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Investor Summit



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6 Meridian



What is Evidence Based Investing?

Investing based on data, processes, algorithms and models that have been shown to work; avoiding making decisions based on emotion or prediction.

Not Evidence Based:

Buy Intel because 5G is going to be huge.

Buy Amazon because Alexa told me to.

Evidence Based:

Buy Intel because it is cheap relative to its earning power. (Value)

Buy Amazon because it is profitable relative to the size of its assets. (Profitability)

These are examples only. Please do not consider these as actual recommendations or advice.



Attributes

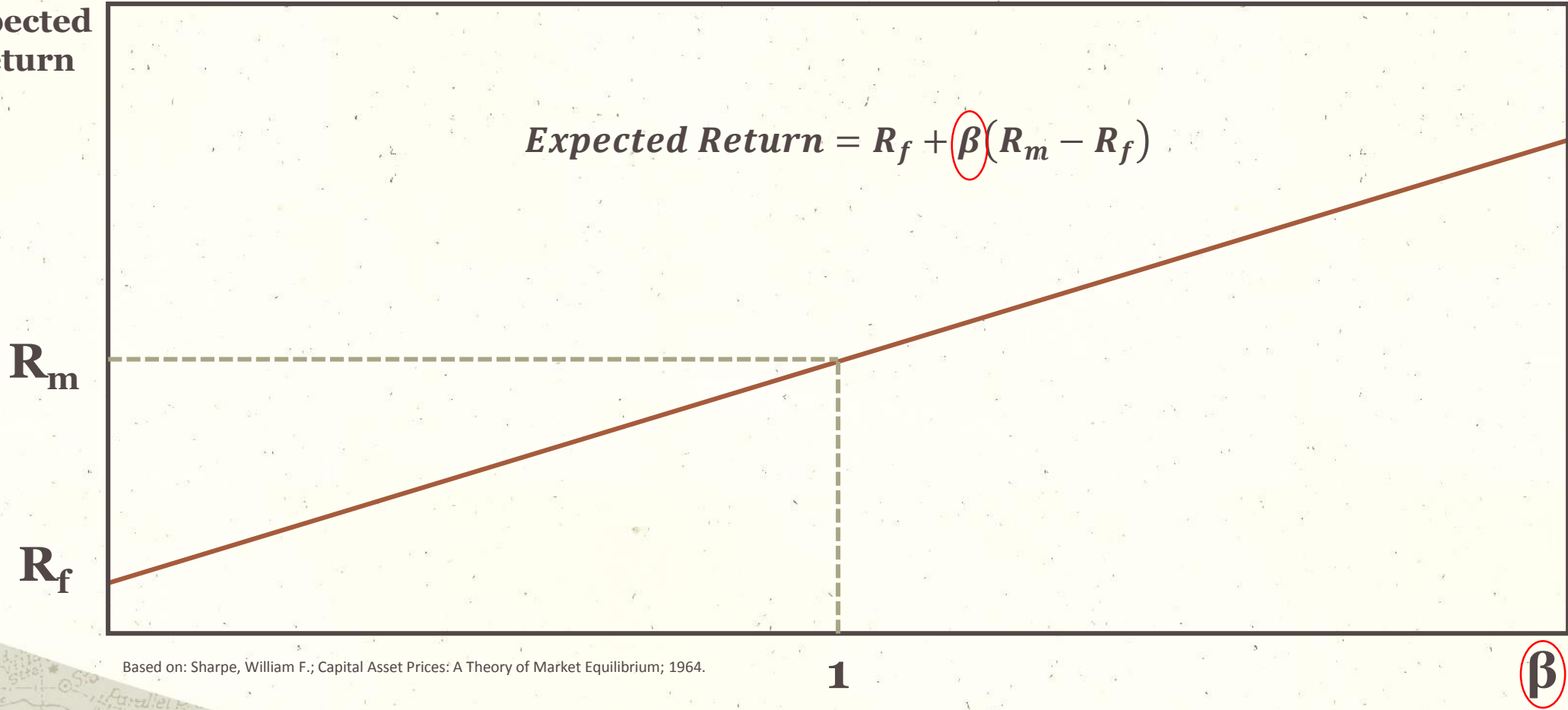
People vs. Companies – Don't mix these up!

