 0.42. The relationship is most apparent at extremely high or low valuations; between extremes many outcomes are possible.

Relationship Between Shiller Price-Earnings Ratios and Subsequent Real Five- and 15-Year AACRs: US

First Quarter 1910 – Fourth Quarter 2016



P/E Ratio Percentile	Begin Period Shiller US P/E Ratio			Subsequent Real Five-Year AACR (%)			Begin Period Shiller US P/E Ratio			Subsequent Real 15-Year AACR (%)		
	Median	High	Low	Median	High	Low	Median	High	Low	Median	High	Low
0–10	7.3	8.6	4.8	16.9	32.3	4.0	7.3	8.6	4.8	9.4	14.9	4.9
10–25	9.8	11.0	8.6	11.0	26.3	-4.2	9.8	11.0	8.6	10.6	15.5	0.5
25–75	15.1	21.0	11.1	6.6	25.6	-13.2	14.8	21.0	11.1	6.1	13.8	-0.2
75–90	22.6	25.8	21.0	2.1	23.7	-11.8	22.0	25.8	21.0	0.4	5.2	-1.8
90–100	30.5	45.0	25.9	-2.8	8.3	-13.1	32.8	45.0	25.9	2.2	5.0	-0.6
Overall	**14.5**	**45.0**	**4.8**	**7.1**	**32.3**	**-13.2**	**13.7**	**45.0**	**4.8**	**7.2**	**15.5**	**-1.8**

Sources: Standard & Poor's, Standard & Poor's Compustat, Thomson Reuters Datastream, US Department of Labor - Bureau of Labor Statistics, and *The Wall Street Journal.*

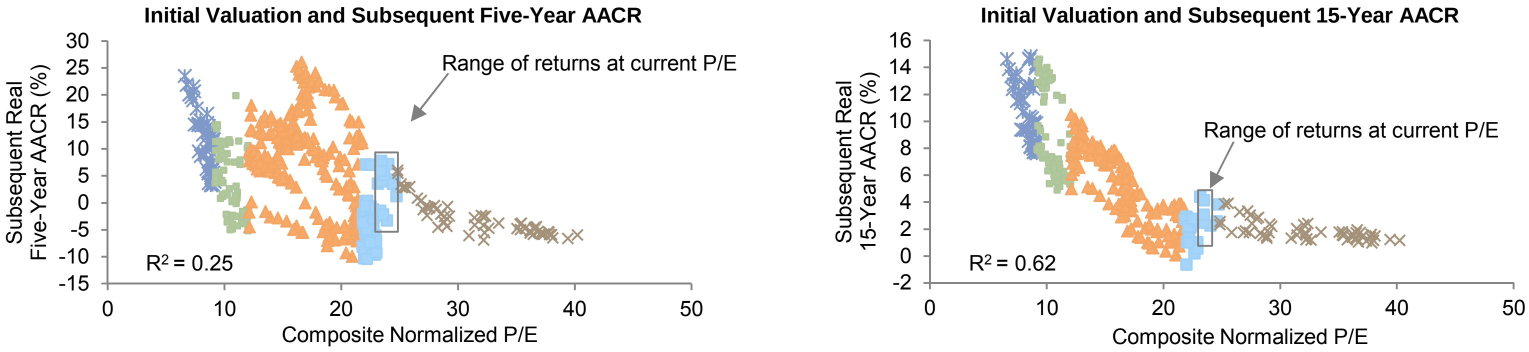
Notes: Data are quarterly. Normalized real price-earnings ratios for the S&P 500 Index are calculated by dividing the current index value by the rolling ten-year average of inflation-adjusted earnings. The last full five-year period was first quarter 2012 to fourth quarter 2016, and the last full 15-year period was first quarter 2002 to fourth quarter 2016.

High normalized P/E ratios typically see very low subsequent 15-year returns

A similar relationship exists using the 48-year history of the MSCI US Index. At the end of 2016, US equity valuations were in the 87th percentile of historical valuations at 23.1 times composite normalized earnings. While five-year real returns from current levels have seen a wide range between -3% and 8%, subsequent 15-year real AACRs have been muted between 2% to 4%.

Relationship Between Composite Normalized Price-Earnings Ratios and Subsequent Real Five- and 15-Year AACRs: US

December 31, 1969 – December 31, 2016



P/E Ratio Percentile	Begin Period Comp Norm US P/E Ratio			Subsequent Real Five-Year AACR (%)			Begin Period Comp Norm US P/E Ratio			Subsequent Real 15-Year AACR (%)		
	Median	High	Low	Median	High	Low	Median	High	Low	Median	High	Low
0–10	8.7	9.2	6.6	10.6	23.5	3.2	8.7	9.2	6.6	10.0	14.8	7.6
10–25	10.2	12.1	9.2	4.4	19.9	-5.2	10.2	12.1	9.2	7.6	14.6	4.9
25–75	16.6	21.9	12.1	8.8	26.0	-10.0	16.2	21.9	12.1	5.9	10.5	0.0
75–90	22.5	24.8	21.9	-2.4	7.7	-10.4	22.4	24.8	21.9	2.2	4.4	-0.7
90–100	32.2	40.3	24.8	-4.2	6.0	-7.0	32.2	40.3	24.8	1.7	3.9	1.0
Overall	**16.2**	**40.3**	**6.6**	**5.7**	**26.0**	**-10.4**	**14.6**	**40.3**	**6.6**	**6.6**	**14.8**	**-0.7**

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.

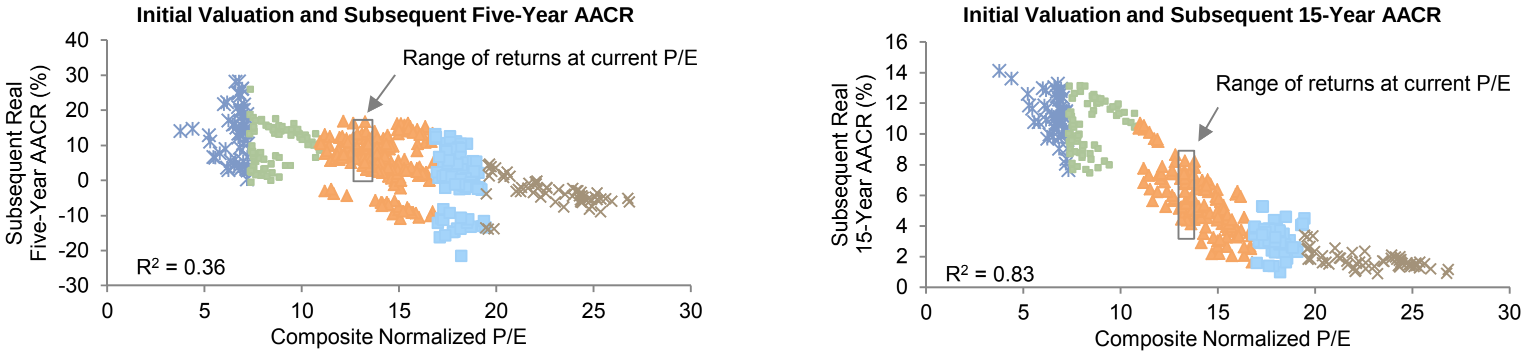
Notes: Data are monthly. The composite normalized price-earnings (P/E) is calculated by dividing the inflation-adjusted index price by the simple average of three normalized earnings metrics: ten-year average real earnings (i.e., Shiller earnings), trend-line earnings, and return on equity–adjusted earnings. The last full five-year period was January 1, 2012, to December 31, 2016, and the last full 15-year period was January 1, 2002, to December 31, 2016.

A P/E at the historical median can see below average subsequent 15-year returns

UK equities ended 2016 at a composite normalized P/E ratio of 13.6, just about at the historical median. From these levels UK equities have experienced a wide range of subsequent five-year real returns (0% to 17%), and 15-year real AACRs from 4% to 9%.

Relationship Between Composite Normalized Price-Earnings Ratios and Subsequent Real Five- and 15-Year AACRs: UK

December 31, 1969 – December 31, 2016



Initial Valuation and Subsequent Five-Year AACR

Initial Valuation and Subsequent 15-Year AACR

	Begin Period Comp Norm UK P/E Ratio			Subsequent Real Five-Year AACR (%)			Begin Period Comp Norm UK P/E Ratio			Subsequent Real 15-Year AACR (%)		
P/E Ratio Percentile	Median	High	Low	Median	High	Low	Median	High	Low	Median	High	Low
0–10	6.8	7.3	3.8	13.6	28.2	0.2	6.8	7.3	3.8	11.2	14.1	7.6
10–25	8.1	10.9	7.3	9.1	26.0	-0.5	8.0	10.9	7.3	10.5	13.2	7.5
25–75	13.9	16.8	10.9	6.9	16.8	-10.9	14.0	16.8	10.9	5.4	10.7	1.6
75–90	18.1	19.5	16.9	0.5	13.1	-21.6	18.0	19.5	16.9	3.0	5.3	1.0
90–100	22.6	26.8	19.5	-3.6	4.6	-13.9	22.8	26.8	19.5	1.6	3.4	0.9
Overall	**13.9**	**26.8**	**3.8**	**5.9**	**28.2**	**-21.6**	**13.7**	**26.8**	**3.8**	**5.9**	**14.1**	**0.9**

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.

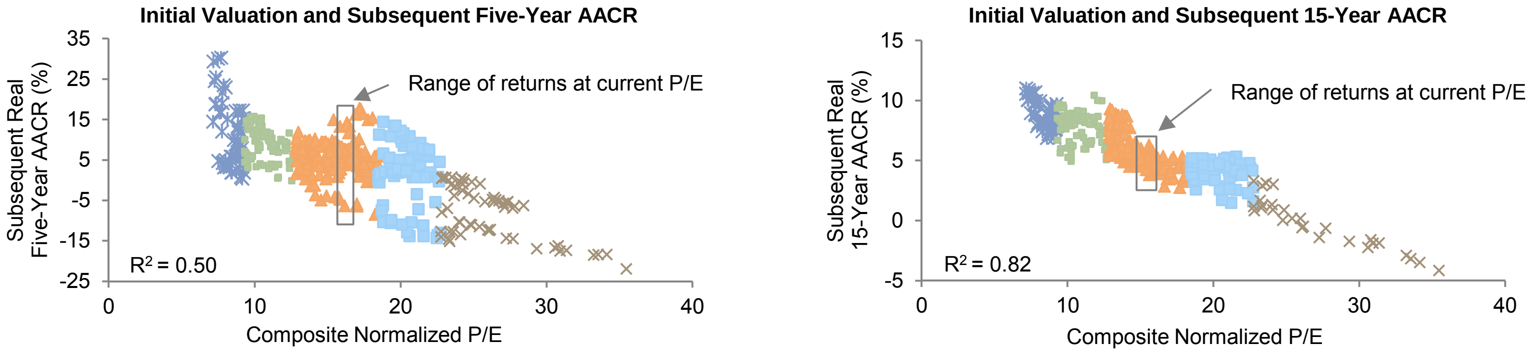
Notes: Data are monthly. The composite normalized price-earnings (P/E) is calculated by dividing the inflation-adjusted index price by the simple average of three normalized earnings metrics: ten-year average real earnings (i.e., Shiller earnings), trend-line earnings, and return on equity–adjusted earnings. The last full five-year period was January 1, 2012, to December 31, 2016, and the last full 15-year period was January 1, 2002, to December 31, 2016.

