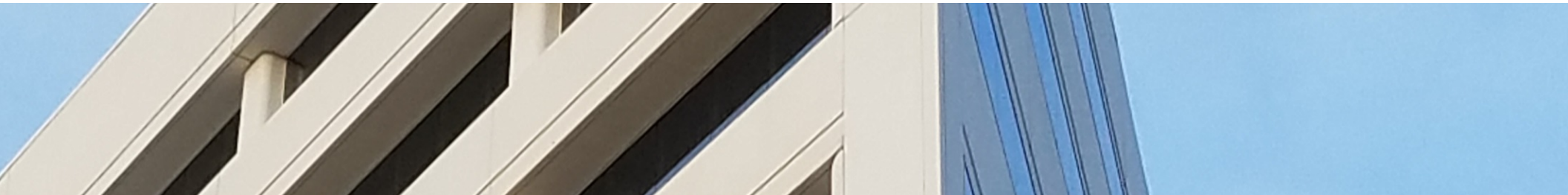




WILSHIRE ASSOCIATES

Wilshire Consulting

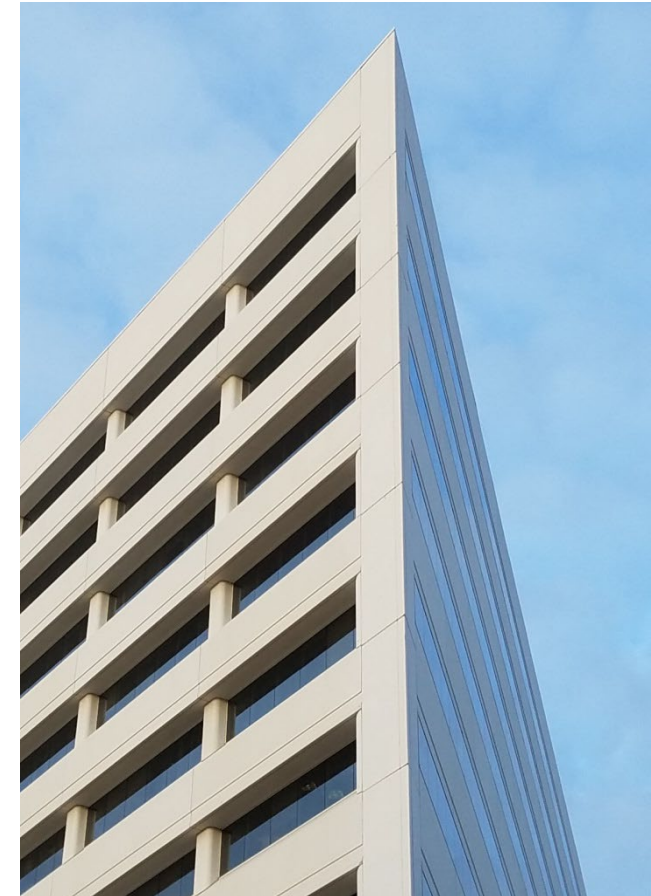


Monthly Valuation Analysis

October 31, 2019

INTRODUCTION

- Analysis includes current valuation levels versus historical norms within and among various asset classes
- Results rely on historical data (i.e. current price levels are compared to historical observations)
- Historical time period used to calculate average observation is the past 15 years ending the most recent quarter-end
- Most exhibits include a ‘median’ line along with breakpoints calculated assuming a normal distribution of outcomes:
 - Conditions are expressed as probabilities with the low end (1%) implying an “expensive” situation and the high end (99%) as “inexpensive” versus history
 - +/- 0.67 standard deviations represents the 75/25% outcomes
 - +/- 1.28 standard deviations represents the 90/10% outcomes
- Yields, including dividend yield for equities, have been used throughout to create a consistent comparison when comparing one asset class to another



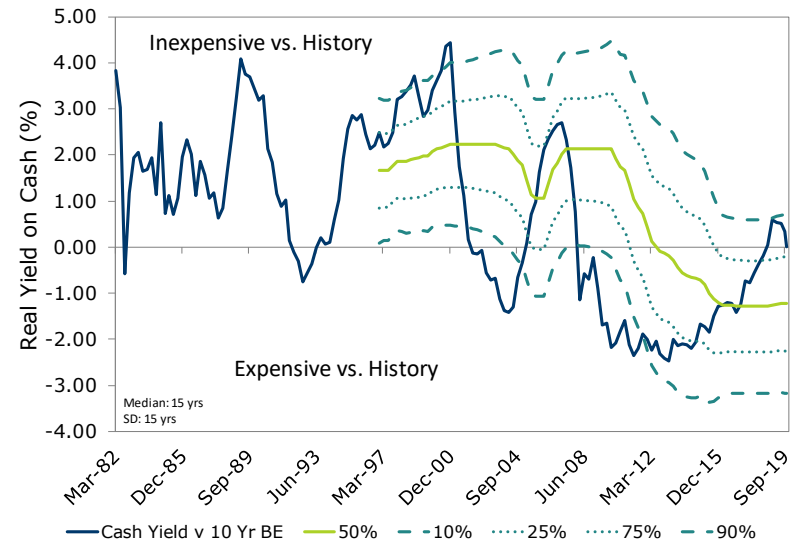
CASH AND TREASURY BONDS

- Real yield on cash has gone to zero
 - 3-month Treasury & breakeven inflation = 1.54% on October 31
 - Yield on 10-year TIPS is still positive (0.15%) after falling below zero for the first time since 2013

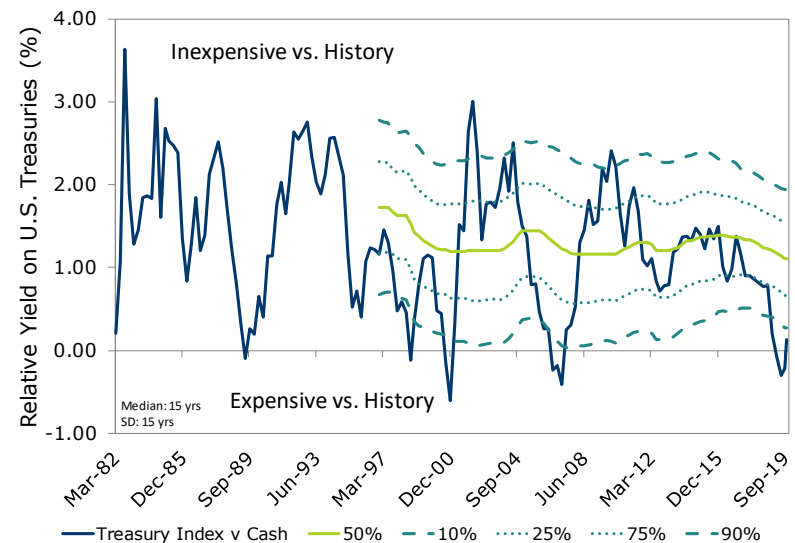
- Spread between the broad Treasury market index and cash has turned positive