- Kind
- Honest
- Trustworthy
- Agreeable
- Interesting
- Low Risk
- Cheap
- Positive Momentum
- High Quality
- High Yield



CAPM – The Textbook Approach

Expected
Return

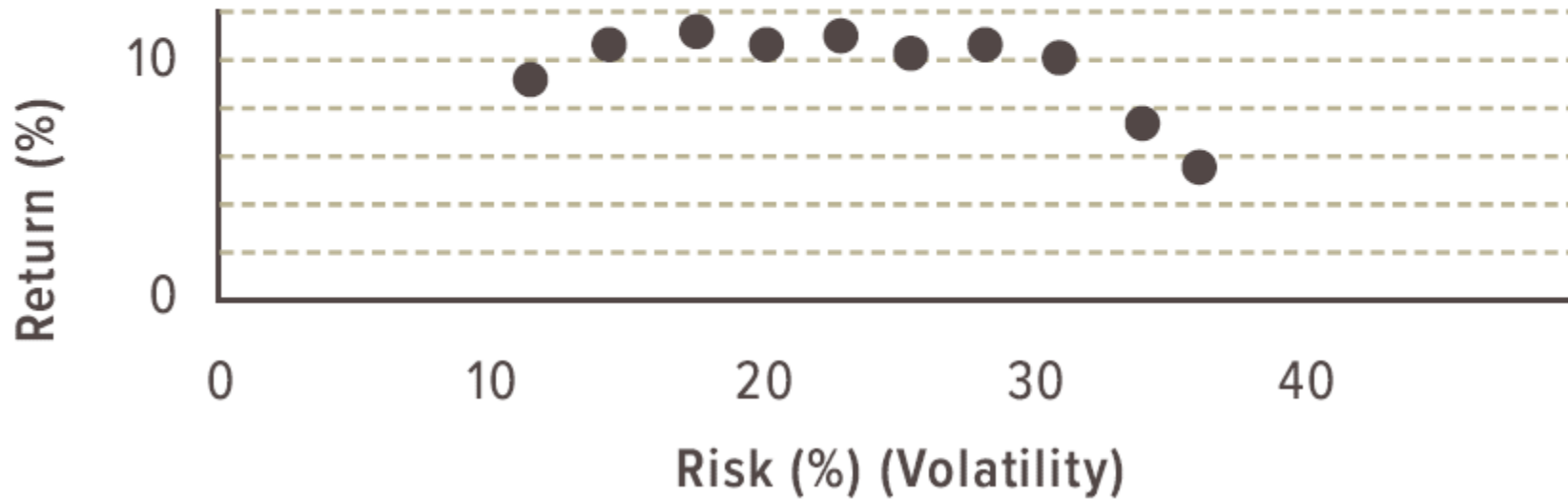


Based on: Sharpe, William F.; Capital Asset Prices: A Theory of Market Equilibrium; 1964.



Meet Real-World Observations

Risk-Return Relation 1931-2009



Source: Van Vliet, Pim. "Low-Volatility Investing: a Long-Term Perspective"; Jan 2012.



