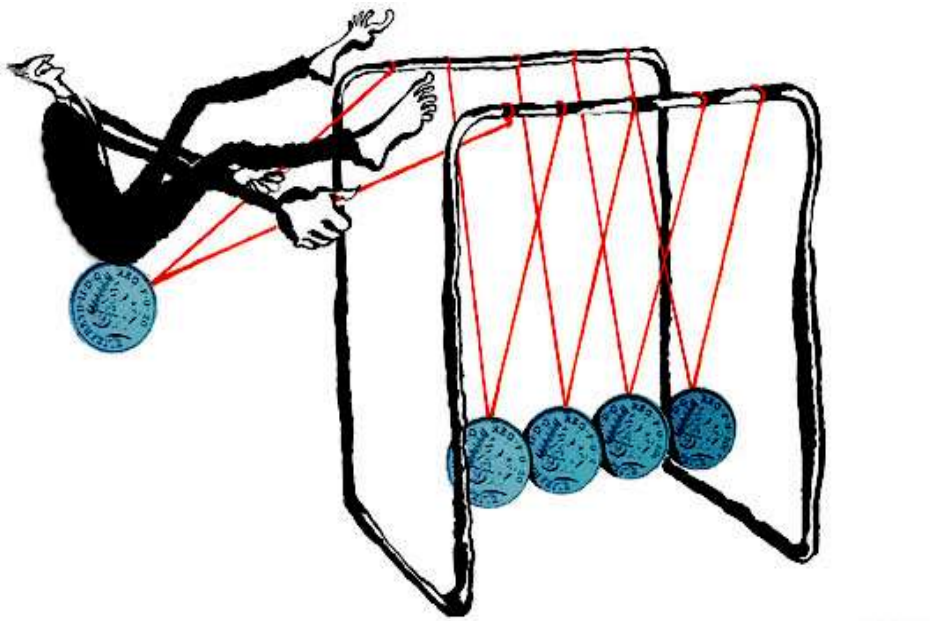
Dual Momentum Investing

Gary Antonacci

Portfolio Management Consultants

What is Momentum?



Sir Isaac Newton (1643-1727)

A body in motion tends to stay in motion

David Riccardo (1772-1823)

Cut your losses short, and let your profits run on

The Great Metropolis, 1838

Modern Momentum

Alfred Cowles III & Herbert Jones

***Econometrica,* July 1937**

NYSE stocks from 1920-1935

Efficient Market Hypothesis

Academics Begin to See the Light

Academics Begin to See the Light

Behavioral finance - 1979

Mean reversion – 1988, 1990

Value and size factors – 1992

Limits to arbitrage - 1995

Jegadeesh & Titman

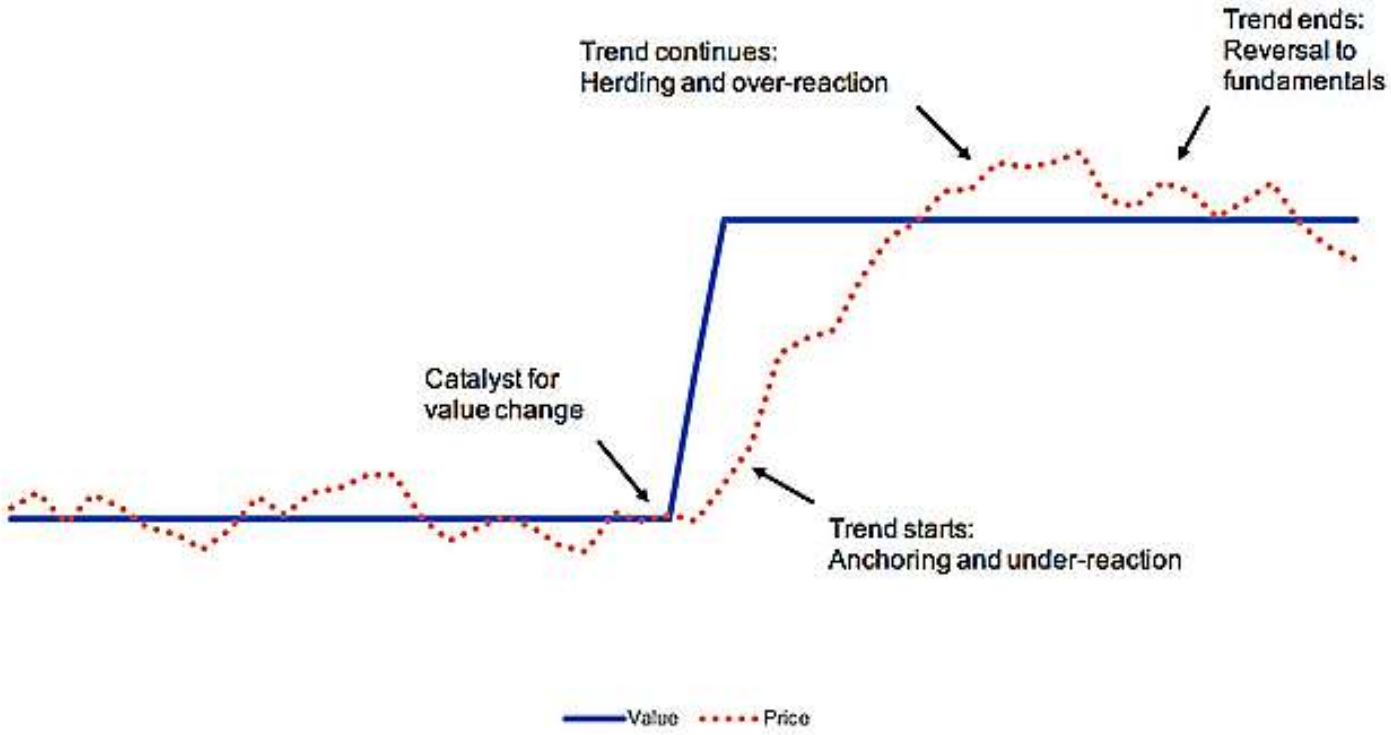
Seminal 1993 study using 1962 to 1989 US stock data

Deciles ranked by momentum

3 to 12 month momentum works!

Momentum works well with stocks, stock indices, sectors, bonds, commodities, and currencies from 1800 until now!

Underreaction and Overreaction



Initial Underreaction

Anchoring/Conservatism

Slow diffusion of information

Disposition effect

Later Overreaction

Herding

Recency bias

Overconfidence

Systematic Momentum

- **High and consistent returns**
- **Persistent over time**
- **Works with all assets**
- **Good explanations for it**

Stock momentum is persistent, pervasive, robust, and intuitive…

but is it *investable*?

Scalability

	50 Stock Portfolio	100 Stock Portfolio	150 Stock Portfolio	200 Stock Portfolio	250 Stock Portfolio	300 Stock Portfolio	500 Stock Universe
1 month hold	17.0%	14.4%	13.6%	12.7%	12.1%	11.5%	9.8%
2 month hold	16.1%	14.2%	13.2%	12.6%	12.0%	11.4%	9.8%
3 month hold	15.2%	13.8%	12.9%	12.3%	11.7%	11.2%	9.8%
4 month hold	14.5%	13.5%	12.8%	12.1%	11.6%	11.2%	9.8%
5 month hold	14.4%	13.3%	12.6%	12.0%	11.6%	11.2%	9.8%
6 month hold	13.9%	13.1%	12.4%	11.9%	11.5%	11.1%	9.8%
7 month hold	13.7%	12.8%	12.1%	11.7%	11.3%	11.0%	9.8%
8 month hold	13.4%	12.6%	11.9%	11.5%	11.2%	10.9%	9.8%
9 month hold	12.9%	12.2%	11.6%	11.2%	11.0%	10.8%	9.8%
10 month hold	12.6%	11.9%	11.4%	11.0%	10.9%	10.7%	9.8%
11 month hold	12.2%	11.6%	11.1%	10.8%	10.7%	10.5%	9.8%
12 month hold	11.8%	11.3%	10.8%	10.6%	10.5%	10.4%	9.8%

Results are hypothetical, are NOT an indicator of future results, and do NOT represent returns that any investor actually attained. Please see disclosures for additional information.

"… the abnormal returns associated with these trading strategies creates an illusion of profit opportunities when, in fact, none exists."

-Lesmond, Schill & Zhou (2002)
"The Illusionary Nature of Momentum Profits"

"… as much as $5 billion…may be invested in some momentum-based strategies before the opportunity profit vanishes."

-Korajcyzk & Sadka (2004)
"Are Momentum Profits Robust to Trading Costs?"


Not so fast!

"We conclude the main anomalies to standard asset pricing models are robust, implementable, and sizeable."

-Frazzini, Israel & Moskowitz (2014)
"Trading Costs of Asset Pricing Anomalies"

"For a one day trading horizon, momentum is the strategy with the smallest asset under management capacity of $65 billion."

-Ratcliffe, Miranda & Ang (2016)
"Capacity of Smart Beta Strategies: A Transaction Cost Perspective"

Theoretical Versus Actual Returns

Table 2. Theoretical vs. Manager Factor Returns, United States, Jan 1991–Dec 2016

Factor Returns	Return Captured by Manager (a)	Theoretical L/S Factor Returns (b)	Shortfall (–)/Excess (+) (a – b)	Correlation
Mkt (Mkt–Rfr)	4.1%	8.2%	–4.2%	0.93
Size	3.3%	2.6%	0.7%	0.96
Value	2.2%	3.6%	–1.4%	0.89
Momentum	0.4%	5.7%	–5.2%	0.91

Source: Research Affiliates, LLC, using data from CRSP, Compustat, Morningstar Direct, and data provided on the website of Kenneth French.

"Our estimates… imply that implementation costs erode almost the entirety of the return to value and momentum strategies...

We agree with Lesmond, Schill, and Zhou (2004)'s analysis that momentum profits in particular may be out of reach for the typical asset manager."