When P/Es fall within the fairly valued band, the range of outcomes can be wide

Australian equities were fairly valued at year end, with the composite normalized P/E of 16.6 in the 59th percentile of historical observations. From this level subsequent five-year real returns have ranged from -5% to 15%, while subsequent 15-year real AACRs have been in a narrower range of 4% to 7%.

Relationship Between Composite Normalized Price-Earnings Ratios and Subsequent Real Five- and 15-Year AACRs: Australia

December 31, 1969 – December 31, 2016



Initial Valuation and Subsequent Five-Year AACR

Initial Valuation and Subsequent 15-Year AACR

P/E Ratio Percentile	Begin Period Comp Norm Australia P/E Ratio			Subsequent Real Five-Year AACR (%)			Begin Period Comp Norm Australia P/E Ratio			Subsequent Real 15-Year AACR (%)		
	Median	High	Low	Median	High	Low	Median	High	Low	Median	High	Low
0–10	8.7	9.3	7.2	9.8	30.2	0.4	8.7	9.3	7.2	8.4	11.0	6.9
10–25	10.7	12.8	9.3	8.8	15.8	-0.1	10.7	12.8	9.3	8.0	10.4	5.0
25–75	15.6	18.4	12.9	6.1	17.6	-8.5	15.0	18.3	12.9	5.3	9.3	2.7
75–90	20.5	22.7	18.5	2.8	14.3	-14.4	20.6	22.7	18.5	4.4	5.3	1.4
90–100	25.4	35.5	22.8	-7.0	0.7	-22.0	25.7	35.5	22.8	0.1	3.3	-4.2
Overall	**15.6**	**35.5**	**7.2**	**5.4**	**30.2**	**-22.0**	**14.1**	**35.5**	**7.2**	**5.7**	**11.0**	**-4.2**

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

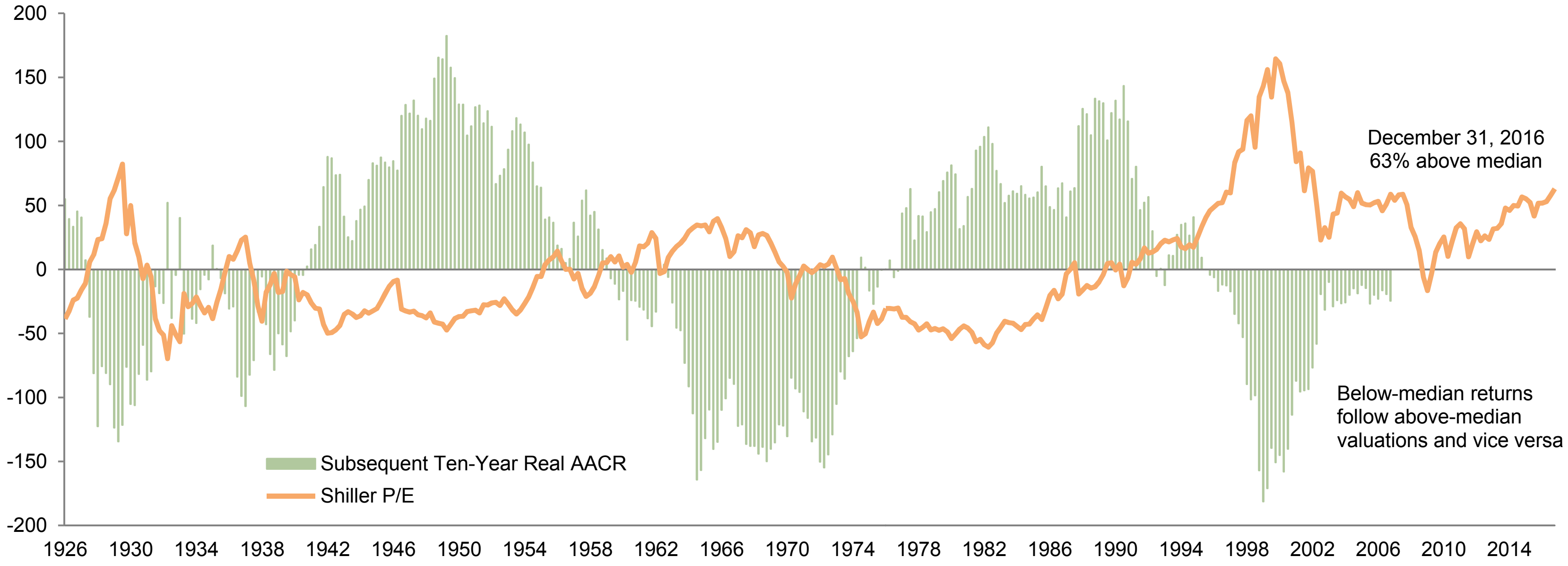
Notes: Data are monthly. The composite normalized price-earnings (P/E) is calculated by dividing the inflation-adjusted index price by the simple average of three normalized earnings metrics: ten-year average real earnings (i.e., Shiller earnings), trend-line earnings, and return on equity–adjusted earnings. The last full five-year period was January 1, 2012, to December 31, 2016, and the last full 15-year period was January 1, 2002, to December 31, 2016.

Higher starting P/E ratios indicate lower subsequent returns

Historically, normalized P/E ratios above their long-term average have typically led to below average subsequent ten-year returns; normalized P/E ratios below the long-term average have been associated with above average subsequent ten-year returns. If history is any guide, elevated valuations in the US in recent years may mean ten-year returns from this starting point are below average.

US Shiller Price-Earnings Ratios and Subsequent Real Ten-Year AACRs

First Quarter 1926 – Fourth Quarter 2016 • Shown as Percent Above/Below Respective Long-Term Median



December 31, 2016
63% above median

Below-median returns follow above-median valuations and vice versa

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

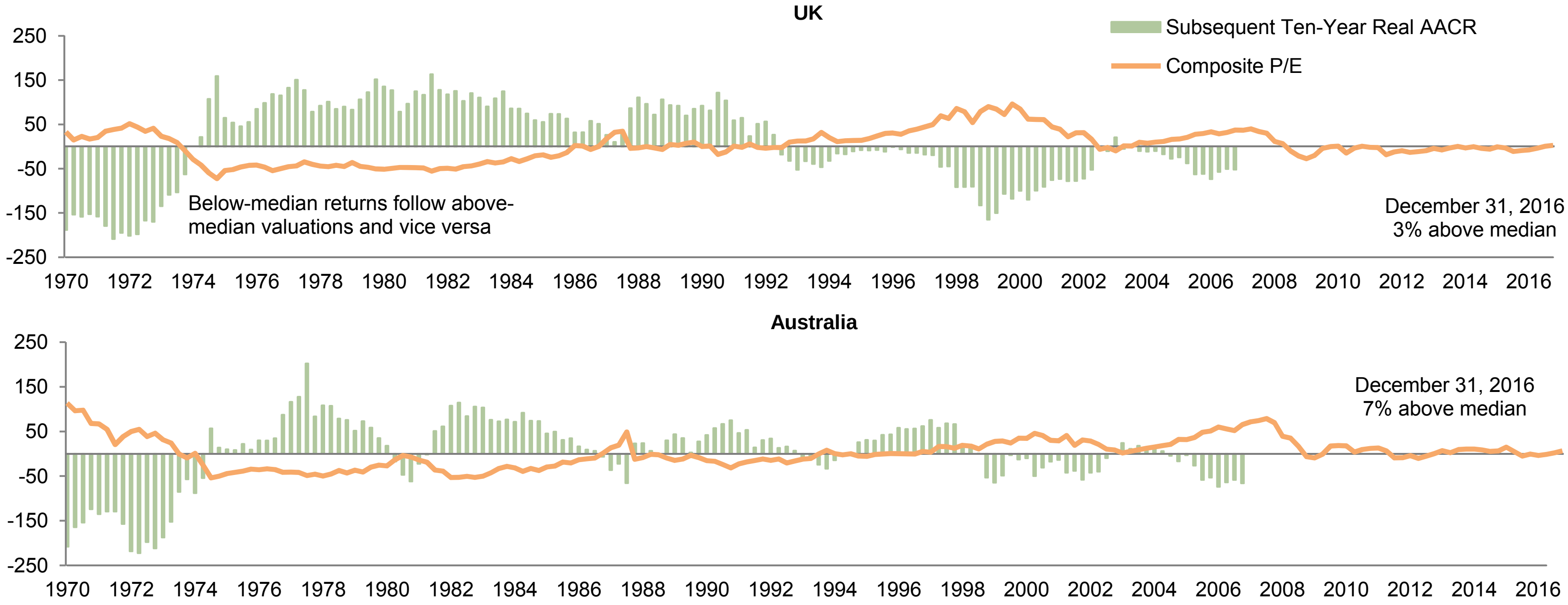
Notes: Graph shows percent above/below median for returns and valuations. Line shows point-in-time normalized real price-earnings (P/E) ratios. Normalized real P/E ratios for the S&P 500 Index are calculated by dividing the current index value by the rolling ten-year average of inflation-adjusted earnings. 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 50.2% above the median ten-year real return.

Higher starting P/E ratios indicate lower subsequent returns

Normalized valuations for UK and Australian equities have also been fairly reliable counter-indicators of future return trends. Based on their near average current valuations, investors may infer a higher likelihood of achieving historically average real returns over the coming decade.

Composite Normalized Price-Earnings Ratios and Subsequent Real Ten-Year AACRs

First Quarter 1970 – Fourth Quarter 2016 • 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.

