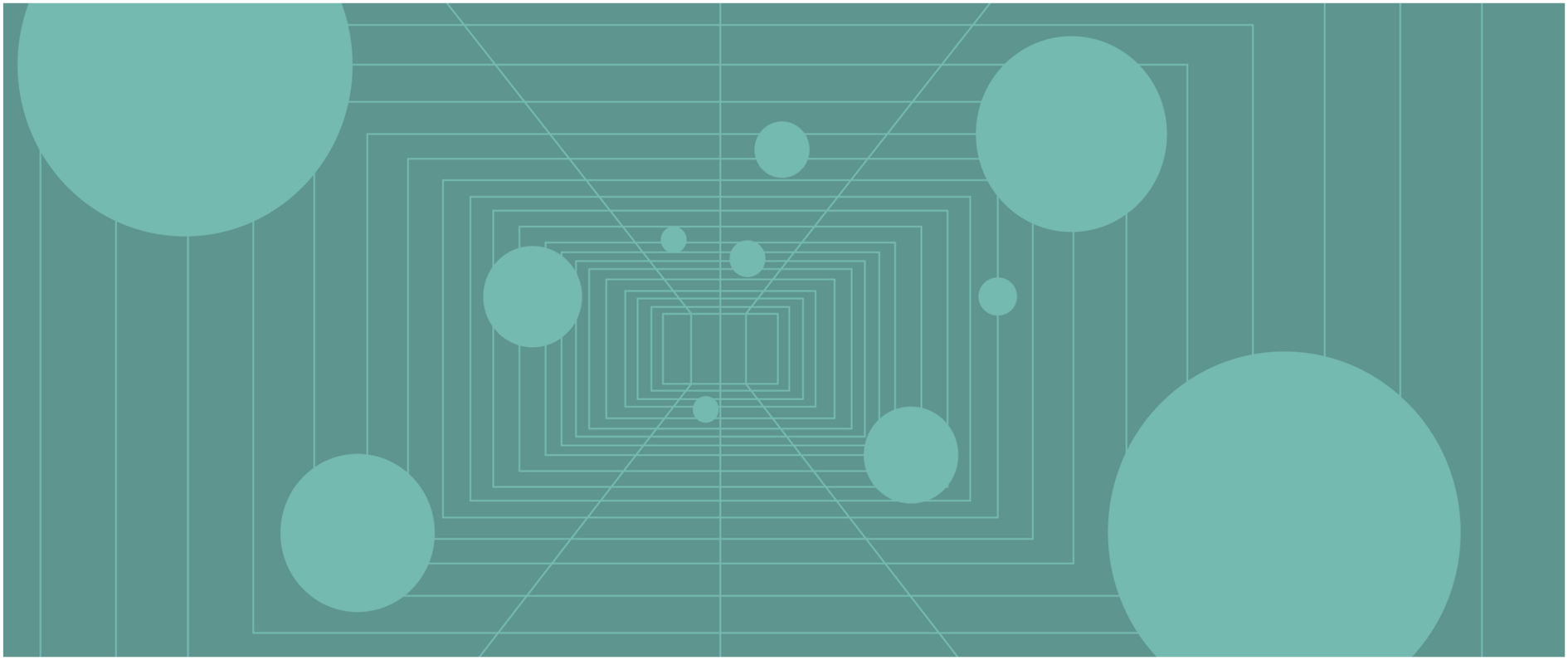
DECADES OF DATA: JAPAN

1900–2019



CAMBRIDGE ASSOCIATES

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.

- **Japanese equities (18.5%) advanced in 2019, in contrast to negative performance in 2018. Still, Japanese stocks remain well below peaks set during the late 1980s equity bubble.** Japanese shares gained the most since calendar year 2017, with 2019's performance ranking in the 66th percentile of historical calendar year returns since 1921. Such strong performance for Japanese stocks is not necessarily uncommon. Japanese equities gained 18% or more in 35 out of 99 calendar years since 1921, more than one-third of the time. Additionally, Japanese stocks earned double-digit returns in 46 calendar years over that same timespan, nearly half of the time. Investors might reasonably expect a market pullback in the subsequent year following such strong returns; however, the data show that strong performance can continue. In fact, in the initial calendar year following 18%+ market gains, Japanese stocks posted double-digit positive returns in 17 out of 34 years, while declining in nine of those years, for an overall subsequent calendar year average of more than 20%.

- **In the decade closed at the end of 2019, Japanese equities posted returns below their very long-term averages.** Investors in Japanese stocks have earned a nominal average annual compound return (AACR) of 8.2% over the past ten years. For the full period analyzed, Japanese equities (1921–2019) have fared better, posting a nominal AACR of 11.1%. Recent below-average performance has persisted for some time as Japanese shares have delivered trailing ten-year returns below the long-term average since 1992, which coincided with the aftermath of the Japanese equity bubble. However, investors should bear in mind that rolling AACR analyses are sensitive to beginning- and end-point timing, even over ten-year periods. Monthly rolling ten-year AACRs reached 9.5% through February 2019, which was their strongest ten-year rolling return since the period ended October 2003, but still below their long-run average. One major reason equities posted relatively stronger returns is that the worst months from the global financial crisis (GFC) fell out of the data set, as the ten-year window began when Japanese equities hit a nadir in March 2009.

Executive Summary (continued)

- **Only equities consistently outpaced inflation over very long-term periods, generating positive inflation-adjusted returns at the lower end of the returns range.** Over rolling 50-year periods, real AACRs for Japanese stocks ranged from a low of 2.4% to a high of 11.4%, whereas the range for benchmark government bonds (-6.4% to 4.6%) and cash (-8.0% to 1.5%) indicated greater potential for diminished purchasing power over certain periods. However, equities never lost out to inflation over the very long term. Inflation in Japan has averaged 6.7% annually since 1922, one of the highest historical rates among developed economies, driven by skyrocketing inflation during and after WWII. Over the past 50 years inflation has been much milder, averaging 2.4% per year. Japanese stocks and benchmark government bonds returned 6.2% and 5.3% annually over the past 50 years, handily outpacing inflation. Cash's spread vis-à-vis inflation is much narrower, returning 2.7% annually over the same time period.

- **Over the long term, Japanese equity investors have generally been compensated for the additional risk of holding stocks.** Since 1921, Japanese equity returns exceeded bond returns during 66% of all five-year periods, 72% of all ten-year periods, and 71% of all 25-year periods (calculated on a nominal basis using rolling monthly data). But these rates of outperformance are low relative to other developed regions, particularly over 25-year periods. While equities tend to outperform in the long term, since 1921 there have been sustained periods of underperformance over rolling five-year periods, as volatile equities are prone to larger drawdowns than bonds. Such periods are a reminder of the ballast fixed income allocations provide to portfolios in terms of diversification.

- **Earnings growth is the primary contributor to equity total return over time, while relatively low dividend yields and the effects of valuation mean reversion diminish the impact of dividend reinvestment and multiple rerating.** Earnings growth provided the highest degree of return contribution since 1970, on average, but can vary significantly from decade to decade. Dividends provide a steady stream of reliable income, but their contribution has averaged less than 2%. Japanese dividend yields are the lowest relative to other major developed markets we studied based on averages since 1969. But Japanese dividend yields also one of the most constant, exhibiting among the lowest variability compared to other markets. In the nine-year period closed at the end of 2019, contributions from earnings growth exceeded that of dividend reinvestment by nearly 5x, while multiple contraction detracted from performance.

Executive Summary (continued)

- **Starting valuations are a useful indicator for long-term (ten+ years) subsequent equity returns, but the relationship is somewhat weaker over shorter time horizons.** Normalized valuations and subsequent returns have a decent relationship over long time periods (e.g., ten-year subsequent returns), but starting valuations alone do not completely explain subsequent returns—many factors can influence equity performance. Since 1979, our cyclically adjusted price-to–cash earnings (CAPCE) ratio for Japan has explained 42% of the variation in subsequent ten-year real returns, a moderately useful but imperfect guide to future returns. At December 31, 2019, Japanese equity valuations ended in the 53rd percentile of historical observations, and from this valuation decile the median subsequent ten-year real return for Japanese equities has been only about 1% per annum.
- **High- or low-valuation environments alone are not a catalyst for market reversals and may persist for several years; waiting for valuations to revert to mean can be an exercise in frustration.** Low valuations provide what famed investment analyst Benjamin Graham called "a margin of safety." High valuations, on the other hand, typically price in lofty projections for the future, providing little room for error. Despite uncertainty regarding the timing of market reversals, the historical record for Japanese equities is clear—periods of low valuations are followed by higher long-term subsequent returns, while periods of high valuations are followed by poorer long-term returns.
- **Japanese equity dividend yields are not as useful as normalized valuations in predicting subsequent performance.** Japanese dividend yields explained 30% of the variation in subsequent ten-year real AACRs over the past 50 years, which is a weaker metric as opposed to normalized valuations. For example, from the 2019 year-end dividend yield of 2.3%, the range of subsequent Japanese equity real ten-year returns was about 20 percentage points, which does not instill confidence in forecasting exercises based solely on dividend yields. Japanese equity dividend yields are low relative to other developed regions, and one of the most constant over time, which helps explain their weaker relationship with subsequent performance. In Japan, dividend yields fail to capture the whole picture, as many other factors influence equity market returns.

Executive Summary (continued)

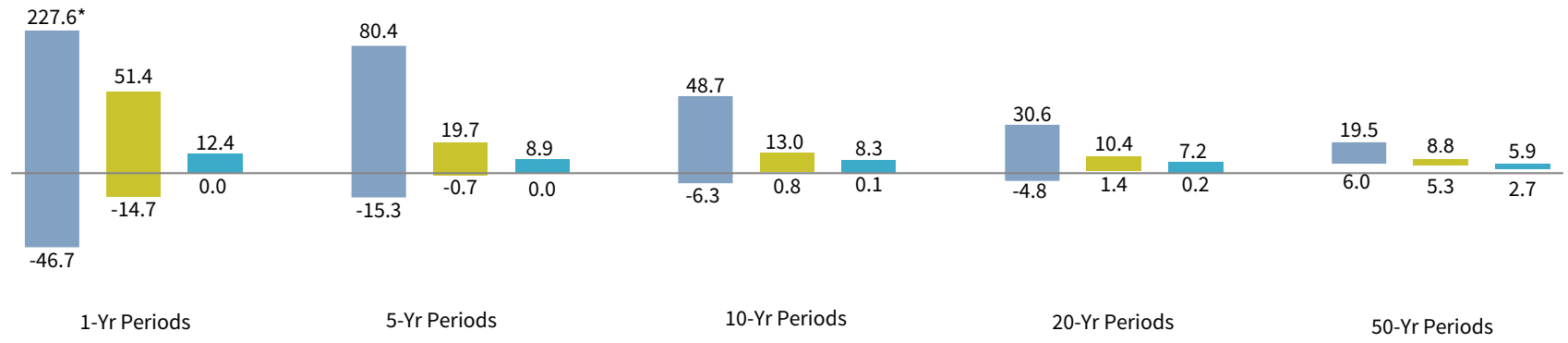
- **Subsequent nominal ten-year Japanese bond returns closely track the starting yield.** Japanese bond yields remained negative and near historical lows at the end of 2019, implying that future long-term returns may in fact fall below zero. In August 2019, Japanese ten-year government bond yields fell to their lowest month-end levels on record (-0.28%) and ended the year at -0.24%. There is no comparable period of such low yield levels in Japan, but if the strong correlation between starting yields and subsequent performance observed since 1900 (correlation coefficient=0.84) is a guide, Japanese bonds could post negative returns in the ensuing ten years. The better news is that price inflation in Japan has been virtually nonexistent in recent years. Investors have benefitted from falling yields over the past 50+ years, with Japanese bonds returning 6.5% annualized since 1962. However, in today's unusual yield environment, where investors are effectively paying to lend money, the expectations for future returns have grown negative.
- **Although rising interest rates are commonly viewed as detrimental to equity prices, this is not necessarily the case**—the drivers of change in interest rates, rather than their outright levels or the amount of changes in the rates, are what impact equity returns. Stocks can rise amid rising bond yields if such yields reflect improving growth conditions or increasing consumer confidence. In Japan, more than two decades of near-zero interest rates may serve as a guide for other developed markets amid the proliferation of central bank zero interest-rate policies following the GFC. Since 1995, when Japanese bill rates first fell to less than 1%, there has been no relationship between short-term interest rates and subsequent real ten-year equity performance with an R^2 value of 0.0.
- **Japanese economic downturns have become more frequent in the past 30 years and overall growth has slowed.** Japan suffered seven recessions since 1990, a period coinciding with the "lost decade" following the Japanese equity bubble burst. Prior to this period, however, Japanese growth was strong, averaging more than 6% annualized with only one recession from 1960 through 1989. Since 1990, economic growth in Japan averaged just 1% annualized. Despite weak growth over the past three decades, Japanese equity real EPS levels are currently near all-time highs reached in January 2019, overcoming three periods of index-level losses from 1999–2000, 2002–03, and 2009–10. Likewise, return on equity for Japanese stocks rose to near multi-decade highs in 2019. Better fundamental outcomes have likely been aided by widespread corporate governance reforms aimed at boosting shareholder value.