-Patton & Weller (2017)
"What You See Is Not What You Get:
The Costs of Trading Market Anomalies"

Oldest Momentum Funds

Momentum Fund Performance

Annual Returns from Inception through Dec 2018

PowerShares DWA Momentum (PDP)	8.6%
Russell 3000 Growth Index Benchmark	11.0%
Shortfall	-2.4%

AQR Large Cap Momentum (AMOMX)	13.2%
Russell 1000 Growth Index Benchmark	15.2%
Shortfall	-2.0%

Momentum Fund Performance

Exhibit 2: Summary Statistics for US Equity Momentum Funds

As of December 31, 2017

	First Full Month	Momentum Coefficient	Average Annual Turnover (%)	Average Expense Ratio	Average Momentum Premium	Annualized Return vs. Russell 3000
Fund A	Jun-03	0.18	111	0.60	0.63	−0.97
Fund B	Apr-07	0.16	70	0.67	0.23	−0.85
Fund C	Sep-07	0.18	—	0.75	−0.04	−1.58
Fund D	Aug-09	0.28	121	0.68	2.36	−1.10
Fund E	Aug-09	0.30	104	0.51	2.36	−0.74
Fund F	Jun-10	0.26	211	0.90	3.01	−2.35
Fund G	Feb-12	0.29	100	0.66	3.65	−1.33
Fund H	Feb-12	0.23	99	0.45	3.65	−0.33
Fund I	Aug-12	0.32	141	0.60	1.47	−1.63
Fund J	Nov-12	0.17	60	0.24	2.19	−0.15
Fund K	May-13	0.24	107	0.15	2.63	3.56

Source: "Have Investors Benefited from Momentum Strategies?" *Dimensional Perspectives, 2018*

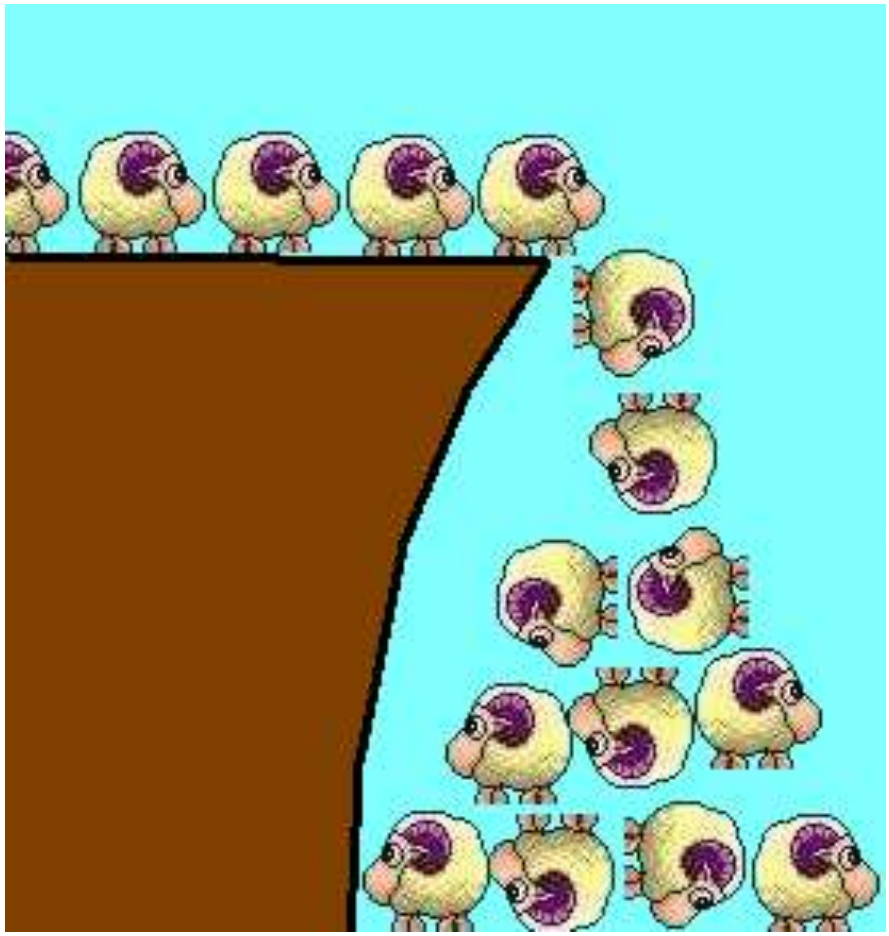
"…momentum profits have slowly disappeared since the early 1990s."

Hwang & Rubesam (2007)
"The Disappearance of Momentum"

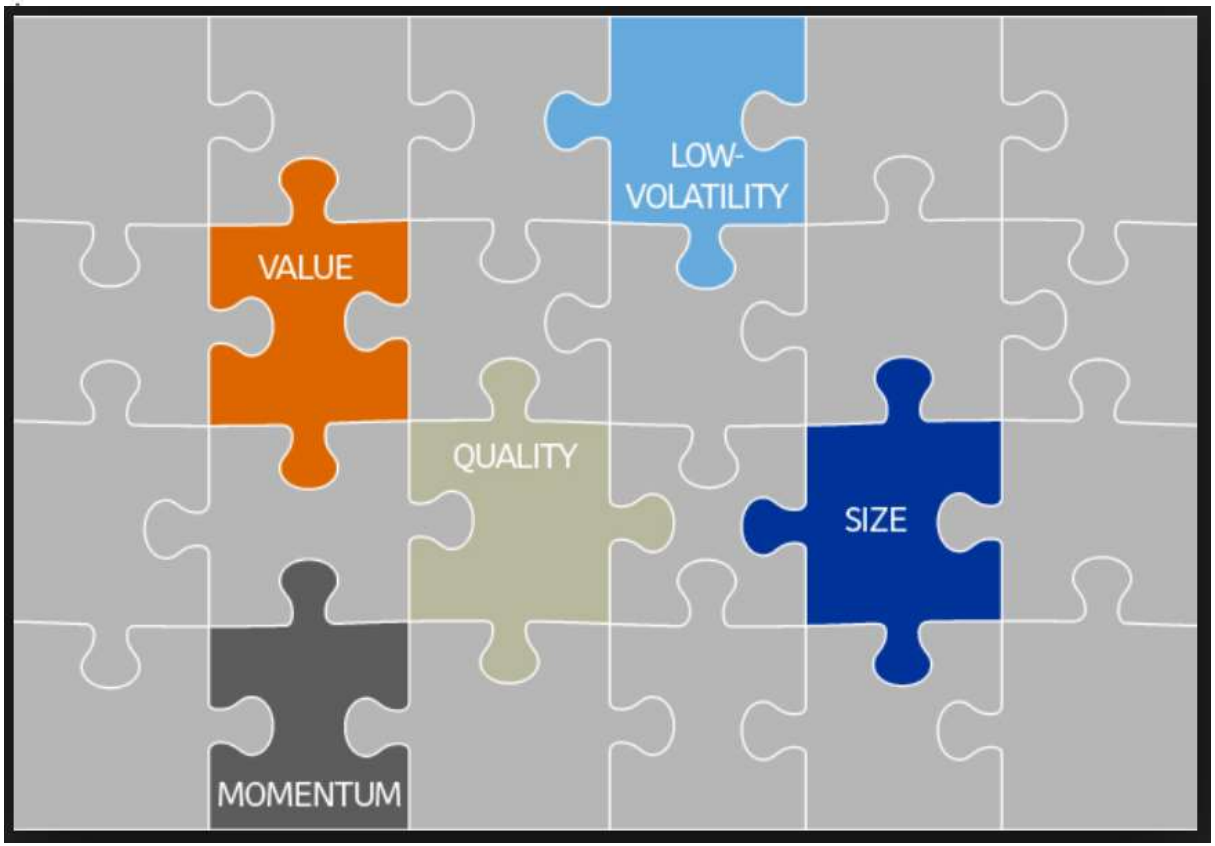
"…momentum profits have become insignificant since the late 1990s."

-Bhattacharya, Li & Sonear (2016)
"Has Momentum Lost Its Momentum"

Want To Do Stock Momentum?



Other Factors?

