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Fashion Island Hotel
Newport Beach, California

March 11–13

2019

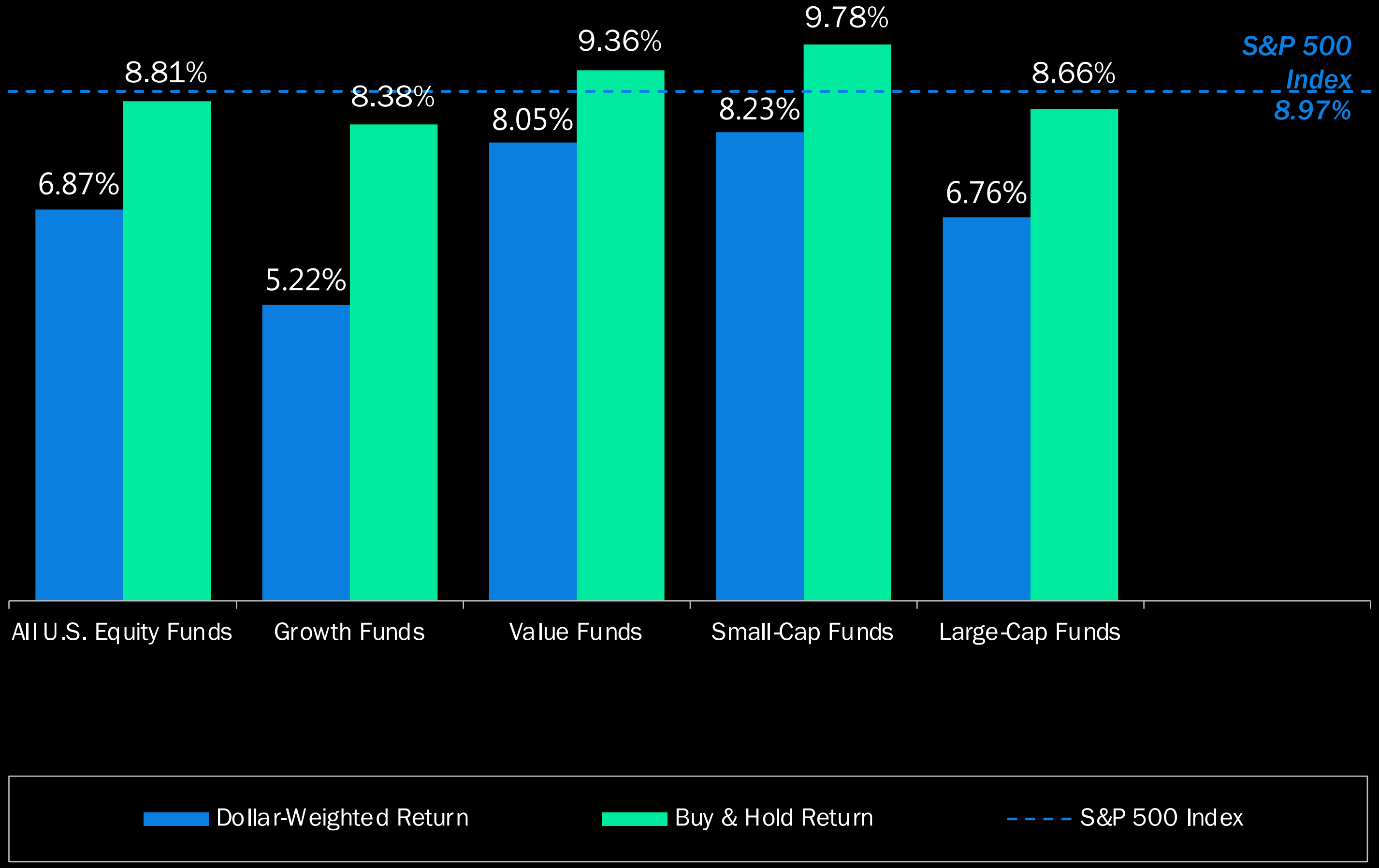
Are Valuations Irrelevant?

Rob Arnott

Partner and Chairman

ADVISOR 2019 SYMPOSIUM

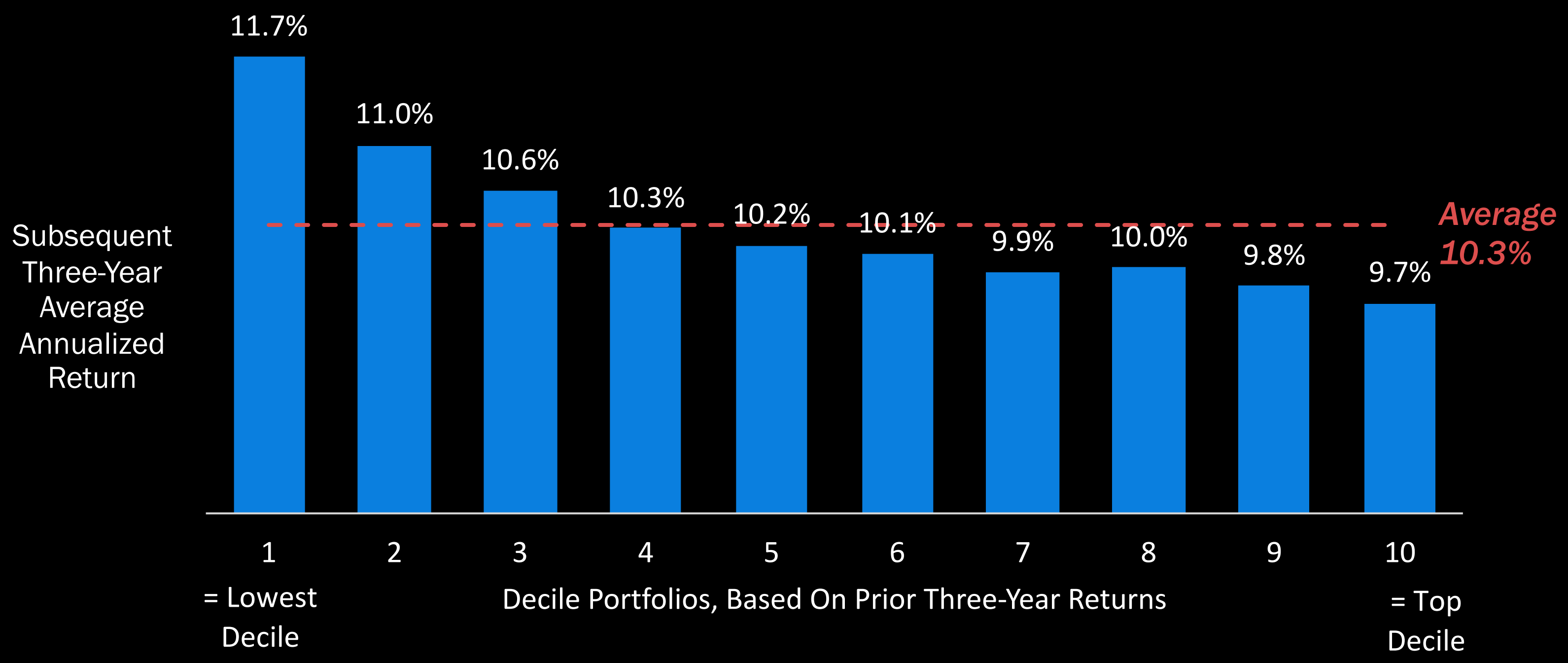
Most Investors Are Trend Chasers!



Source: Hsu, Myers, and Whitby, “Timing Poorly: A Guide to Generating Poor Returns While Investing in Successful Strategies,” *Journal of Portfolio Management* (Winter 2016).

Actively Managed Mutual Funds
...A Naïve Contrarian Strategy Can Work

Average Mutual Fund Subsequent Three-Year Performance, Sorted by Prior Three-Year Returns, US Long-Only Equity Funds (Jan 1990–Dec 2016)



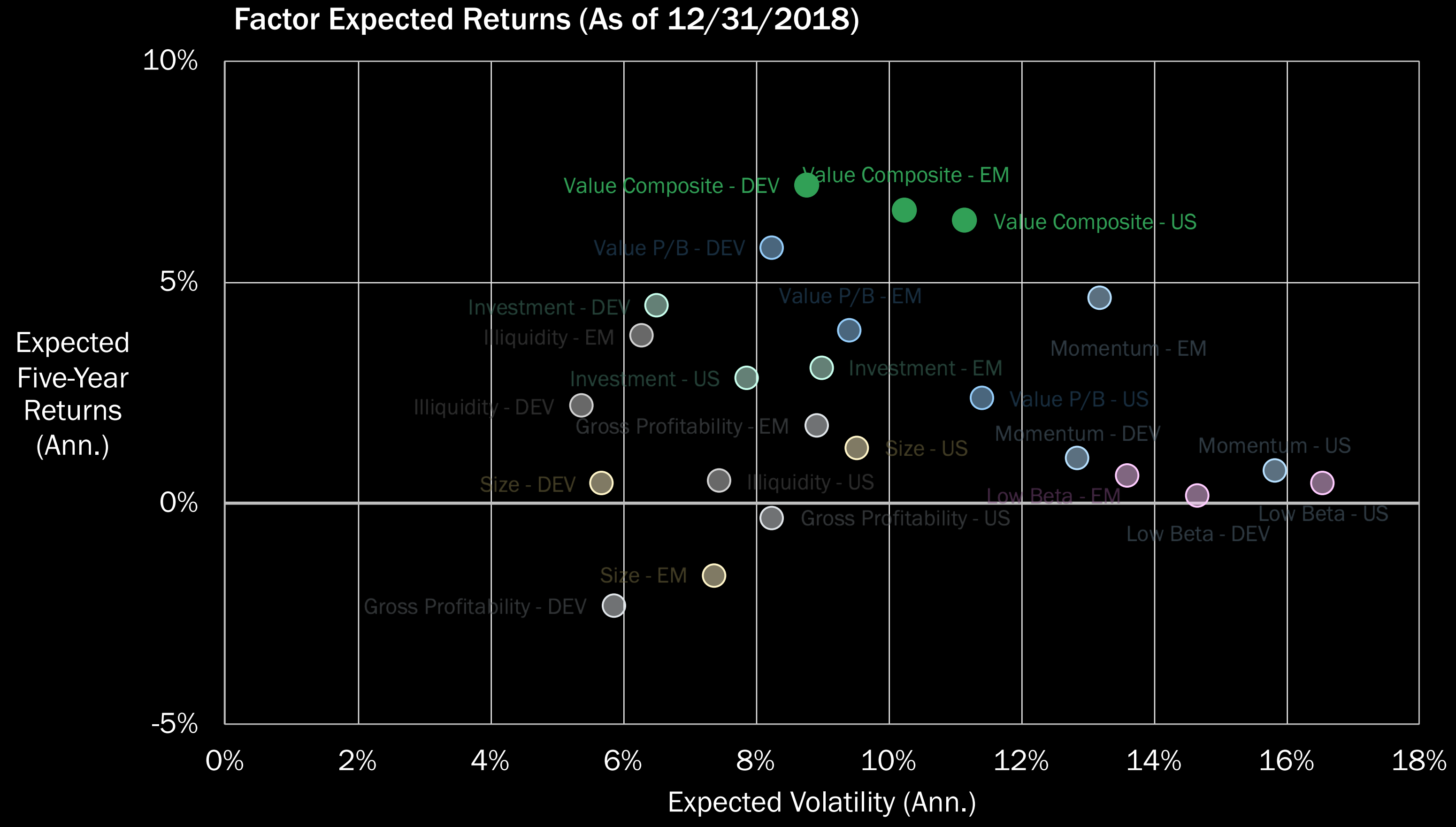
This result is arguably created by our industry's favorite decision rule: Three bad years and out!

Source: Research Affiliates, LLC, based on data from Morningstar Direct.

What Style Are Investors Chasing Today? Growth!