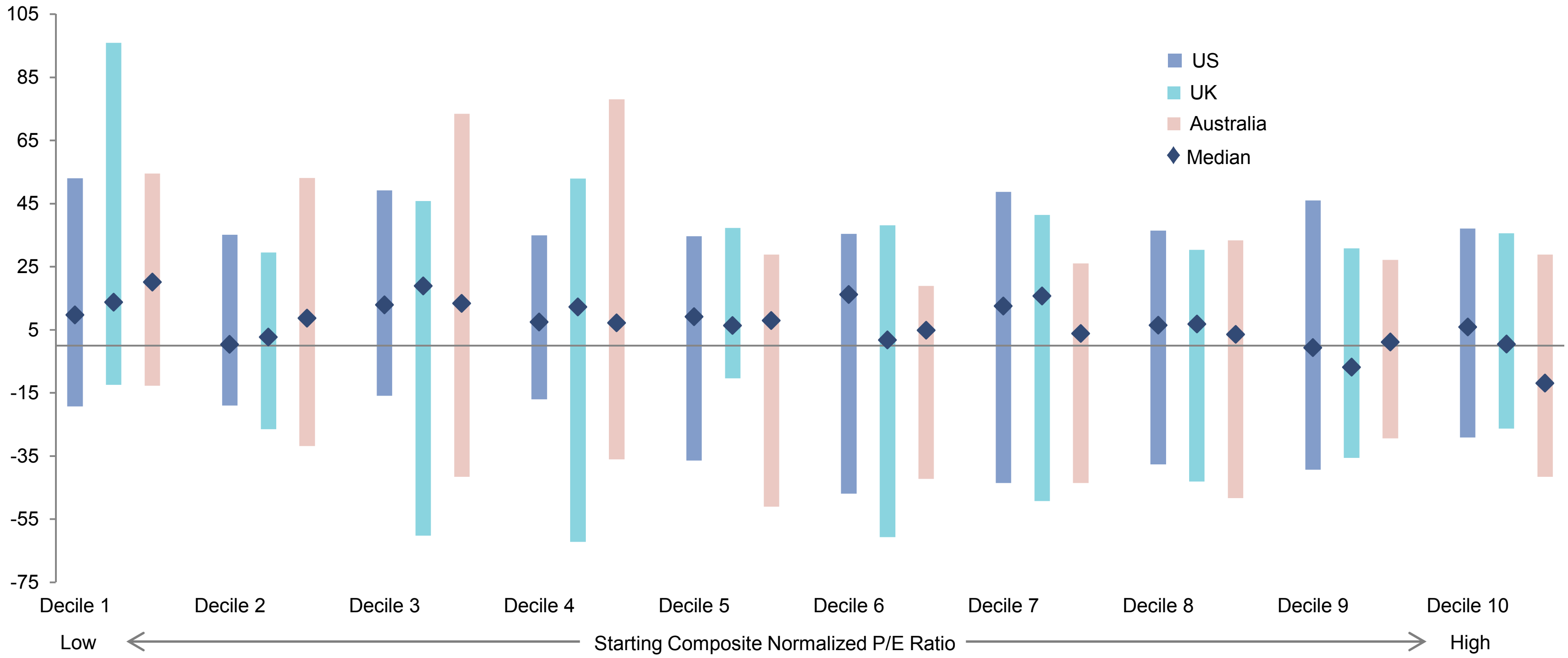
Notes: Graph shows percent above/below median for returns and valuations. Line shows point-in-time composite normalized real price-earnings (P/E) ratios. Bars are based on quarterly data and show subsequent rolling ten-year real average annual compound returns (AACRs) as a percentage above/below the long-term median ten-year real return of each region of 5.4% and 5.6% for Australia and the United Kingdom, respectively. For example, the first data point shows that the real AACR for the period 1970–79 was 220.1% below the median ten-year real return for Australia and was 196.5% below the median ten-year real return for the United Kingdom.

Normalized valuations are not a good guide to short-term returns …

For investors with a short-term (one-year) time horizon, starting valuations provide little guidance for future returns. High and low starting valuations are not universally disastrous nor advantageous in the short run, as investors have seen 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 as a reminder that valuations are a poor guide to subsequent short-term returns.

Range of Subsequent One-Year Real Returns from Starting Composite Normalized P/E Deciles: US, UK, and Australia

December 31, 1969 – December 31, 2016 • Percent (%)



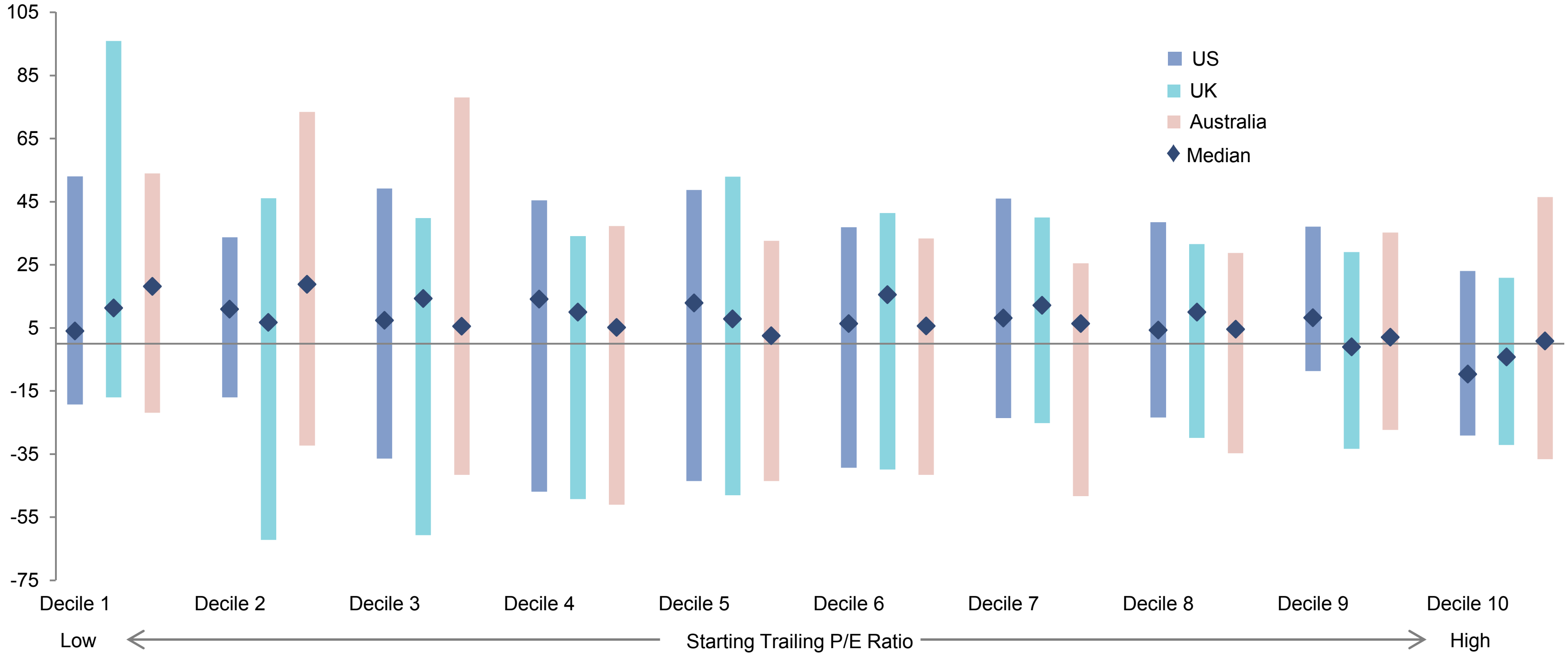
Sources: MSCI Inc. and Thomson Reuters Datastream. MSCI data provided "as is" without and express or implied warranties.
Note: The composite normalized price-earnings (P/E) is calculated by dividing the inflation-adjusted index price by the simple average of three normalized earnings metrics: ten-year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

… and neither are trailing valuations

Trailing P/Es, which divide price by trailing 12-month reported earnings and are often widely quoted in the press, also provide little guidance for returns in the next year. Trailing P/Es tend to be understated at peaks in the earnings cycle, and overstated at earnings cycle troughs, as the *E* falls much faster than the *P*, sending the ratio sharply higher.

Range of Subsequent One-Year Real Returns from Starting Trailing P/E Deciles: US, UK, and Australia

December 31, 1969 – December 31, 2016 • Percent (%)



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

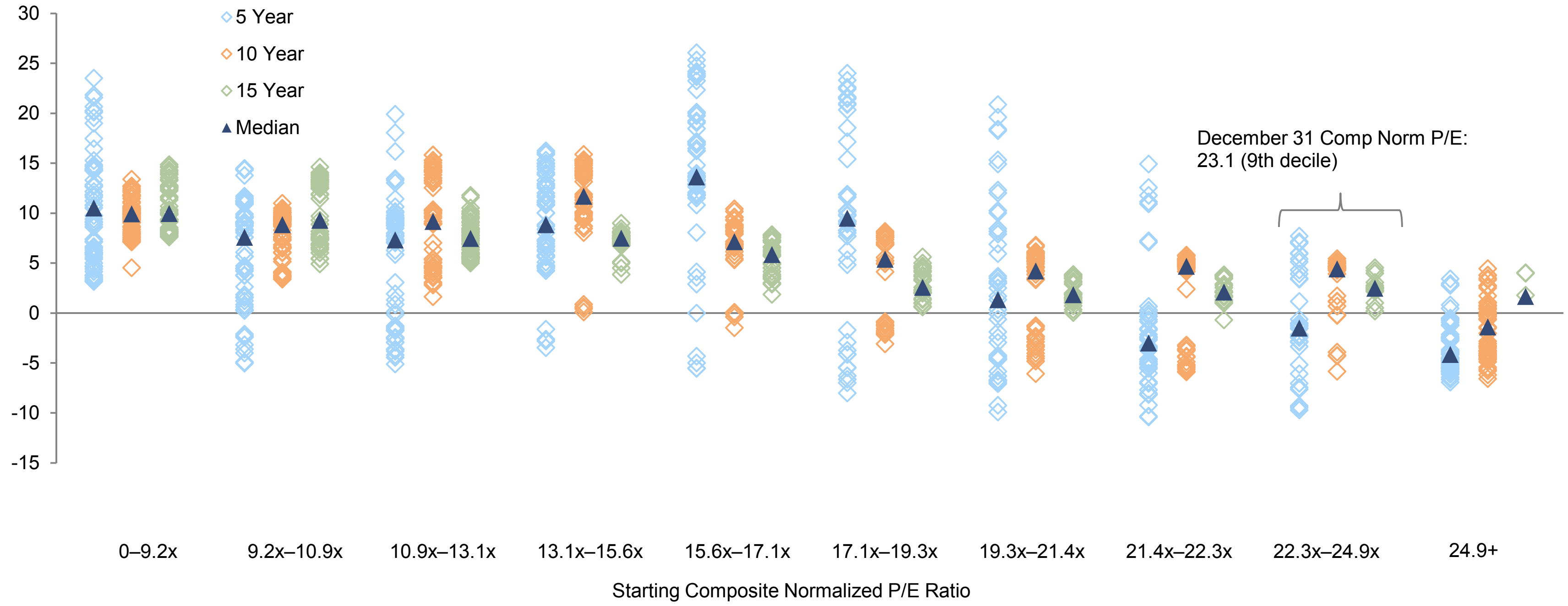
Note: All data are monthly.

Over longer periods, elevated valuations portend lower returns (and vice versa)

The longer the holding period, the more certain that starting normalized valuations will impact realized real returns. In the US, the composite normalized P/E ratio of 23.1 at December 31 lies in the 9th decile of historical observations. From this decile, the median subsequent 15-year real AACR is just 2%, with a max of 5%.