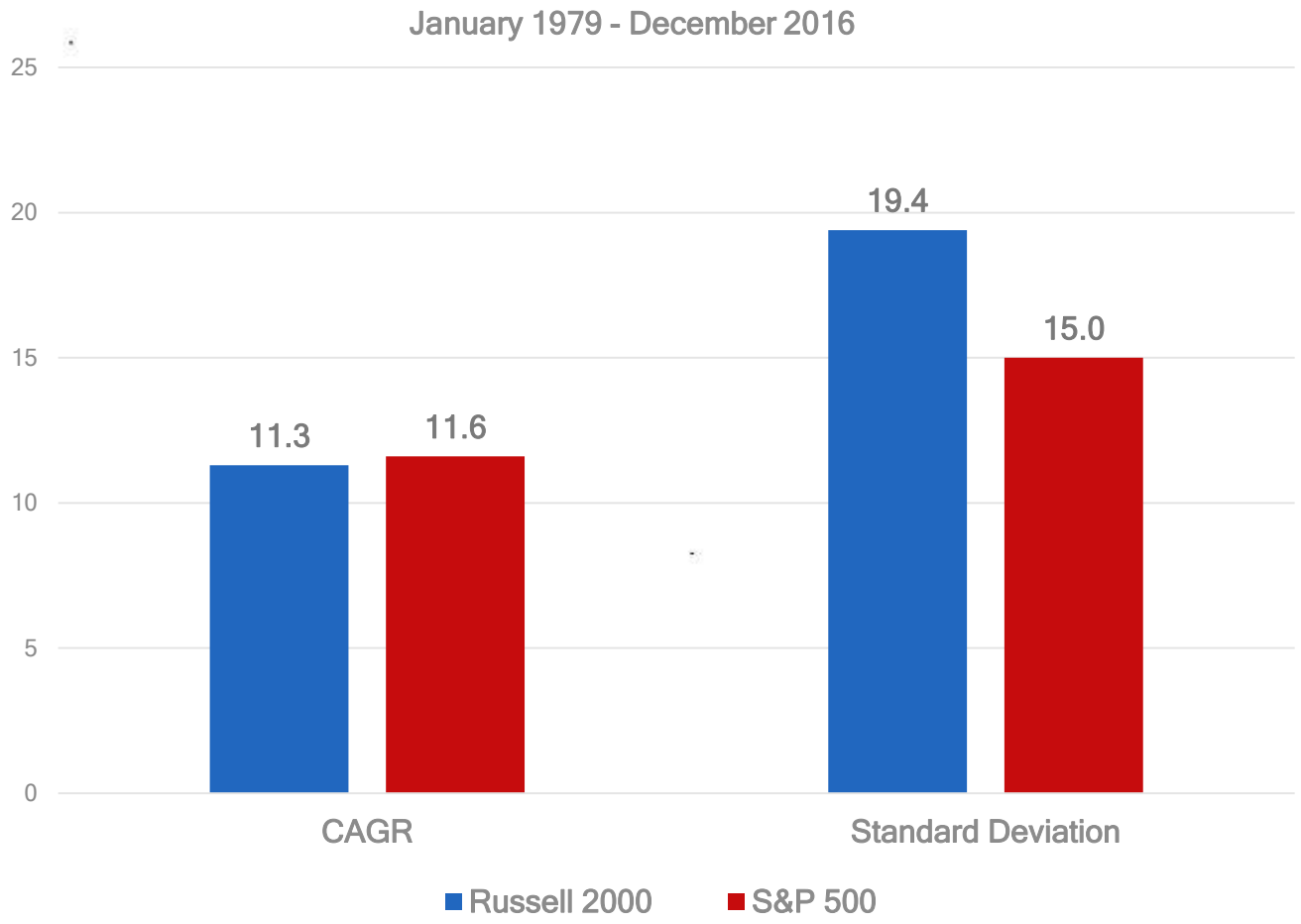


Factor Investing Popularity


Small-Cap
Stocks

Does Size Matter?

Small Cap vs Large Cap



Small Cap vs Large Cap

Table 2. Average Returns on Long-Only Portfolios

Nation	Small Stocks			Large Stocks			Difference		
	Average Return	Average Volatility	Sharpe Ratio	Average Return	Average Volatility	Sharpe Ratio	Average Return	Average Volatility	Sharpe Ratio
Post Publication Period, 1982–2014									
Australia	10.8%	24.9%	0.26	12.4%	23.4%	0.35	−1.6%	1.5%	−0.08
Austria	13.3%	21.5%	0.42	10.2%	24.4%	0.24	3.1%	−2.9%	0.18
Belgium	15.8%	18.7%	0.62	12.6%	20.3%	0.41	3.2%	−1.6%	0.21
Canada	11.2%	21.4%	0.33	11.1%	18.7%	0.37	0.1%	2.7%	−0.04
Denmark	12.1%	20.1%	0.39	12.6%	19.4%	0.43	−0.4%	0.7%	−0.04
France	15.7%	20.5%	0.56	12.5%	21.0%	0.39	3.2%	−0.5%	0.17
Germany	11.0%	18.4%	0.36	11.0%	21.4%	0.31	0.0%	−3.0%	0.05
Hong kong	10.6%	31.9%	0.20	12.5%	29.2%	0.28	−1.9%	2.7%	−0.08
Ireland	18.3%	23.6%	0.60	12.6%	23.8%	0.35	5.7%	−0.2%	0.24
Italy	8.1%	23.6%	0.16	8.7%	24.9%	0.18	−0.6%	−1.3%	−0.02
Japan	9.3%	23.8%	0.21	6.4%	21.8%	0.10	2.9%	2.0%	0.11
Netherlands	14.7%	20.0%	0.52	13.1%	19.0%	0.46	1.6%	1.0%	0.06
Norway	13.6%	24.9%	0.38	13.3%	25.9%	0.35	0.2%	−1.0%	0.02
Singapore	10.1%	31.7%	0.19	9.6%	24.3%	0.22	0.5%	7.3%	−0.03
Sweden	14.8%	24.7%	0.42	13.8%	24.9%	0.39	0.9%	−0.2%	0.04
Switzerland	11.0%	17.9%	0.38	13.5%	17.3%	0.53	−2.5%	0.6%	−0.16
United Kingdom	11.8%	19.8%	0.38	11.5%	17.7%	0.41	0.3%	2.1%	−0.03
United States	13.3%	19.1%	0.48	12.0%	15.2%	0.51	1.3%	3.9%	−0.04
Arithmetic average:	12.5%	22.6%	0.38	11.6%	21.8%	0.35	0.9%	0.8%	0.03
Full Sample, United States, 1926–2014									
United States	11.8%	27.2%	0.31	9.8%	18.4%	0.34	2.1%	8.7%	−0.03

Note: Within each country we split stocks into capitalization-weighted large and small portfolios. Following Fama and French (2012), the large stock portfolio comprises 90% of the national market, and the small stock portfolio, 10%. The returns shown are the geometric average returns of the small and large stock portfolios. The difference columns represent the simple differences of the geometric average return, volatility, and Sharpe ratios.

Source: Research Affiliates, using CRSP/Compustat and Worldscope/Datastream data.

Small Cap Premium

- Upward bias due to errors on delisted stocks
- Transaction costs offset much of the premium
- Anomaly no longer exists inside the U.S.
- Anomaly never existed outside the U.S.

For documentation, see “Factor Zoo or Unicorn Ranch?”,
http://www.dualmomentum.net/2017/02/factor-zoo-or-unicorn-ranch.html

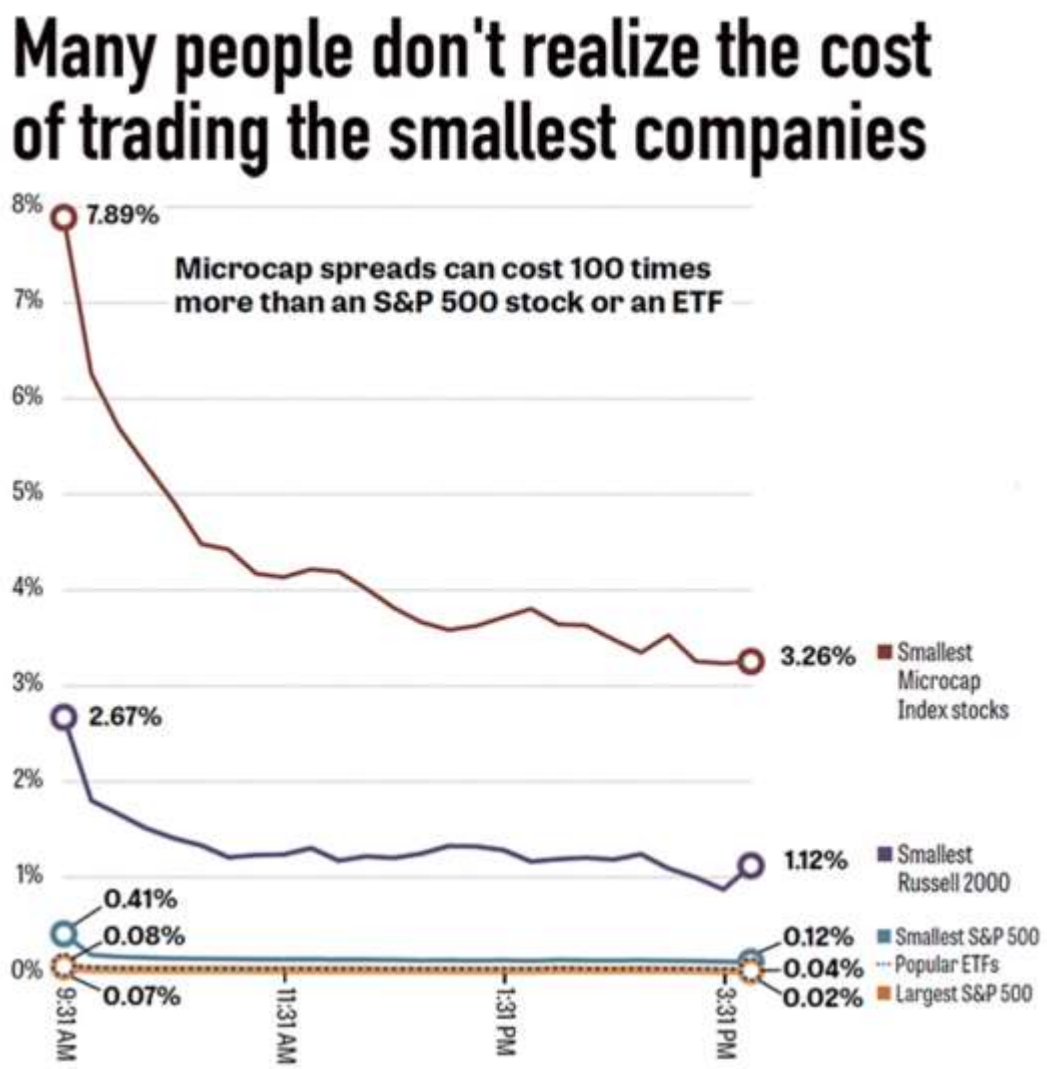

VALUE

"The value premium decreases with firm size and is weak among the largest stocks…"

-Israel & Moskowitz (2012)
"The Role of Shorting, Firm Size, and Time on Market Anomalies"