The Origin of Factors

- Fama & French 1992 paper
- 3 Factors explain 90% of market return

Beta	Equity Market Risk
Market Capitalization	Size
Book-to-Market Equity	Value

THE JOURNAL OF FINANCE • VOL. XLVII, NO. 2 • JUNE 1992

The Cross-Section of Expected Stock Returns

EUGENE F. FAMA and KENNETH R. FRENCH*

ABSTRACT

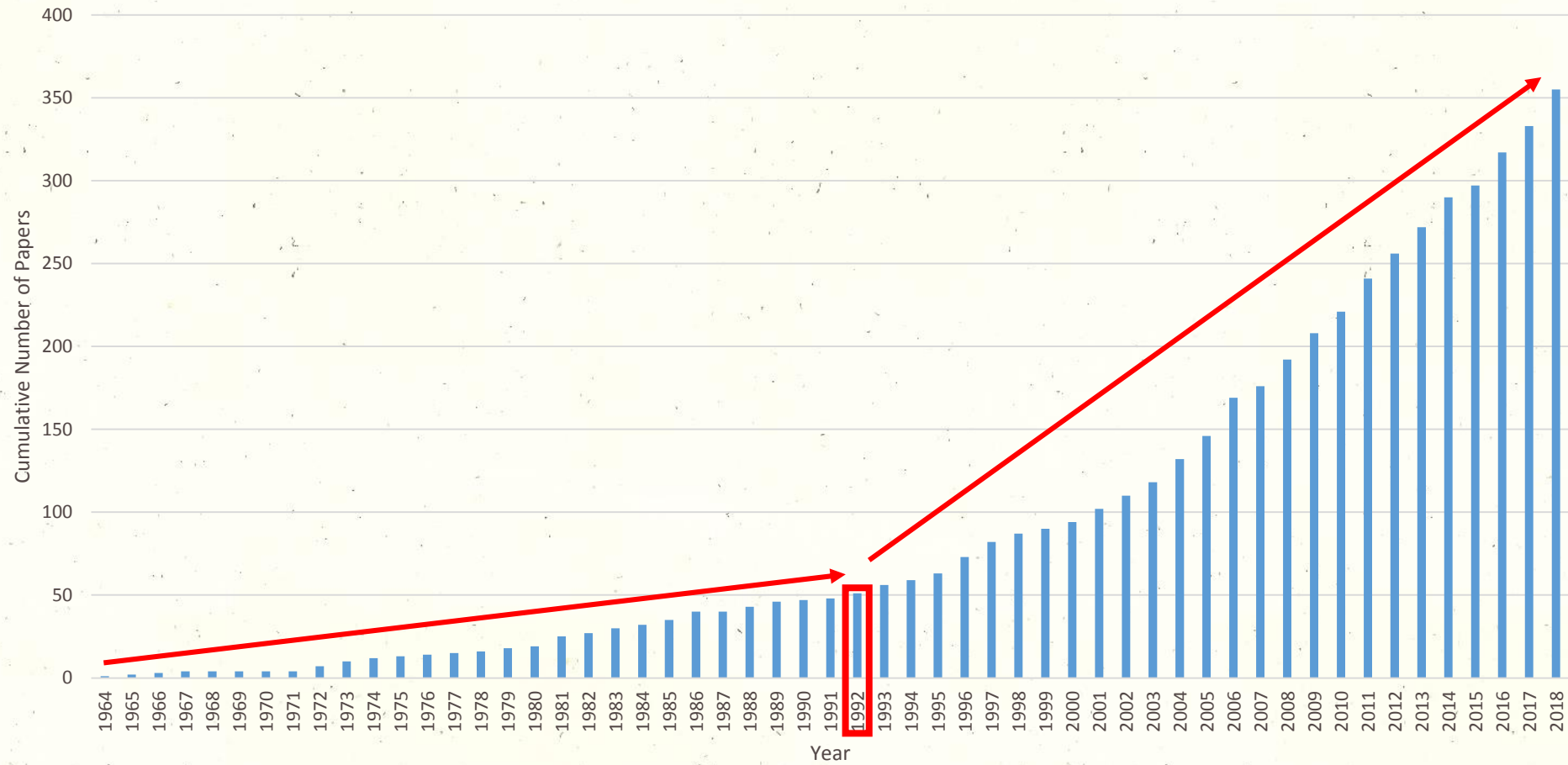
Two easily measured variables, size and book-to-market equity, combine to capture the cross-sectional variation in average stock returns associated with market β , size, leverage, book-to-market equity, and earnings-price ratios. Moreover, when the tests allow for variation in β that is unrelated to size, the relation between market β and average return is flat, even when β is the only explanatory variable.

THE ASSET-PRICING MODEL OF Sharpe (1964), Lintner (1965), and Black (1972) has long shaped the way academics and practitioners think about average returns and risk. The central prediction of the model is that the market portfolio of invested wealth is mean-variance efficient in the sense of Markowitz (1959). The efficiency of the market portfolio implies that (a) expected returns on securities are a positive linear function of their market β s (the slope in the regression of a security's return on the market's return), and (b) market β s suffice to describe the cross-section of expected returns.

There are several empirical contradictions of the Sharpe-Lintner-Black (SLB) model. The most prominent is the size effect of Banz (1981). He finds that market equity, ME (a stock's price times shares outstanding), adds to the explanation of the cross-section of average returns provided by market β s. Average returns on small (low ME) stocks are too high given their β estimates, and average returns on large stocks are too low.



Publications on Investment Factors



Source: Harvey, Campbell R. and Liu, Yan, A Census of the Factor Zoo (February 25, 2019). Available at SSRN: <https://ssrn.com/abstract=3341728> or <http://dx.doi.org/10.2139/ssrn.3341728>. Accessed 07/23/2019.