- Yield curve inversion improved during October with the short end falling 30 basis points and the long end up slightly

CASH YIELD VS 10-YEAR BREAKEVEN



TREASURY INDEX VS CASH



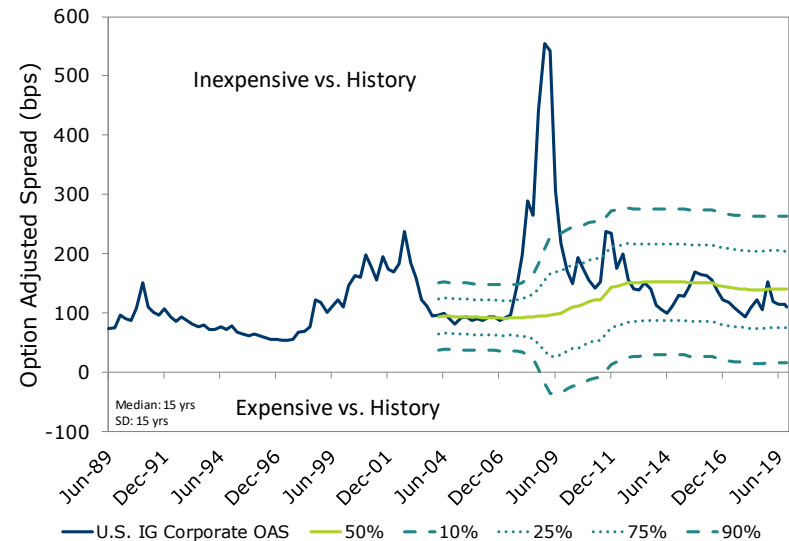
Data source: Bloomberg

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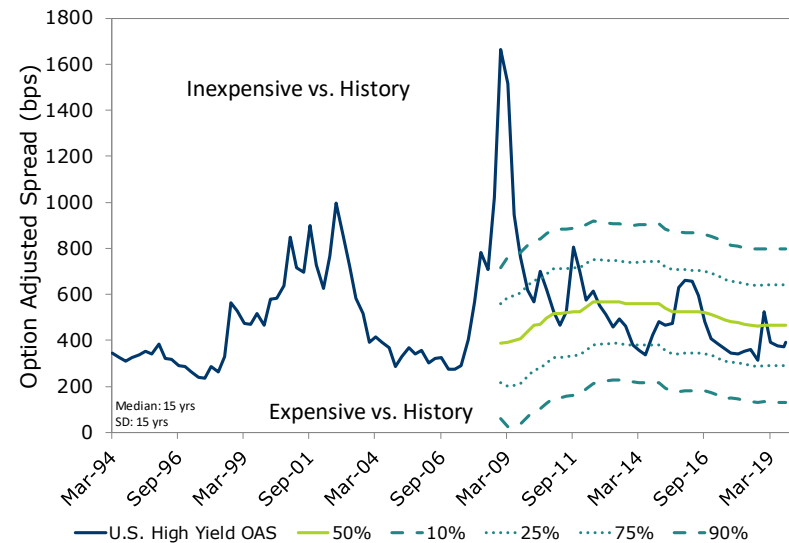
RELATIVE FIXED INCOME YIELDS

- Spread versus Treasuries on the investment grade index is below its 15 year historical median, at the 38%-percentile outcome
- Spread on high yield bonds is below the historical median, currently at the 39%-percentile outcome

INVESTMENT GRADE CORPORATE OAS



HIGH YIELD OAS



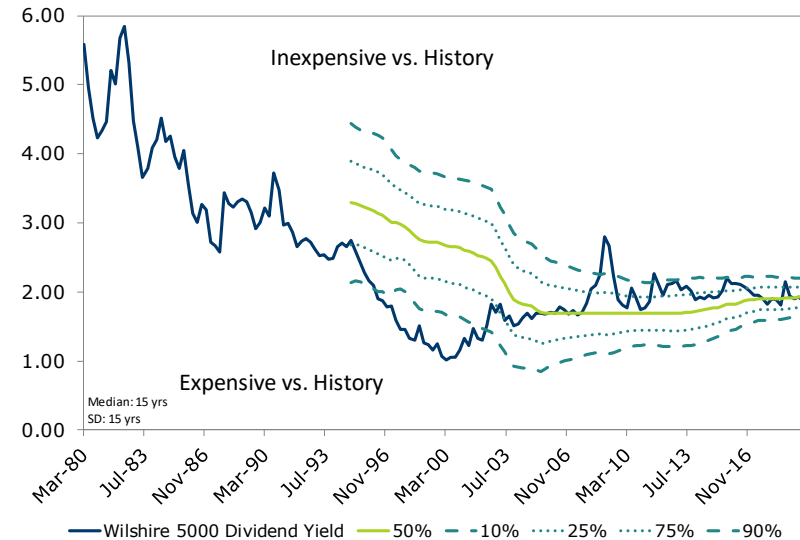
Data source: Bloomberg

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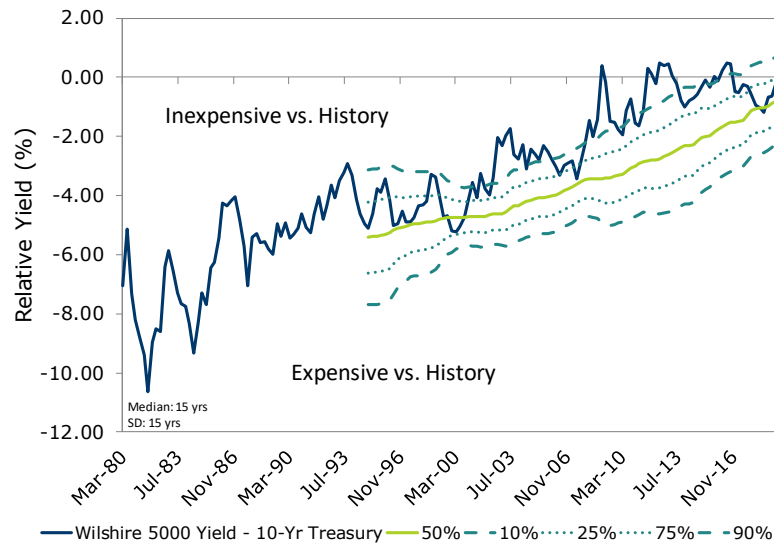
U.S. EQUITY VALUATIONS

- Distribution of historical dividend yield is tight; current observation at the 46%-percentile outcome
- Spread (discount) between the dividend yield and Treasuries has decreased as yields have fallen through the years