Distribution of Subsequent Real Returns from Starting Composite Normalized P/E Deciles: US

December 31, 1969 – December 31, 2016 • Subsequent Real Return AACR (%)



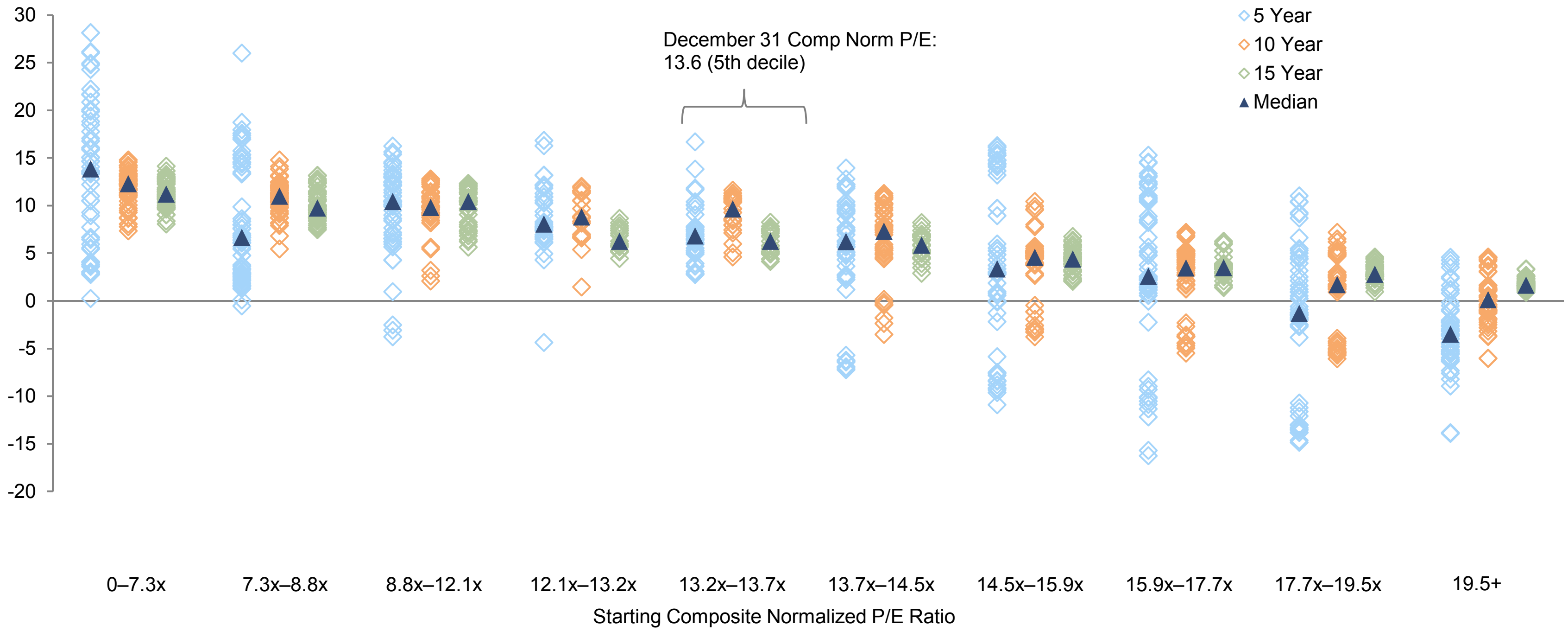
Sources: MSCI Inc. and Thomson Reuters Datastream. MSCI data provided "as is" without and express or implied warranties.
Note: The composite normalized price-earnings (P/E) is calculated by dividing the inflation-adjusted index price by the simple average of three normalized earnings metrics: ten-year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

Over longer periods, elevated valuations portend lower returns (and vice versa)

In the UK, the current composite normalized P/E ratio of 13.6 lies in the 5th decile of historical observations. From this decile, the median subsequent 15-year real AACR is about 6%.

Distribution of Subsequent Real Returns from Starting Composite Normalized P/E Deciles: UK

December 31, 1969 – December 31, 2016 • Subsequent Real Return AACR (%)



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

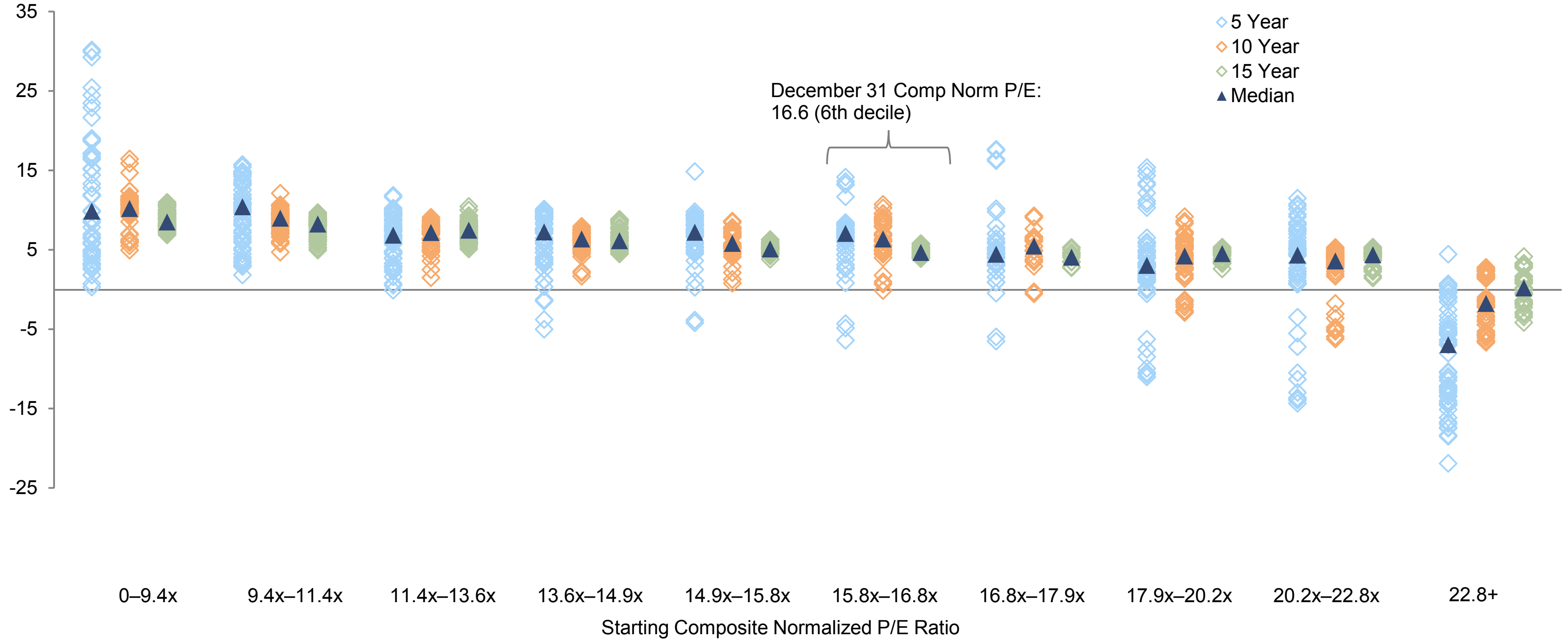
Note: The composite normalized price-earnings (P/E) is calculated by dividing the inflation-adjusted index price by the simple average of three normalized earnings metrics: ten-year average real earnings (i.e., Shiller earnings), trend-line earnings, and return on equity–adjusted earnings.

Over longer periods, elevated valuations portend lower returns (and vice versa)

In Australia, the current composite normalized P/E ratio of 16.6 sits in the 6th decile of historical observations. From this decile, the median subsequent real 15-year AACR has delivered mid-single-digit returns.

Distribution of Subsequent Real Returns from Starting Composite Normalized P/E Deciles: Australia

December 31, 1969 – December 31, 2016 • Subsequent Real Return AACR (%)

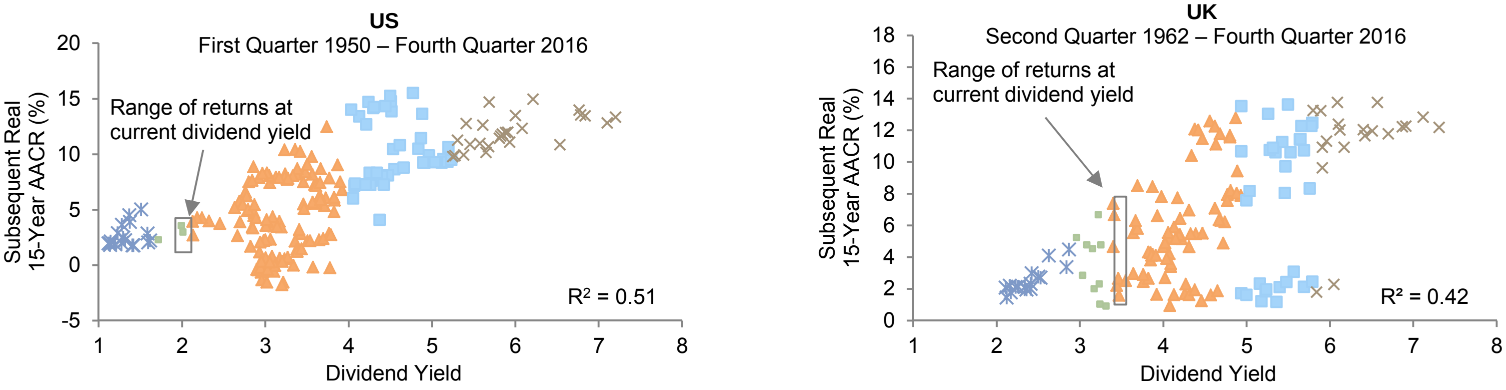


Sources: MSCI Inc. and Thomson Reuters Datastream. MSCI data provided "as is" without and express or implied warranties.
Note: The composite normalized price-earnings (P/E) is calculated by dividing the inflation-adjusted index price by the simple average of three normalized earnings metrics: ten-year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

Dividend yields can be a useful indicator of subsequent equity returns

Dividend yields also have a relationship with subsequent returns. In the US, the top decile of dividend yields has been associated with subsequent 15-year real returns well above average. This is not so in the UK, where even periods of high dividend yields have seen poor subsequent returns, and where the relationship between dividend yields and returns is noticeably weaker. At 2.0%, the current US dividend yield is quite low relative to history and associated with poor subsequent returns.

Relationship Between Dividend Yields and Subsequent Real 15-Year AACRs



Dividend Yield Percentile	Beginning Period US Dividend Yield (%)			Subsequent Real 15-Year AACR (%)			Beginning Period UK Dividend Yield (%)			Subsequent Real 15-Year AACR (%)		
	Median	High	Low	Median	High	Low	Median	High	Low	Median	High	Low
0–10	1.3	1.6	1.1	2.2	5.0	1.8	2.4	2.9	2.1	2.1	4.5	1.4
10–25	2.0	2.0	1.7	3.0	3.6	2.3	3.2	3.3	3.0	3.7	6.7	0.9
25–75	3.2	3.9	2.1	4.0	12.5	-1.8	4.2	4.9	3.4	5.4	12.8	0.9
75–90	4.5	5.2	4.0	9.4	15.5	4.1	5.4	5.8	4.9	9.0	13.6	1.1
90–100	5.8	7.2	5.3	11.9	14.9	9.8	6.3	11.7	5.8	12.1	16.4	1.8
Overall	**3.4**	**7.4**	**1.1**	**6.0**	**15.5**	**-1.8**	**4.4**	**11.7**	**2.1**	**5.4**	**16.4**	**0.9**

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* .