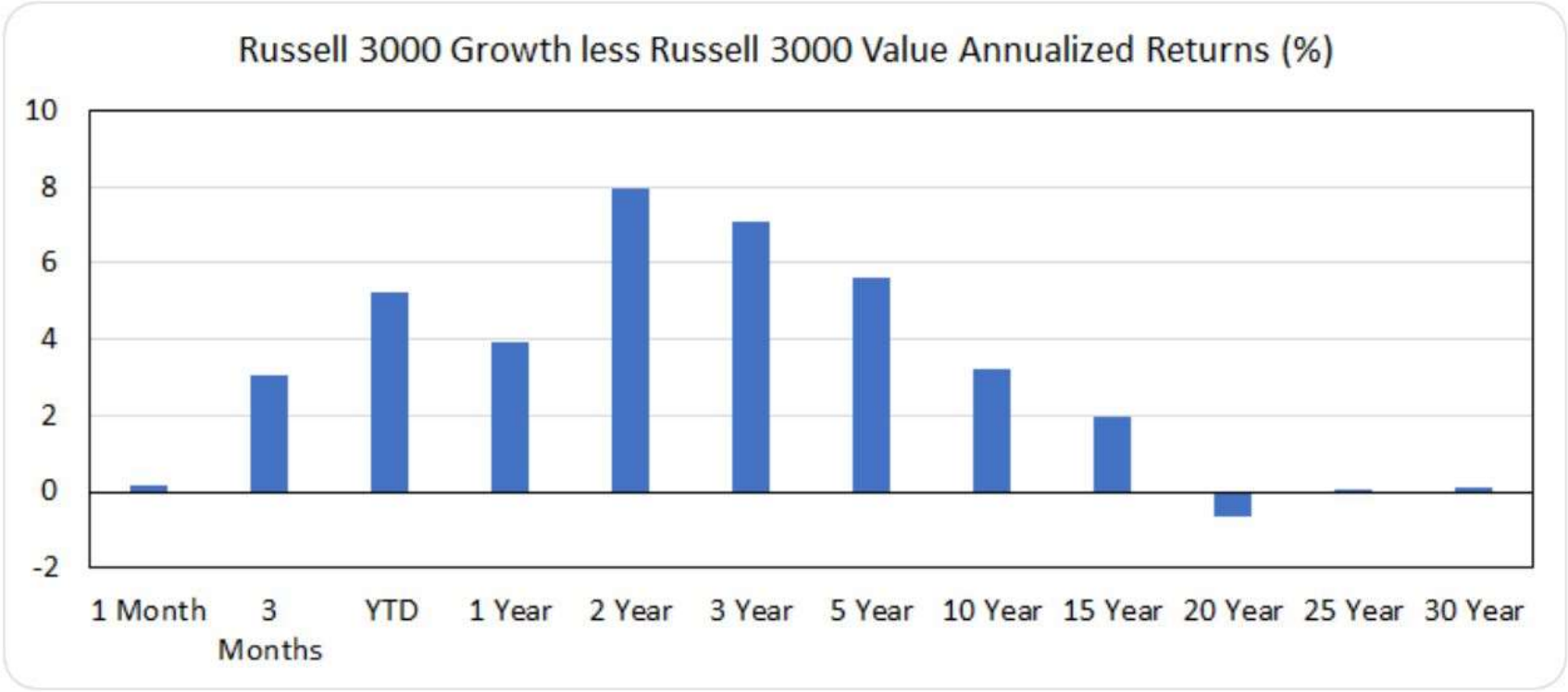
"The market-adjusted return to value within large cap is not reliably different from zero."

-Asness, Frazzini, Israel & Moskowitz (2015)
"Fact, Fiction & Value Investing"



Source: Livingston, “You’re Paying Too Much for Small Stocks,” *MarketWatch*, Jan 2019

Value Versus Growth



Value Versus Growth

	Large-Cap Stock Funds				Small-Cap Stock Funds			
Year	Growth	Neutral	Value	Value-Growth	Growth	Neutral	Value	Value-Growth
1965	19.36	15.68	18.77	-0.58	28.91	30.45	35.10	6.19
1966	-5.88	-5.37	-14.03	-8.15	1.27	-1.51	-3.01	-4.28
1967	25.80	24.38	13.64	-12.16	53.42	44.89	57.30	3.87
1968	8.72	12.21	22.04	13.32	17.21	12.82	9.37	-7.84
1969	-0.49	-8.11	-12.45	-11.97	0.81	-16.27	-16.30	-17.11
1970	-13.34	-0.56	7.86	21.20	-12.46	-8.46	-5.31	7.16
1971	22.95	16.67	11.17	-11.78	25.48	19.51	16.45	-9.04
1972	16.14	14.05	11.87	-4.28	13.48	10.84	9.67	-3.81
1973	-20.77	-19.92	-15.82	4.95	-30.74	-28.42	-27.31	3.43
1974	-32.36	-26.81	-21.13	11.23	-33.66	-30.45	-20.43	13.22
1975	27.04	30.91	40.63	13.59	43.20	45.93	44.74	1.54
1976	15.10	21.12	28.36	13.26	30.03	29.51	43.00	12.96
1977	-4.59	-5.05	-1.77	2.82	4.75	10.80	11.72	6.97
1978	14.76	10.35	6.52	-8.24	19.06	15.29	16.96	-2.10
1979	23.38	24.07	21.74	-1.64	38.31	38.40	29.83	-8.48
1980	42.30	31.99	26.77	-15.52	43.96	40.33	29.93	-14.03
1981	-9.12	-4.57	-0.68	8.44	-5.57	0.06	0.51	6.08
1982	21.70	20.05	24.42	2.72	26.65	27.16	26.79	0.14
1983	15.25	19.88	20.64	5.39	17.53	23.39	23.83	6.30
1984	-5.78	2.94	4.99	10.76	-10.34	-4.98	0.88	11.22
1985	29.39	28.71	29.66	0.26	30.70	29.89	27.40	-3.30
1986	17.14	15.25	18.15	1.02	11.94	11.74	19.15	7.21
1987	5.53	4.41	4.35	-1.18	1.26	-0.60	4.79	3.53
1988	8.27	12.10	16.80	8.53	13.10	18.64	11.74	-1.36
1989	29.17	29.66	26.83	-2.34	28.32	24.61	28.20	-0.12
1990	1.59	-3.66	-4.91	-6.50	-6.40	-10.18	-13.21	-6.81
1991	47.62	31.14	20.21	-27.41	57.77	36.78	21.69	-36.09
1992	0.89	7.77	-2.82	-3.71	6.18	9.82	11.20	5.02
1993	5.81	14.89	22.28	16.47	14.54	13.39	40.58	26.04
1994	1.71	-2.49	-2.31	-4.02	-1.72	-2.72	-1.10	0.62
1995	34.41	31.17	30.80	-3.61	37.39	26.91	24.91	-12.48
1996	19.49	20.69	18.98	-0.51	16.06	18.00	18.89	2.83
1997	25.48	29.05	27.82	2.34	13.53	21.99	18.21	4.68
1998	33.91	21.40	13.15	-20.76	16.29	6.94	-5.68	-21.97
1999	37.21	15.84	3.21	-33.99	66.17	30.70	8.80	-57.37
2000	-16.42	-2.84	9.63	26.04	-12.95	1.74	14.23	27.18
2001	-23.27	-10.67	-3.03	20.24	-26.31	-9.32	8.31	34.63
Yr. Ave.	11.30	11.25	11.41	0.11	14.52	13.18	14.10	-0.42
t-stat				(0.05)				(-0.16)

Source: Loughran and Houge (2006), “Do Investors Capture the Value Premium?”

"Our estimates… imply that implementation costs erode almost the entirety of the return to *value* and momentum strategies...

-Patton & Weller (2017)
"What You See Is Not What You Get:
The Costs of Trading Market Anomalies"

Value Premium

- Over invested
- High tracking error
- Mostly with small/micro caps
- In *practice,* has underperformed

For documentation, see “Factor Zoo or Unicorn Ranch?”,
http://www.dualmomentum.net/2017/02/factor-zoo-or-unicorn-ranch.html

Where’s the Factor Alpha?

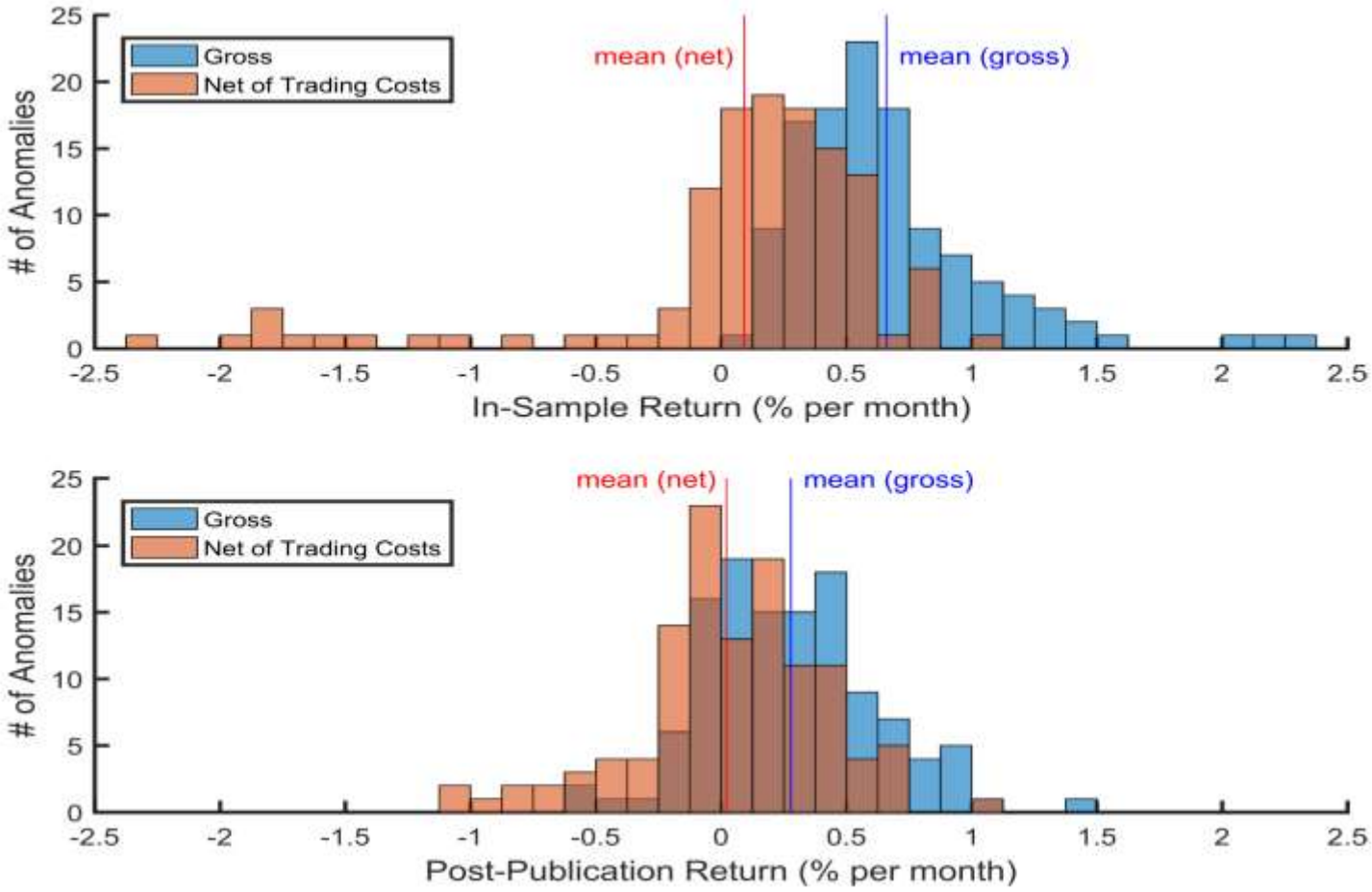
Where's the Factor Alpha?