The range of investment returns narrows as holding periods increase

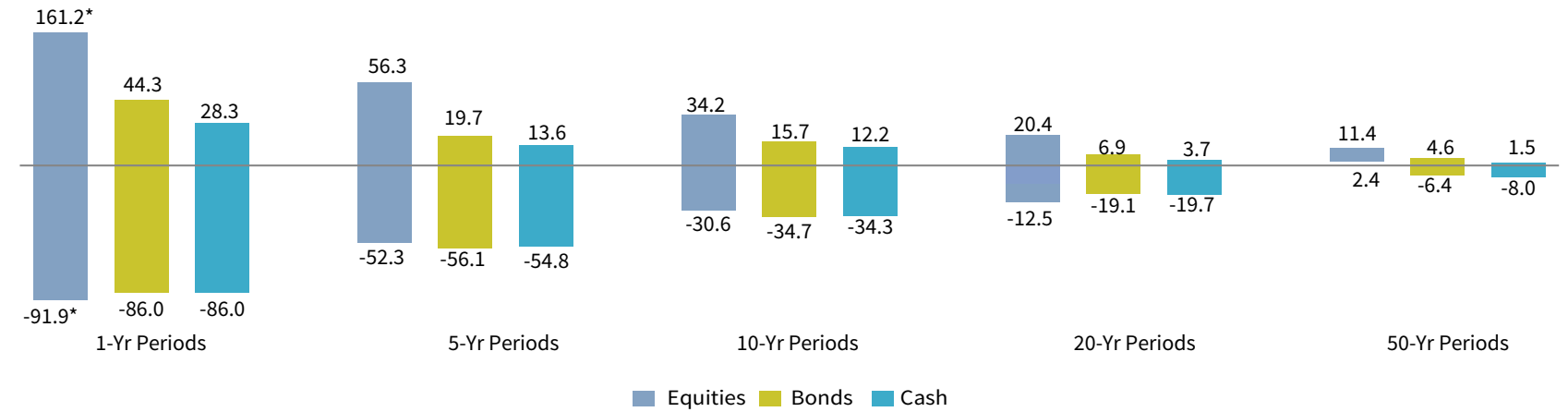
RANGE OF EQUITY, BOND, AND CASH RETURNS FOR VARIOUS ROLLING MONTHLY TIME HORIZONS

1921–2019 • Average Annual Compound Return (%)

Nominal Returns



Real Returns



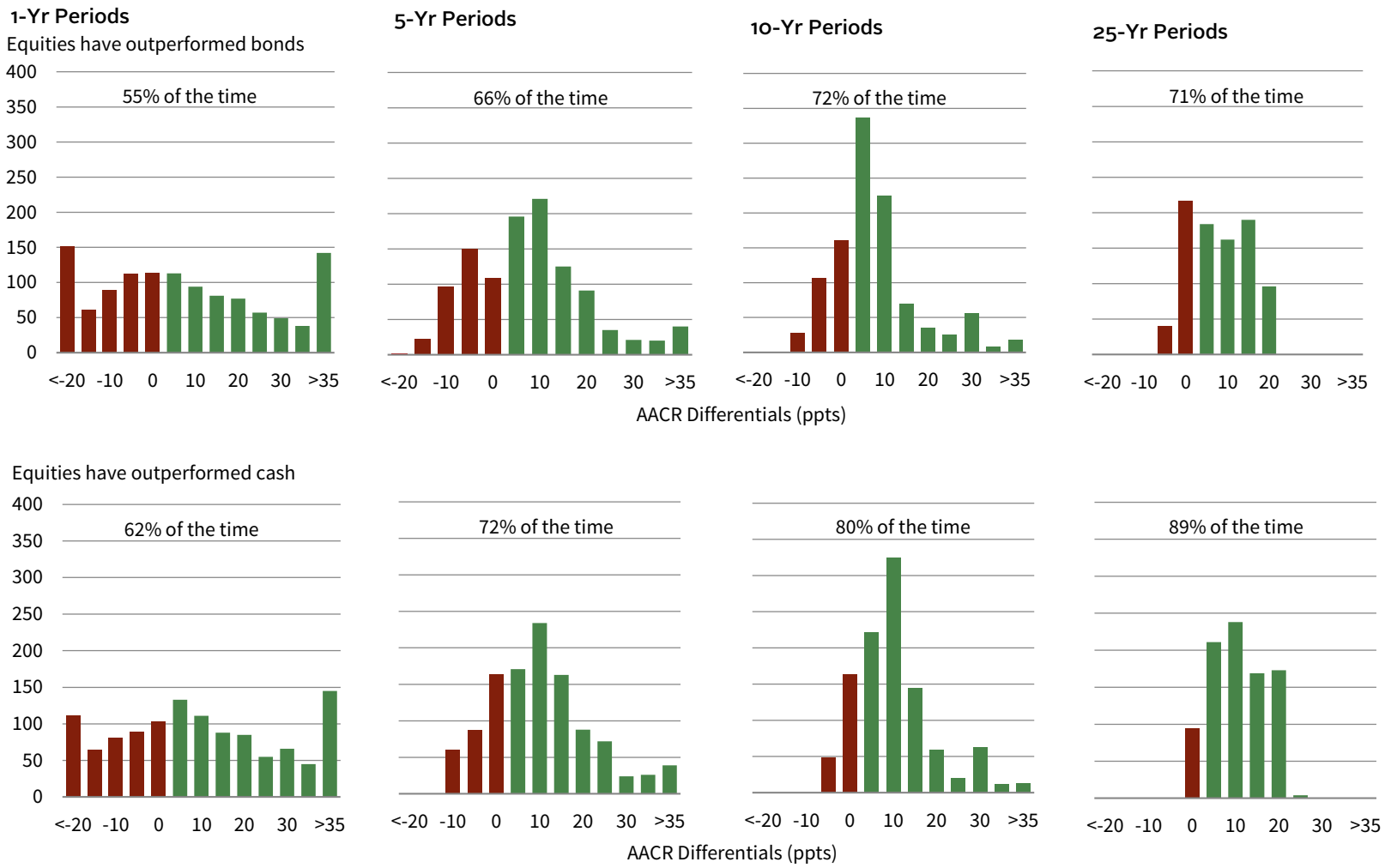
* Axis capped for scaling purposes.

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

Equities more likely to outperform bonds and cash as holding periods increase

EXCESS RETURNS OF EQUITIES OVER BONDS AND CASH

1921–2019 • Number of Rolling Monthly Periods

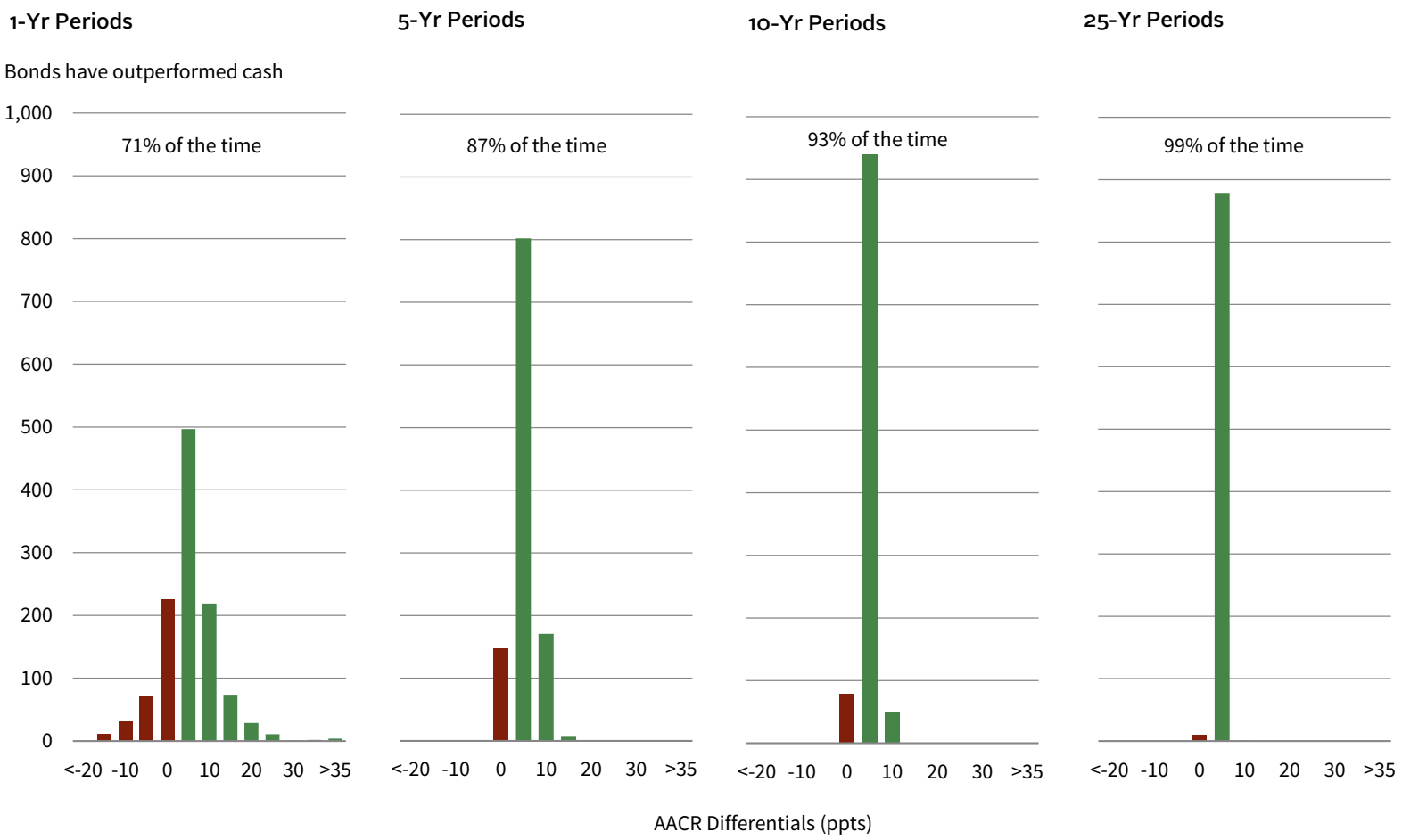


Sources: Global Financial Data, Inc., MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.
Notes: Buckets represent ranges of 5 percentage points each with the label denoting the high end of the range, inclusive. For example, the "0" bucket corresponds to the number of rolling monthly periods in which the excess return of equities over bonds/cash was greater than -5, but equal to or less than zero.

Japanese bonds generally outperform cash, with a nearly perfect record over the long term

EXCESS RETURNS OF BONDS OVER CASH

1921–2019 • Number of Rolling Monthly Periods

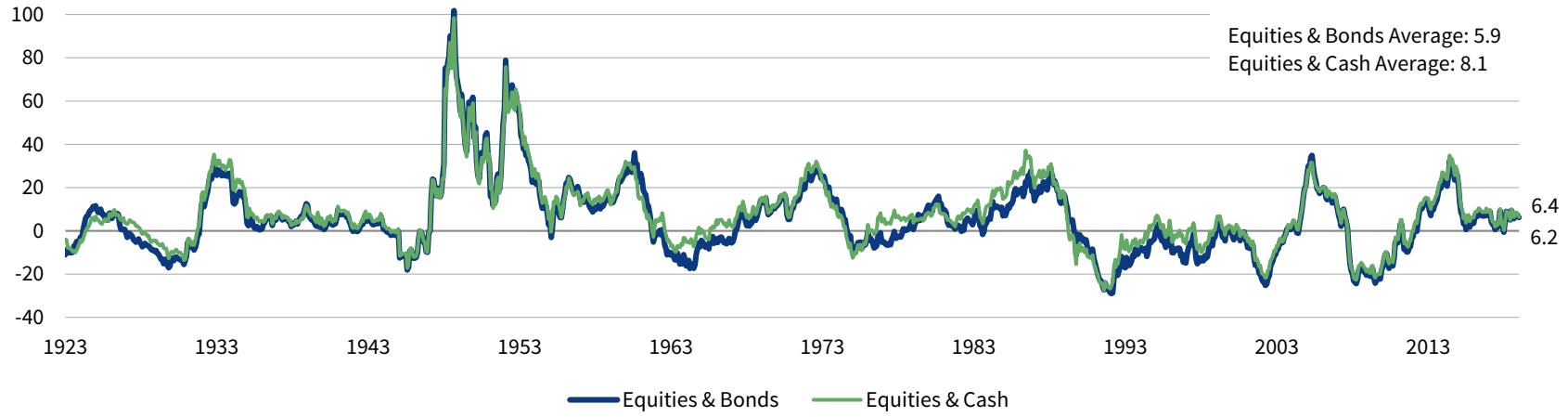


Sources: Global Financial Data, Inc., MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.
Notes: Buckets represent ranges of 5 percentage points each with the label denoting the high end of the range, inclusive. For example, the "0" bucket corresponds to the number of rolling monthly periods in which the excess return of bonds over cash was greater than -5, but equal to or less than zero.