Things you don't need to read

2 The distribution of market-capitalization weights

It has been noted that the cross-sectional distribution of weights (or equivalently market capitalization) in a market-capitalization index is approximately log-normal [2, 6]. Mathematically, this implies that the distribution of the natural logarithm of weights z follows the normal distribution:

$$P(\sigma, \mu, z) = \frac{1}{\sqrt{2\pi\sigma^2}} \text{Exp} \left[-\frac{(z - \mu)^2}{2\sigma^2} \right] \quad (1)$$

where the cross-sectional mean and standard deviation of the natural logarithm of market-capitalization weights are μ and σ respectively. We can assess whether this holds for a set of market capitalizations $MCAP_i$, with weights M_i given by:

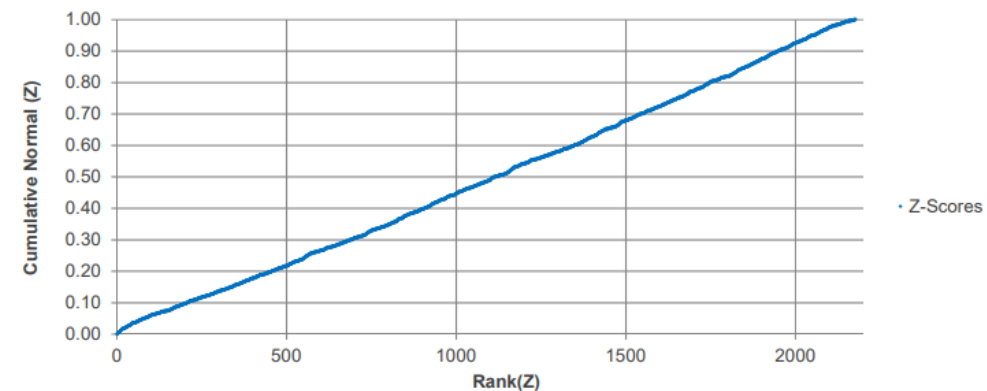
$$M_i = \frac{MCAP_i}{\sum_j MCAP_j} \quad (2)$$

by testing whether the resulting Z-Score follows a normal distribution with mean zero and standard deviation one.

$$Z_i = \frac{\text{Log}[M_i] - \mu}{\sigma} \quad (3)$$

One simple way to do this is to plot the Cumulative Normal of Z_i , against its rank order in the universe. If Z_i is normally distributed, these points should sit on a straight line through the origin. We do this for the March 2019 cross-section of the FTSE Developed Index universe in Figure 1:

Figure 1: Cumulative Normal (Z) versus Rank (Z)



Source: FTSE Russell. Data based on the FTSE Developed Index Universe from March 2019.

Source: LSE Group. The Size Exposure Spectrum and Factor Tilts. June 2019. <http://research.ftserussell.com>