Source: Research Affiliates, LLC, using data from FactSet. Data as of 12/31/2018.

Current Equity Factor Return Forecasts: The Highest Return Potential Is Available from the Value Factor



Source: Research Affiliates, LLC, using data from CRSP/Compustat and Datascope/Worldstream. Please see important information at the end of this presentation regarding simulated data. Return expectations as of December 31, 2018.

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Equity Forecasts:
Past Is Not Prologue... Again

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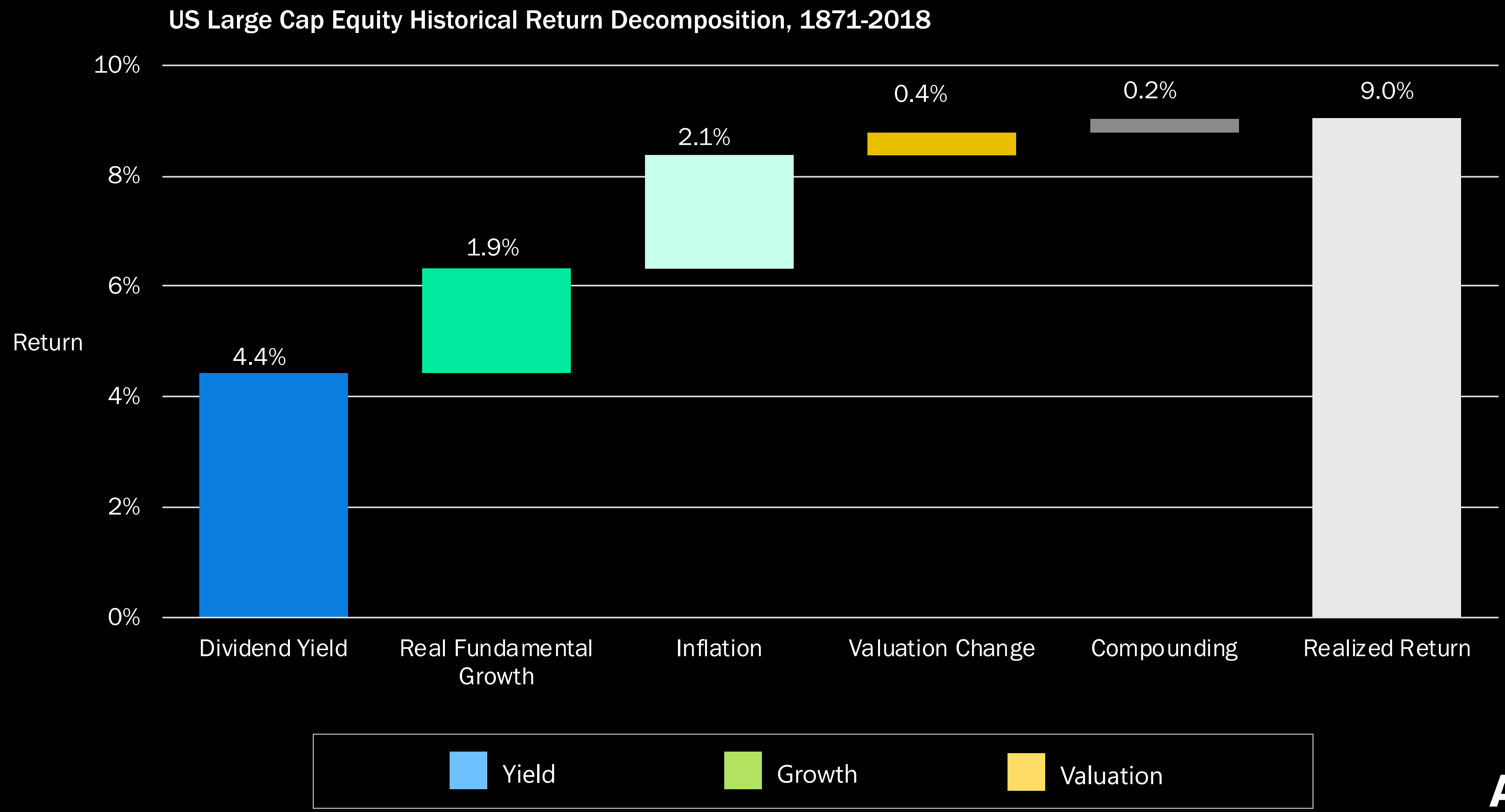
What Were the Sources of Historical Returns?



Source: Research Affiliates, LLC, based on data from the Robert Shiller database.

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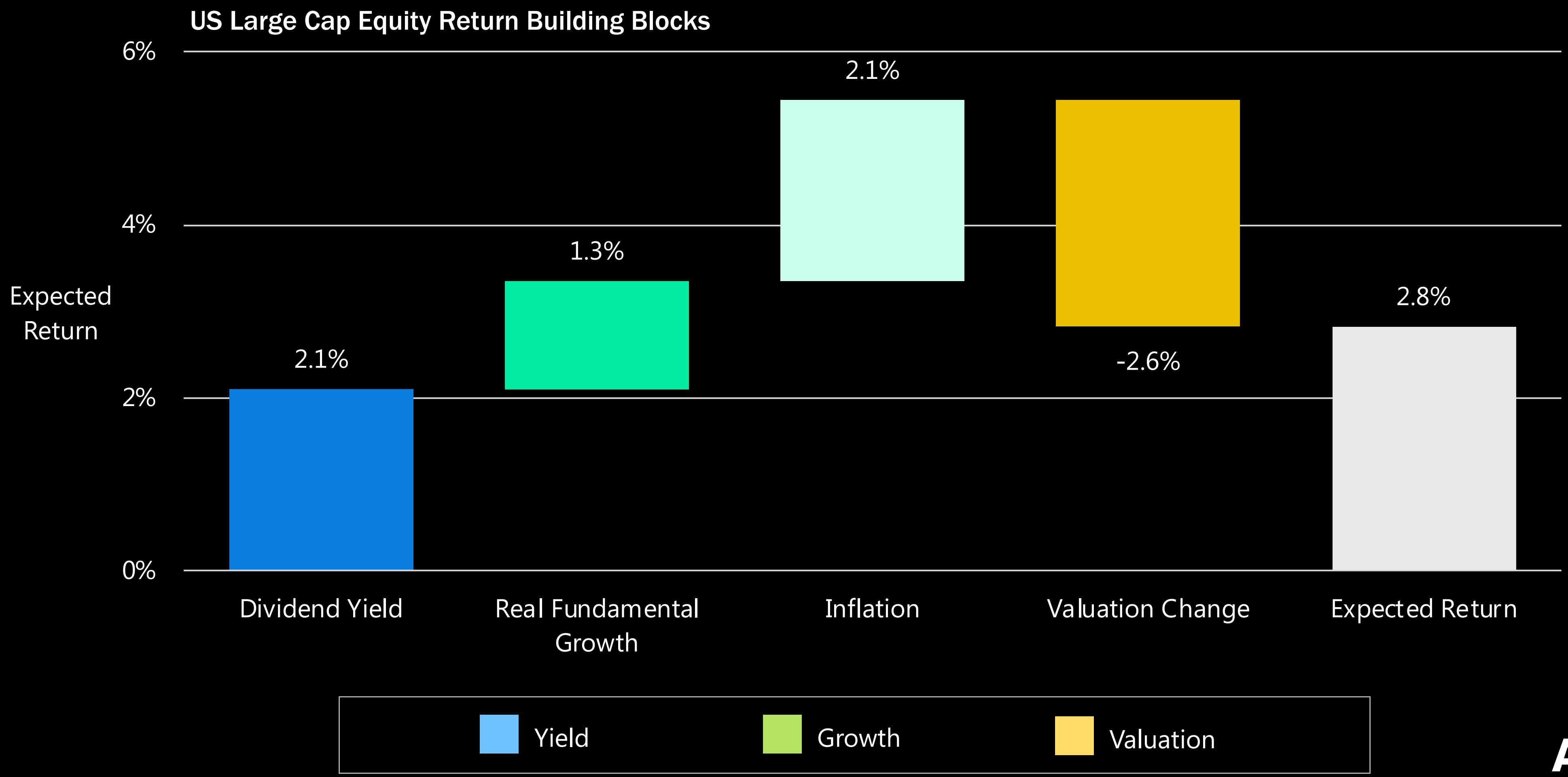
Equity Forecasts: A Function of Dividend Yield, Earnings Growth, and Valuation Changes



Source: Research Affiliates, LLC, based on data from the Robert Shiller database.

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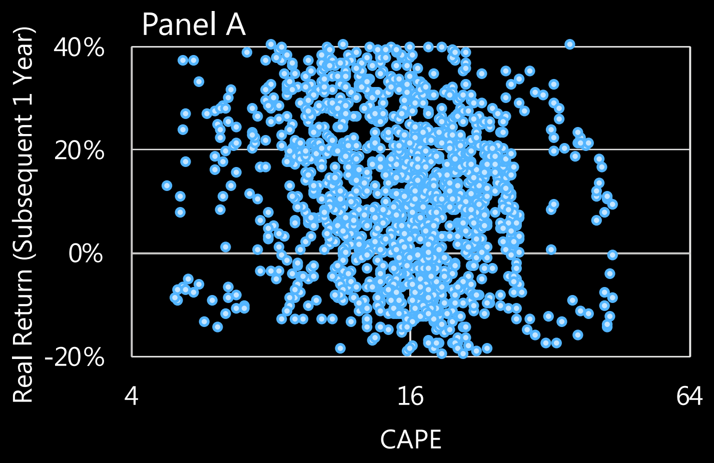
CAPE Is Powerful at Forecasting Long-Horizon Returns, but Almost Useless for Market Timing

Correlation of CAPE Ratio with S&P 500 Index Real Return at 1-Year Horizons, 1881–Oct 2017



Source: Research Affiliates, LLC, based on data from the Robert Shiller database.

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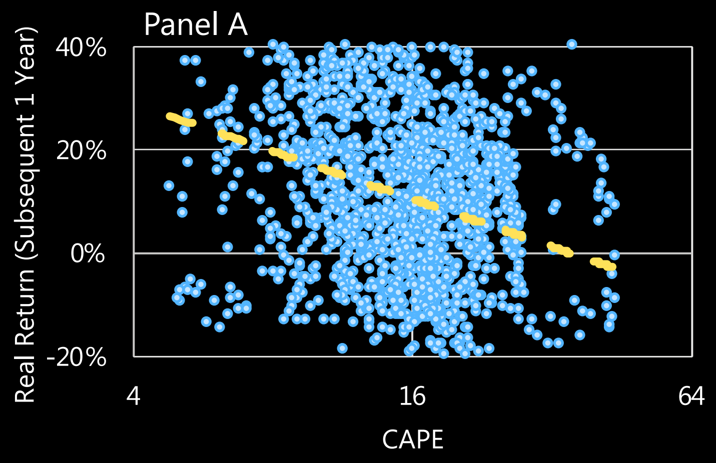

Source: Research Affiliates, LLC, based on data from the Robert Shiller database.