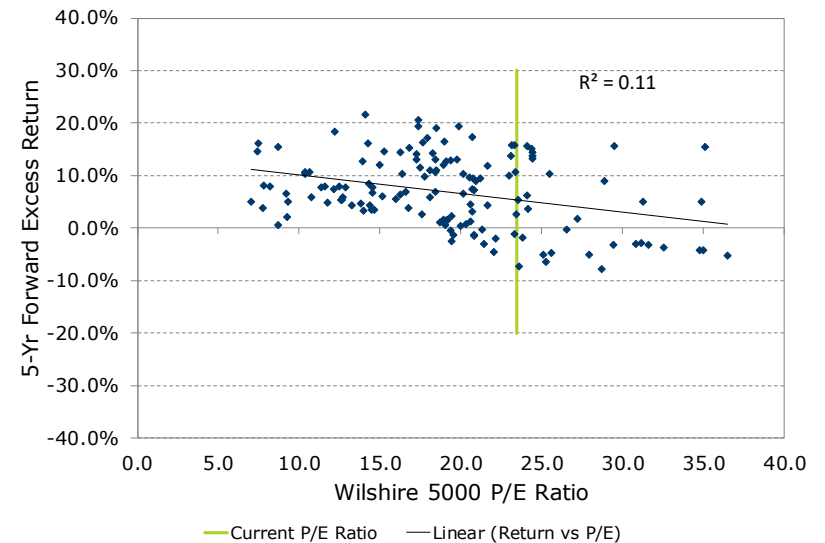
WILSHIRE 5000 DIVIDEND YIELD %



EQUITY TO TREASURY YIELD SPREAD



P/E RATIO & SUBSEQUENT EXCESS RETURN (OVER CASH)

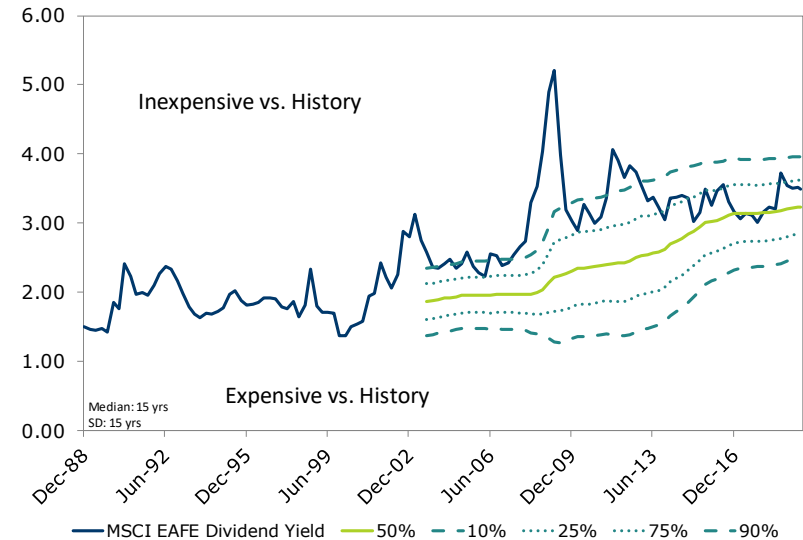


Data sources: Wilshire Atlas, Bloomberg

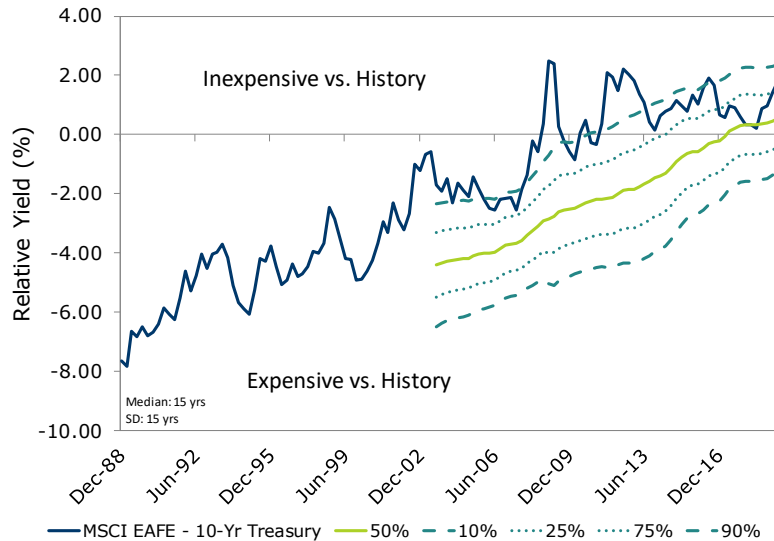
DEVELOPED MARKET VALUATIONS

- Dividend yield is above the 15-year median; at the 67%-percentile outcome
- Spread between Developed Equity and the 10-Year Treasury has been narrowing

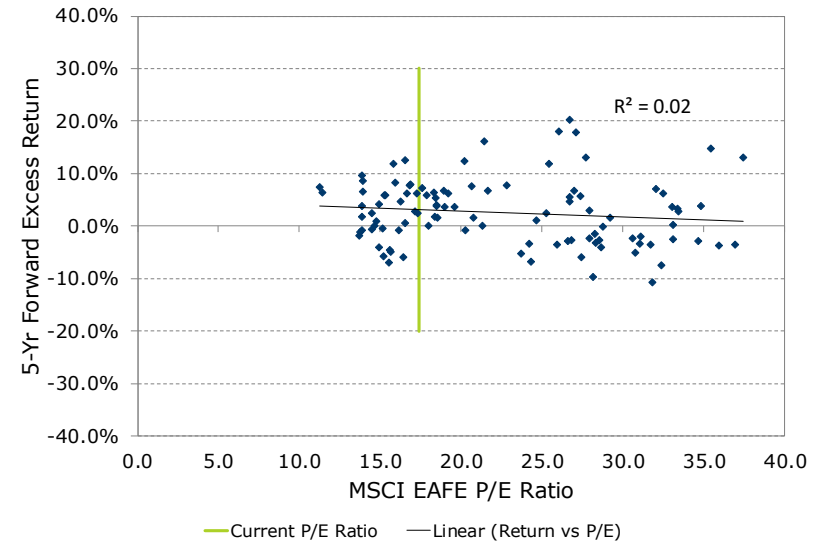
MSCI EAFE DIVIDEND YIELD %



EQUITY TO TREASURY YIELD SPREAD



P/E RATIO & SUBSEQUENT EXCESS RETURN (OVER LIBOR)