What to Believe About Factor Investing

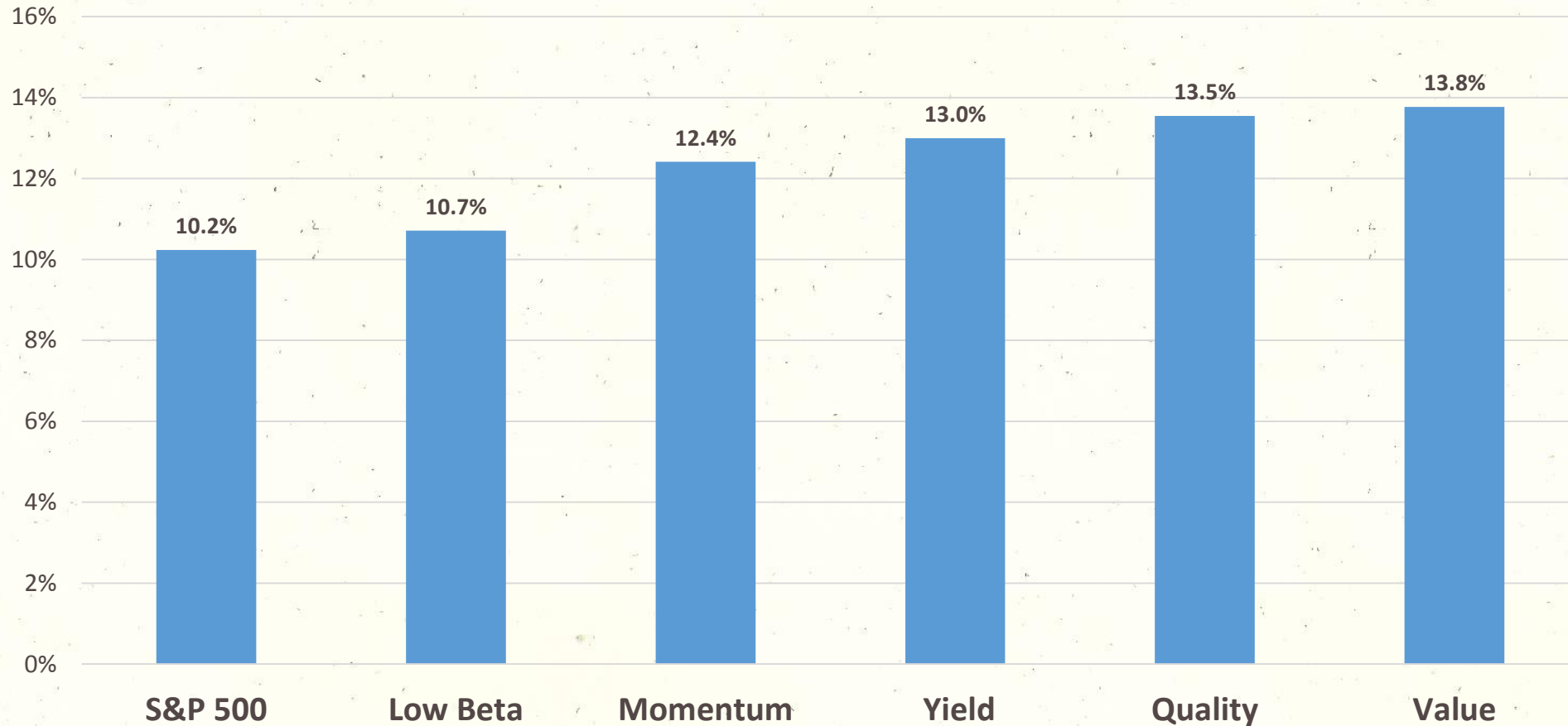
- Over 350 published papers describing over 500 factors.
- Many are a result of data mining or are dependent on unreasonable assumptions about transaction costs, taxes, execution impact, or speed.
- BUT there are several that meet criteria for holding up in the real world:
 - Implementable
 - Still work outside of the original sample
 - Large t-stats

Published "Factors"