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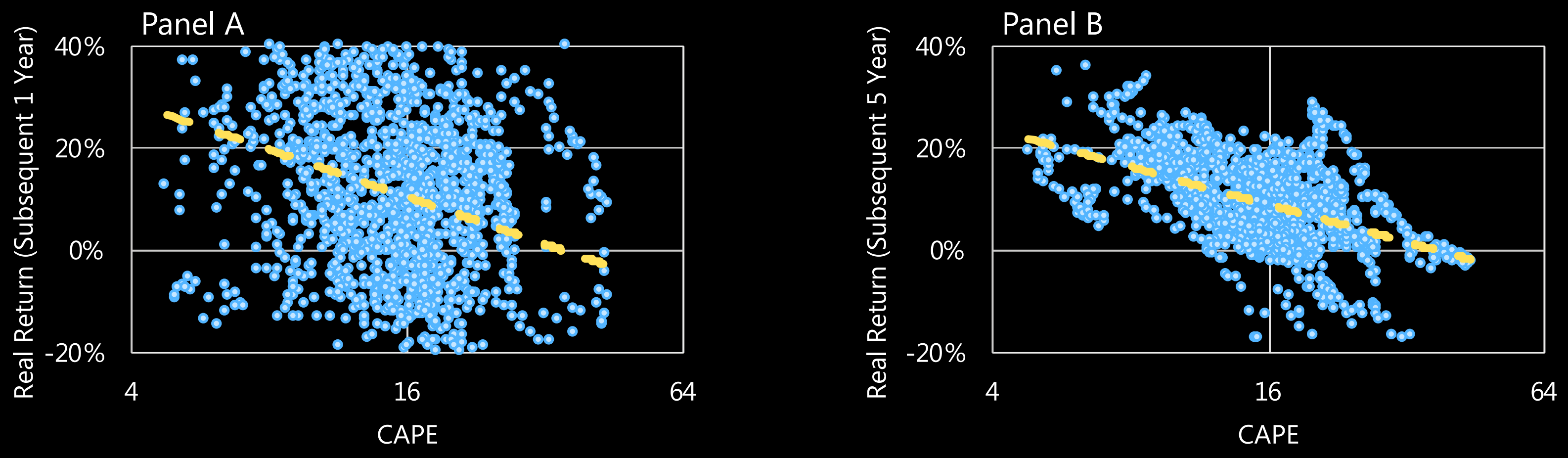
CAPE Is Powerful at Forecasting Long-Horizon Returns, but Almost Useless for Market Timing

Correlation of CAPE Ratio with S&P 500 Index Real Return at 1-, and 5-Year Horizons, 1881–Oct 2017



Source: Research Affiliates, LLC, based on data from the Robert Shiller database.

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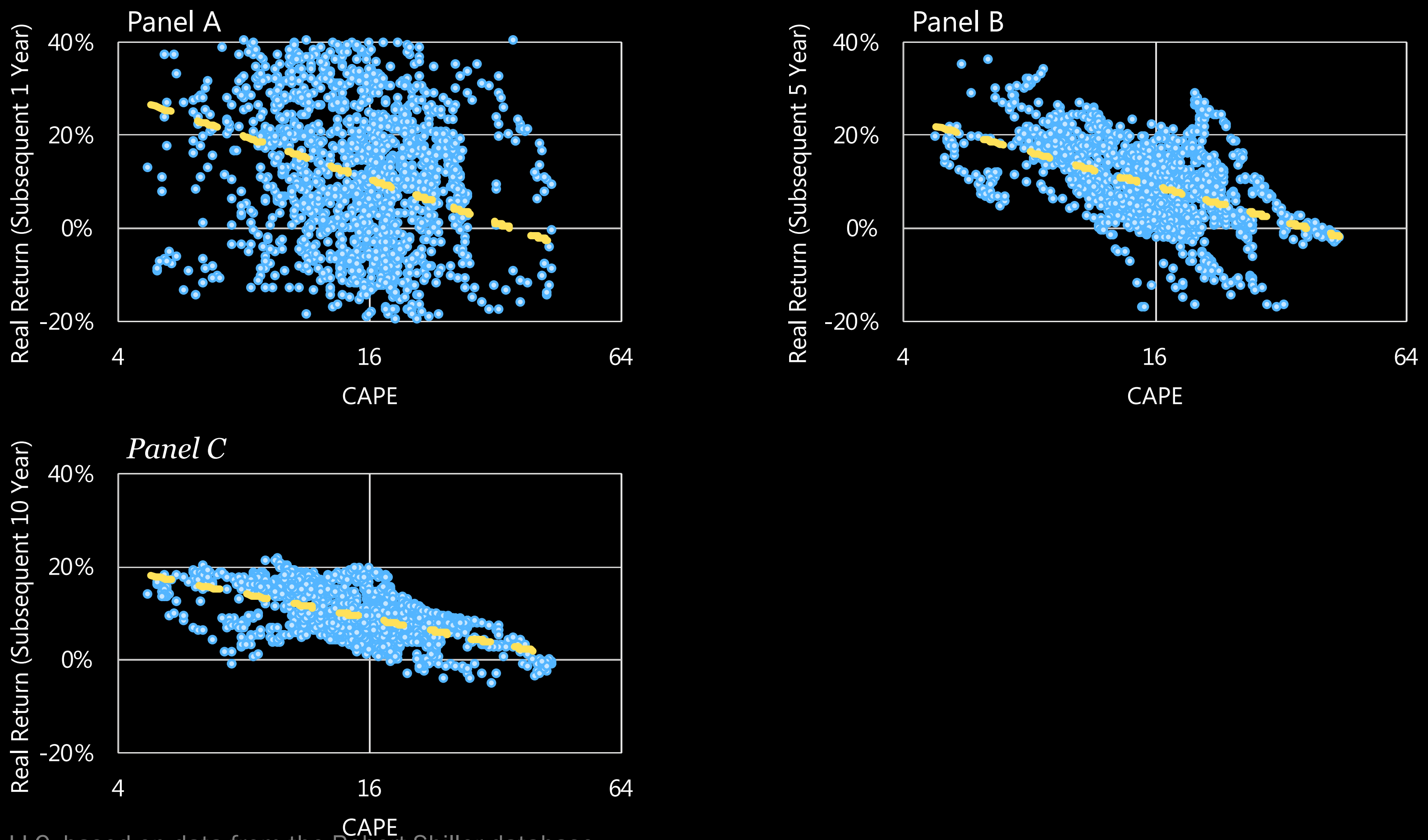
CAPE Is Powerful at Forecasting Long-Horizon Returns, but Almost Useless for Market Timing

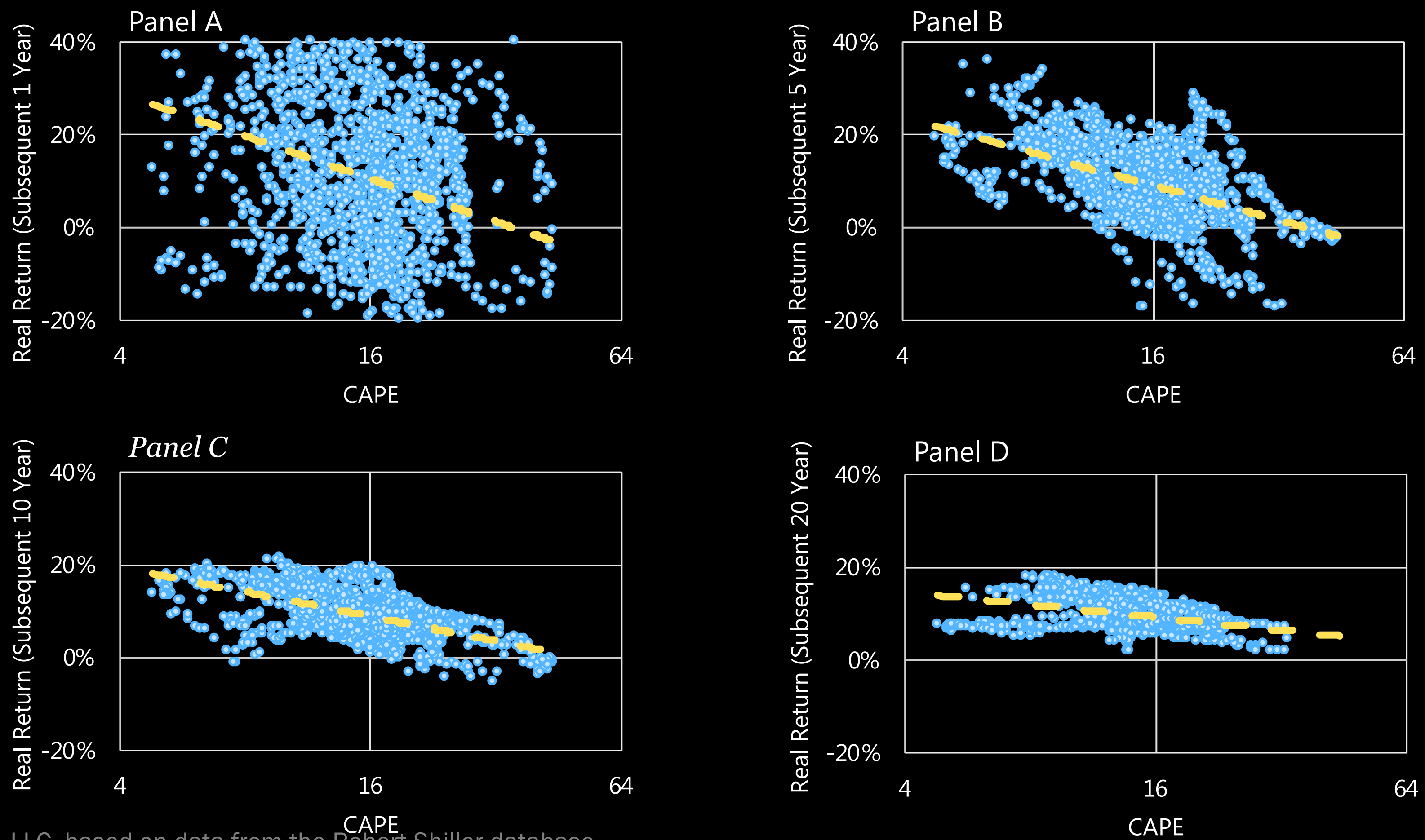
Correlation of CAPE Ratio with S&P 500 Index Real Return at 1-, 5-, and 10-Year Horizons, 1881–Oct 2017



Source: Research Affiliates, LLC, based on data from the Robert Shiller database.

CAPE Is Powerful at Forecasting Long-Horizon Returns, but Almost Useless for Market Timing

Correlation of CAPE Ratio with S&P 500 Index Real Return at 1-, 5-, 10-, and 20-Year Horizons, 1881–Oct 2017



Source: Research Affiliates, LLC, based on data from the Robert Shiller database.

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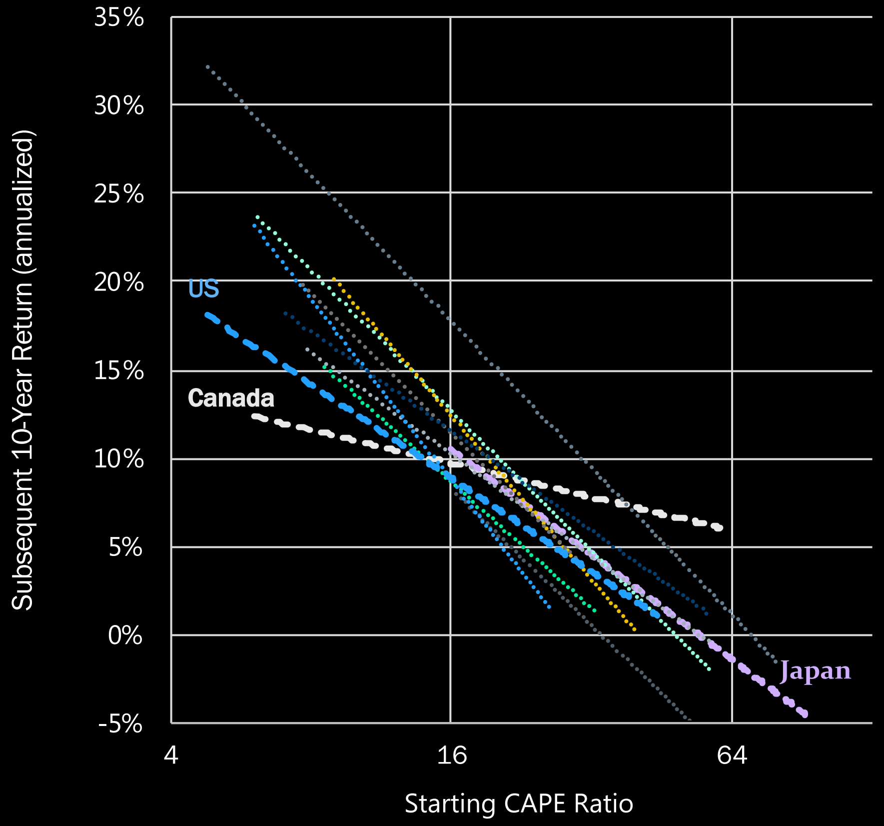
The Link Between Starting Valuations and Subsequent Returns Is Robust Across Equity Markets