Equities outperform bonds and cash by a wide margin; bonds outperform cash to a lesser degree

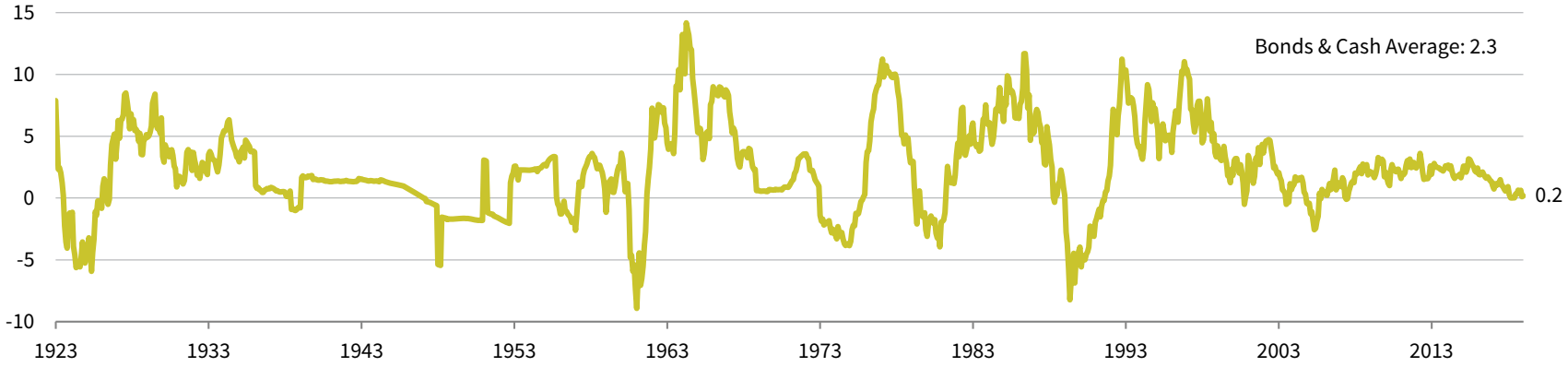
AACR OF ROLLING MONTHLY 3-YR RETURN DIFFERENTIAL BETWEEN EQUITY, BOND, AND CASH RETURNS

1923–2019 • Percent (%)



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

1923–2019 • Percent (%)

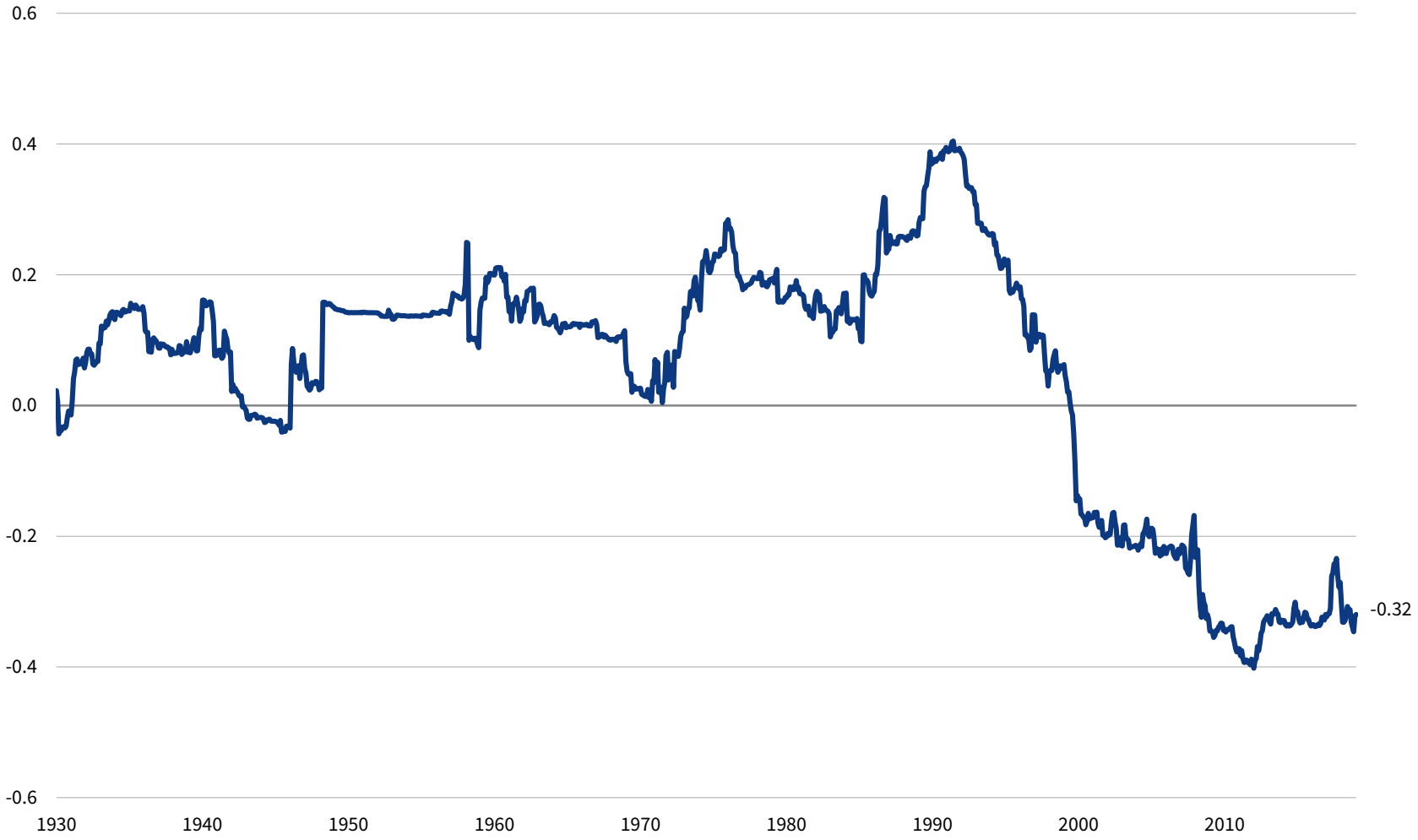


Sources: Global Financial Data, Inc., MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Stock and bond correlation remains near historical lows

ROLLING 10-YR CORRELATIONS OF STOCK AND BOND RETURNS

December 31, 1930 – December 31, 2019 • Correlation Coefficient



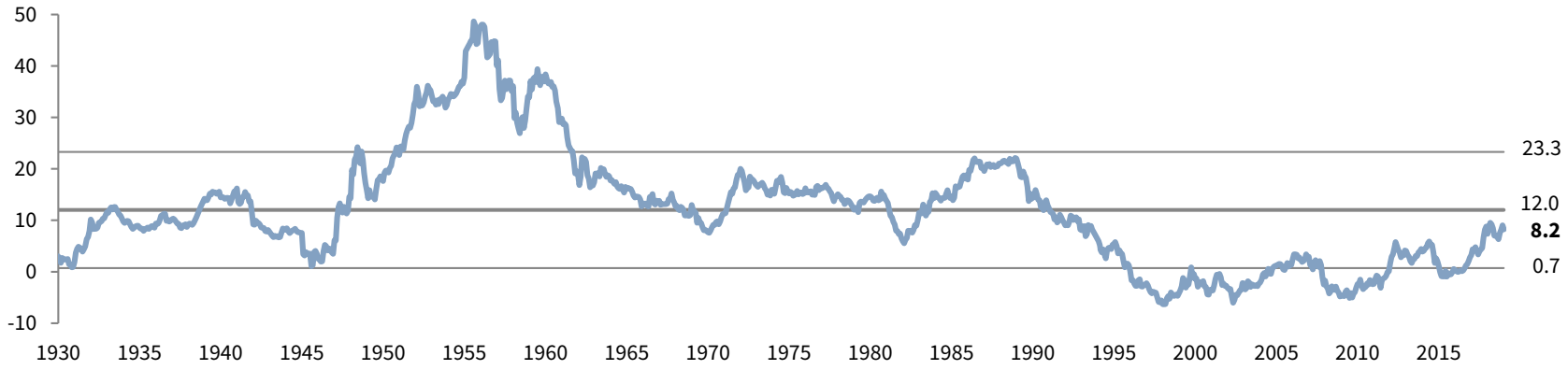
Sources: Global Financial Data, Inc., MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.
Notes: Data begin on January 31, 1921. All return data are monthly.

Equity performance mean reversion in Japan is not a smooth process

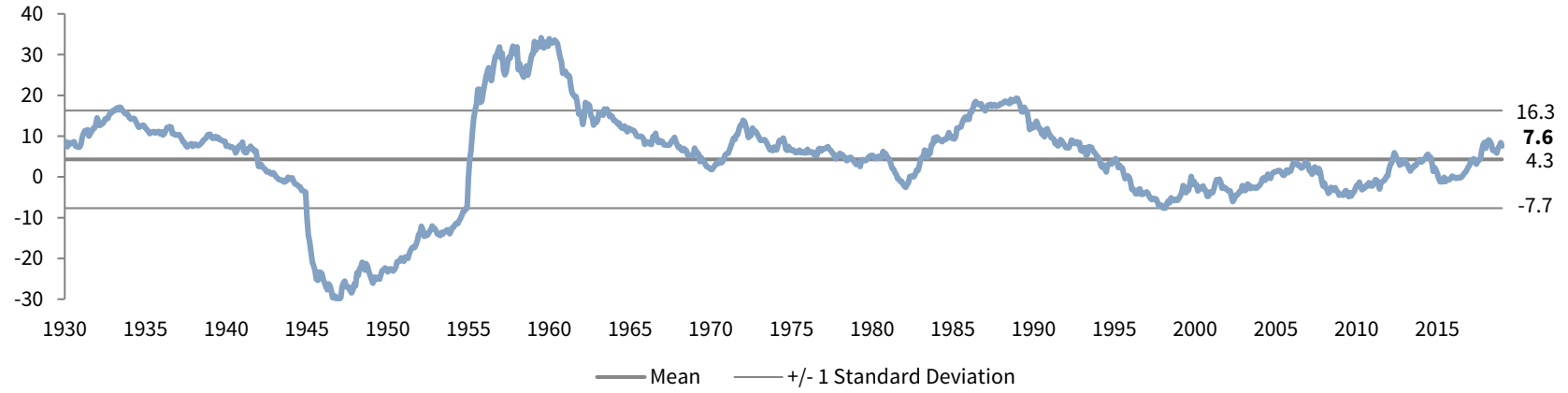
ROLLING MONTHLY EQUITY TOTAL RETURN 10-YR AACR

1930–2019 • Percent (%)

Nominal Returns



Real Returns

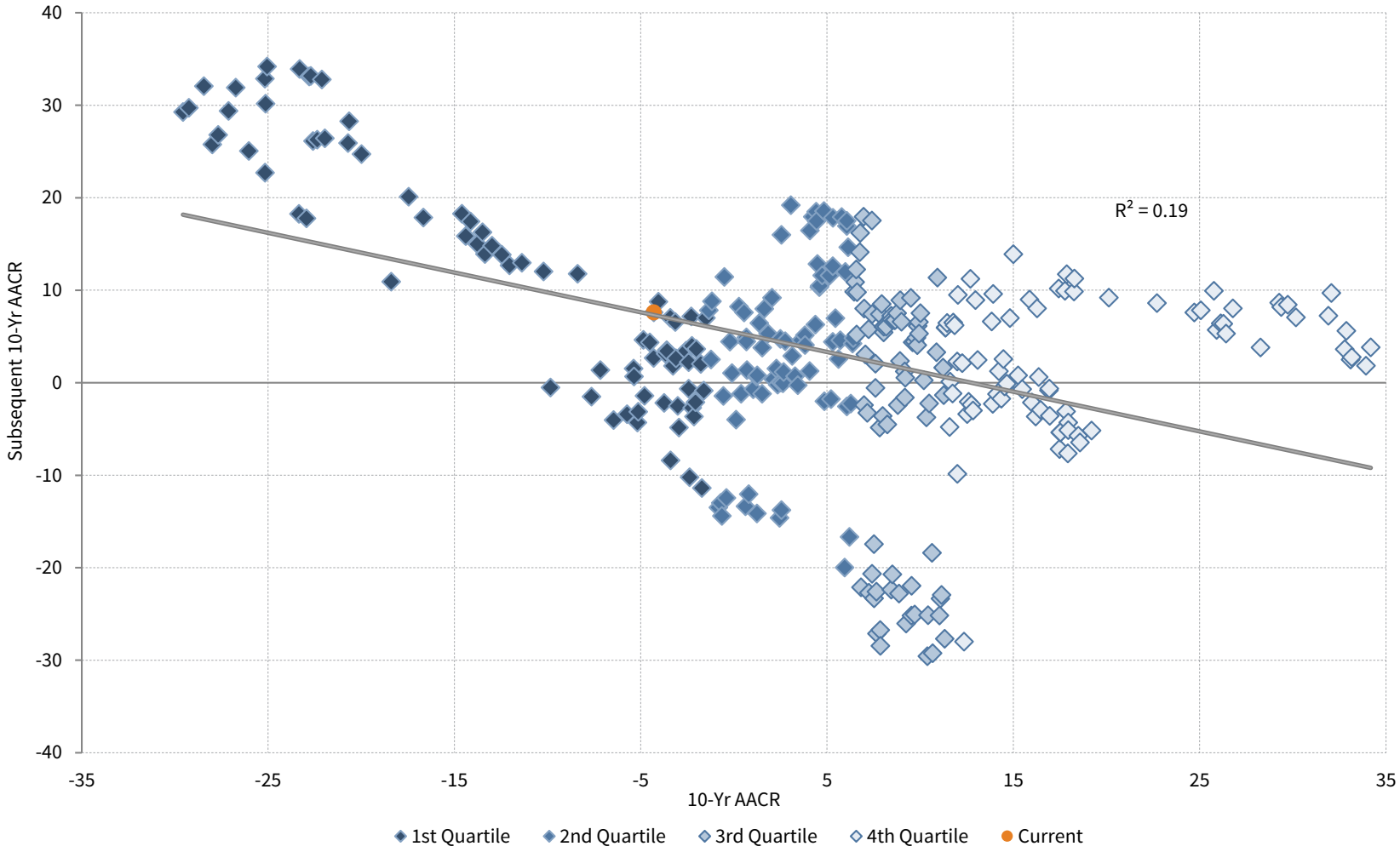


Sources: Global Financial Data, Inc., MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Weak but inverse relationship between past and future equity performance