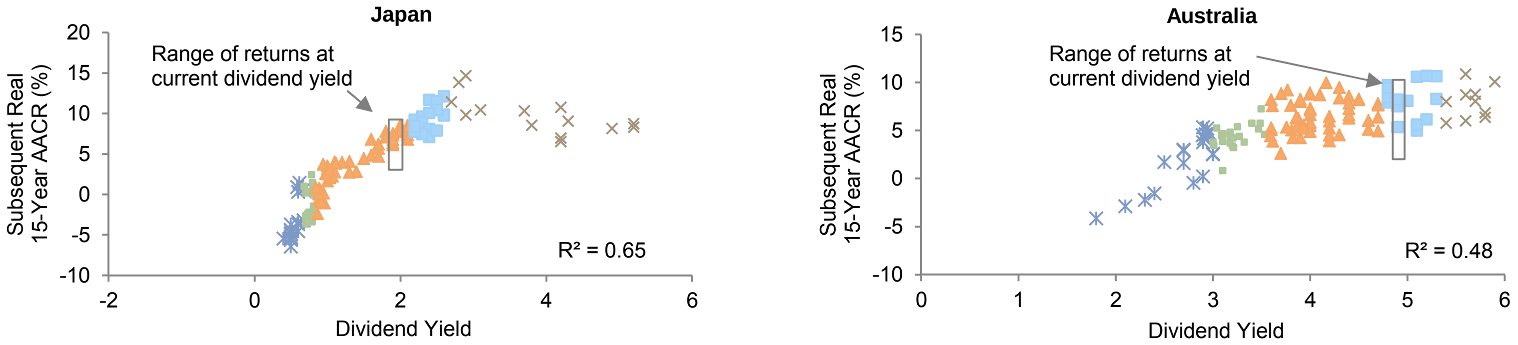
Notes: Data are quarterly. The last full 15-year period was first quarter 2002 through fourth quarter 2016. Outliers are not shown on graph but are included in R^2.

Dividend yields can be a useful indicator of subsequent equity returns

Japanese dividend yields show the highest correlation with subsequent returns, with an R^2 of 0.65, likely due to the very narrow range for Japanese dividend yields. At 2%, the current dividend yield in Japan is elevated relative to history (70th percentile). In Australia, the current dividend yield of 4% is about on par with its long-term median.

Relationship Between Dividend Yields and Subsequent Real 15-Year AACRs

Fourth Quarter 1969 – Fourth Quarter 2016



Dividend Yield Percentile	Beginning Period Japan Dividend Yield (%)			Subsequent Real 15-Year AACR (%)			Beginning Period Australia Dividend Yield (%)			Subsequent Real 15-Year AACR (%)		
	Median	High	Low	Median	High	Low	Median	High	Low	Median	High	Low
0–10	0.5	0.7	0.4	-4.5	1.4	-6.4	2.9	3.0	1.8	2.7	5.3	-4.2
10–25	0.8	0.8	0.7	-1.7	2.4	-3.7	3.2	3.5	3.0	4.5	7.3	0.8
25–75	1.3	2.1	0.8	3.9	8.5	-2.4	4.0	4.7	3.6	6.3	10.0	2.6
75–90	2.4	2.6	2.2	9.4	12.1	7.1	5.0	5.3	4.8	8.2	10.7	5.0
90–100	4.0	5.2	2.7	9.4	14.6	6.5	5.8	9.2	5.4	8.0	10.9	5.8
Overall	**1.0**	**5.2**	**0.4**	**2.7**	**14.6**	**-6.4**	**3.9**	**9.2**	**1.8**	**5.8**	**10.9**	**-4.2**

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 15-year period was first quarter 2002 through fourth quarter 2016. Outliers are not shown on graph but are included in R^2.

Upside from current valuations varies by region

Combining many of the factors discussed throughout this report, we can do some simple modeling to estimate future return outcomes. Holding dividends and payout ratio assumptions constant—and reverting today’s valuations to terminal levels given specific earnings growth assumptions—the range of outcomes is wide. In the US, elevated starting valuations indicate the potential for increased downside risk if valuations revert to median at the end of ten years and earnings growth is average. UK, Australia, and Japan show better potential returns from today’s valuations.

Real Return Expectations Given Various Earnings Growth and Ending Composite Normalized P/E Assumptions

As of December 31, 2016 • Ten-Year Average Annual Compound Return Expectations (%)

US

Ending Comp Norm P/E Ratio		Annualized Real Earnings Growth (%)			
		-2.0	0.0	**2.0**	4.0
10th %ile	*9.2*	-8.1	-6.2	-4.4	-2.6
25th %ile	*12*	-5.8	-3.9	-2.1	-0.2
Median	*17*	-2.9	-0.9	1.0	3.0
75th %ile	*22*	-0.7	1.3	3.3	5.3
90th %ile	*25*	0.5	2.5	4.5	6.5

UK

Ending Comp Norm P/E Ratio		Annualized Real Earnings Growth (%)			
		-2.0	0.0	**2.0**	4.0
10th %ile	*7.3*	-3.0	-1.1	0.8	2.8
25th %ile	*11*	0.0	2.0	4.0	6.0
Median	*14*	1.8	3.9	5.9	7.9
75th %ile	*17*	3.5	5.6	7.7	9.7
90th %ile	*19*	4.7	6.8	8.9	11.0

Japan

Ending Comp Norm P/E Ratio		Annualized Real Earnings Growth (%)			
		-2.0	0.0	**2.0**	4.0
10th %ile	*11.0*	-2.6	-0.7	1.2	3.2
25th %ile	*12.7*	-1.4	0.6	2.6	4.5
Median	*14.7*	-0.1	1.9	3.8	5.8
75th %ile	*18.0*	1.7	3.7	5.7	7.8
90th %ile	*21.3*	3.2	5.3	7.3	9.4

Australia

Ending Comp Norm P/E Ratio		Annualized Real Earnings Growth (%)			
		-2.0	0.0	**2.0**	4.0
10th %ile	*9.4*	-2.6	-0.7	1.3	3.2
25th %ile	*13.0*	-0.2	1.8	3.8	5.8
Median	*15.8*	1.4	3.4	5.4	7.5
75th %ile	*18.7*	2.7	4.8	6.8	8.9
90th %ile	*22.8*	4.4	6.5	8.6	10.7

🟥 Negative 🟩 5% or Higher

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

Notes: Table displays annualized return expectations. 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 tables represents composite normalized P/E ratios and percentiles based on full MSCI index history, which begins December 31, 1969. The Japan table represents ROE-adjusted P/E ratios and percentiles. 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

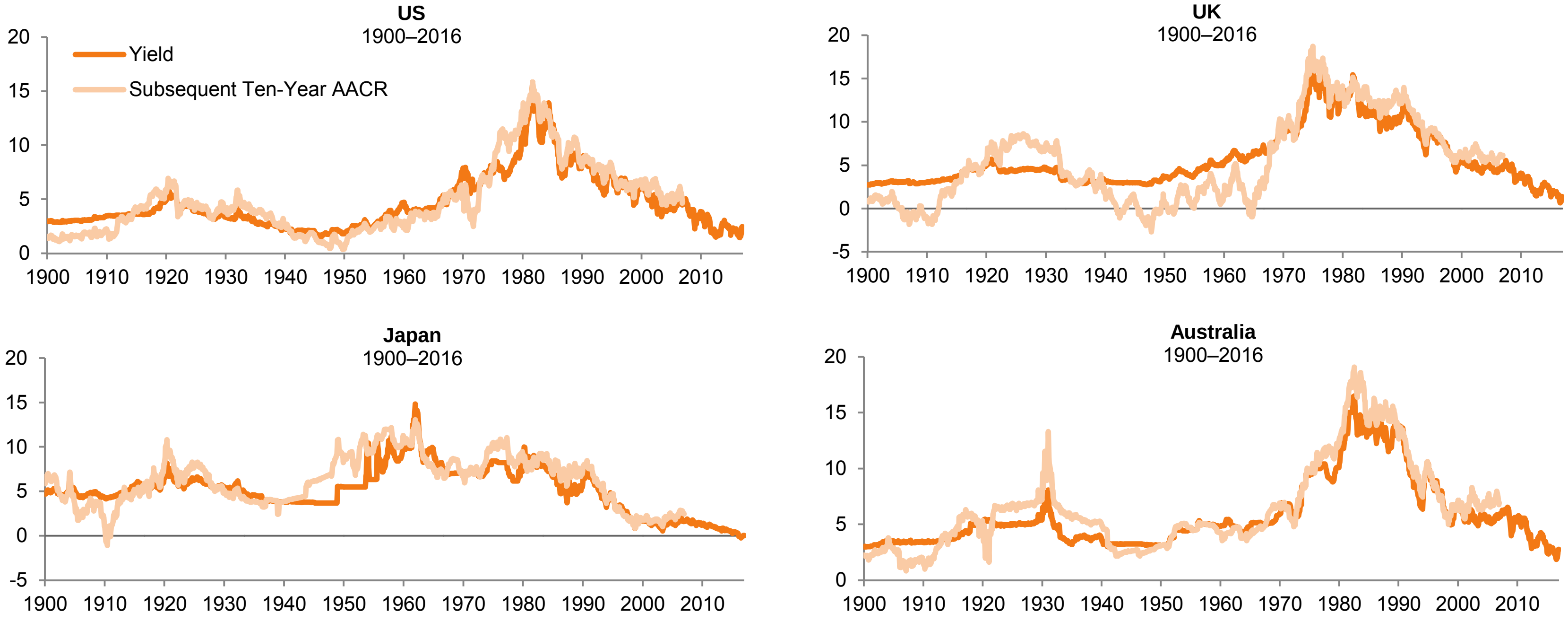
History and basic bond math have shown that the entry yield of a bond or portfolio of bonds is likely to be the overwhelming determinant of future returns. Given today's low-yield environment—in some cases record low yield—the outlook for future bond returns is muted at best. Japan's experience, where bond yields have been below 5% since November 1992, may serve as a guide. Since July 1993, no rolling monthly trailing nominal ten-year return on Japanese bonds has exceeded 5%, and nearly half of these 161 observations have been nominal trailing ten-year returns of less than 2%.

Subsequent bond returns largely track the starting yield

Historically, current bond yields have been a very good predictor of future returns, with correlations in excess of 90% 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.