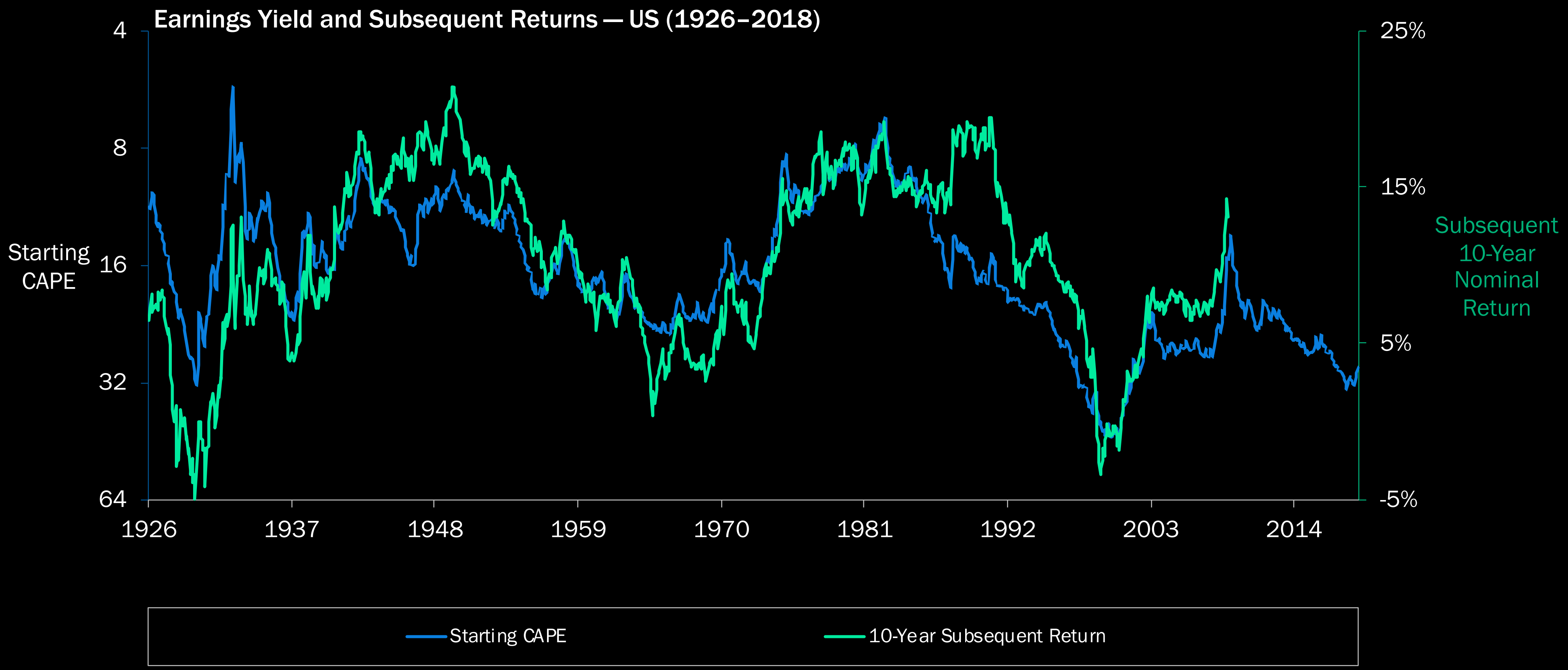


Country	Slope	Correlation
Australia	-0.12	91%
Canada	-0.03	48%
France	-0.12	89%
Germany	-0.08	81%
Hong Kong	-0.10	75%
Italy	-0.11	62%
Japan	-0.09	68%
Spain	-0.13	79%
Sweden	-0.12	87%
Switzerland	-0.08	72%
United Kingdom	-0.15	90%
United States	-0.08	58%

Average Correlation = 75%

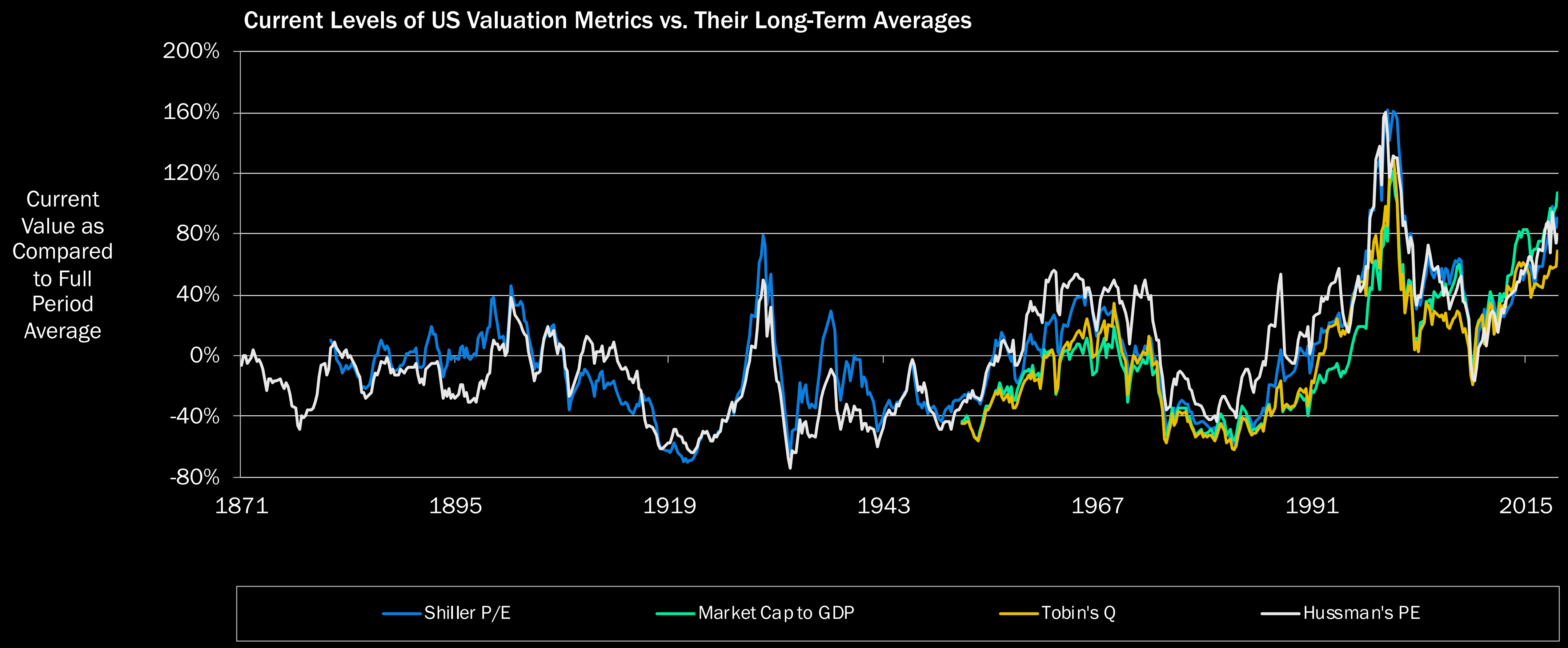
Source: Research Affiliates, LLC, using data from Robert Shiller database, Bloomberg, and MSCI. Note: Each country is measured over the time span for which earnings data are available through October 2007 in order to calculate 10-year returns ending in 2017. The start date for earnings data in the United States is 1871; in Australia, Canada, Germany, Sweden, Switzerland, and the United Kingdom is 1969; in France is 1971; in Hong Kong and Spain is 1980; and in Italy is 1984. Using a beginning date of 1969 in the United States yields results consistent with the results when the start date is 1871.

US Equities Are Poised for Lackluster Future Returns



Source: Research Affiliates, LLC, based on data from Bloomberg and Robert Shiller database. The index and inception date is the S&P 500 Index (January 1926). Earnings yield is computed as the inverse of the CAPE ratio. For more information, please visit http://www.researchaffiliates.com/en_us/asset-allocation.html. As of December 31, 2018.

Other Useful Metrics Corroborate High US Valuations



Source: Research Affiliates, LLC, based on data from Robert Shiller database and the Federal Reserve Economic Data (FRED). US Valuation Metrics referenced above are presented as of the first date that data is available. As of December 31, 2018.