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

1921–2019 • Percent (%)

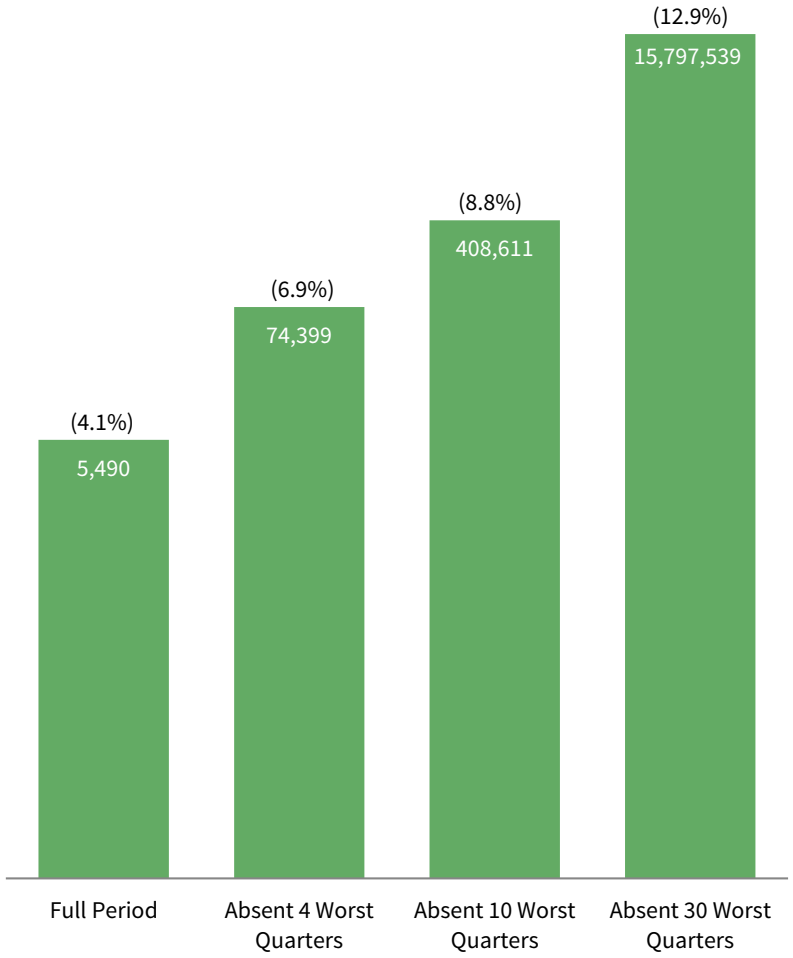


Sources: Global Financial Data, Inc., MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or impied warranties.

Attempting to time the market carries significant risk

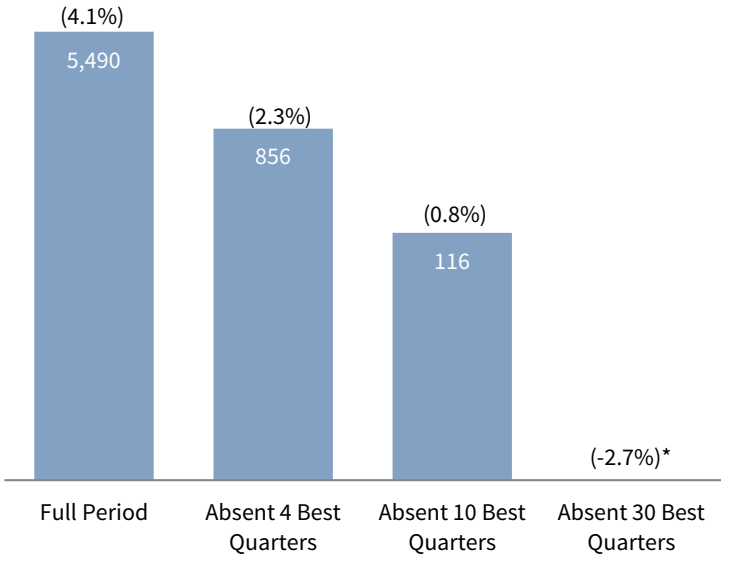
CUMULATIVE REAL WEALTH ABSENT WORST QUARTERS

1921–2019 • January 1, 1921 = 100 • AACR (%) in Parentheses



CUMULATIVE REAL WEALTH ABSENT BEST QUARTERS

1921–2019 • January 1, 1921 = 100 • AACR (%) in Parentheses



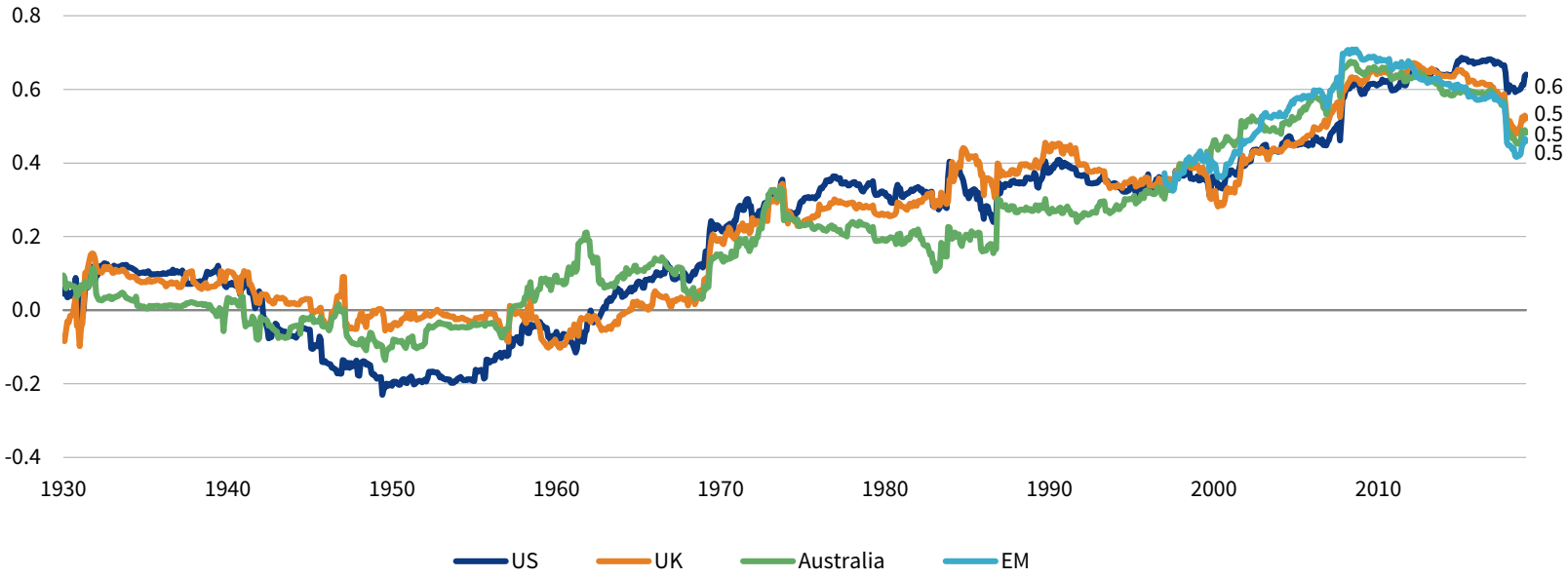
*Cumulative real wealth absent 30 best quarters is -93.

Sources: Global Financial Data, Inc., MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or impied warranties.
Note: Cumulative real wealth is shown on a logarithmic scale.

Interregional equity correlations have increased over time, but turned lower in recent years

ROLLING 10-YR CORRELATIONS: JAPAN EQUITY VS GLOBAL PEERS

December 31, 1930 – December 31, 2019 • Correlation Coefficient



CORRELATION MATRIX

January 31, 1921 – December 31, 1969

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

CORRELATION MATRIX

January 31, 1970 – December 31, 2019

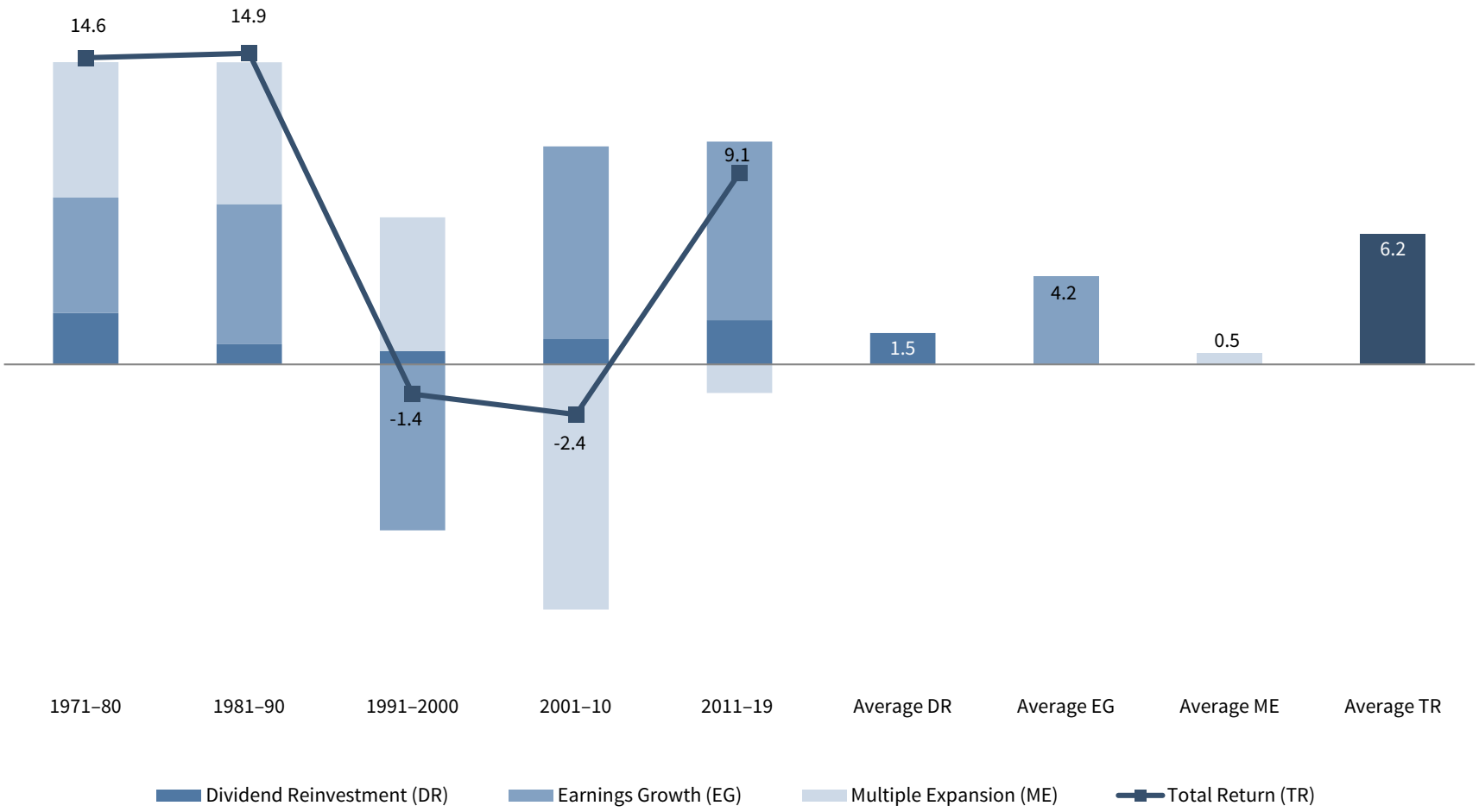
	Japan	US	UK	Australia	EM
Japan	1.00				
US	0.44	1.00			
UK	0.38	0.62	1.00		
Australia	0.34	0.55	0.52	1.00	
EM	0.50	0.67	0.62	0.58	1.00

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 the Japan, US, UK, and Australia begin on January 31, 1921. Data for EM begin on January 31, 1988. All return data are monthly. EM returns are in USD terms. All other returns are in local currency.