Exhibit 6: Aggregate factor exposures of ETFs

	alpha	market	SMB	HML	MOM	LV-HV
Panel A: All ETFs						
AuM weighted aggregate exposure	0.02%	0.97	0.03	-0.03	0.01	-0.00
t-statistic	0.48	64.31	1.40	-1.30	0.97	-0.29
% funds sign. positive exposure	4.1%	91.1%	32.0%	21.4%	13.0%	19.5%
% funds sign. negative exposure	6.7%	8.2%	18.1%	17.3%	10.6%	25.8%
Panel B: Smart-beta ETFs						
AuM weighted aggregate exposure	-0.03%	0.97	0.25	0.08	0.03	0.06
t-statistic	-0.44	43.42	7.89	2.29	1.28	2.42
Panel C: Conventional ETFs						
AuM weighted aggregate exposure	0.04%	0.97	-0.06	-0.08	0.01	-0.03
t-statistic	0.90	62.04	-2.62	-3.07	0.57	-1.78

Source: Blitz (2017), "Are Exchange Traded Funds Harvesting Factor Premiums?"

Where's the Factor Alpha?



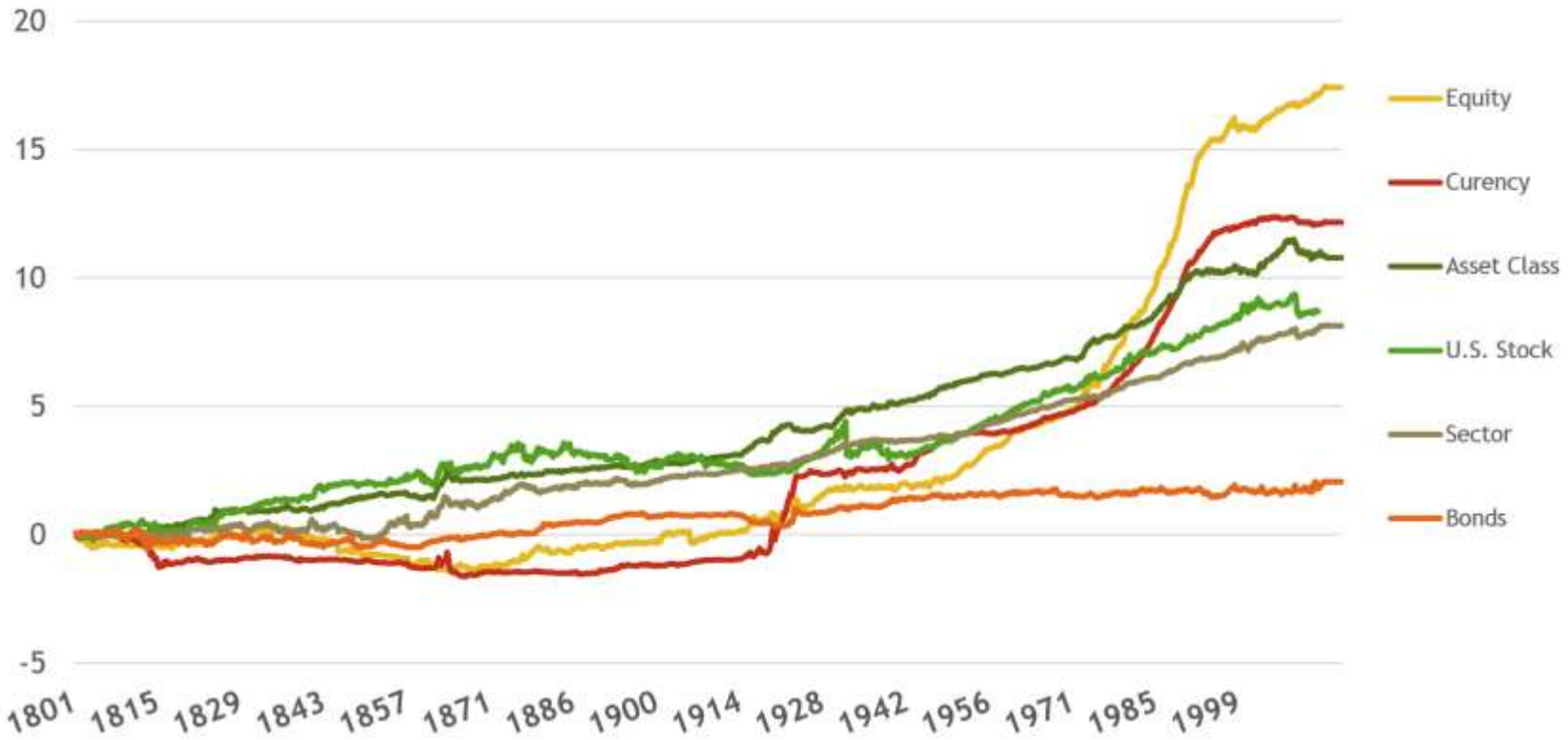
Source: Chen and Velikov (2017), "Accounting for the Anomaly Zoo: A Trading Cost Perspective"

Factor Investing

What To Do?

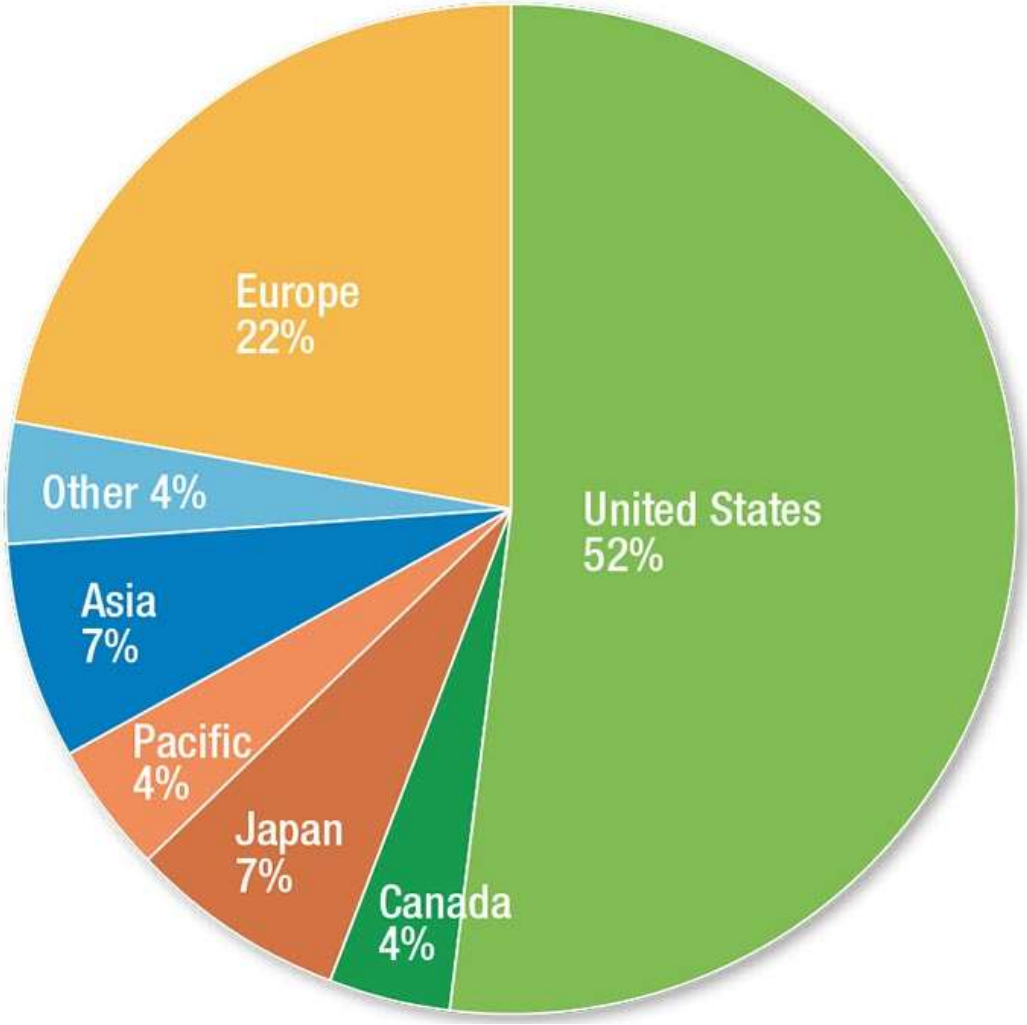

LOST
CONFUSED
UNSURE
UNCLEAR
PERPLEXED
DISORIENTED
BEWILDERED

Momentum by Asset Class



Source: Geczy and Samonov (2015), “215 Years of Global Multi-Asset Momentum: 1800-2014”