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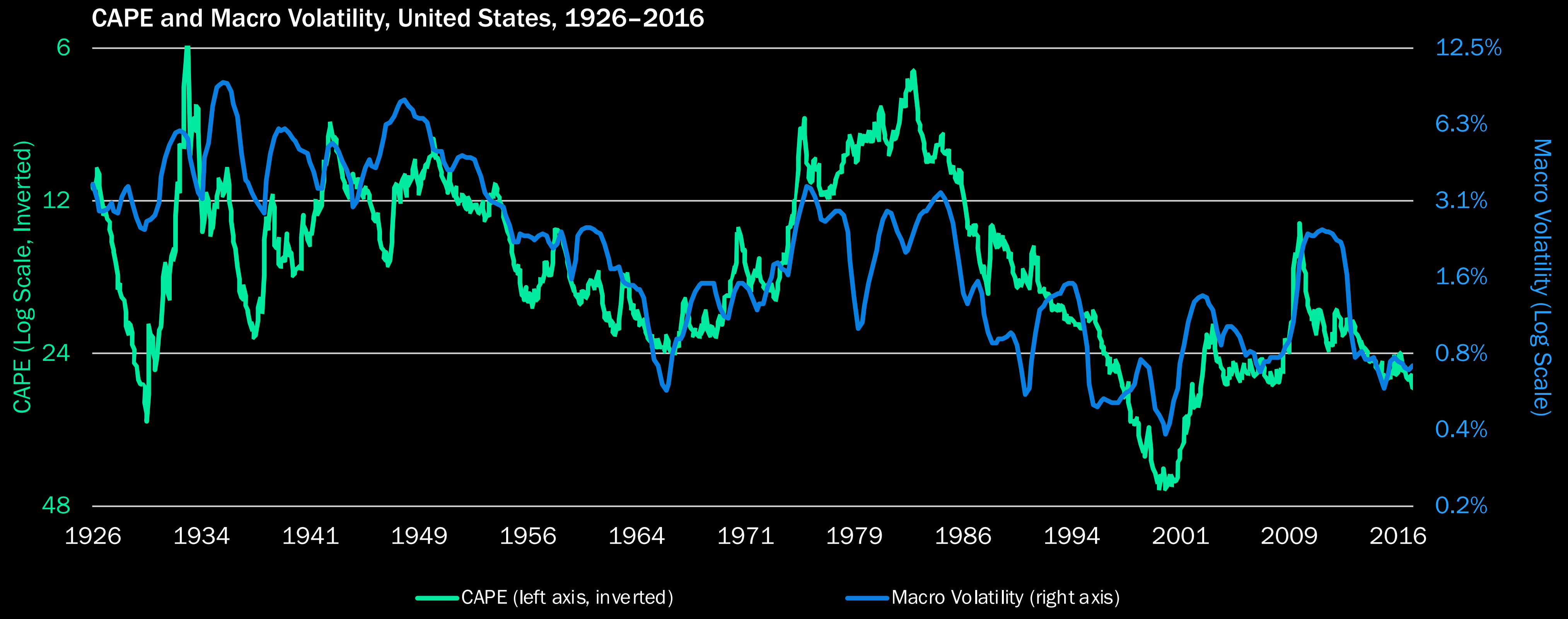
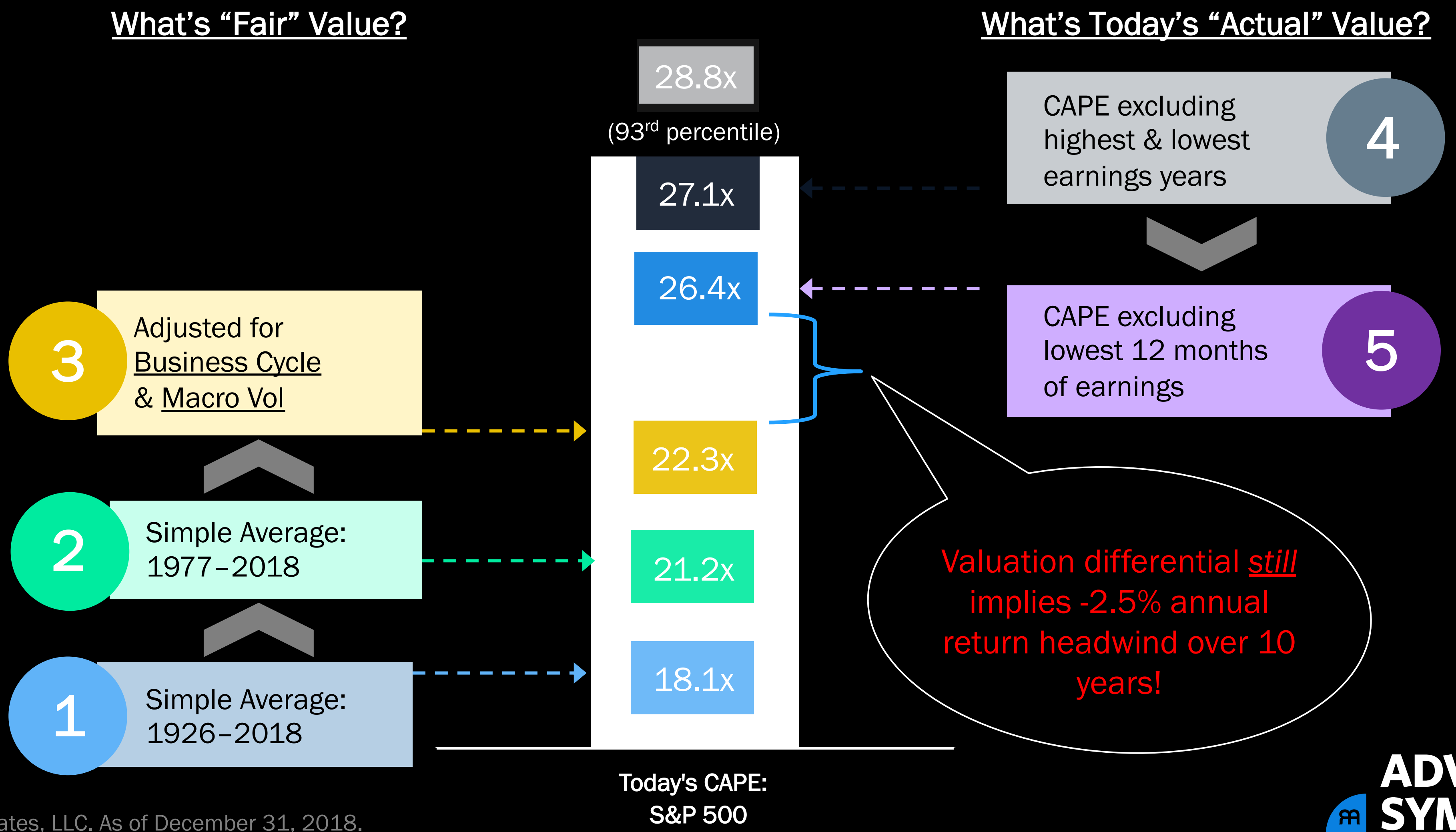
Low Macro Volatility Helps Explain High CAPE Ratios



Aked, Mazzoleni, and Shakernia (2017) find that today's low volatility levels support an equilibrium CAPE of 23, nearly 30% below the current level of 32.

Source: Research Affiliates, LLC, using data from FRED at the Federal Reserve Bank of St. Louis, Robert Shiller's database, and Ray C. Fair's quarterly historical GDP Data (https://fairmodel.econ.yale.edu/rayfair/pdf/2002dtbl.htm). For quarterly real GDP growth, we use FRED data from 1947 to present, backfilled with data from Ray Fair's website. Macro volatility is defined as the arithmetic average of the rolling three-year volatility of real GDP growth and the rolling three-year volatility of inflation.

Even After Making Multiple Adjustments, US Equities Face Headwinds from Valuation Contraction



Source: Research Affiliates, LLC. As of December 31, 2018.

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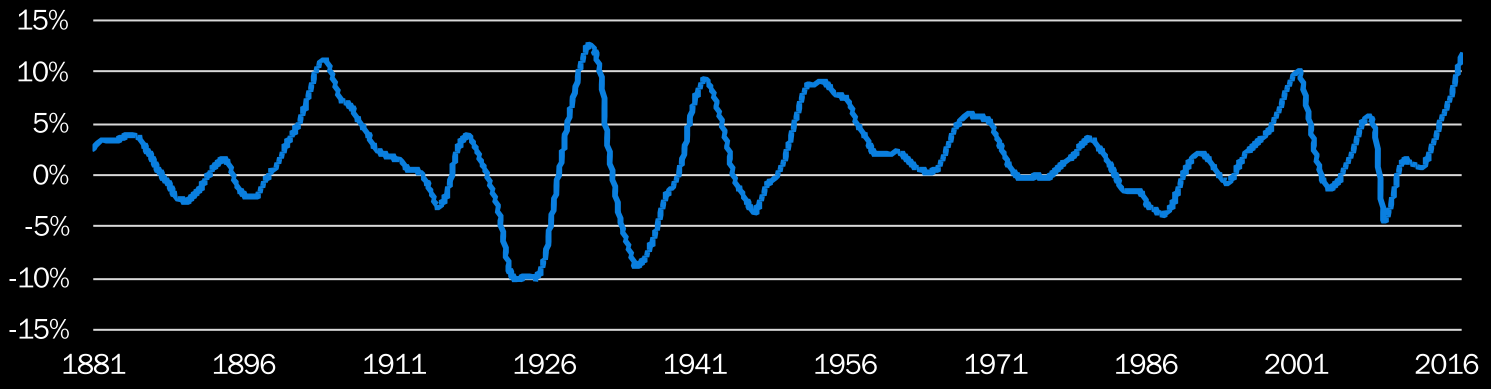
High Earnings Are Not Enough to Portend a High CAPE Ratio!

For returns to remain elevated with a high CAPE, EPS growth must be high as well

- EPS growth arguments[1] for elevated CAPE explain high **past** EPS growth, not high future EPS growth.
- EPS growth rates are cyclical.

Rolling 10-Year US Real EPS Trend Growth, 1871–Oct 2017



- Indeed, real earnings of the S&P 500 crested in 2014. We are skeptical that earnings can grow much, relative to GDP, in the years ahead.

Source: Research Affiliates, LLC, using data from Robert Shiller database.

[1] Grantham, Jeremy. 2017. "This Time Seems Very, Very Different." *Advisor Perspectives*, GMO Quarterly Letter (May 2).

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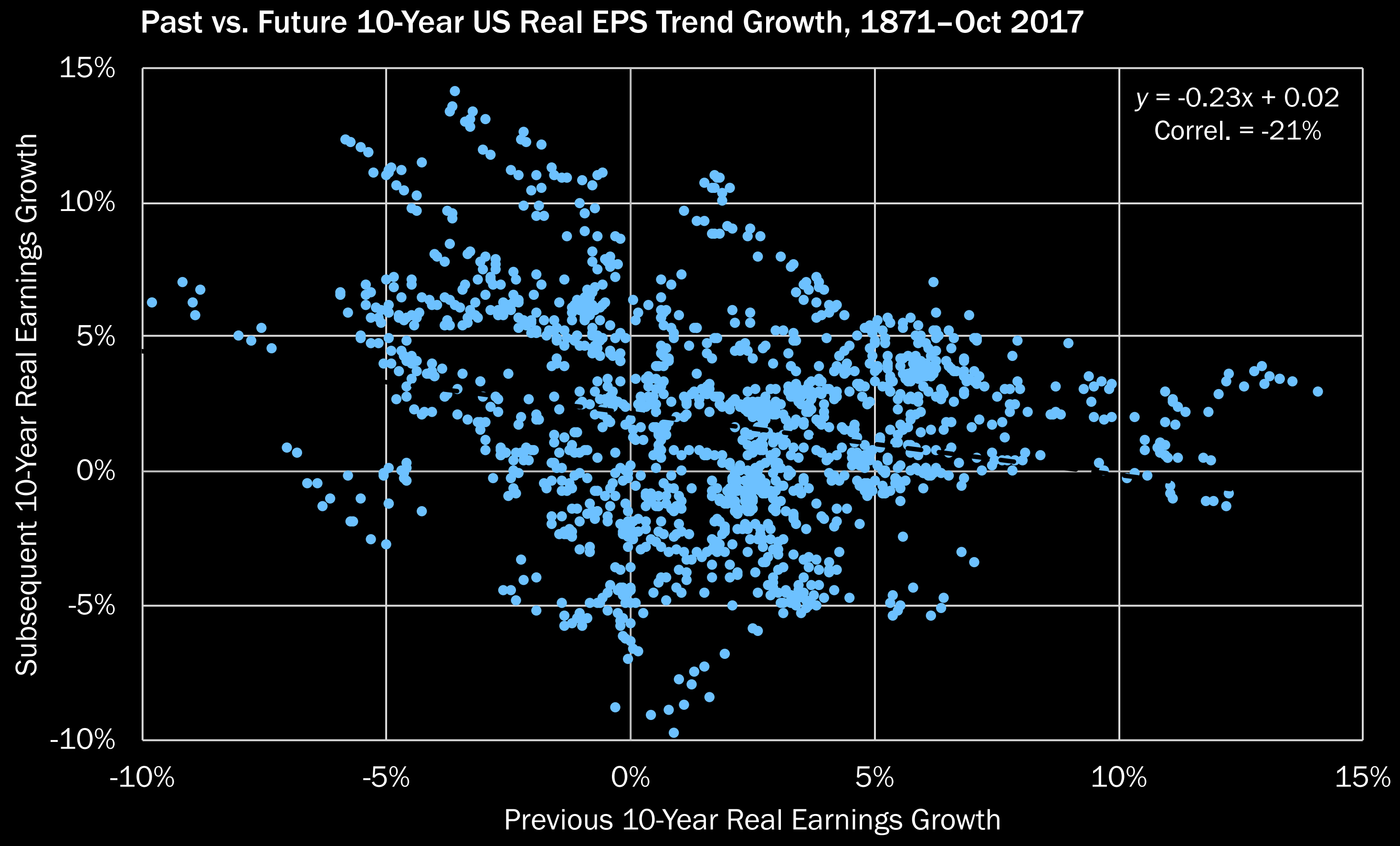
High EPS Growth Often Precedes Low EPS Growth



Source: Research Affiliates, LLC, using data from Robert Shiller database.