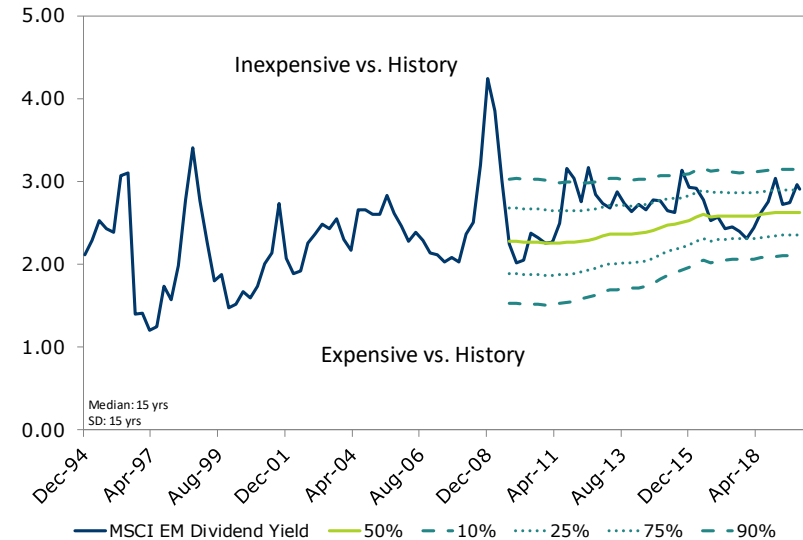


Data source: Bloomberg

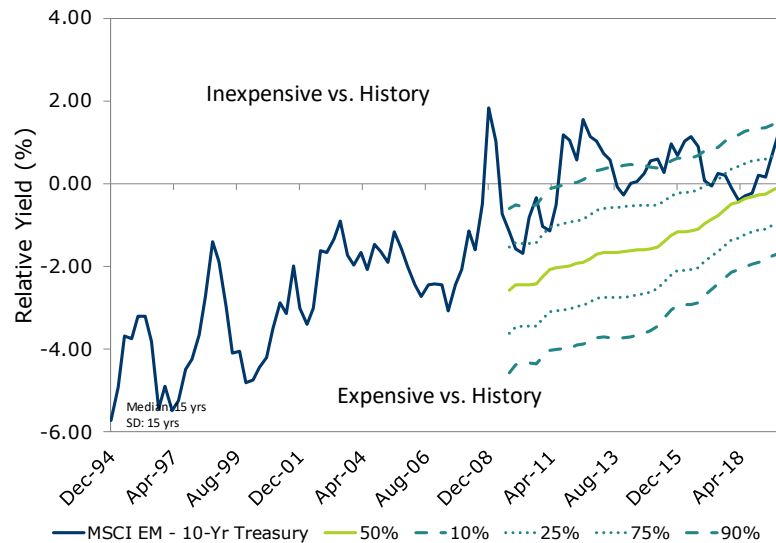
EMERGING MARKET VALUATIONS

- Current dividend yield above its 15-year median; at the 76%-percentile outcome
- Spread between Emerging Market Equity and the 10-Year Treasury has been narrowing

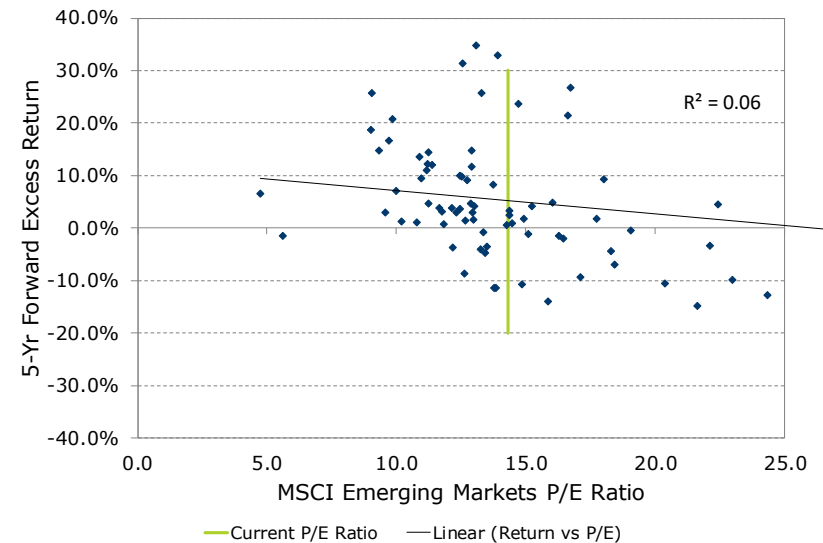
MSCI EMRG MRKT DIVIDEND YIELD %



EQUITY TO TREASURY YIELD SPREAD



P/E RATIO & SUBSEQUENT EXCESS RETURN (OVER LIBOR)

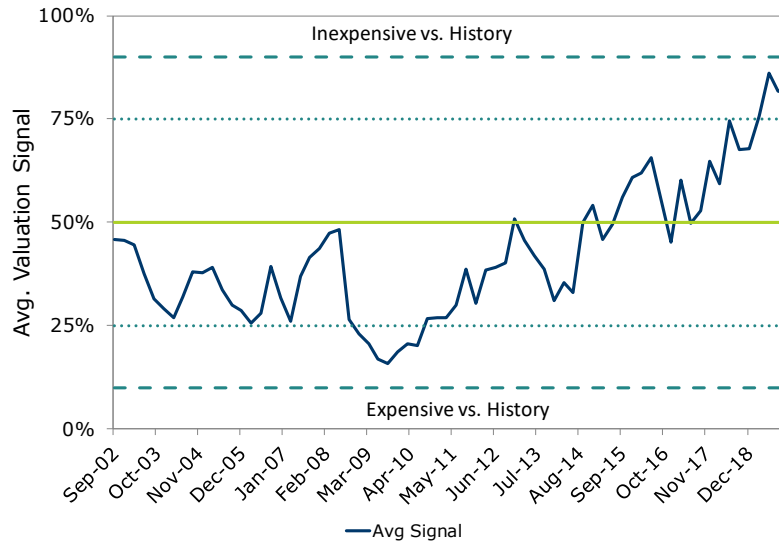


Data source: Bloomberg

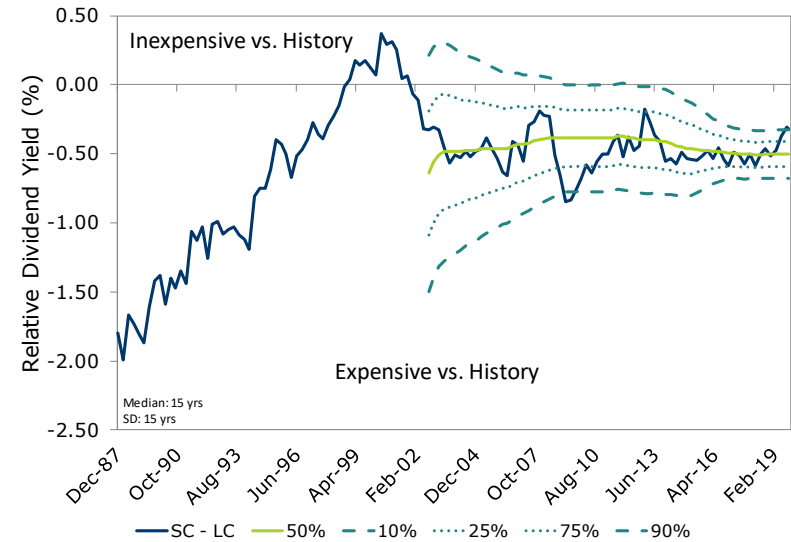
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RELATIVE U.S. EQUITY: SIZE