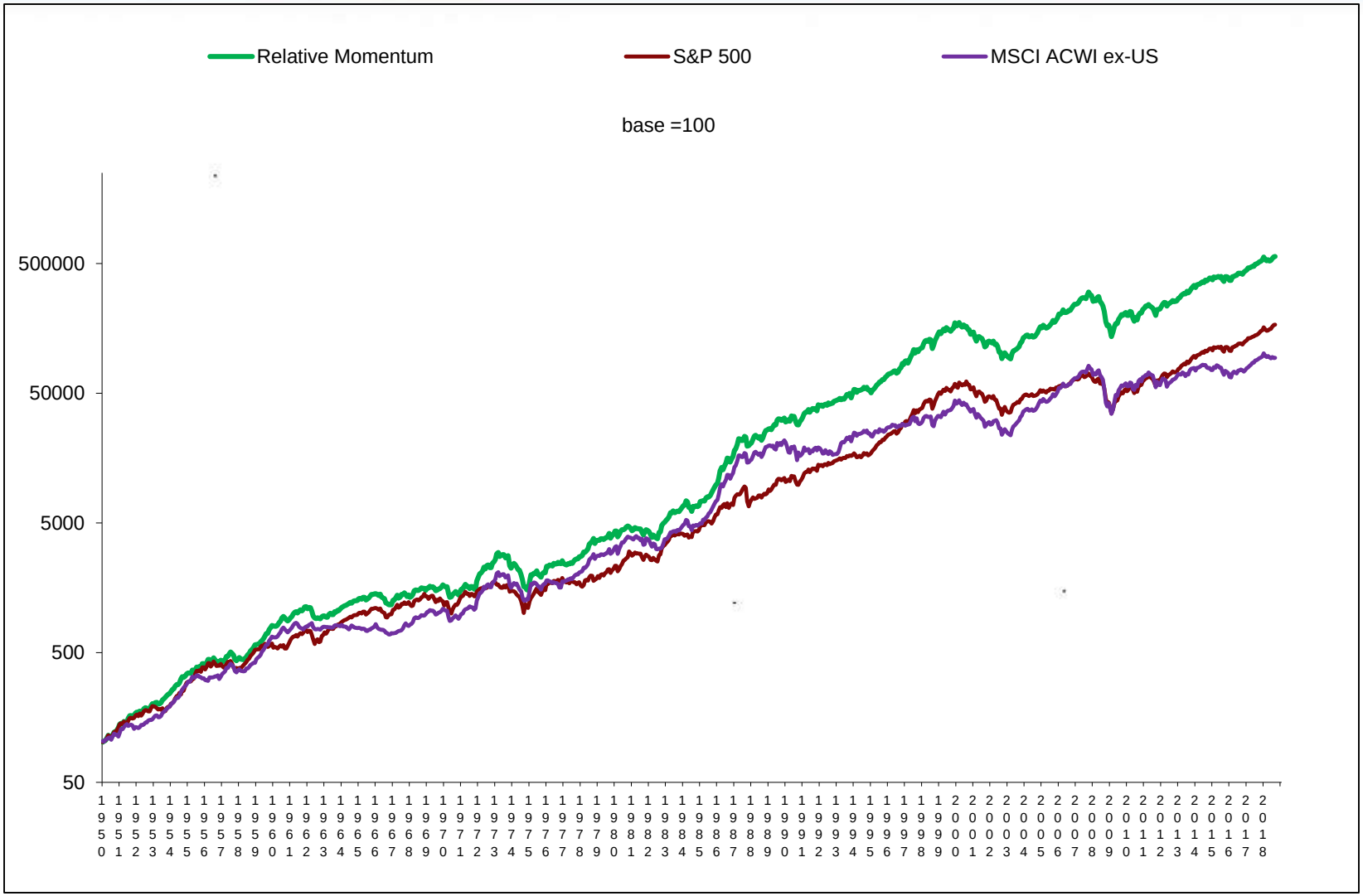
World Stock Market Capitalization



Relative Momentum

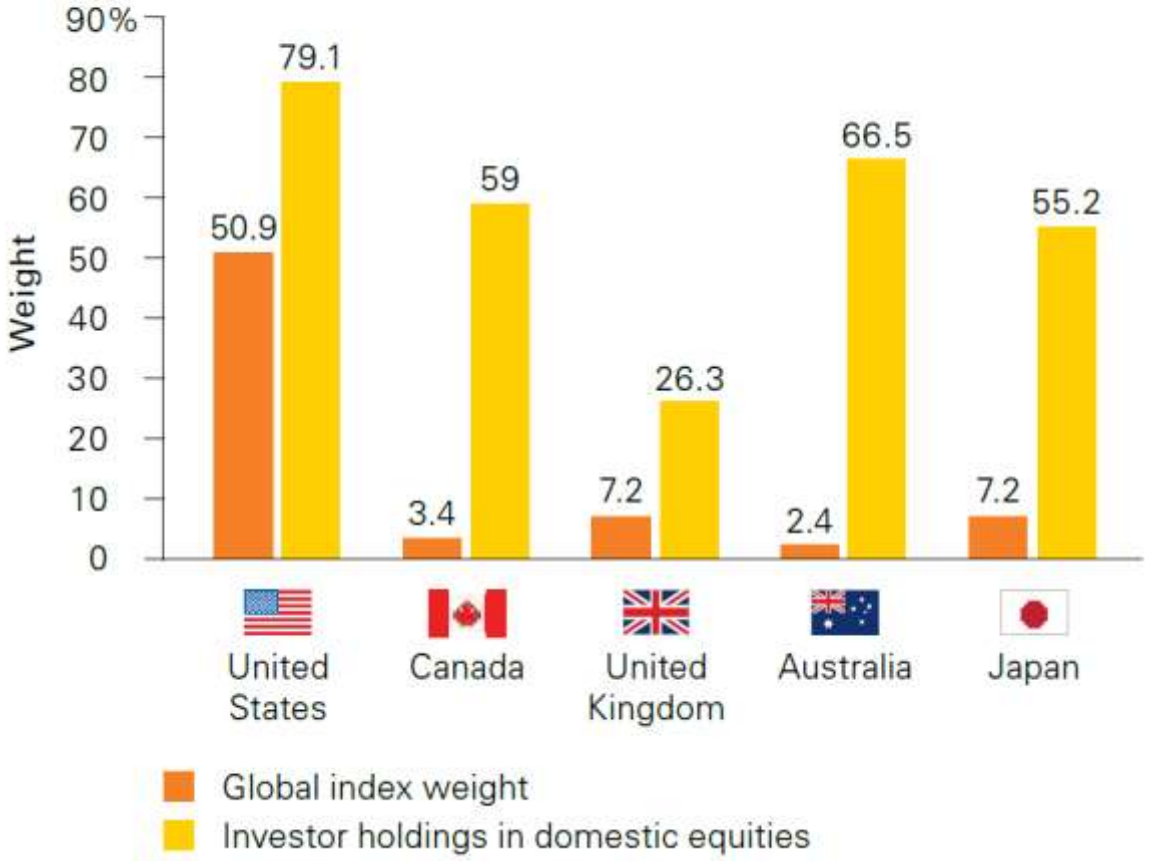
Switch between the S&P 500 and the MSCI All Country World Index (ACWI) ex-US

Monthly rebalancing, 12-month look back



Results are hypothetical, are NOT an indicator of future results, and do NOT represent returns that any investor actually attained.
Please see disclosures for additional information.

Figure 5. Equity market home bias by country



Sources: Vanguard, based on data from the IMF's Coordinated Portfolio Investment Survey (2014), Barclays, Thomson Reuters Datastream, and FactSet.

Vertical Diversification

S&P 500 **55% always**

MSCI ACWI ex-US **45% always**

Horizontal Diversification

S&P 500 → **MSCI ACWI ex-US**

55% of the time **45% of the time**

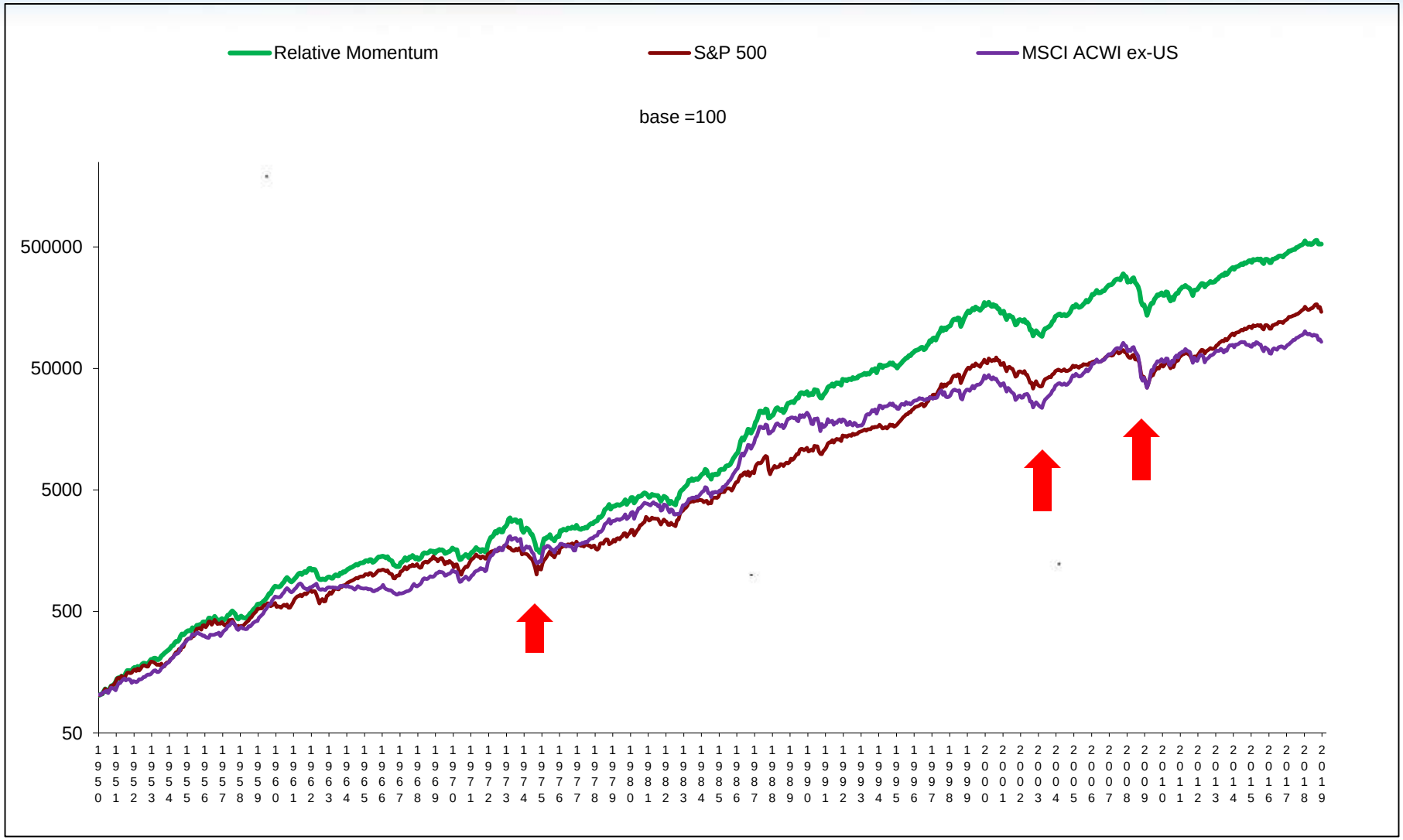
Global Macro Strategy

Global Macro Strategy

Major USD Cycles	Approximate USD % Gain/Loss	Wilshire 5000 TR*	MSCI World ex-USA GR*
10/31/1978 - 02/28/1985	52%	17.88%	8.87%
02/28/1985 - 12/31/1987	-38%	13.28%	48.45%
02/28/1991 - 06/30/2001	25%	14.34%	5.44%
06/30/2001 - 04/30/2008	-36%	4.69%	7.75%
04/30/2008 - 01/31/2016	32%	8.27%	0.55%