Government Bond Yields and Subsequent Returns

Percent (%)



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

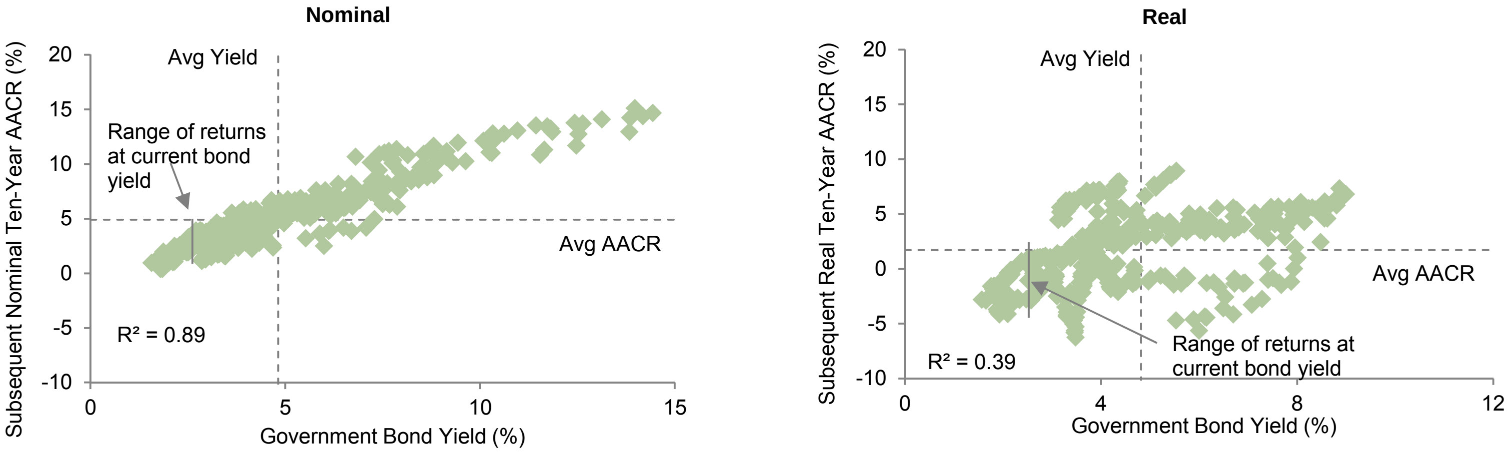
Notes: Data are monthly. The last full ten-year period was January 1, 2007, to December 31, 2016.

Initial bond yields are strongly correlated to subsequent nominal returns

Initial yields and subsequent nominal ten-year returns on US government bonds have an R^2 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 US Government Bond Yields and Subsequent Ten-Year AACRs

1900–2016



Yield	Beginning Period Government Bond Yields			Subsequent Nominal Ten-Year AACR (%)				Beginning Period Government Bond Yields			Subsequent Real Ten-Year AACR (%)			
Quartiles	Mean	High	Low	Mean	High	Low	Std Dev	Mean	High	Low	Mean	High	Low	Std Dev
First	2.43	3.01	1.57	1.95	3.92	0.37	0.87	2.43	3.01	1.57	-1.09	1.16	-4.14	1.52
Second	3.46	3.88	3.01	3.34	5.55	1.47	1.13	3.46	3.88	3.01	0.74	7.15	-6.26	3.65
Third	4.76	6.12	3.92	4.97	7.60	2.22	1.27	4.76	6.12	3.92	2.77	8.93	-5.65	3.35
Fourth	8.62	15.84	6.15	9.30	15.82	3.86	2.74	8.62	15.84	6.15	4.41	11.43	-4.46	3.66
Overall	**4.82**	**15.84**	**1.57**	**4.89**	**15.82**	**0.37**	**3.23**	**4.82**	**15.84**	**1.57**	**1.71**	**11.43**	**-6.26**	**3.78**

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

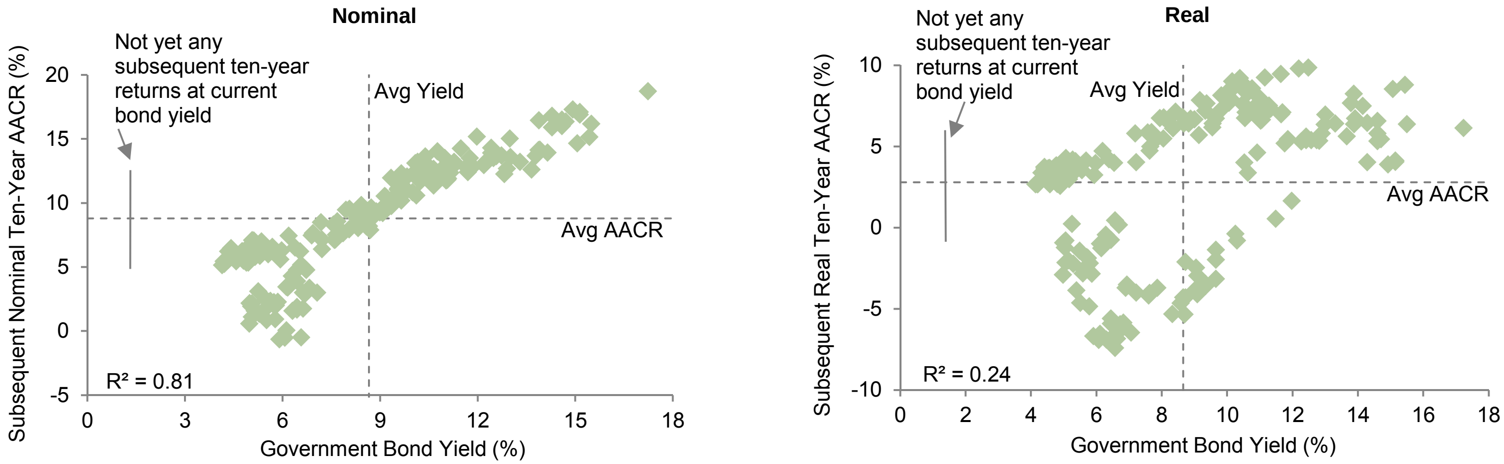
Notes: Data are quarterly. The last full ten-year period was first quarter 2006 through fourth quarter 2016.

Initial bond yields are strongly correlated to subsequent nominal returns

UK bond yields have been a strong predictor of future nominal ten-year returns, but less so for real returns. With the year-end nominal yield of 1.2% not far from the all-time low, future returns for UK bonds are highly likely to be below historical averages.

Relationship Between UK Government Bond Yields and Subsequent Ten-Year AACRs

1958–2016



Yield	Beginning Period Government Bond Yields			Subsequent Nominal Ten-Year AACR (%)				Beginning Period Government Bond Yields			Subsequent Real Ten-Year AACR (%)			
Quartiles	Mean	High	Low	Mean	High	Low	Std Dev	Mean	High	Low	Mean	High	Low	Std Dev
First	4.98	5.74	4.14	4.74	7.08	0.57	2.02	4.98	5.74	4.14	1.72	4.27	-4.64	2.67
Second	6.95	8.58	5.78	5.26	9.83	-0.66	3.00	6.95	8.58	5.78	-0.85	7.14	-7.42	5.13
Third	9.73	10.83	8.64	11.05	14.03	7.89	1.53	9.73	10.83	8.64	3.94	9.19	-5.35	5.05
Fourth	12.96	17.24	10.86	14.12	18.72	11.76	1.74	12.96	17.24	10.86	6.32	9.84	0.54	1.82
Overall	**8.65**	**17.24**	**4.14**	**8.79**	**18.72**	**-0.66**	**4.50**	**8.65**	**17.24**	**4.14**	**2.78**	**9.84**	**-7.42**	**4.73**

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

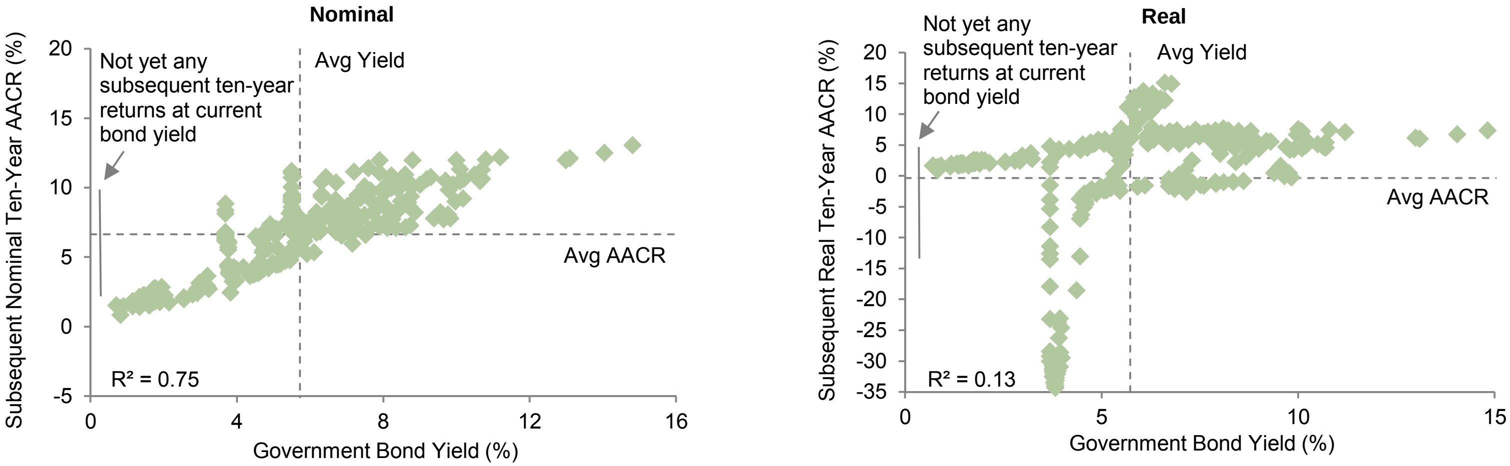
Notes: Data are quarterly. The last full ten-year period was first quarter 2007 through fourth quarter 2016.

Initial bond yields are strongly correlated to subsequent nominal returns

While still high at 0.75, 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 0.13. Japan's triple-digit annual inflation during 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 Japanese Government Bond Yields and Subsequent Ten-Year AACRs

1921–2016



	Beginning Period Government Bond Yields			Subsequent Nominal Ten-Year AACR (%)				Beginning Period Government Bond Yields			Subsequent Real Ten-Year AACR (%)			
Yield Quartiles	Mean	High	Low	Mean	High	Low	Std Dev	Mean	High	Low	Mean	High	Low	Std Dev
First	2.67	3.83	0.71	3.56	8.83	0.84	1.99	2.67	3.83	0.71	-9.54	4.75	-34.34	15.58
Second	4.91	5.60	3.83	5.84	11.18	3.24	2.14	4.91	5.60	3.83	-2.03	7.59	-33.18	11.96
Third	6.48	7.21	5.61	7.71	11.14	5.23	1.09	6.48	7.21	5.61	5.72	15.04	-2.61	5.08
Fourth	8.84	14.82	7.23	9.46	13.04	6.58	1.57	8.84	14.82	7.23	4.49	7.64	-1.78	2.89
Overall	**5.72**	**14.82**	**0.71**	**6.64**	**13.04**	**0.84**	**2.80**	**5.72**	**14.82**	**0.71**	**-0.34**	**15.04**	**-34.34**	**11.88**