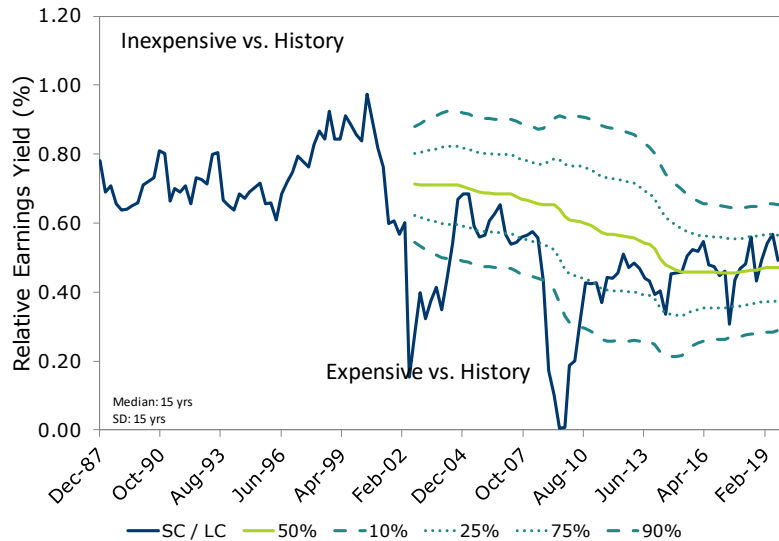
U.S. SMALL CAP RELATIVE TO LARGE CAP



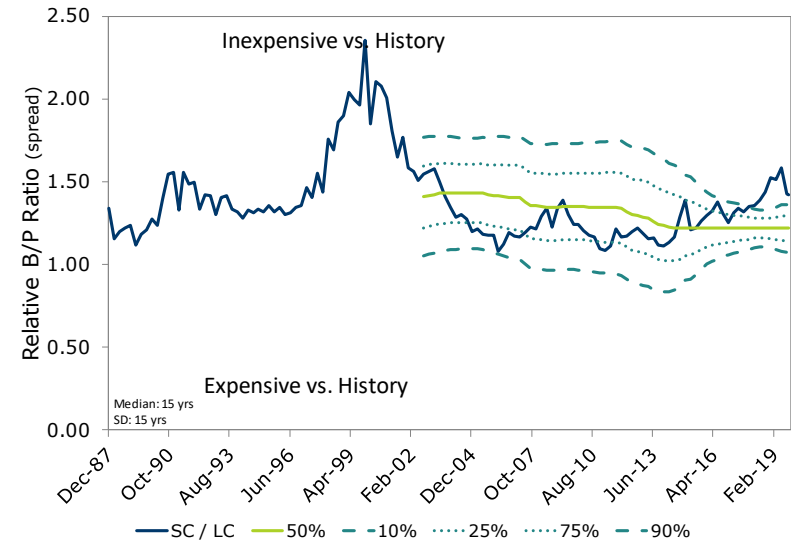
U.S. SMALL CAP RELATIVE TO LARGE CAP



U.S. SMALL CAP RELATIVE TO LARGE CAP



U.S. SMALL CAP RELATIVE TO LARGE CAP

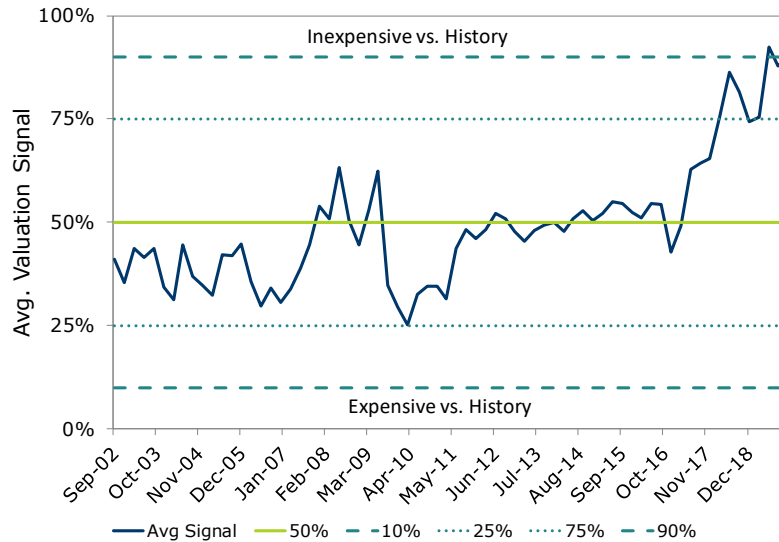


Data source: Bloomberg

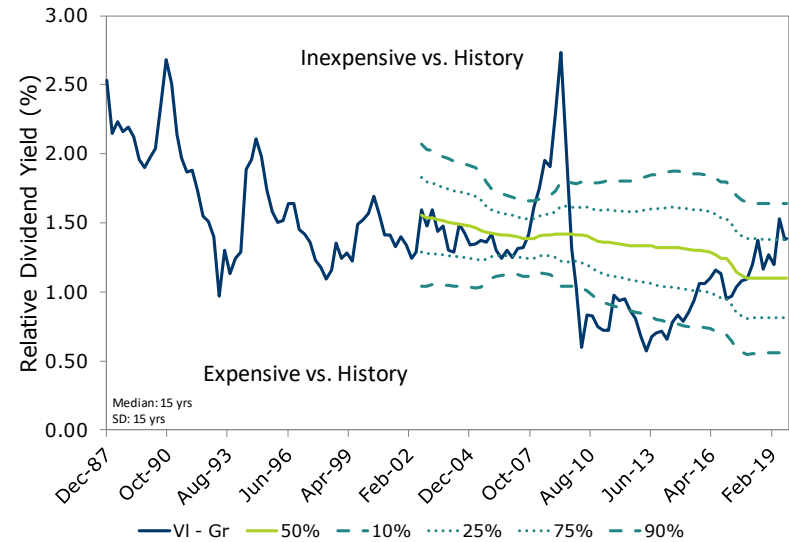
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RELATIVE U.S. EQUITY: STYLE