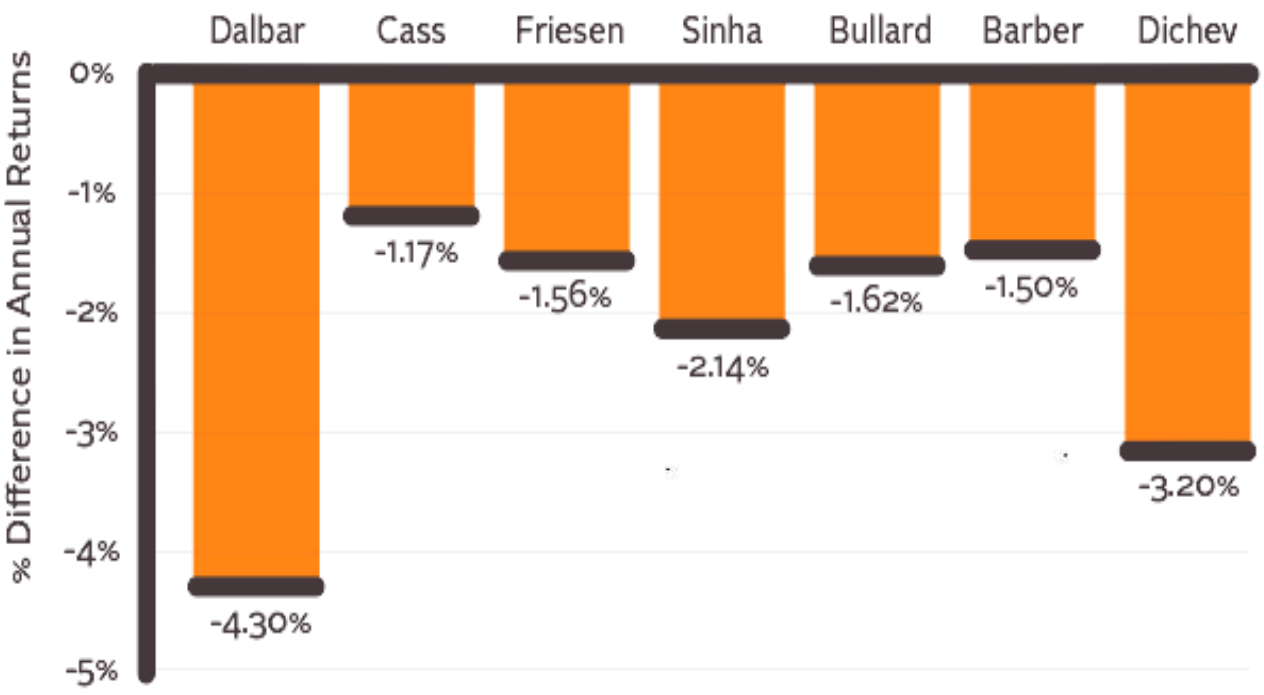
*annualized

Sources: FRED; Morningstar



Results are hypothetical, are NOT an indicator of future results, and do NOT represent returns that any investor actually attained. Please see disclosures for additional information.

Behavioral Gaps



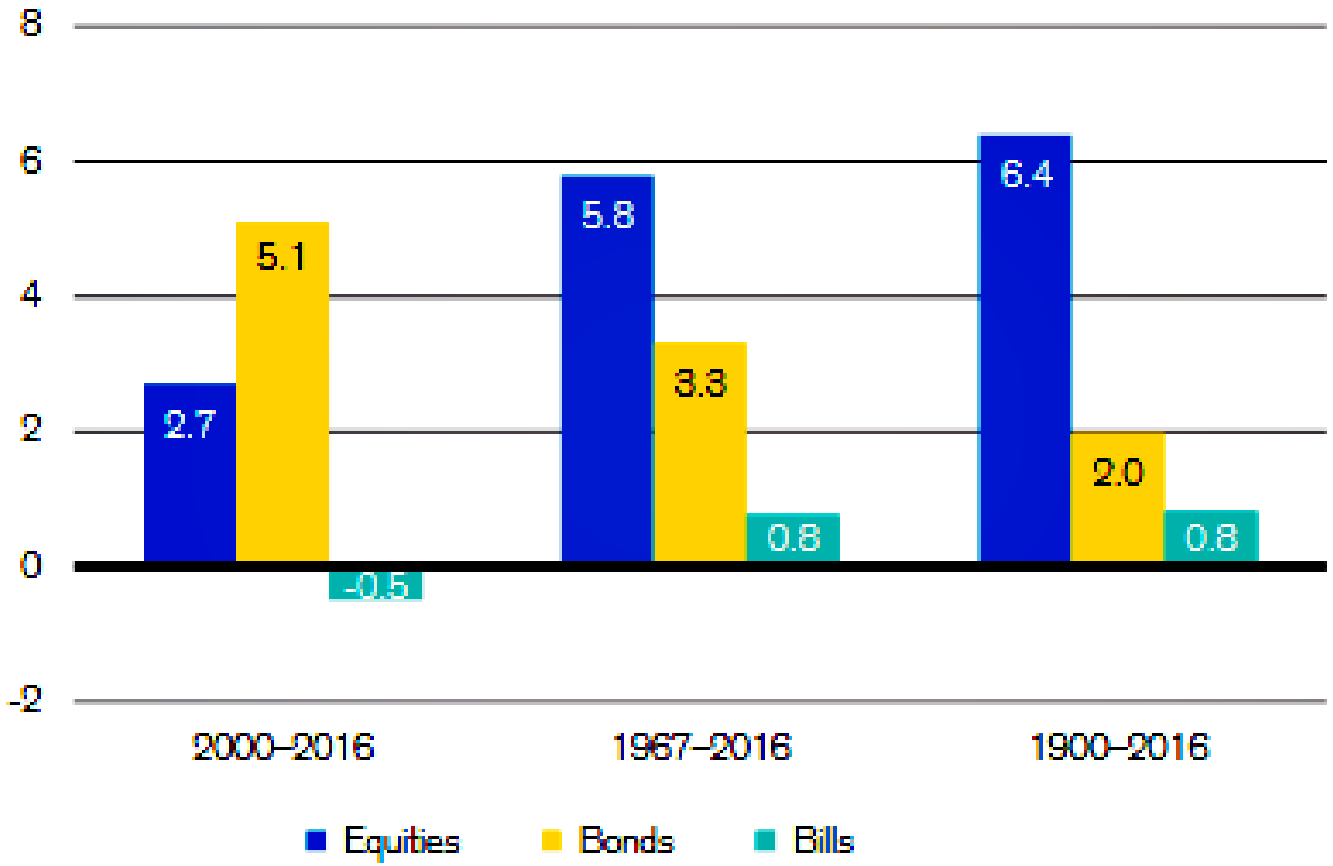
We don’t have people with investment problems. We have investments with people problems.