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

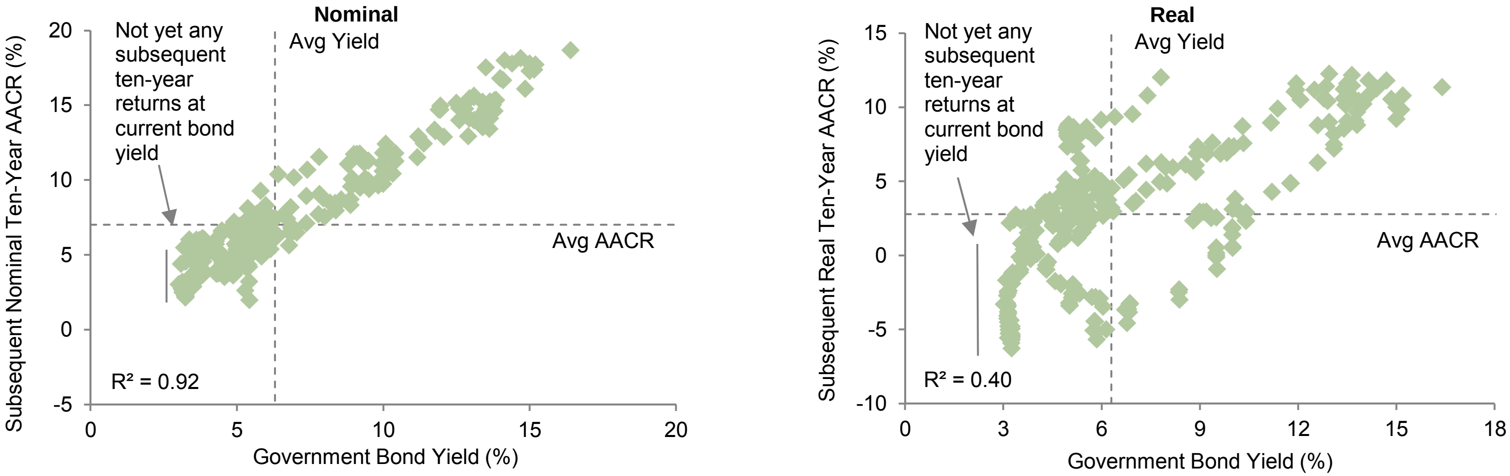
Notes: Data are quarterly. The last full ten-year period was first quarter 2007 through fourth quarter 2016.

Initial bond yields are strongly correlated to subsequent nominal returns

Bond yields and nominal ten-year returns showed the highest R^2 for Australia at 0.92. This fell to 0.40 on a real return basis, but was still the highest of the four regions examined. With Australian government bonds yielding just 2.8%, future returns are likely to be sub-par.

Relationship Between Australian Government Bond Yields and Subsequent Ten-Year AACRs

1912–2016



Yield	Beginning Period Government Bond Yields			Subsequent Nominal Ten-Year AACR (%)				Beginning Period Government Bond Yields			Subsequent Real Ten-Year AACR (%)			
Quartiles	Mean	High	Low	Mean	High	Low	Std Dev	Mean	High	Low	Mean	High	Low	Std Dev
First	3.48	4.23	3.02	3.90	6.12	2.15	1.28	3.48	4.23	3.02	-1.42	3.37	-6.27	3.10
Second	4.81	5.10	4.24	5.40	7.20	3.53	0.99	4.81	5.10	4.24	3.48	8.83	-3.41	3.31
Third	5.71	7.05	5.10	6.28	10.39	1.98	1.38	5.71	7.05	5.10	2.27	9.53	-5.67	4.20
Fourth	11.20	16.40	7.37	12.51	18.68	7.12	2.95	11.20	16.40	7.37	6.82	12.25	-3.00	4.03
Overall	**6.30**	**16.40**	**3.02**	**7.02**	**18.68**	**1.98**	**3.75**	**6.30**	**16.40**	**3.02**	**2.79**	**12.25**	**-6.27**	**4.71**

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

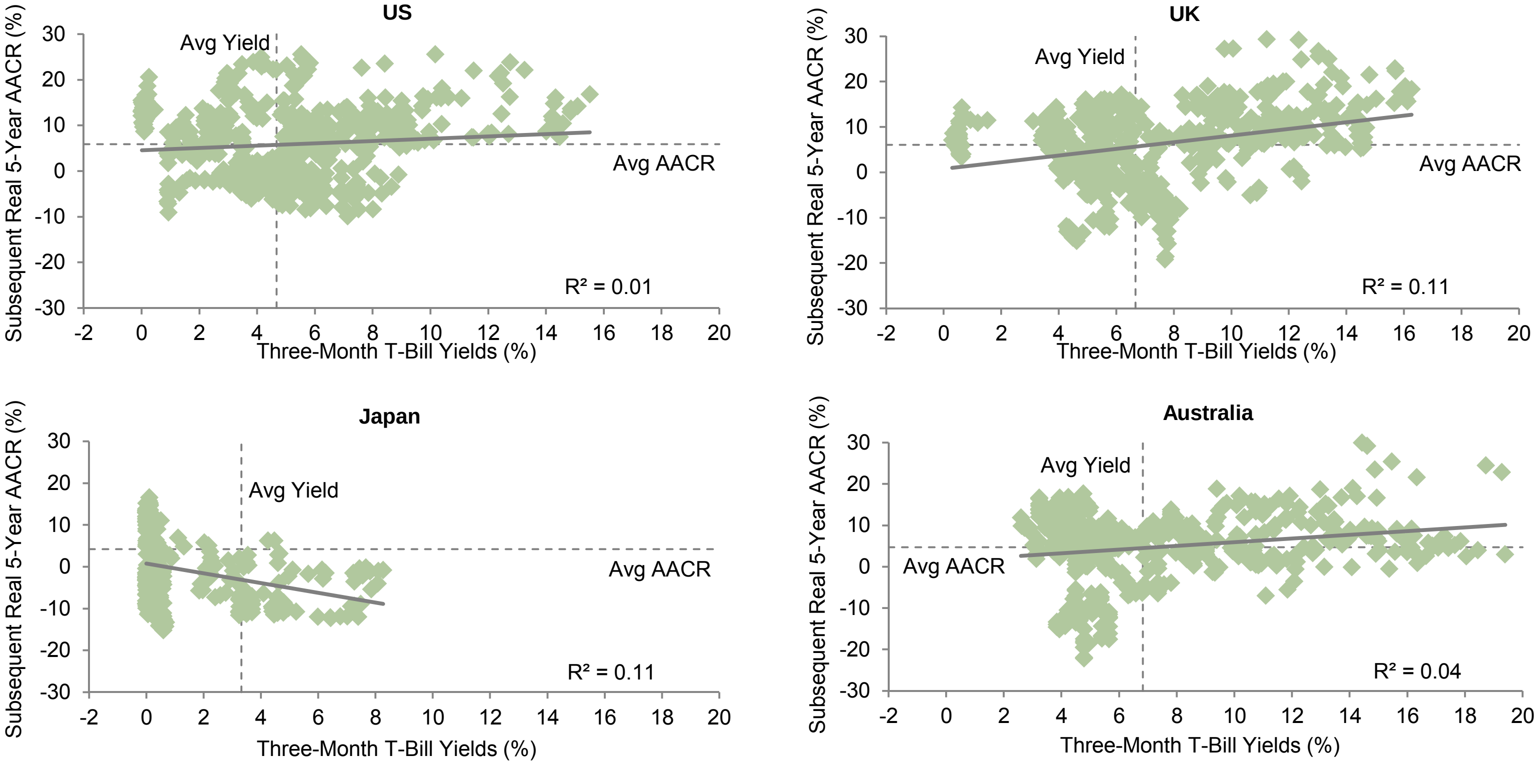
Notes: Data are quarterly. The last full ten-year period was first quarter 2007 through fourth quarter 2016.

No meaningful relationship between absolute interest rates and equity returns

The very weak relationship between short-term rates and subsequent five-year returns shows that the level of rates has little impact. The observed R^2 ranges from .01 (US) to .11 (UK and Japan). Stock valuations and stocks themselves can rise amid rising bond yields if such yields reflect improved growth conditions, or increasing consumer confidence. As such, interest rates themselves have a less clear impact on equities than the factors driving the changes in yields.

Relationship Between Treasury Bill Yields and Subsequent Real Five-Year Equity AACRs

January 31, 1960 – December 31, 2016



Sources: Global Financial Data, Inc., Thomson Reuters Datastream, and US Department of Labor - Bureau of Labor Statistics.

Notes: Data are monthly. Japan data being January 1, 1987. The last full five-year period was fourth quarter 2011 to fourth quarter 2016.

The rate of change in interest rates also gives no meaningful signal

Starting with the rate hikes that began in December 2015, the Fed has now raised its policy rate by 50 bps over 12 months, after seven years of holding a 25 bp target rate. Looking at historical periods of Fed rate hikes of at least 100 bps provides no clear guidance as to whether equities, bonds, or cash will perform best. The direction of rates is not the only thing that determines risk asset performance; many other factors influence returns.

Bond & Equity Returns During Periods When Target Fed Funds Rate Increased by 100 bps or More

As of December 31, 2016

			Cumulative Return (%)		
Period of ≥100 bps Target Fed Rate Increase	Months	Target Fed Funds Rate Change (bps)	T-Bills	Ten-Year Govt Bonds	S&P 500
7/1/1971 to 10/31/1971	4	150	1.60	8.57	-4.55
3/1/1972 to 6/30/1974	28	700	16.35	4.27	-13.20
8/1/1977 to 3/31/1980	32	1,175	24.97	-8.66	18.39
10/1/1980 to 2/28/1981	5	650	5.70	-3.54	6.60
5/1/1981 to 6/30/1981	2	350	2.64	3.68	-0.43
2/1/1982 to 4/30/1982	3	200	3.49	5.06	-1.74
3/1/1984 to 8/31/1984	6	206	5.40	2.30	8.87
3/1/1988 to 5/31/1989	15	331	9.80	8.64	25.32
2/1/1994 to 6/30/1995	17	300	7.03	6.51	17.80
6/1/1999 to 12/31/2000	19	175	9.32	14.31	3.33
6/1/2004 to 8/31/2007	39	425	12.89	16.96	39.65

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

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, as earlier charts showed.

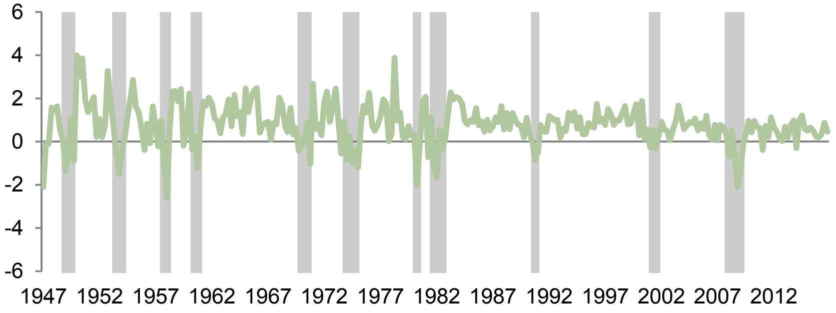
* A common definition for a recession is two or more quarters of declining real GDP. However, GDP is not the only factor used by major economic research organizations when identifying recessions. For instance, the US experienced a recession in 2001, even without experiencing two consecutive quarters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

Steady economic growth has kept recession risk low in recent years

According to NBER data, the US is currently in the fourth longest expansion on record (90 months). History would suggest that the odds of continued economic expansion are diminishing, but continued expansion would not be unprecedented—cycles do not die of old age. This is clearly shown in Australia, which has not experienced a recession in 25 years.