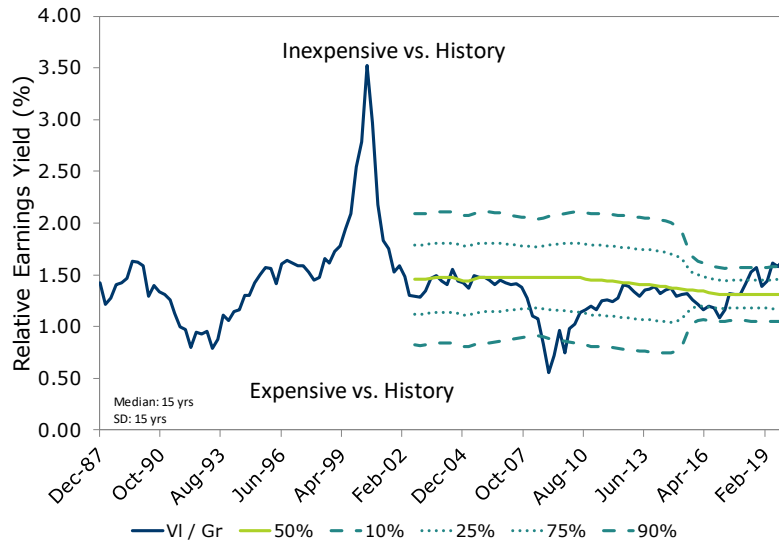
U.S. VALUE RELATIVE TO GROWTH



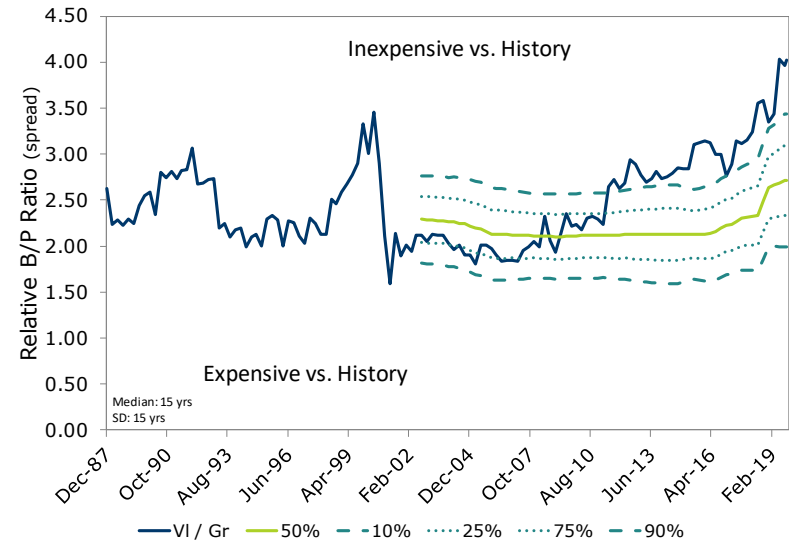
U.S. VALUE RELATIVE TO GROWTH



U.S. VALUE RELATIVE TO GROWTH



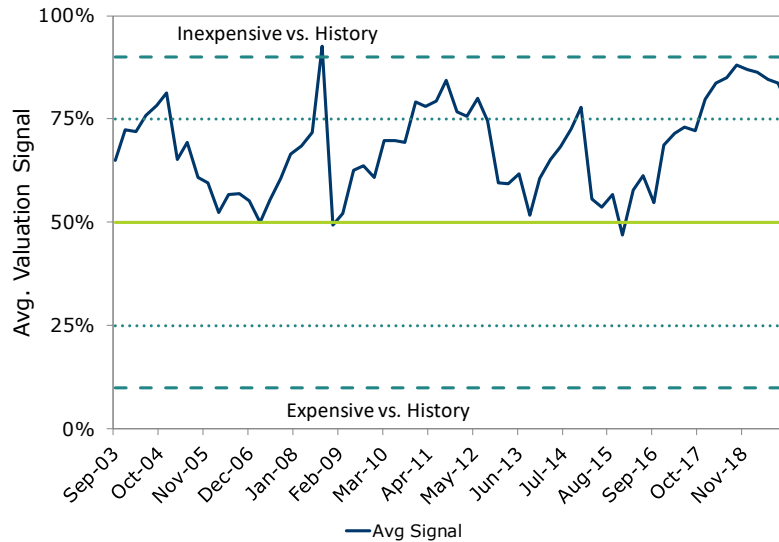
U.S. VALUE RELATIVE TO GROWTH



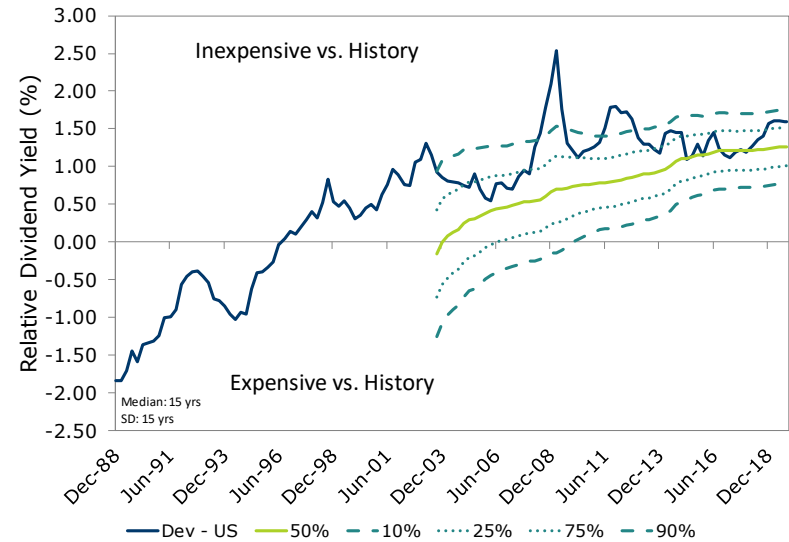
Data source: Bloomberg

GLOBAL EQUITY: DEVELOPED

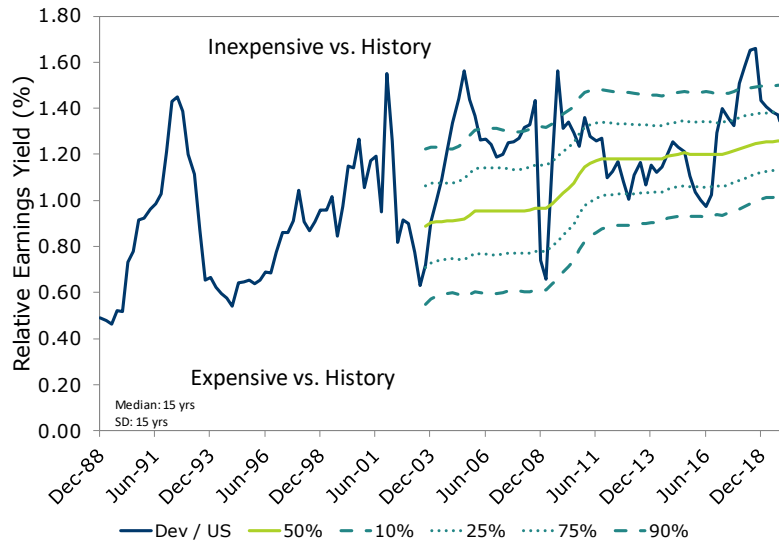
NON-U.S. DEV EQUITY RELATIVE TO U.S. EQUITY