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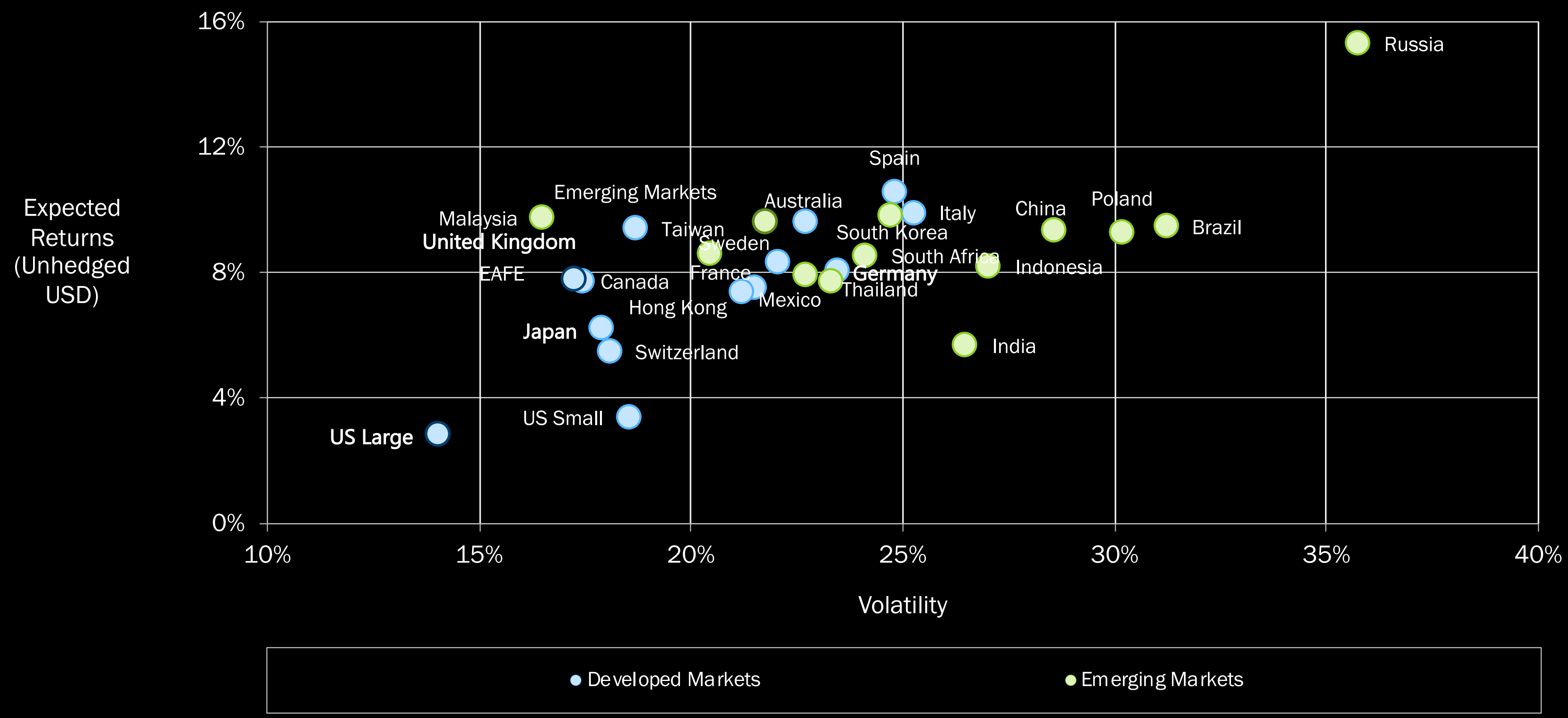
Equities: Long-Term Return Expectations



Source: Research Affiliates, LLC, based on data from Ibbotson, Shiller, Bloomberg, MSCI, and FactSet. The bolded country indices are represented by the S&P 500, MSCI Germany, MSCI Japan, and MSCI UK. For more information, please visit http://www.researchaffiliates.com/en_us/asset-allocation.html. Please see important information at the end of this presentation regarding simulated data. As of December 31, 2018.

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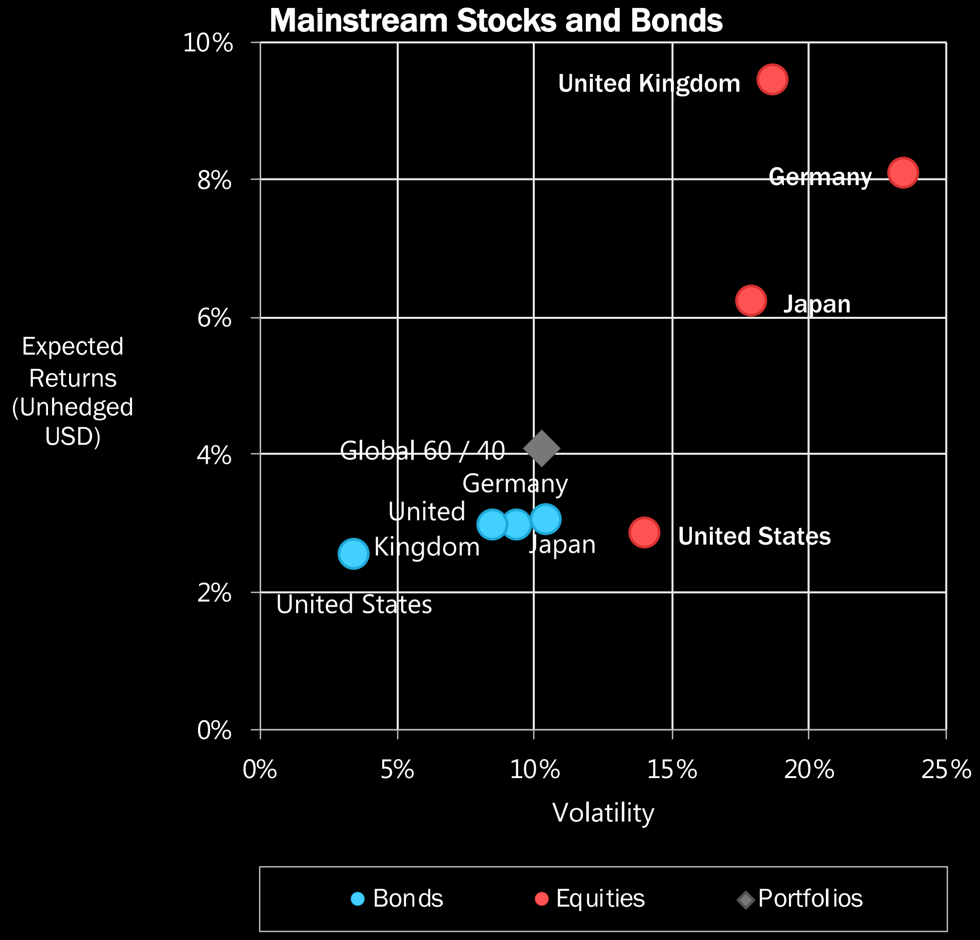

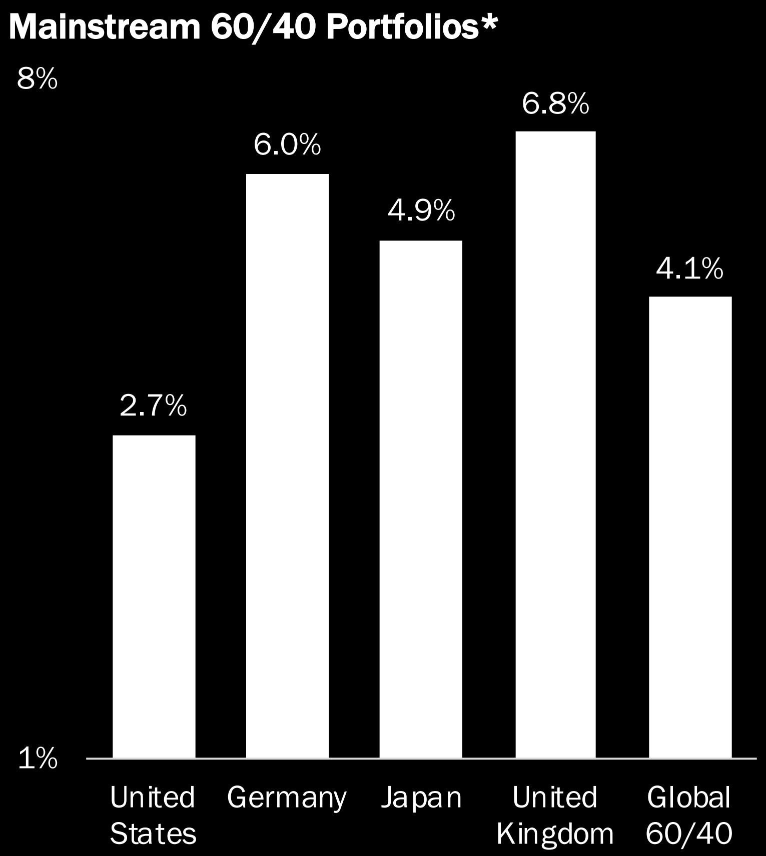

*60/40 portfolios are represented as 60% core equity index and 40% Treasury 5-7 Year bond index for each specific country. For the United States, the Barclays Aggregate is used in lieu of the 5-7 Year Treasury. Source: Research Affiliates, LLC, based on data from Ibbotson, Shiller, Bloomberg, FactSet, MSCI, and Barclays. Please see important information at the end of this presentation regarding simulated data. As of December 31, 2018.