Potentially Usable



Big 5 over nearly 30 years

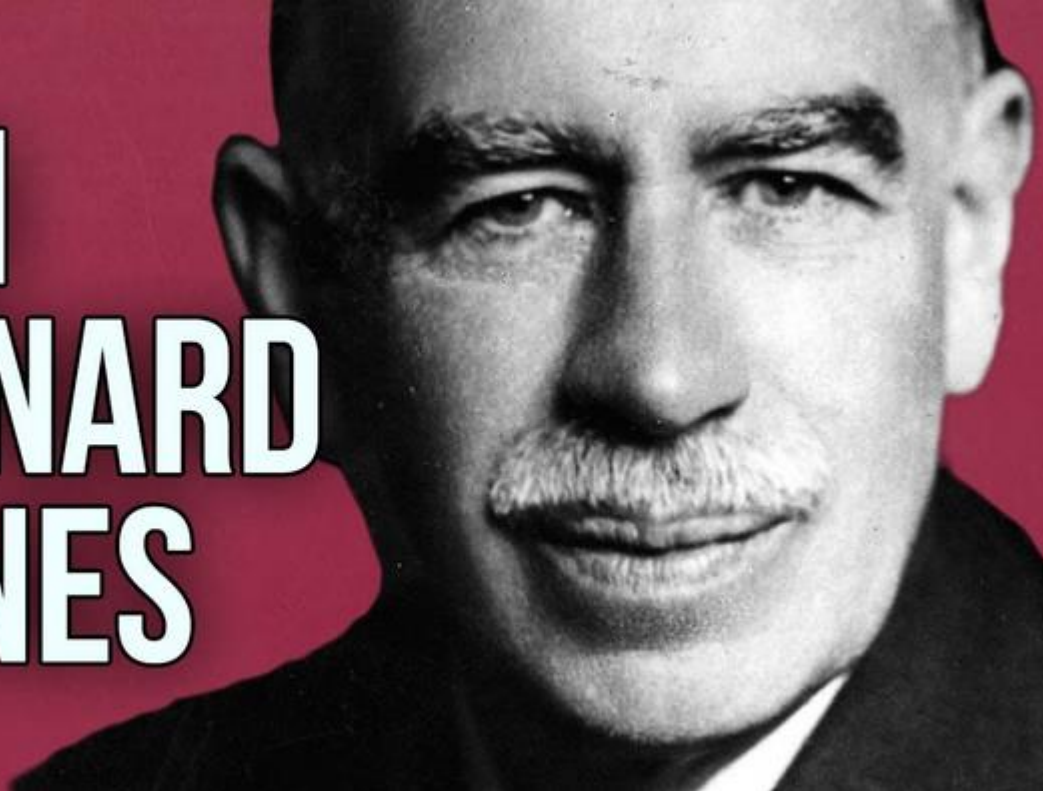


Source: FactSet; Universe: S&P 500 Constituents. Calculated using monthly returns from 12/31/1990 through 06/30/2019. Returns for each factor based on top quintile rebalanced semi-annually.



In the long run...

**JOHN
MAYNARD
KEYNES**



...we are all dead.

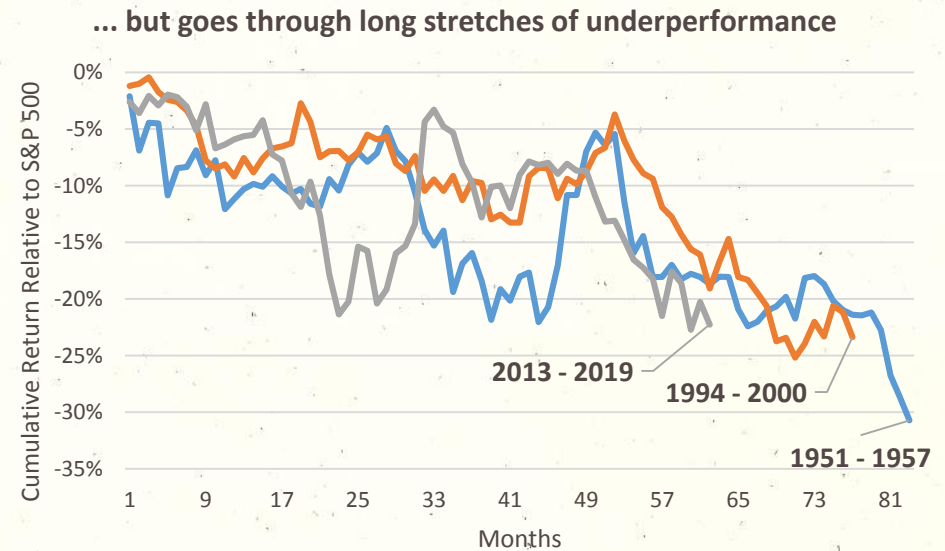
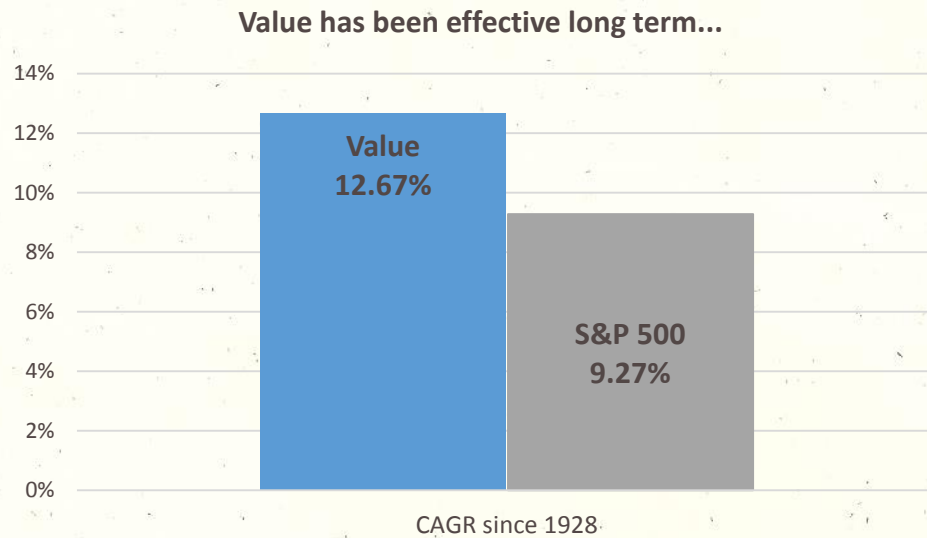
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Evidence Based Investing



Possible long periods of underperformance

- Equities
- Tax-Aware
- Returns we can live with



Source: Kenneth French; https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html ; Value taken as value-weighted monthly returns of top quintile sorted on Book Equity / Market Equity.