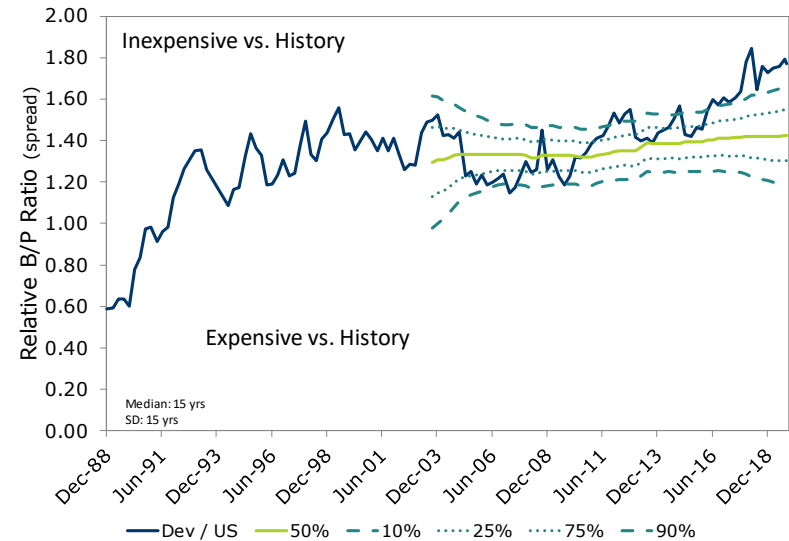
NON-U.S. DEV EQUITY RELATIVE TO U.S. EQUITY



NON-U.S. DEV EQUITY RELATIVE TO U.S. EQUITY



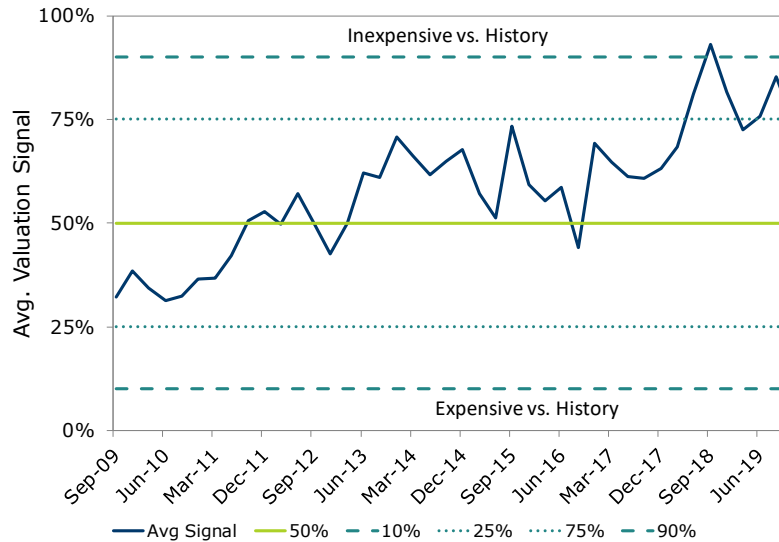
NON-U.S. DEV EQUITY RELATIVE TO U.S. EQUITY



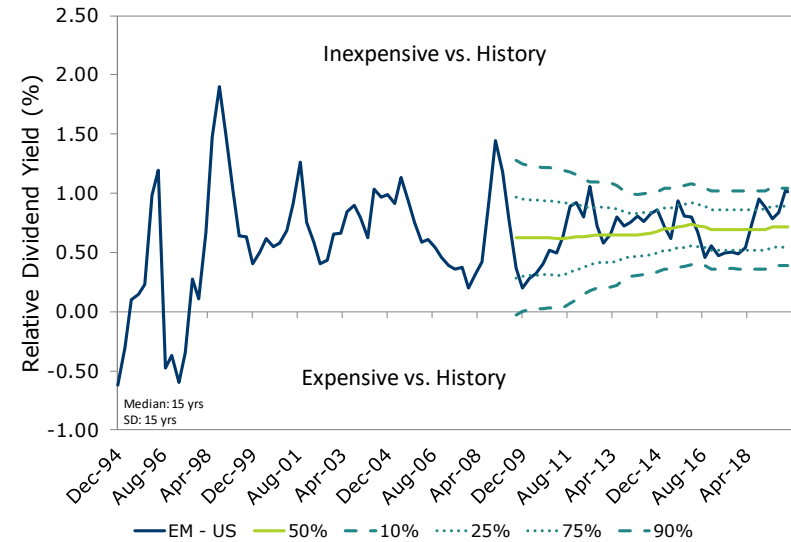
Data sources: Wilshire Atlas, Bloomberg

GLOBAL EQUITY: EMERGING

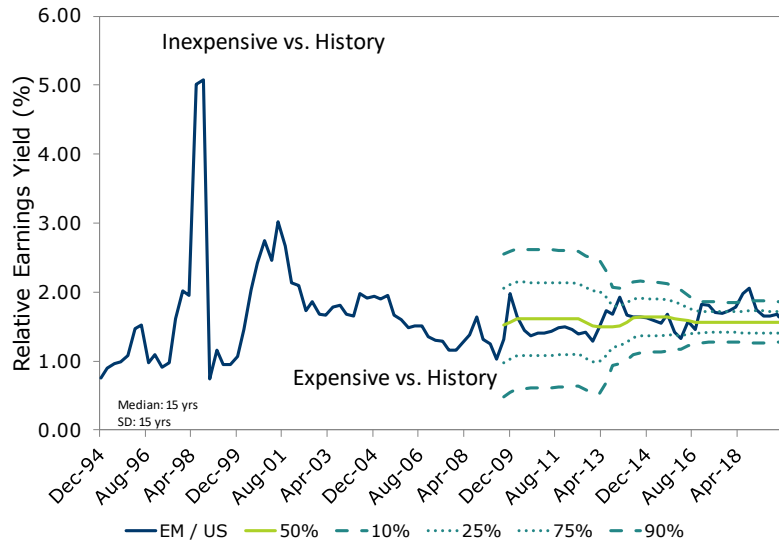
EMRG MRKT EQUITY RELATIVE TO U.S. EQUITY



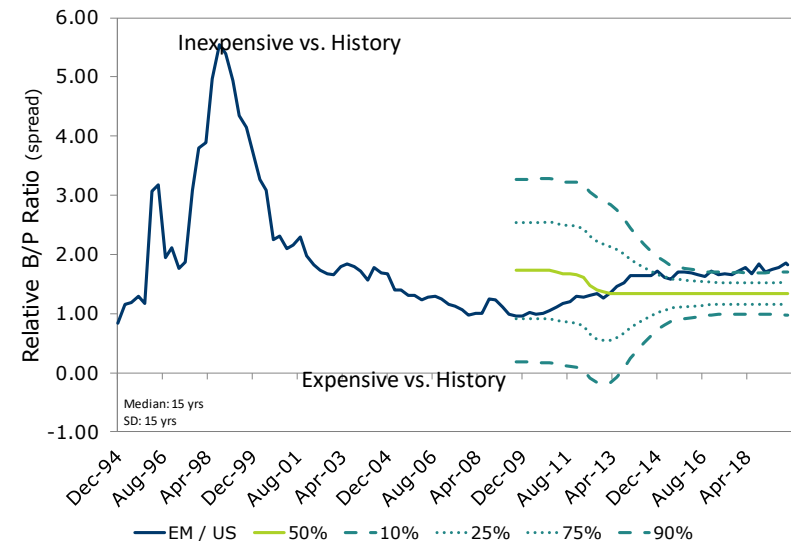
EMRG MRKT EQUITY RELATIVE TO U.S. EQUITY