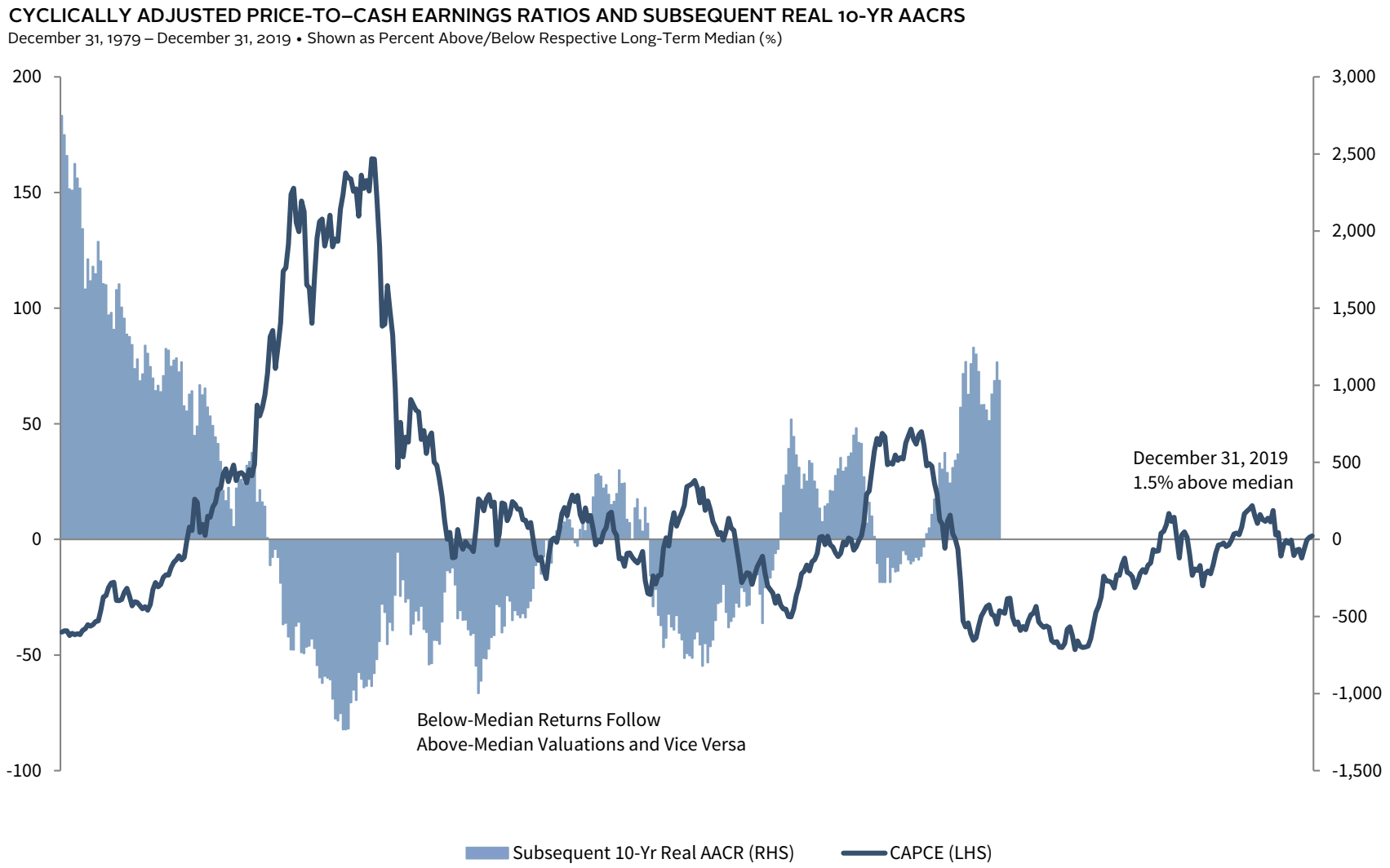
Earnings growth has been the primary contributor to return for Japanese stocks

BREAKDOWN OF TOTAL RETURN AACR OVER TIME
1971–2019 • 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.

High valuations imply weak subsequent returns and vice versa



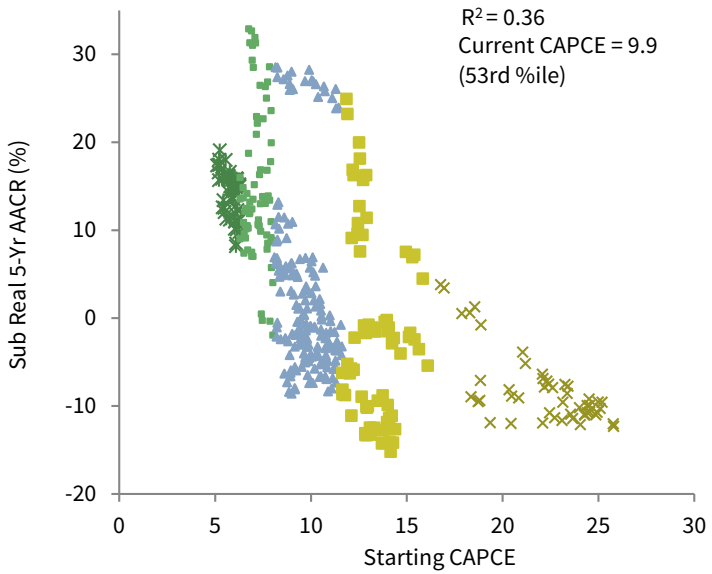
Sources: MSCI Inc. and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.
Notes: Chart shows percent above/below median for returns and valuations. Line shows point-in-time cyclically adjusted price-to–cash earnings (CAPCE) ratios. Bars are based on monthly 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 0.67% since 1979. For example, the first data point shows that the real AACR for the period 1979–88 was 2748.1% above the median ten-year real return.

Starting valuations are a useful guide in setting long-term return expectations

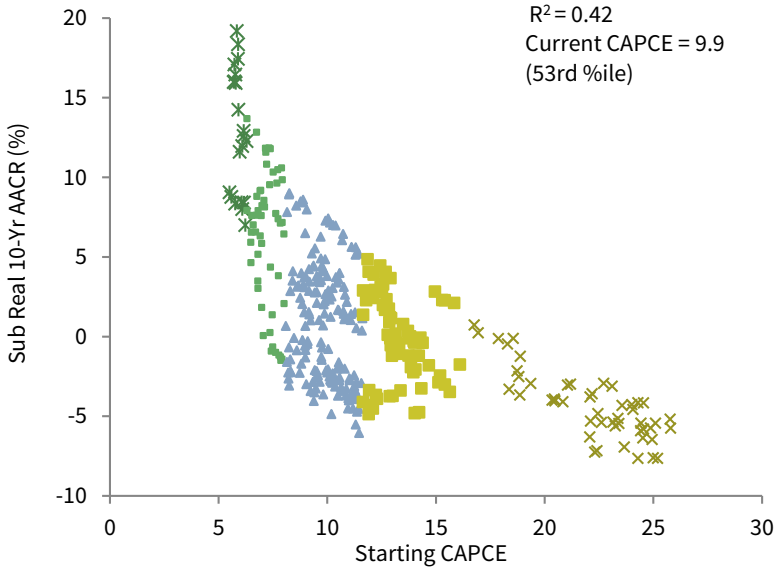
RELATIONSHIP BETWEEN CYCLICALLY ADJUSTED PRICE-TO-CASH EARNINGS RATIOS AND SUBSEQUENT REAL 5- AND 10-YR AACRS

December 31, 1979 – December 31, 2019

Initial Valuation and Subsequent 5-Yr AACR



Initial Valuation and Subsequent 10-Yr AACR



P/CE Ratio Percentile	Starting Cyclically Adjusted Price-to-Cash Earnings Ratio			Subsequent Real 5-Yr AACR (%)			Starting Cyclically Adjusted Price-to-Cash Earnings Ratio			Subsequent Real 10-Yr AACR (%)		
	Median	High	Low	Median	High	Low	Median	High	Low	Median	High	Low
0–10	5.9	6.3	5.1	14.9	19.1	8.2	5.9	6.3	5.5	12.6	19.2	7.0
10–25	7.2	8.0	6.3	13.0	32.9	-1.9	7.2	8.0	6.3	7.2	13.7	-1.5
25–75	9.7	11.6	8.1	-0.9	28.6	-8.6	9.8	11.6	8.1	1.0	9.0	-6.0
75–90	13.0	16.1	11.6	-4.6	25.0	-15.2	13.0	16.1	11.6	-0.2	4.9	-4.9
90–100	22.6	25.8	16.8	-9.5	3.8	-12.3	22.6	25.8	16.8	-4.3	0.7	-7.6
Overall	**9.7**	**25.8**	**5.1**	**1.3**	**32.9**	**-15.2**	**10.2**	**25.8**	**5.5**	**0.7**	**19.2**	**-7.6**

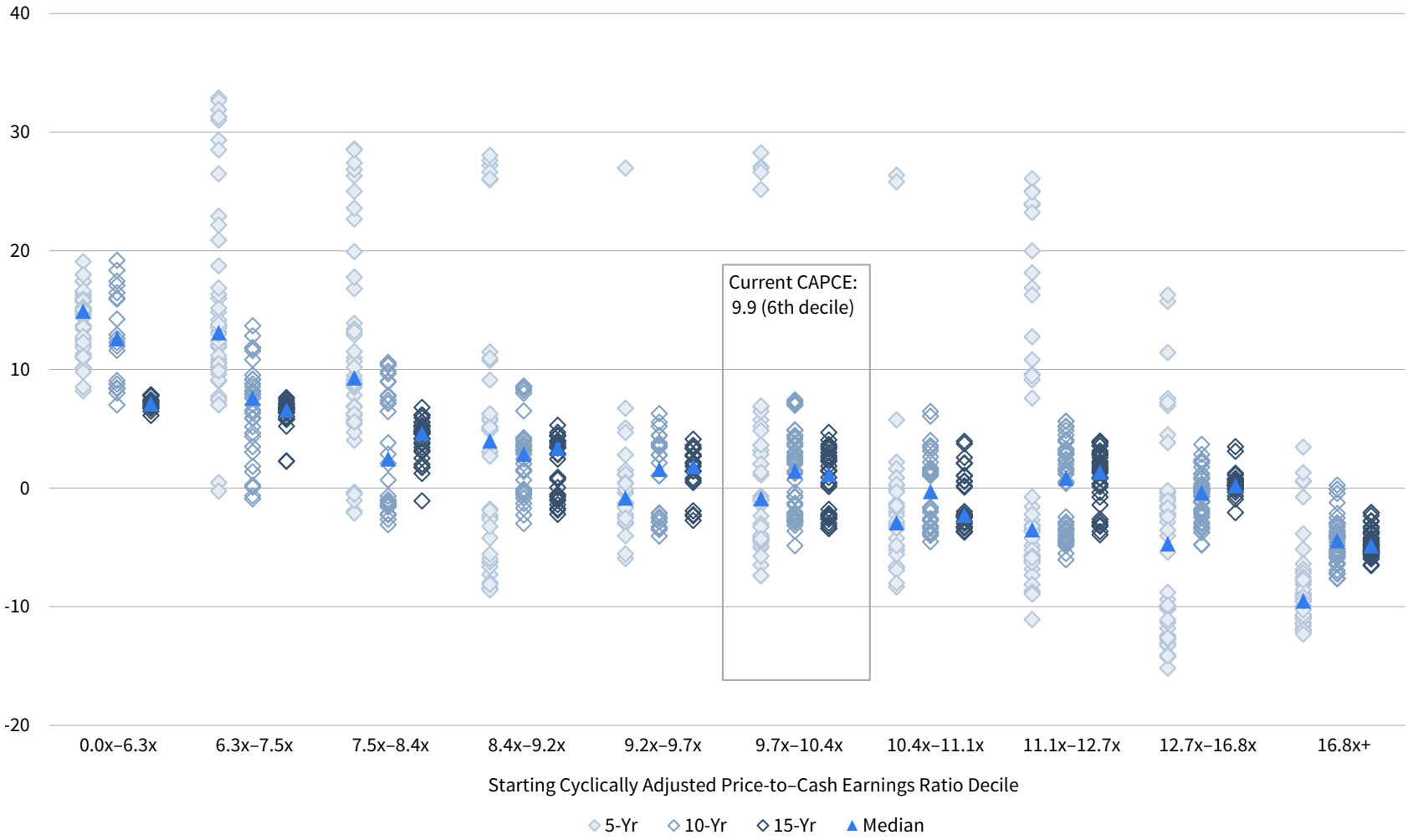
Sources: MSCI Inc. and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Notes: Data are monthly. The last full five-year period was January 1, 2015, to December 31, 2019, and the last full ten-year period was January 1, 2010, to December 31, 2019.