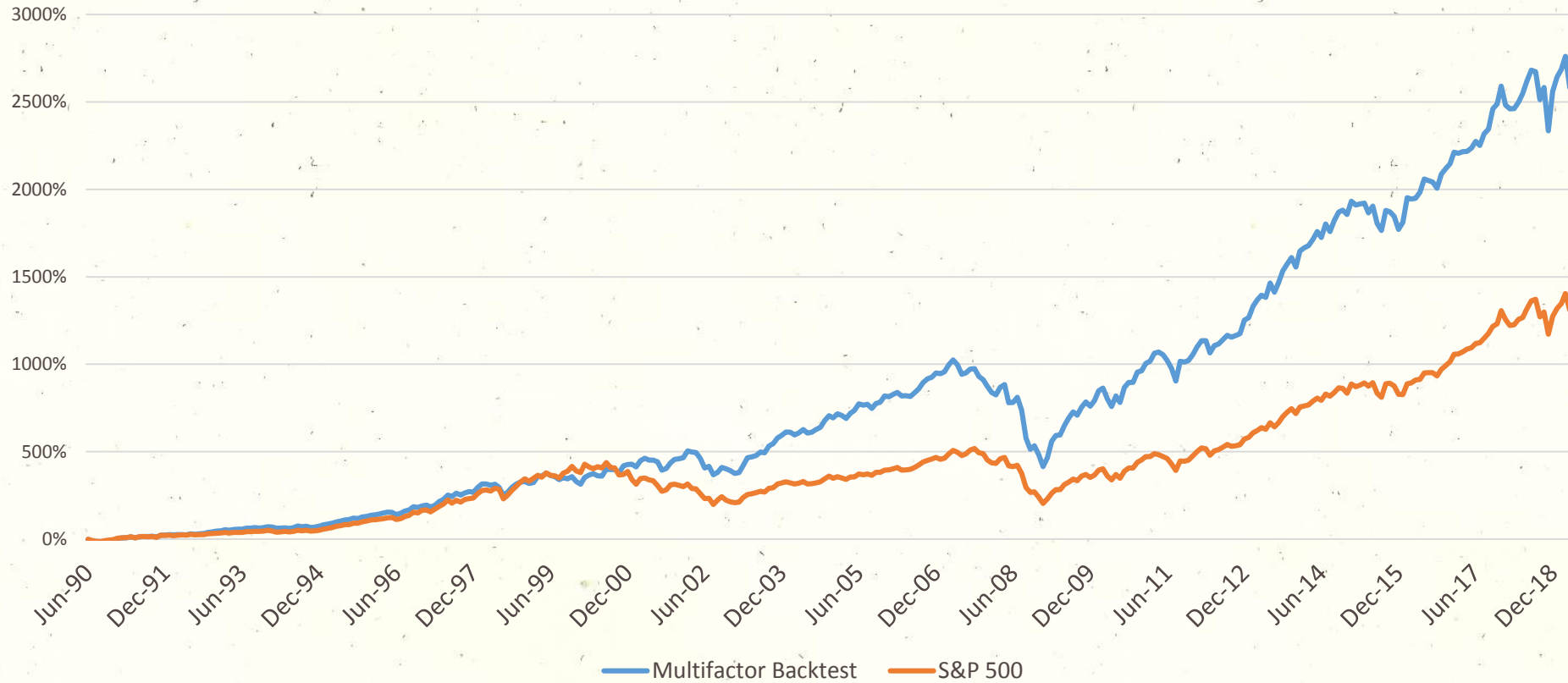
Factor Correlations

	Low Beta	Momentum	Yield	Value	Quality	S&P 500
Low Beta	1					
Momentum	0.66	1				
Yield	0.82	0.64	1			
Value	0.77	0.72	0.91	1		
Quality	0.70	0.84	0.77	0.85	1	
S&P 500	0.71	0.88	0.78	0.84	0.92	1