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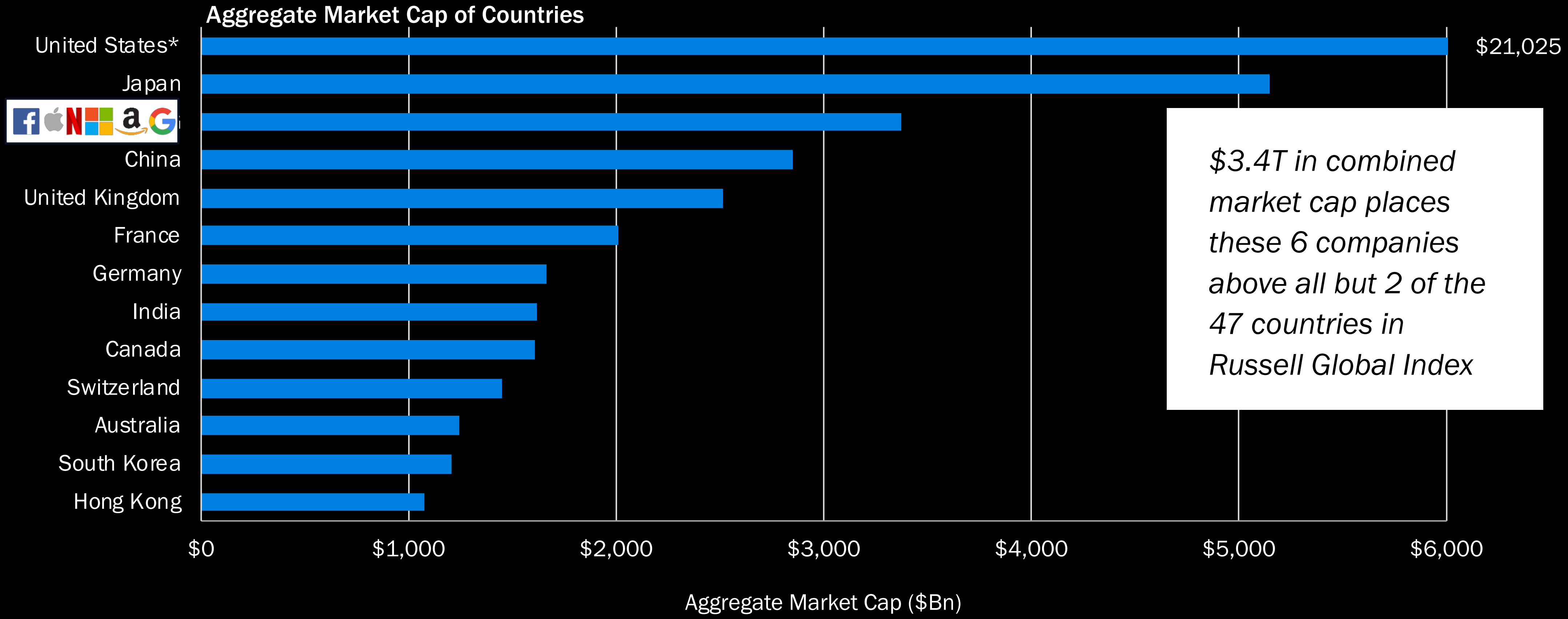
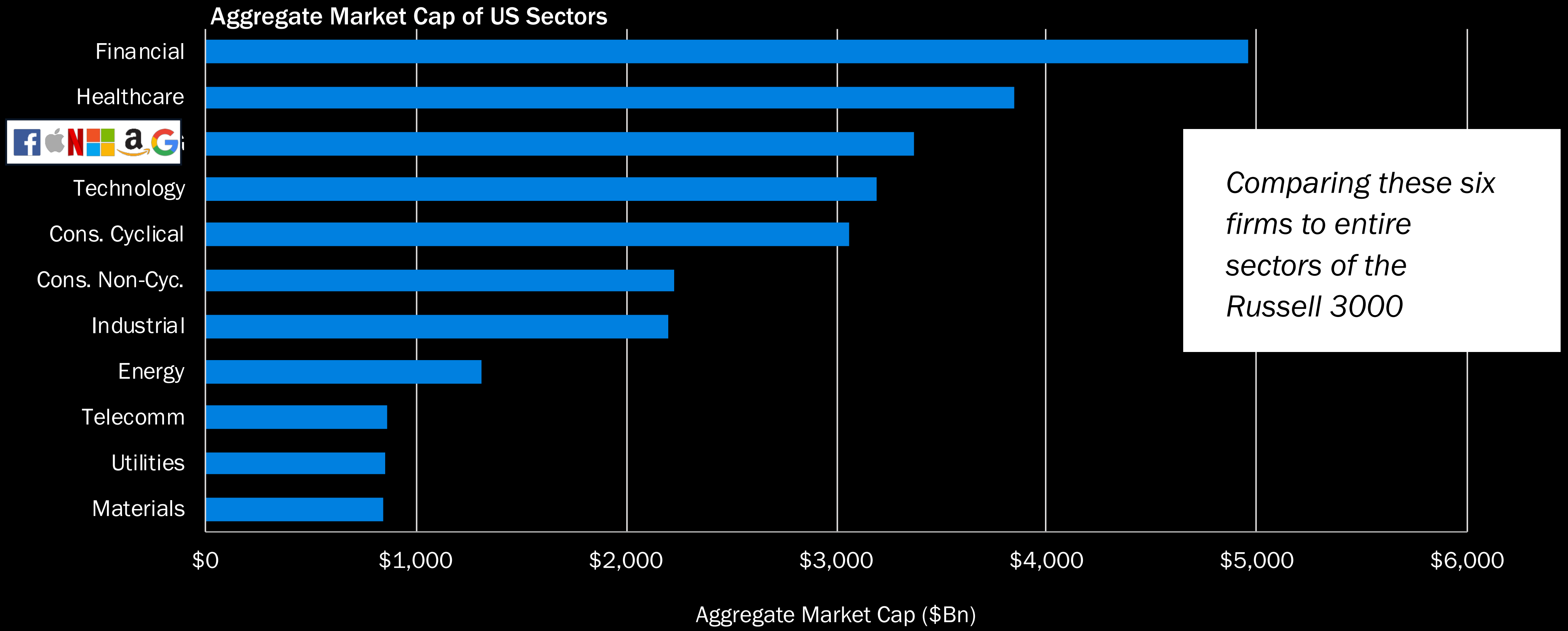
How Do the Largest Holdings of Index Funds Impact Performance?

How Expensive Are FANMAG (Facebook, Apple, Netflix, Microsoft, Amazon, & Google)?



*US Market Cap extends beyond the scale of the graph.
Source: Research Affiliates, LLC, based on data from FactSet as of 12/31/2018. Market cap for countries represents the sum of the market caps for their constituents in the 10,000+ security Russell Global Index. Market caps for Facebook, Apple, Netflix, Microsoft, Amazon, & Google are excluded from the US category.

How Expensive Are FANMAG (Facebook, Apple, Netflix, Microsoft, Amazon, & Google)?



Source: Research Affiliates, LLC, based on data from FactSet as of 12/31/2018. Market cap for sectors represents the sum of the market caps for their constituents in the Russell US 3000 Index. Market caps for Facebook, Apple, Netflix, Microsoft, Amazon, & Google are excluded from the technology sector.

The "Top Dogs" in an All-World Cap-Weighted Portfolio are Remarkably Inconsistent!

Since 1980, a decade-by-decade analysis shows that typically only 2 of the top 10 companies in the market remain among the largest companies 10 years later.

2019	2018	2017	2016	2015	2014	2013
Microsoft	Apple Inc.	Apple Inc.	Apple Inc.	Apple Inc.	Apple Inc.	Apple Inc.
Apple Inc.	Alphabet Inc.	Alphabet Inc.	Google	Exxon Mobil	Exxon Mobil	Exxon Mobil
Amazon.com	Microsoft	Microsoft	Microsoft	Microsoft	Berkshire Hathaway	**PetroChina**
Alphabet Inc.	Amazon.com	Berkshire Hathaway	Berkshire Hathaway	Berkshire Hathaway	Microsoft	**BHP Billiton**
Berkshire Hathaway	Facebook	ExxonMobil	Exxon Mobil	Google	Johnson & Johnson	**ICBC**
Facebook	**Tencent**	Amazon.com	Johnson & Johnson	**PetroChina**	General Electric	**China Mobile**
Tencent	Berkshire Hathaway	Johnson & Johnson	General Electric	Johnson & Johnson	Wal-Mart	Wal-Mart
Alibaba Group	**Alibaba Group**	JPMorgan Chase	**China Mobile**	Wells Fargo	Google	**Samsung Electronics**
Johnson & Johnson	Johnson & Johnson	General Electric	**Novartis**	Wal-Mart	Chevron Corporation	Microsoft
JPMorgan Chase	JPMorgan Chase	Wells Fargo	**Nestlé**	**ICBC**	**Hoffmann-La Roche**	**Royal Dutch Shell**

2012	2011	2010	2009	2000	1990	1980
Apple Inc.	Exxon Mobil	**PetroChina**	Exxon Mobil	Microsoft	**NTT**	IBM
Exxon Mobil	**PetroChina**	Exxon Mobil	**PetroChina**	General Electric	**Bank of Tokyo-Mitsubishi**	AT&T
PetroChina	Apple Inc.	Microsoft	Wal-Mart	**NTT DoCoMo**	**Industrial Bank of Japan**	Exxon
IBM	**BHP Billiton**	**ICBC**	**China Mobile**	Cisco Sytems	**Sumitomo Mitsui Banking**	Standard Oil
Microsoft	Microsoft	Wal-Mart	Procter & Gamble	Wal-Mart	**Toyota Motors**	Schlumberger
ICBC	**ICBC**	**China Construction Bank**	**ICBC**	Intel	**Fuji Bank**	**Shell**
China Mobile	**Petrobras**	**BHP Billiton**	Microsoft	**NTT**	**Dai-Ichi Kangyo Bank**	Mobil
Royal Dutch Shell	**China Construction Bank**	**HSBC**	AT&T	Exxon Mobil	IBM	Atlantic Richfield
Nestlé	**Royal Dutch Shell**	**Petrobras**	Johnson & Johnson	Lucent Technologies	**UFJ Bank**	General Electric
Chevron Corporation	**Nestlé**	Apple Inc.	General Electric	**Deutsche Telekom**	Exxon	Eastman Kodak

Legend: New Addition to List | Drops Off List Next Year | Flip-Flop: New then Drops

Black = US Company | **Red Bold Text = Emerging Markets Company** | **Blue Bold Text = European Company** | **Brown Bold Text = Japan / Australia**

Source: Research Affiliates, LLC, using data from *Financial Times* and Wikipedia. Rankings shown represent start-of-year rankings.

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“Top Dogs” Vanish Because They *Underperform*!

- The global top dog outpaced the global cap-weighted stock market only 5% of the time in the last 30 years.
- It delivered an annual shortfall of 10.5% per year, roughly equivalent to losing 2/3 of its value!

Performance of Largest Market Cap Stocks, 1982–2011

Type of Top Dog	Horizon	Relative Return vs. Sector, Avg Across Countries	Frequency of Win vs. Sector, Avg Across Countries
Average, Largest stocks in each sector across G-8 countries	1yr	-5.3%	44%
	5yrs	-4.8%	39%
	10yrs	-5.1%	34%

	Horizon	Relative Return vs. Developed World	Frequency of Win vs. Developed World
Largest market cap stock in Developed World	1yr	-12.5%	33%
	5yrs	-11.2%	15%
	10yrs	**-10.5%**	**5%**

Source: Arnott, Rob, and Lillian Wu. 2012. “The Winner’s Curse,” *Journal of Indexes* (October 29).

How Do “Top Dogs” Impact Index Performance?

Do I want to own a portfolio in which my largest holding has a 95% likelihood of underperforming over the next 10 years? ***No!***

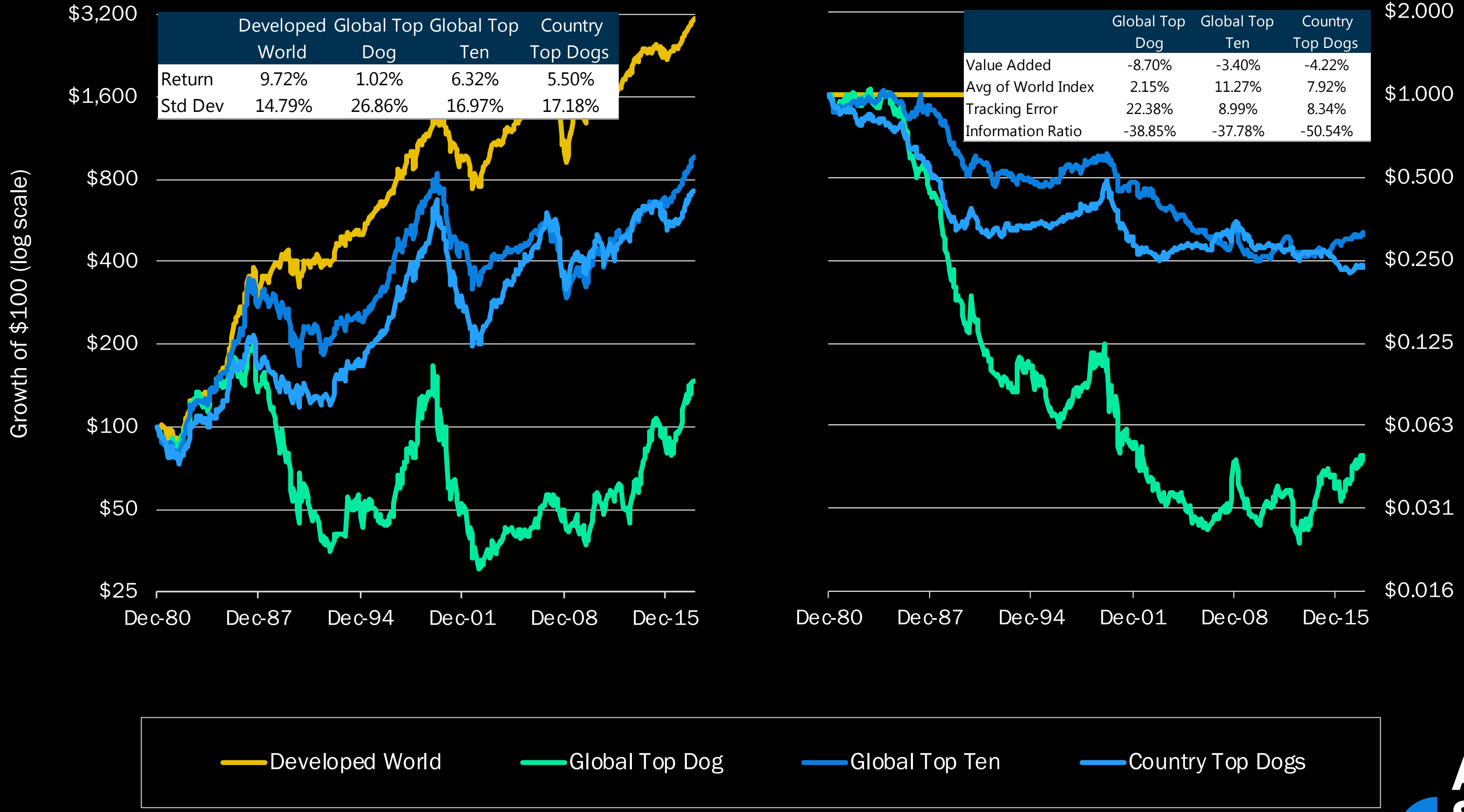
We compared the performance of five different portfolios