Starting normalized valuations are more meaningful as holding periods increase

DISTRIBUTION OF SUBSEQUENT REAL RETURNS FROM STARTING NORMALIZED VALUATION DECILES

December 31, 1979 – December 31, 2019 • Subsequent Real Return AACR (%)



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

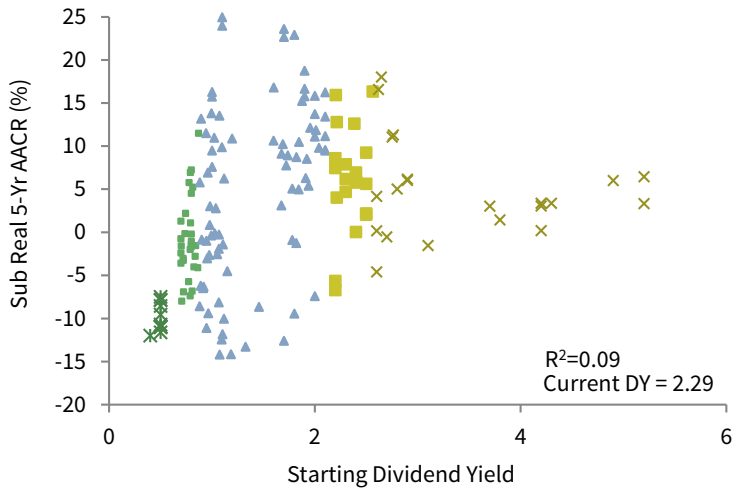
Notes: Data are monthly. The last full five-year period was January 1, 2015, to December 31, 2019, the last full ten-year period was January 1, 2010, to December 31, 2019, and the last full 15-year period was January 1, 2005, to December 31, 2019.

Dividend yields are a more useful indicator over long-term periods

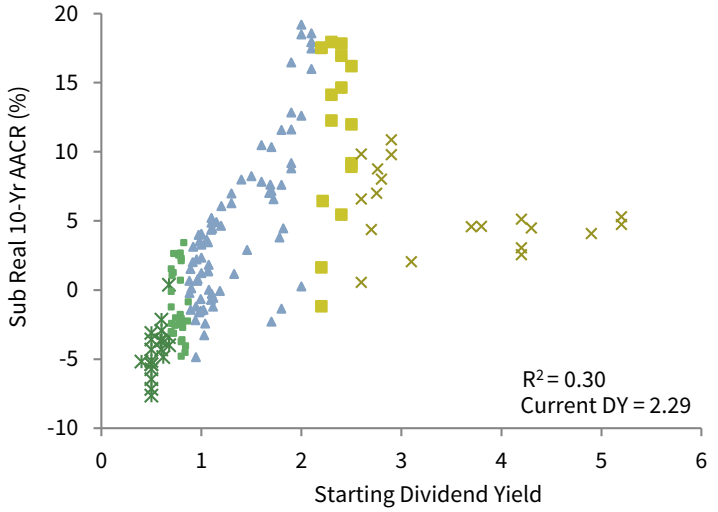
RELATIONSHIP BETWEEN DIVIDEND YIELDS AND SUBSEQUENT REAL AACRS

Fourth Quarter 1969 – Fourth Quarter 2019

Dividend Yield and Subsequent 5-YR AACR



Dividend Yield and Subsequent 10-YR AACR



Dividend Yield Percentile	Starting Period Dividend Yield (%)			Subsequent Real 5-Yr AACR (%)		
	Median	High	Low	Median	High	Low
0–10	0.5	0.5	0.4	-10.7	-7.5	-12.0
10–25	0.8	0.9	0.7	-1.6	11.5	-8.0
25–75	1.3	2.1	0.9	8.8	32.9	-14.2
75–90	2.3	2.6	2.2	6.1	16.3	-6.7
90–100	2.9	5.2	2.6	3.4	18.0	-4.6
Overall	**1.2**	**5.2**	**0.4**	**3.1**	**32.9**	**-14.2**

	Starting Period Dividend Yield (%)			Subsequent Real 10-Yr AACR (%)		
	Median	High	Low	Median	High	Low
0–10	0.5	0.7	0.4	-4.3	0.4	-7.6
10–25	0.8	0.9	0.7	-2.0	3.4	-4.8
25–75	1.1	2.1	0.9	3.6	19.2	-4.9
75–90	2.4	2.5	2.2	13.2	17.9	-1.2
90–100	3.1	5.2	2.6	4.7	10.9	0.5
Overall	**1.1**	**5.2**	**0.4**	**2.2**	**19.2**	**-7.6**

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

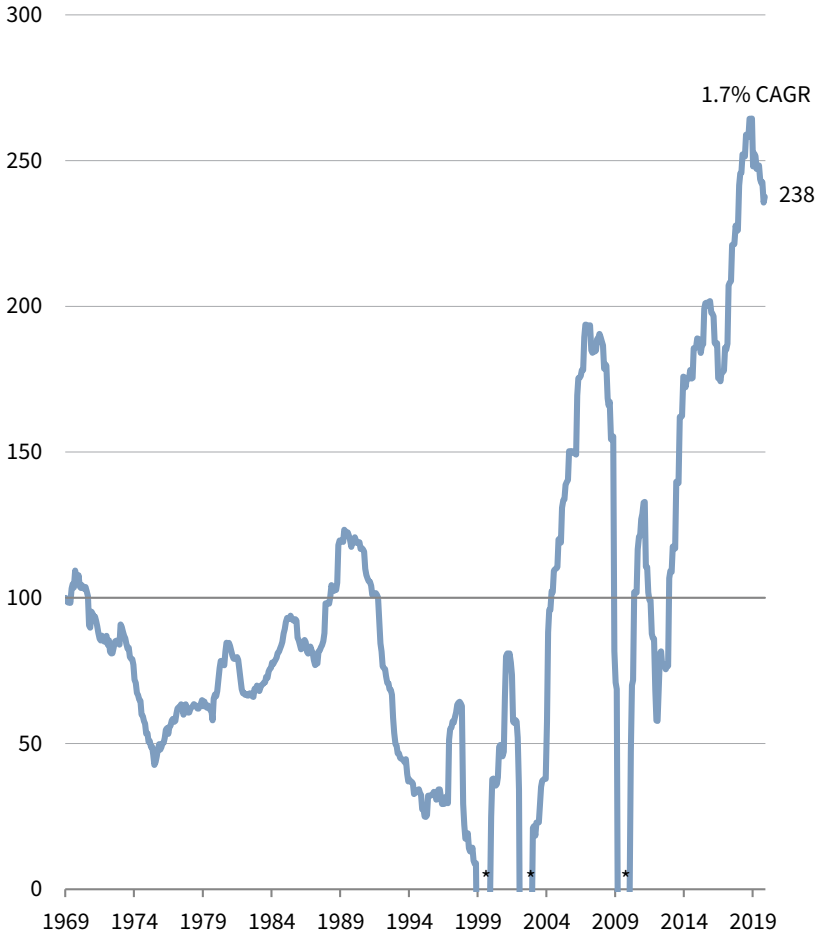
Notes: Data are quarterly. The last full five-year period was first quarter 2015 through fourth quarter 2019. The last full ten-year period was first quarter 2010 through fourth quarter 2019.

Outliers are not shown on graph but are included in R^2.

Japanese equity earnings sit near all-time highs, overcoming periods of index-level losses

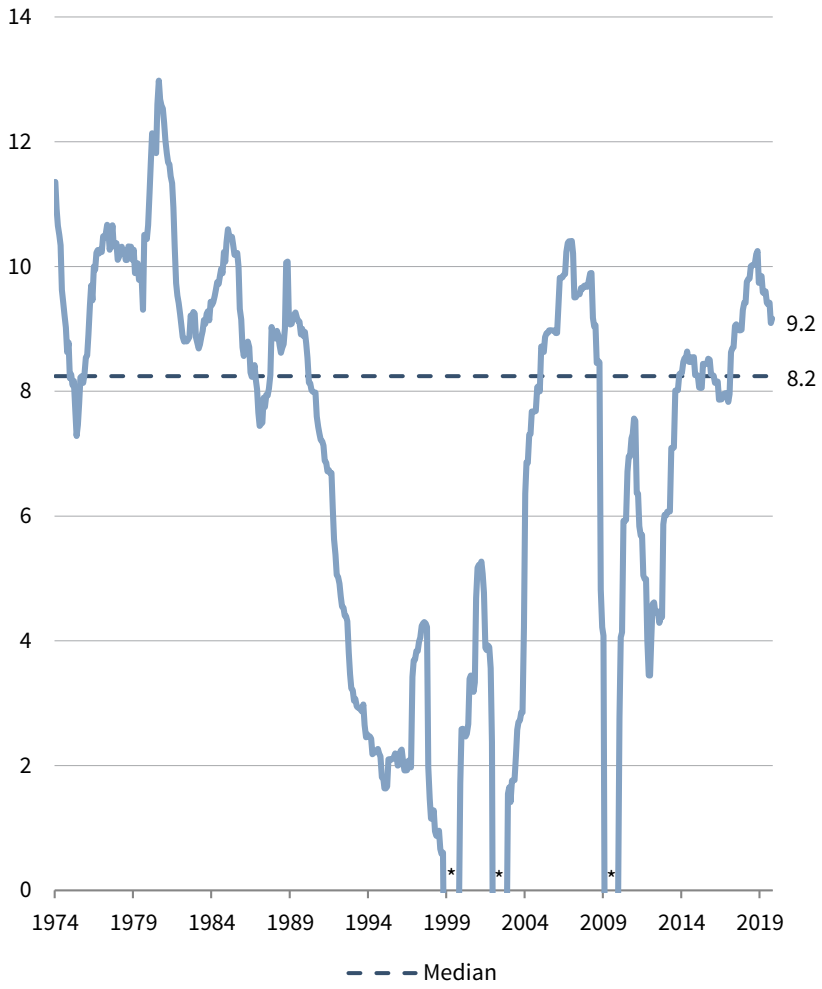
REAL EARNINGS PER SHARE OVER TIME

December 31, 1969 – December 31, 2019 • December 31, 1969 Cumulative Wealth = 100



RETURN ON EQUITY

December 31, 1974 – December 31, 2019 • Percent (%)



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

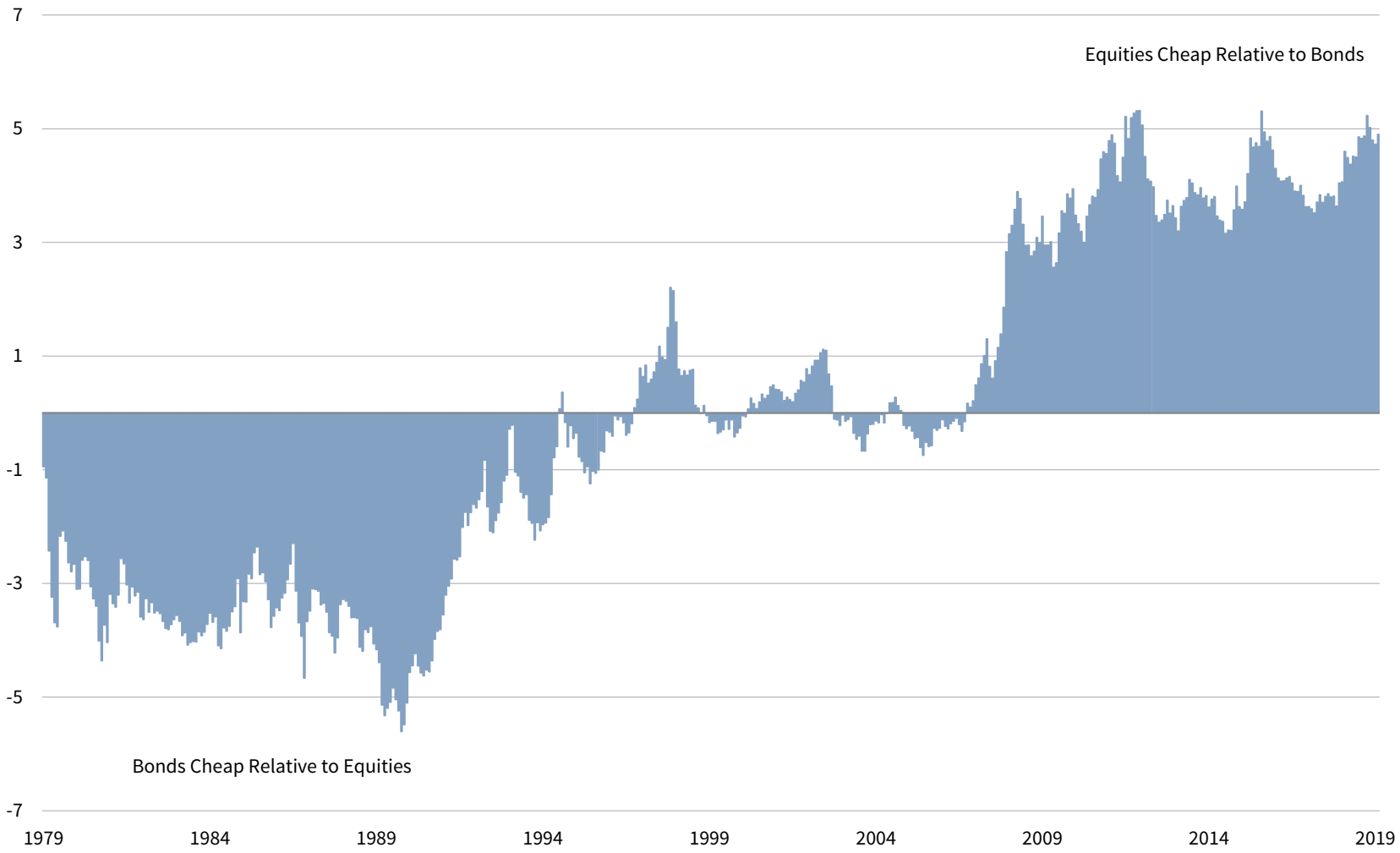
Sources: MSCI Inc. and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Note: Real earnings per share and return on equity are both based on the MSCI Japan Index.