The Dollars and Cents of it

Cumulative Return: June 1990 - June 2019

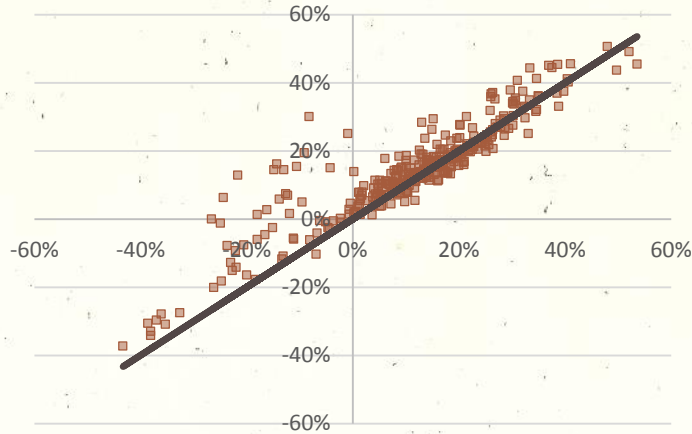


Source: FactSet; Universe: S&P 500 Constituents. Calculated using monthly returns from 06/30/1990 through 06/30/2019. Returns based on equal-weighted portfolio of the top quintile from each factor, rebalanced semi-annually.

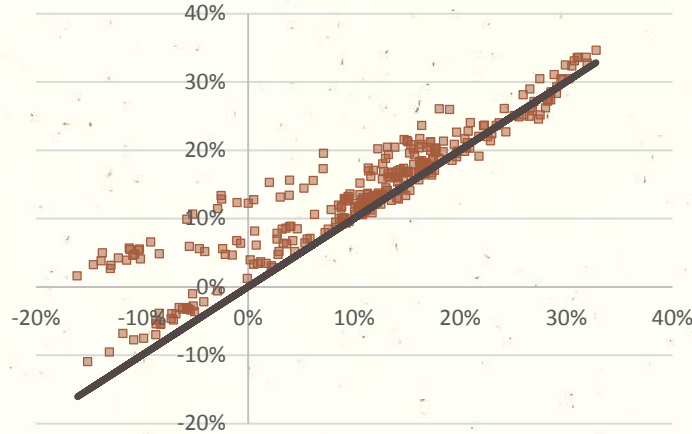


In the Long Run

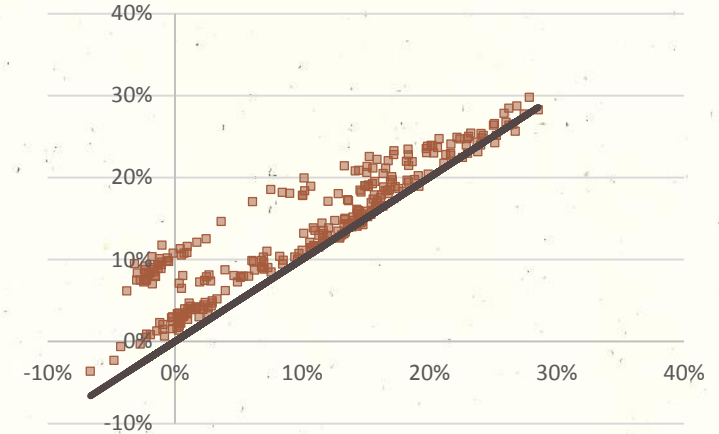
Rolling 1-yr Returns



Rolling 3-yr Returns



Rolling 5-yr Returns



	# of Occurrences	% of Occurrences
Total # of Observations	337	100%
Backtest outperforms S&P 500	223	66%
Backtest underperforms S&P 500	114	34%

	# of Occurrences	% of Occurrences
Total # of Observations	313	100%
Backtest outperforms S&P 500	270	86%
Backtest underperforms S&P 500	43	14%

	# of Occurrences	% of Occurrences
Total # of Observations	289	100%
Backtest outperforms S&P 500	268	93%
Backtest underperforms S&P 500	21	7%



Do you have a market forecast?



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Then and now

As of August 31:	2018	2019
Global Equities ¹	523	511
S&P 500	2,902	2,926
Forward P/E	17.9x	17.7x
Trailing Earnings Growth	22%	6%
Russell 2000	1,741	1,495
Oil (WTI, \$/Barrel)	\$70	\$55
Copper (\$/lb)	\$265	\$263
30 Year T-Bond	3.02%	1.96%
10 Year T-Note	2.86%	1.50%
2 Year T-Note	2.63%	1.50%
Unemployment	3.8%	3.7%
LEI Yr/Yr Growth	6.3%	1.6%
CFNAI	0.38	(0.14)
ISM Mfg PMI	60.8	49.1

Source: Bloomberg; ¹ MSCI ACWI



Disclosures

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