- Developed World Portfolio, Cap-Weighted (“World”)
- World, excluding the single largest market-cap stock in the world
- World, excluding the ten largest market-cap stocks in the world
- World, excluding the largest market-cap stock in each country

Portfolios of “Top Dogs” Underperform the Market

Performance of Top Dog Portfolios

Performance Relative to Developed World



	Developed World	Global Top Dog	Global Top Ten	Country Top Dogs
Return	9.72%	1.02%	6.32%	5.50%
Std Dev	14.79%	26.86%	16.97%	17.18%

	Global Top Dog	Global Top Ten	Country Top Dogs
Value Added	-8.70%	-3.40%	-4.22%
Avg of World Index	2.15%	11.27%	7.92%
Tracking Error	22.38%	8.99%	8.34%
Information Ratio	-38.85%	-37.78%	-50.54%

Source: Research Affiliates, LLC, based on data from Worldscope and Datastream. Data from 1980–2017.

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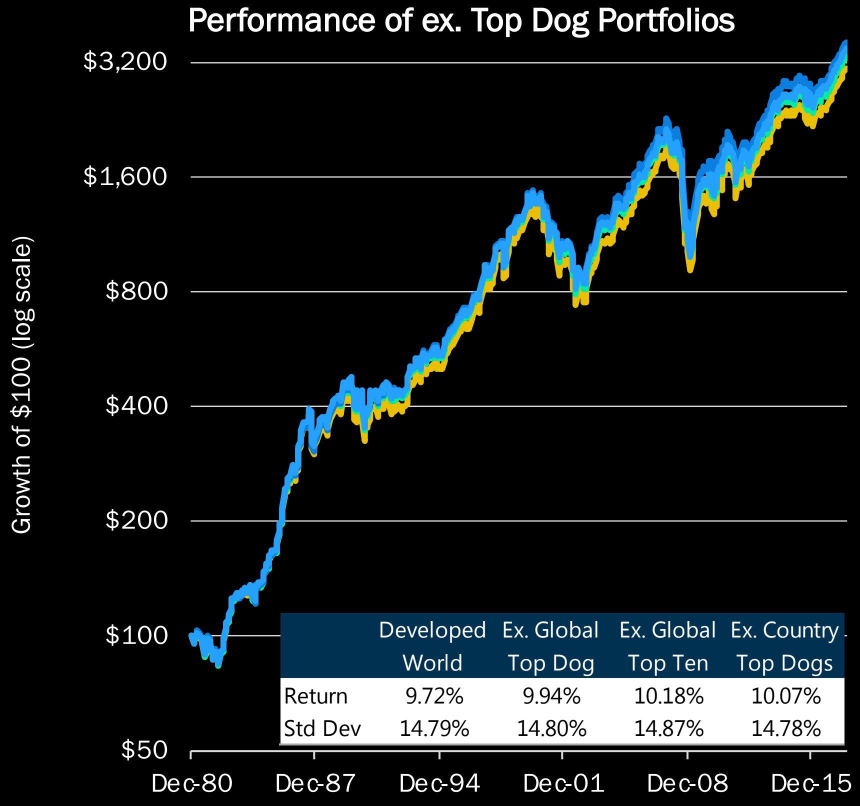
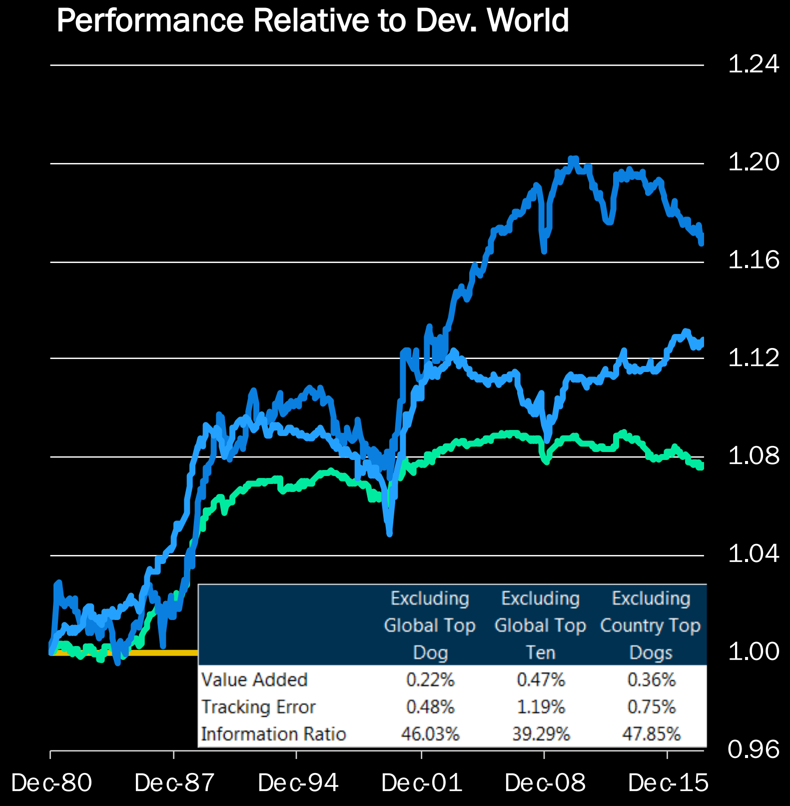
Performance Improves With Each Exclusion… But Investors Must Be Willing To Accept Higher TE



	Developed World	Ex. Global Top Dog	Ex. Global Top Ten	Ex. Country Top Dogs
Return	9.72%	9.94%	10.18%	10.07%
Std Dev	14.79%	14.80%	14.87%	14.78%



	Excluding Global Top Dog	Excluding Global Top Ten	Excluding Country Top Dogs
Value Added	0.22%	0.47%	0.36%
Tracking Error	0.48%	1.19%	0.75%
Information Ratio	46.03%	39.29%	47.85%

Developed World — World ex Global Top Dog — World ex Global Top Ten — World ex Country Top Dogs

Source: Research Affiliates, LLC, based on data from Worldscope and Datastream. Data from 1980–2017.

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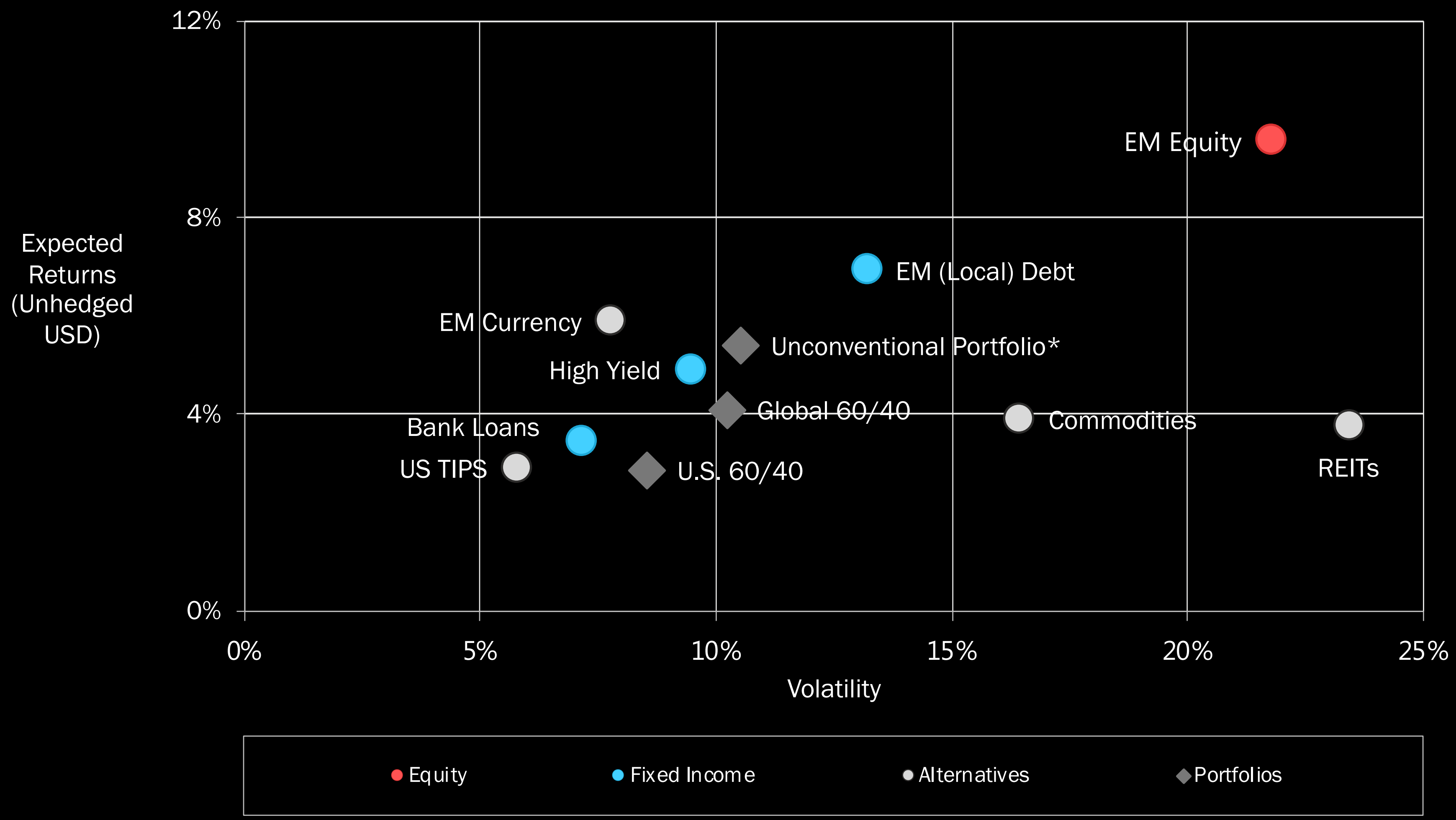
Unconventional Assets Mostly Priced to Offer Better Returns



Source: Research Affiliates, LLC, based on data from Ibbotson, Shiller, Bloomberg, FactSet, MSCI, and Barclays. Please see important information at the end of this presentation regarding simulated data. As of December 31, 2018.

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Key Takeaways

The link between starting valuations and subsequent returns is powerful

- Valuation levels are not useful for timing market tops and bottoms.
- Chasing returns can be very costly. High valuations can go higher, but not indefinitely.
- "Over-rebalance" into laggards — averaging in — as a long-term performance-enhancing strategy.

Across asset classes, higher return potential exists in international and diversifying markets

- Investors should balance return maximization goals with risk relative to peer groups or conventional benchmarks.

Within equities, the value factor offers the highest return potential today

- A dynamic multi-factor approach may also balance alpha and tracking error goals.

The largest stocks in the market are often expensive and have historically underperformed after reaching the top 10

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