Post-GFC low-yield environment has made equities more attractive to bonds on a valuation basis

SHILLER EARNINGS YIELDS VERSUS 10-YR BOND YIELDS

1979–2019



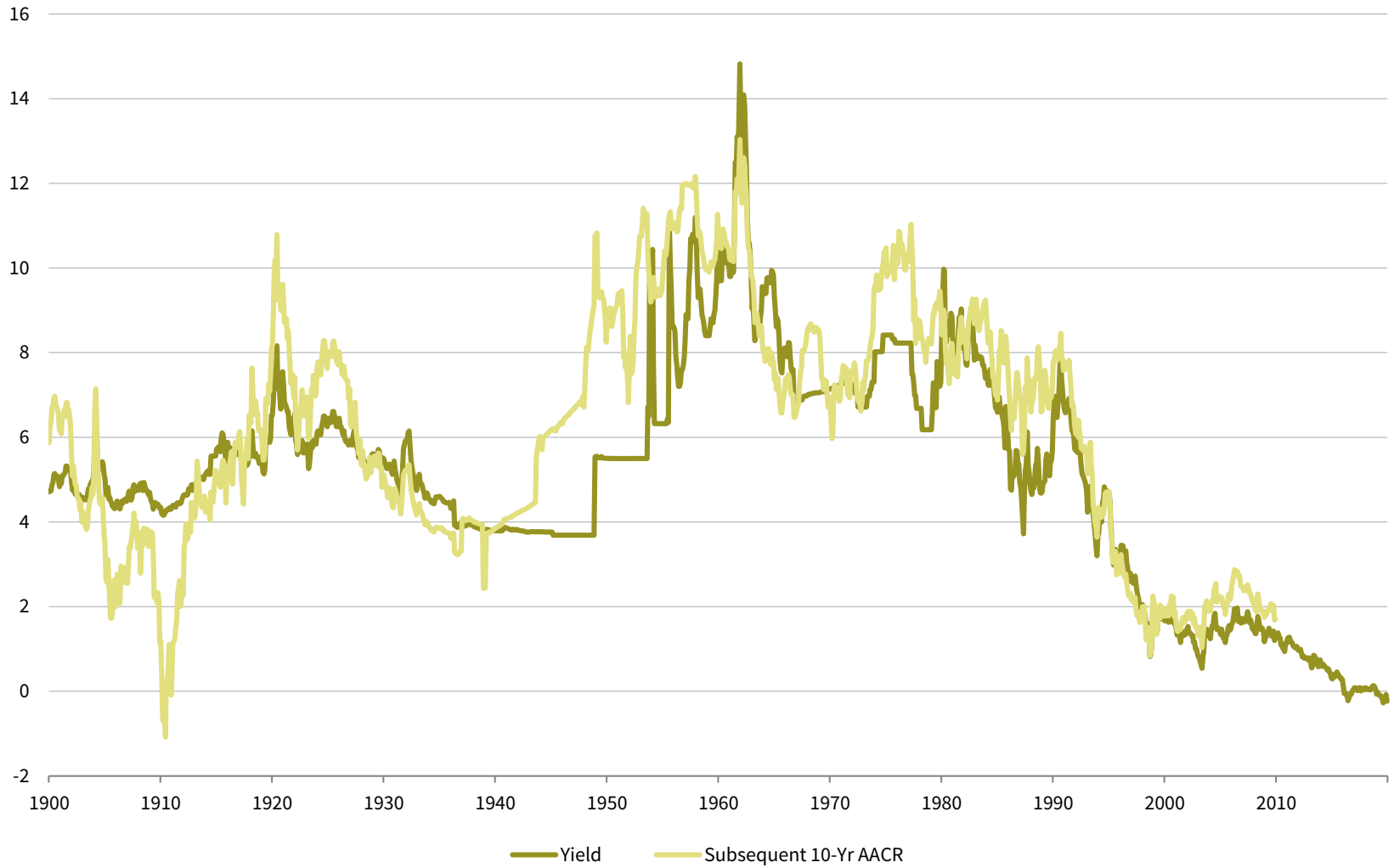
Sources: Global Financial Data, Inc., MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or implied warranties.

Notes: Data are monthly. Chart shows the spread between the normalized earnings yields and ten-year bond yields calculated as earnings yield minus bond yield. Normalized earnings yields are based on the Shiller P/E ratio.

Starting Japanese bond yields are an informative guide to subsequent returns

RELATIONSHIP BETWEEN GOVERNMENT BOND YIELDS AND SUBSEQUENT 10-YR AACRS

1900–2019 • Percent (%)



Source: Global Financial Data, Inc.

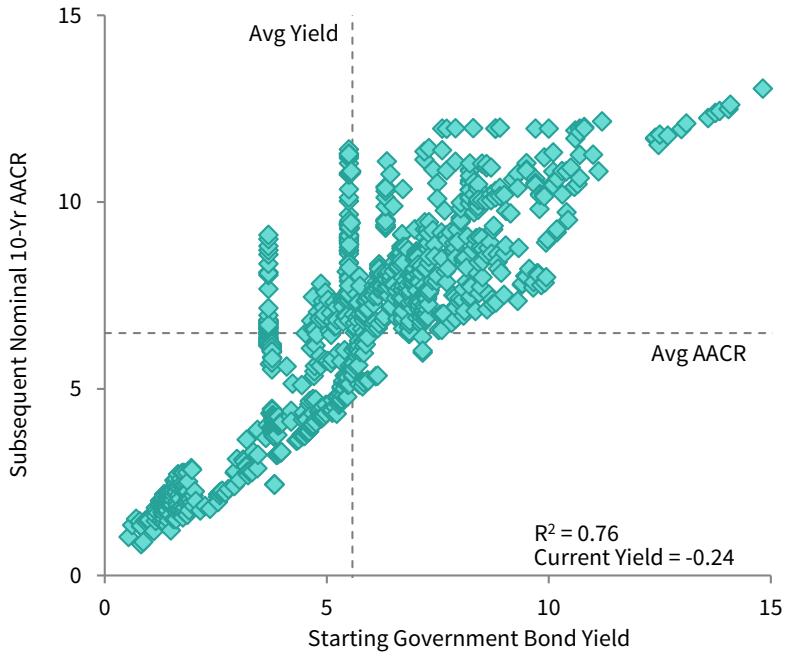
Notes: Data are monthly. The last full ten-year period was January 1, 2010, to December 31, 2019.

All-time low starting yields imply low subsequent returns for bonds

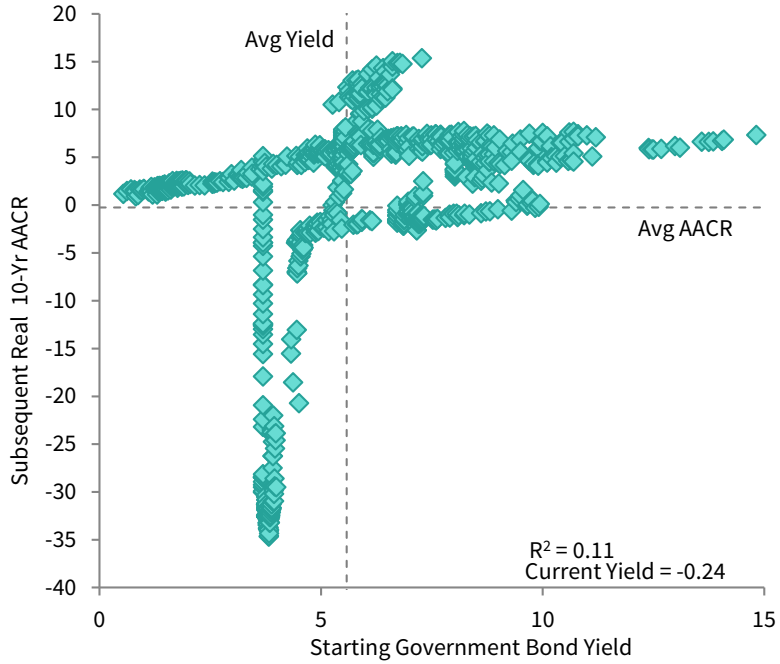
RELATIONSHIP BETWEEN GOVERNMENT BOND YIELDS AND SUBSEQUENT 10-YR AACRS

1921–2019 • Percent (%)

Nominal Returns



Real Returns



Yield Quartiles	Starting Period Government Bond Yields			Subsequent Nominal 10-Yr AACR (%)			
	Mean	High	Low	Mean	High	Low	Std Dev
First	2.40	3.79	0.54	3.37	9.12	0.84	2.04
Second	4.74	5.52	3.79	5.57	11.41	2.43	2.09
Third	6.39	7.20	5.52	7.62	11.36	5.07	1.23
Fourth	8.79	14.82	7.21	9.41	13.04	6.58	1.53
Overall	**5.58**	**14.82**	**0.54**	**6.49**	**13.04**	**0.84**	**2.86**

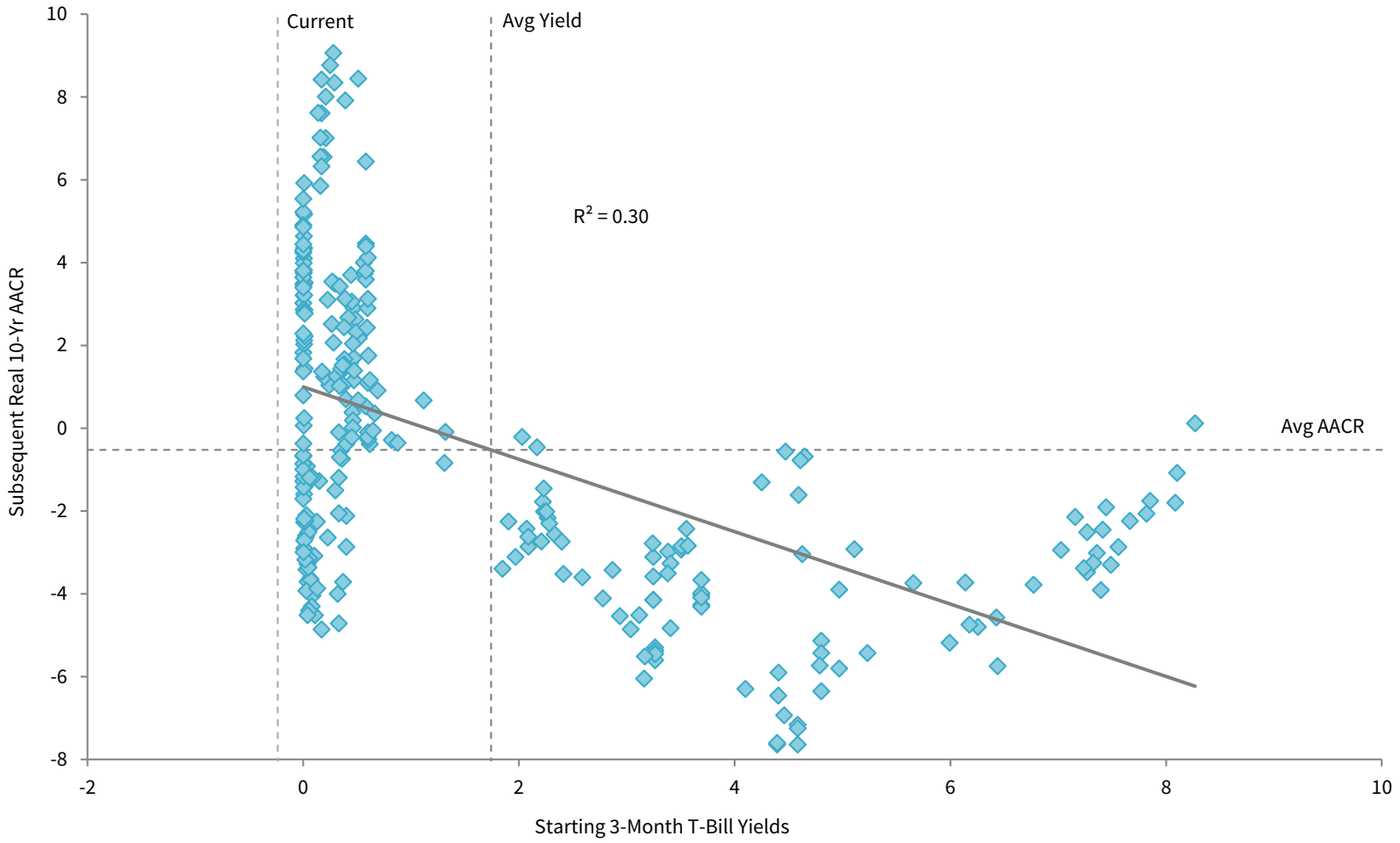
	Starting Period Government Bond Yields			Subsequent Real 10-Yr AACR (%)			
	Mean	High	Low	Mean	High	Low	Std Dev
First	2.40	3.79	0.54	-5.10	5.12	-33.23	13.02
Second	4.74	5.52	3.79	-6.07	10.77	-34.66	15.14
Third	6.39	7.20	5.52	5.61	15.04	-2.65	5.01
Fourth	8.79	14.82	7.21	4.54	15.37	-1.98	2.92
Overall	**5.58**	**14.82**	**0.54**	**-0.26**	**15.37**	**-34.66**	**11.68**

Sources: Global Financial Data, Inc. and Thomson Reuters Datastream.
Notes: Data are monthly. The last full ten-year period was January 1, 2010, to December 31, 2019.