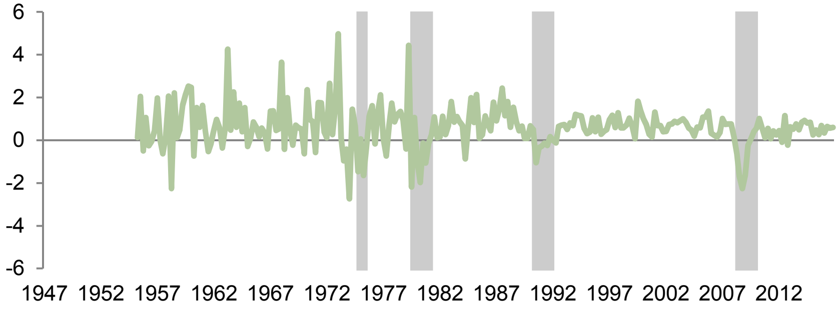
US GDP

1947–2016 • Quarter-Over-Quarter (%)



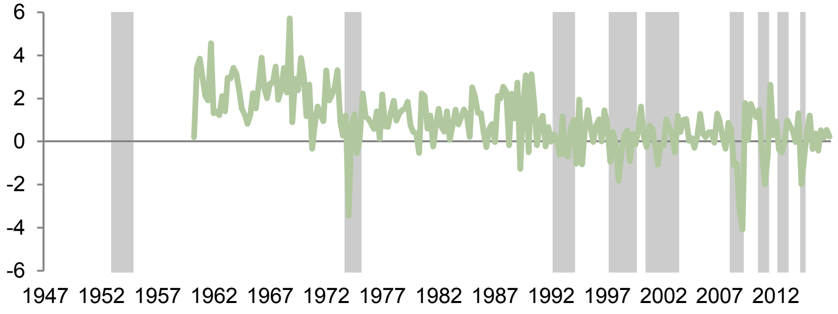
UK GDP

1955–2016 • Quarter-Over-Quarter (%)



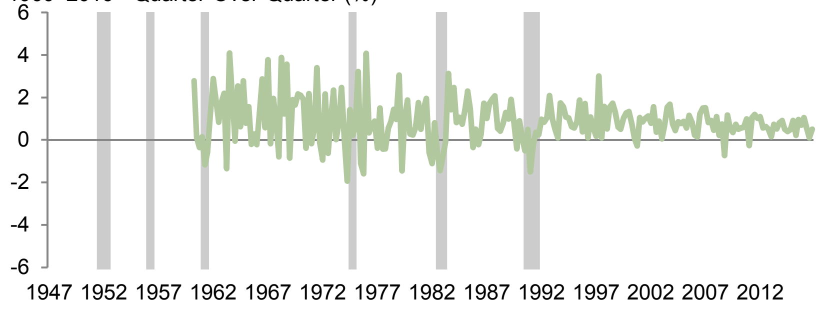
Japanese GDP

1960–2016 • Quarter-Over-Quarter (%)



Australian GDP

1960–2016 • Quarter-Over-Quarter (%)



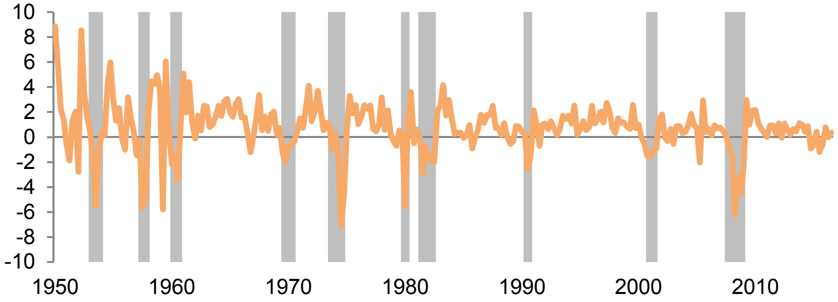
Sources: Economic Cycle Research Institute, Global Financial Data, Inc., National Bureau of Economic Research, OECD, and UK Office for National Statistics.
Notes: Gray bars for the United States represent NBER-defined recessions. Gray bars for others defined by Economic Cycle Research Institute business cycle peak to trough dates. Japan and Australia GDP are from OECD. GDP as of December 31, 2016 are preliminary.

Industrial production has been muted since the global financial crisis

Industrial production, another gauge of economic health, shows more pronounced drops during recessionary periods, but not every drop in industrial production is associated with an economic recession. Like GDP growth, industrial production has been subdued since the global financial crisis. Excluding Japan, quarter-over-quarter industrial production growth has averaged between 0% and 1%.

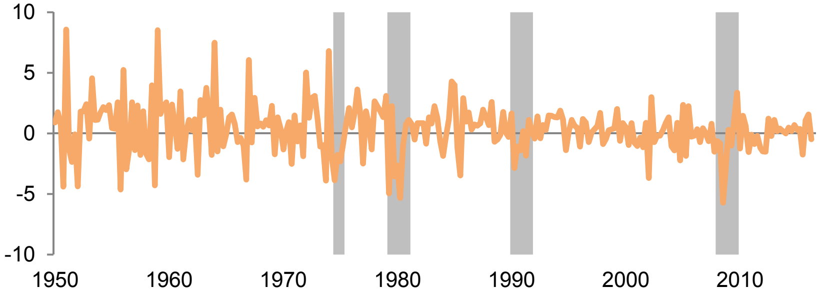
US Industrial Production

1950–2016 • Quarter-Over-Quarter (%)



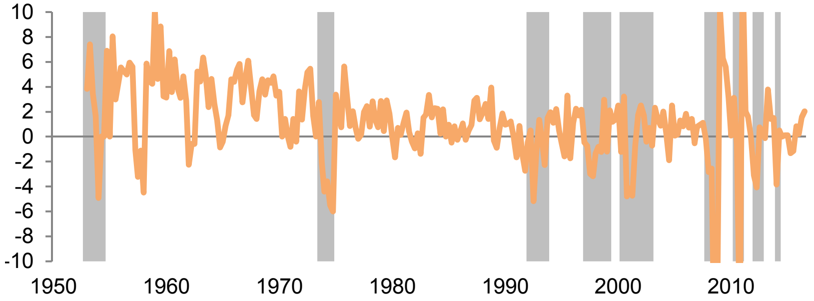
UK Industrial Production

1950–2016 • Quarter-Over-Quarter (%)



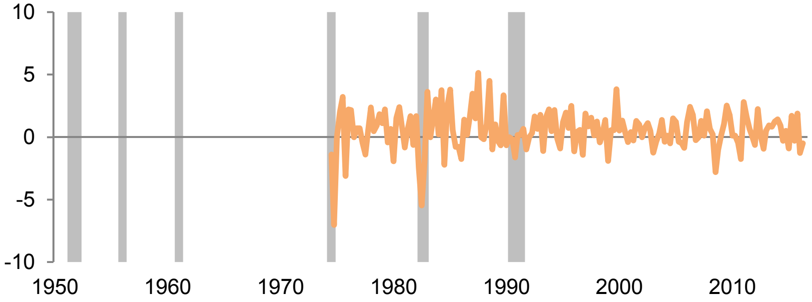
Japanese Industrial Production

1953–2016 • Quarter-Over-Quarter (%)



Australian Industrial Production

1974–2016 • Quarter-Over-Quarter (%)



Sources: Australian Bureau of Statistics, Bank of England, Economic Cycle Research Institute, Federal Reserve, Japan Ministry of Economy, Trade, and Industry, National Bureau of Economic Research, Thomson Reuters Datastream, and UK Office for National Statistics.

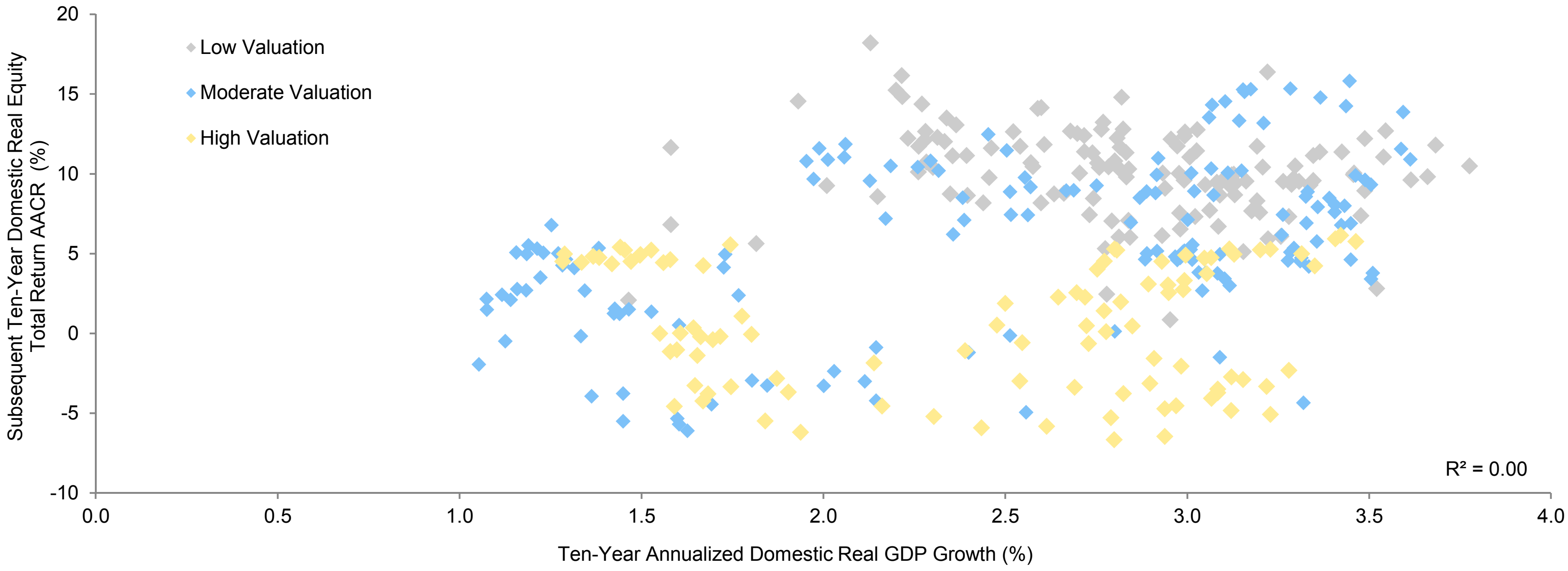
Notes: Gray bars for the United States represent NBER-defined recessions. Gray bars for others defined by Economic Cycle Research Institute business cycle peak to trough dates. Data for United Kingdom and Australia are as of September 30, 2016.

GDP growth and equity returns have little relationship

Comparing data from four developed markets over nearly 50 years, measuring ten-year annualized GDP growth and comparing that to subsequent ten-year real equity AACRs shows no meaningful relationship. Valuations are a better guide, with extreme lows and extreme highs the best indictors of what subsequent returns will look like.

Relationship Between Ten-Year Real GDP Growth and Rolling Ten-Year MSCI Real Total Return AACRs

Second Quarter 1970 – Fourth Quarter 2016 • Local Currency



Sources: MSCI Inc. 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%.