EMRG MRKT EQUITY RELATIVE TO U.S. EQUITY



EMRG MRKT EQUITY RELATIVE TO U.S. EQUITY



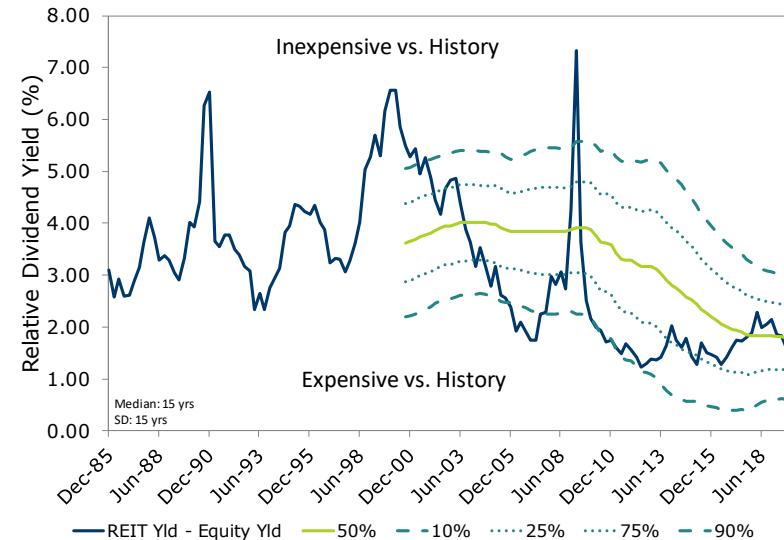
Data sources: Wilshire Atlas, Bloomberg

RELATIVE YIELD ON REAL ASSETS

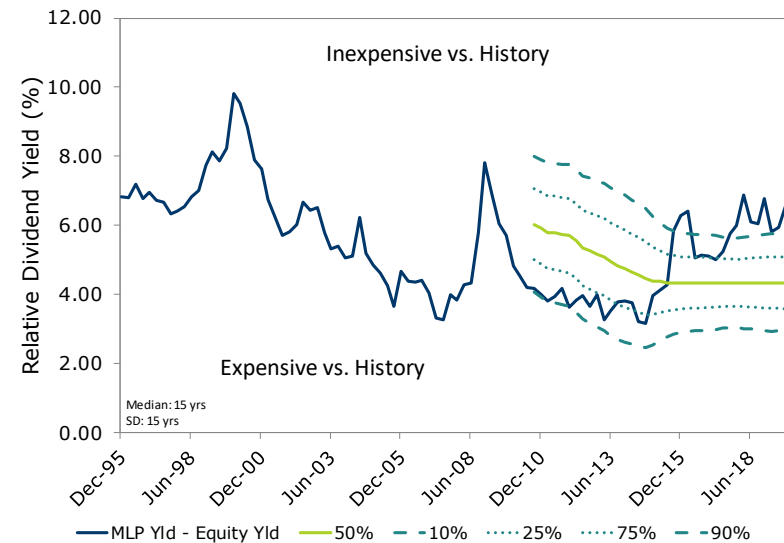
- REIT yields typically run higher than the earnings yield for the broad equity market
- Current relative yield at the 41%-percentile outcome

- MLP prices have been quite volatile for the past few years
- Current relative yield is at the 100%-percentile outcome

REIT YIELD RELATIVE TO U.S. EQUITY



MLP YIELD RELATIVE TO U.S. EQUITY



Data sources: Wilshire Atlas, Bloomberg

SUMMARY

- Yield spread on the broad Treasury index is again positive versus 3-month Treasuries
- Credit spreads are below the historical medians
- Equity signals are yield-based only in the following exhibit
- Non-U.S. equity is Inexpensive versus U.S. stocks

ASSET CLASS	FACTOR	CURRENT	HISTORICAL MEDIAN	CURRENT FROM MEDIAN (SD)	CURRENT VALUATION %
CASH	Real Yield	0.00	-1.23	0.82	79%
U.S. TREASURIES	Relative Yield to Cash	0.13	1.10	(1.49)	7%
U.S. IG CORPORATE	Spread to Treasuries	110	140	(0.31)	38%
U.S. HIGH YIELD	Spread to Treasuries	392	466	(0.28)	39%
U.S. EQUITY	Dividend Yield	1.90	1.92	(0.09)	46%
NON-U.S. DEV EQUITY	Dividend Yield	3.49	3.23	0.45	67%
NON-U.S. EMRG MRKT	Dividend Yield	2.91	2.62	0.70	76%
U.S. REITs	Relative Yield to Eqty	1.58	1.79	(0.22)	41%
MLPs	Relative Yield to Eqty	7.35	4.35	2.68	100%
SMALL V LARGE	Relative Yield	-0.32	-0.50	1.33	91%
VALUE V GROWTH	Relative Yield	1.39	1.10	0.68	75%
NON-U.S. DEV V U.S.	Relative Yield	1.59	1.26	0.86	81%
EMRG MRKT V U.S.	Relative Yield	1.01	0.72	1.14	87%

CROSS-ASSET CLASS VALUATION

- Methodology: matrix below summarizes relative relationships among asset classes
 - 15 years of yield data is used for each AC
 - The difference in yield is calculated and the resulting percentile of each outcome is included in the matrix, for example:
 - » Current Treasuries to Core Bonds spread is -0.6%, above its median of -0.9%
 - » Spread is tighter than normal (with 75% probability) meaning that Treasuries are getting “inexpensive” relative to Core Bonds (which are getting “expensive”)
- Relative yields on Non-U.S. markets are attractive versus U.S. Equity

AS OF OCTOBER 31, 2019	ASSET CLASS RELATIONSHIP RELATIVE TO EACH OF THE FOLLOWING:									
	INFLATION	CASH	TREASURY	CORE BONDS	HIGH YIELD	REITs	MLPs	U.S. STOCKS	NON-U.S. DEV	EMRG MRKT
CASH	79%		93%	92%	73%	75%	19%	77%	68%	65%
TREASURY	49%	7%		75%	63%	50%	6%	44%	37%	33%
CORE BONDS	45%	8%	25%		59%	44%	3%	32%	32%	26%
HIGHYIELD	36%	27%	37%	41%		21%	2%	24%	19%	20%
REITs	56%	25%	50%	56%	79%		0%	41%	25%	22%
MLPs	99%	81%	94%	97%	98%	100%		100%	99%	99%
U.S. STOCKS	81%	23%	56%	68%	76%	59%	0%		19%	13%
NON-U.S. DEV	80%	32%	63%	68%	81%	75%	1%	81%		40%
EMRG MRKT	88%	35%	67%	74%	80%	78%	1%	87%	60%	