20+ years of 0% short-term interest rates muddles the relationship with equity performance

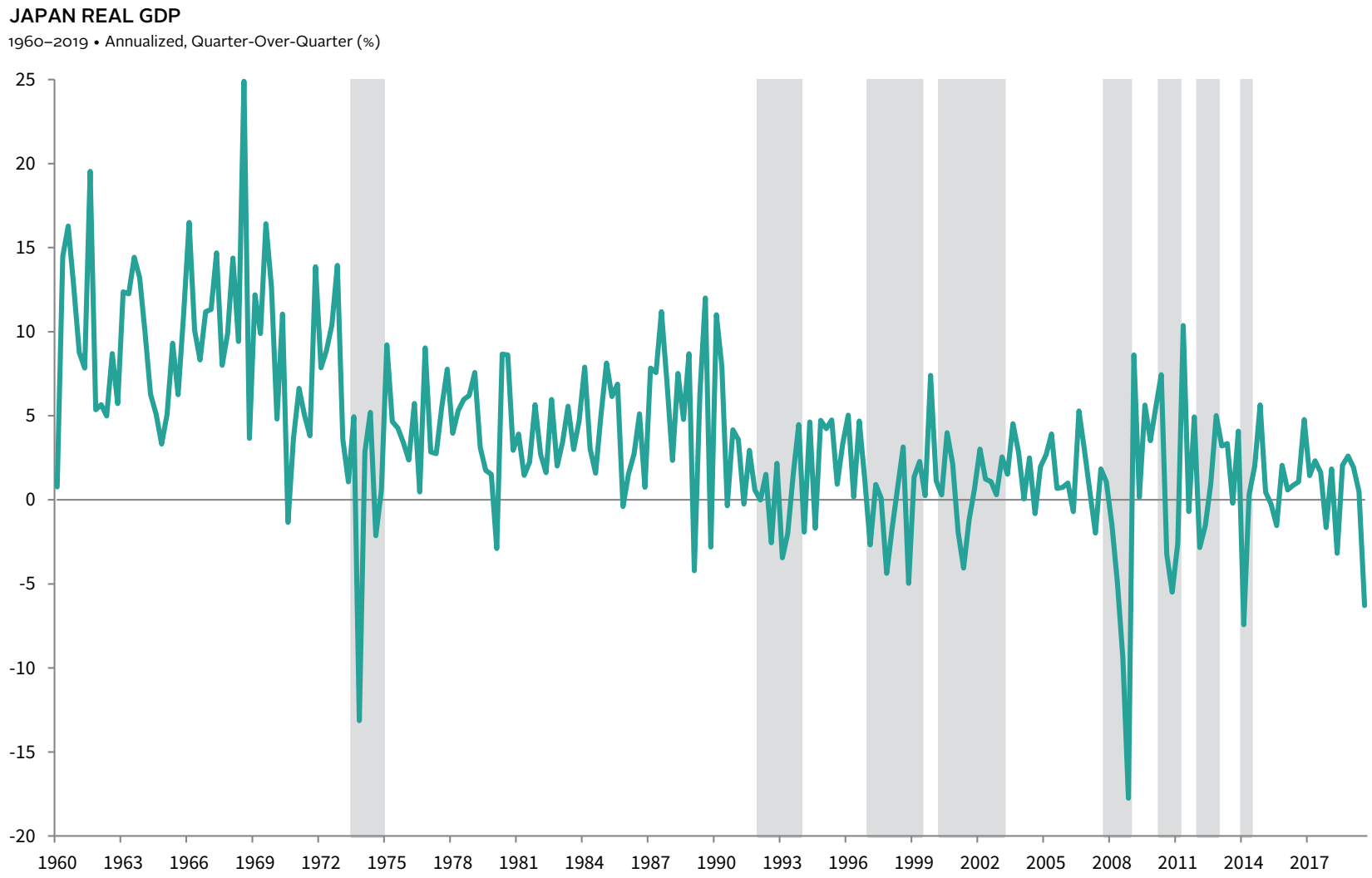
RELATIONSHIP BETWEEN TREASURY BILL YIELDS AND SUBSEQUENT REAL 10-YR EQUITY AACRS

January 31, 1987 – December 31, 2019 • Percent (%)



Sources: Global Financial Data, Inc., MSCI Inc., and Thomson Reuters Datastream. MSCI data provided "as is" without any express or impied warranties.
Notes: Data are monthly. The last full ten-year period was from January 1, 2010, to December 31, 2019.

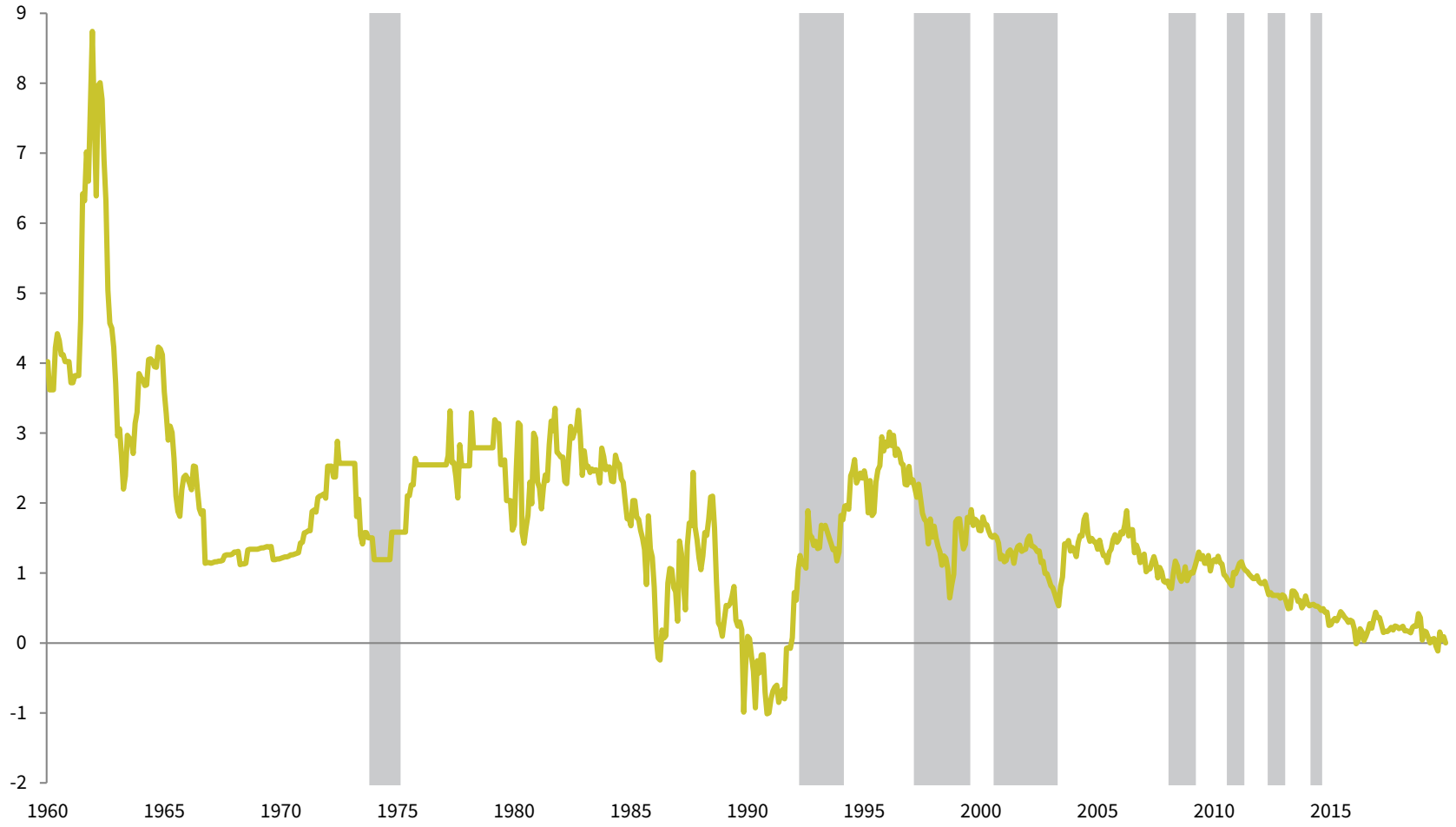
Japanese economic recessions have become more common in recent decades



Sources: Economic Cycle Research Institute (ECRI), Japanese Cabinet Office, OECD, and Thomson Reuters Datastream.
Note: Gray bars are recessions defined by ECRI business cycle peak-to-trough dates.

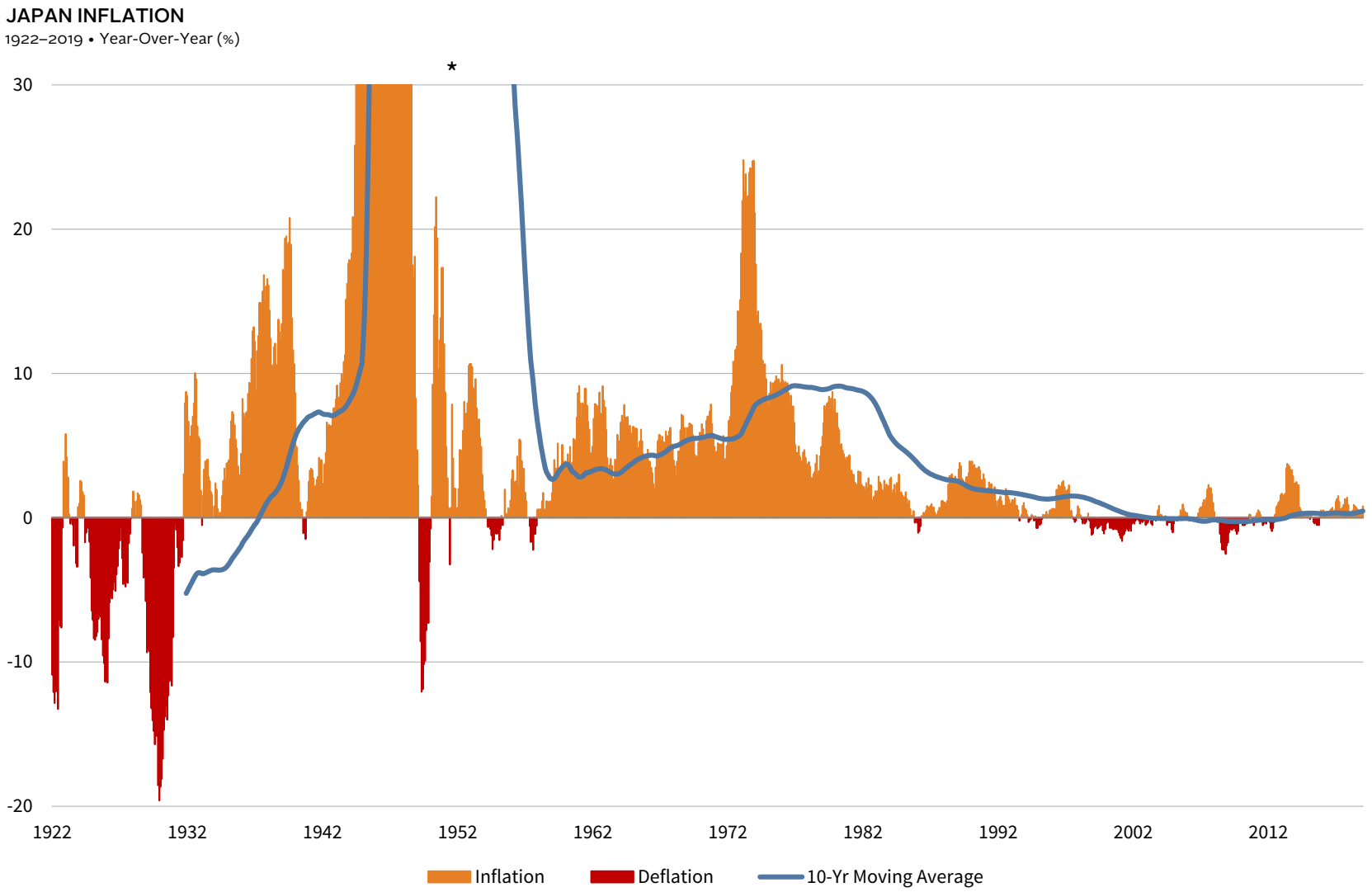
Japanese yield curve has rarely inverted prior to economic downturns

10-YR/3-MONTH YIELD SPREAD
1960–2019 • Percent (%)



Sources: Economic Cycle Research Institute (ECRI), Global Financial Data, Inc., and Thomson Reuters Datastream.
Notes: Data are monthly. Gray bars are recessions defined by ECRI business cycle peak-to-trough dates.

Japanese inflation has fallen to near zero in stark contrast to volatile history



* Japan inflation data have been capped at 30%. Inflation peaked at 639% year-over-year in 1946.
Sources: Global Financial Data, Inc. and Thomson Reuters Datastream.
Notes: Data are monthly. Moving average begins ten years after the first monthly observation.

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