-Gregg Fisher

Diversify

Bonds

Real Returns



Source: *Credit Suisse Global Investment Returns Yearbook 2016*

Stock and Bond Correlations

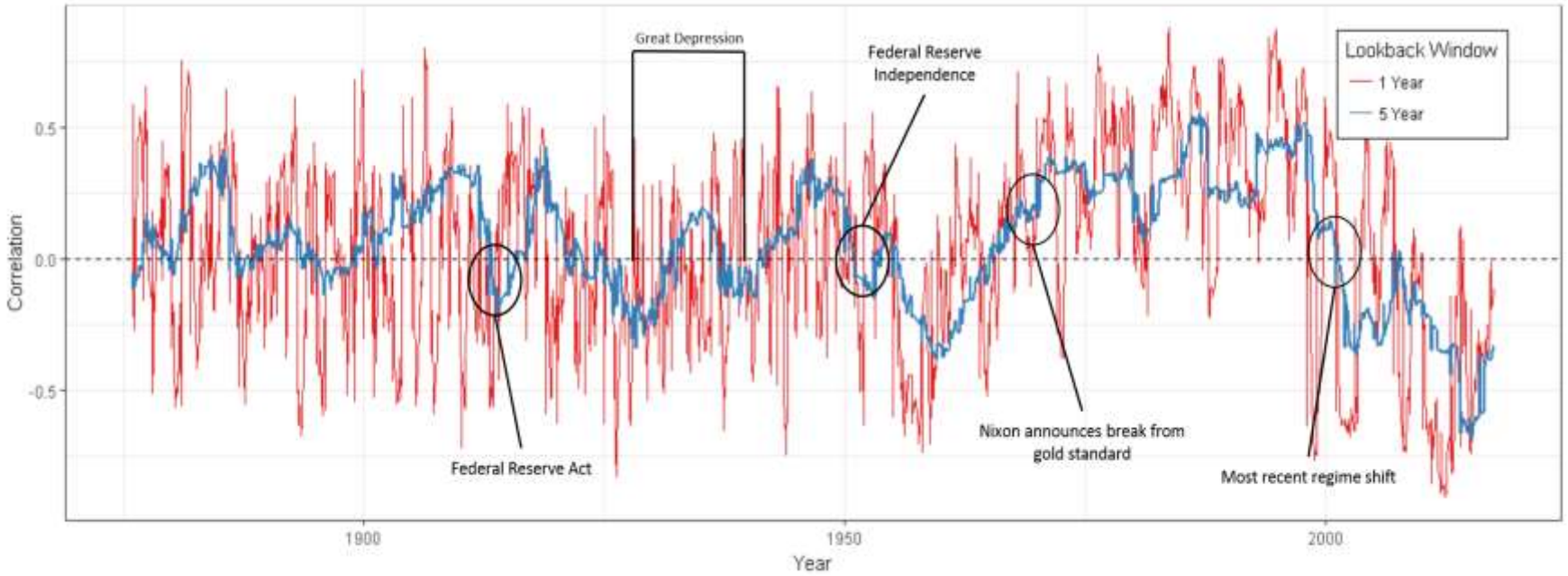
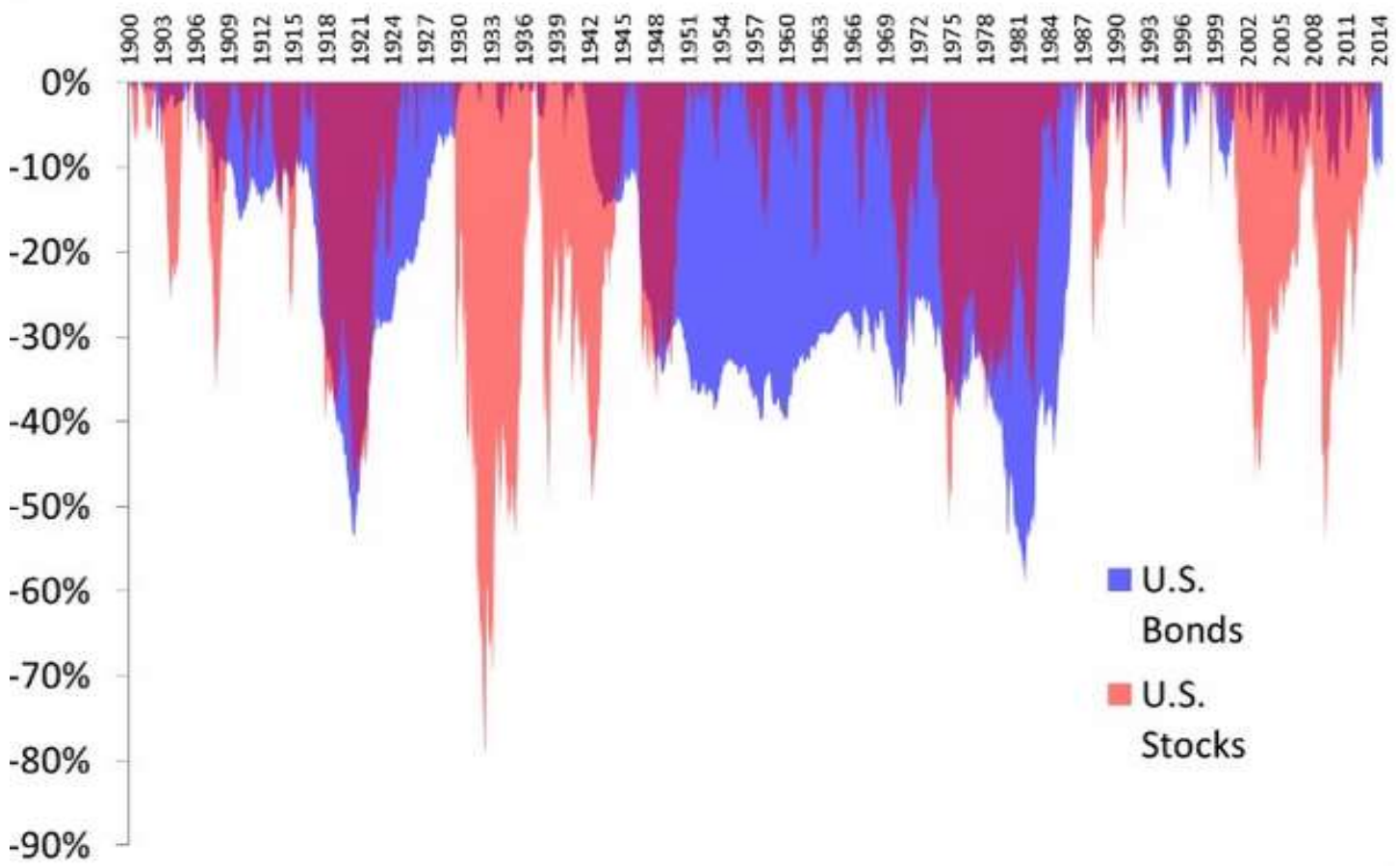


Figure 2. Rolling one-year (red) and five-year (blue) correlation between monthly equity and bond returns dating back to 1871.

Source: "Equity-Bond Correlation: A Historical Perspective", *Graham Capital Management Research Note,* September 2017

Stock and Bond Risks



Source: *Credit Suisse Global Investment Returns Yearbook 2015*

Bond Risks

Worst real return drawdown since 1900:

Stocks -73%
Bonds -68%

Since 1807, worst rolling 10-year real return has been worse for bonds

Bonds in S&P 500 Bear Markets

S&P 500 Bear Markets Since WWII			
Peak	**Trough**	**S&P 500**	**5 Year Treasuries**
May 1946	Oct. 1946	-26.6%	0.4%
June 1948	June 1949	-20.6%	1.6%
July 1957	Oct. 1957	-20.7%	1.4%
Jan. 1962	June 1962	-26.4%	2.5%
Feb. 1966	Oct. 1966	-22.2%	1.3%
Nov. 1968	May 1970	-36.1%	8.6%
Jan. 1973	Oct. 1974	-48.2%	4.0%
Sept. 1976	Mar. 1978	-19.4%	7.6%
Nov. 1980	Aug. 1982	-27.1%	28.8%
July 1987	Dec. 1987	-33.5%	-1.8%
July 1990	Oct. 1990	-19.9%	1.8%
July 1998	Aug. 1998	-19.3%	3.0%
Mar. 2000	Oct. 2002	-49.1%	32.7%
Oct. 2007	Mar. 2009	-56.8%	15.0%
Apr. 2011	Oct. 2011	-19.4%	6.1%
Averages		**-29.7%**	**7.5%**

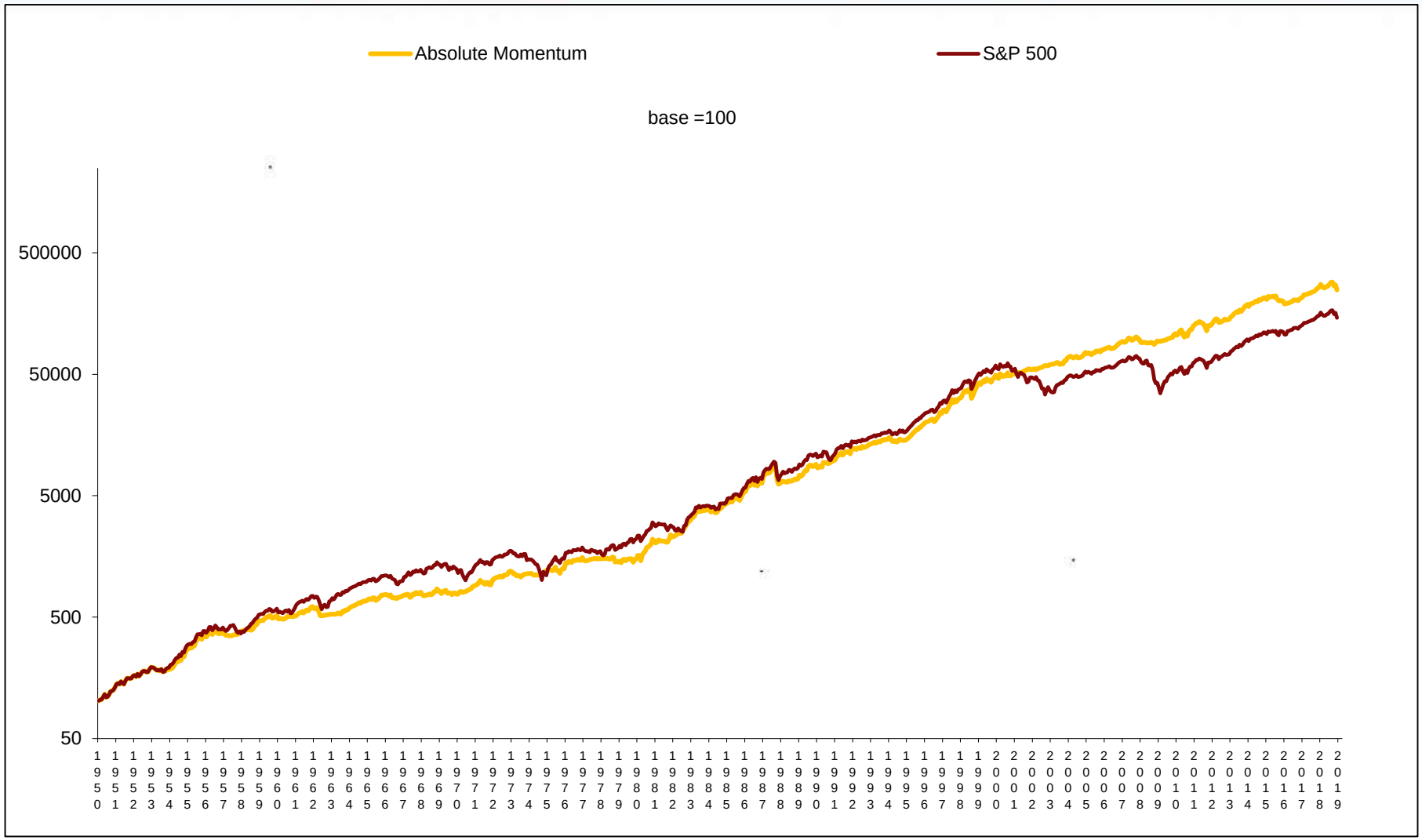
Check with Your Advisor?

Two Types of Momentum

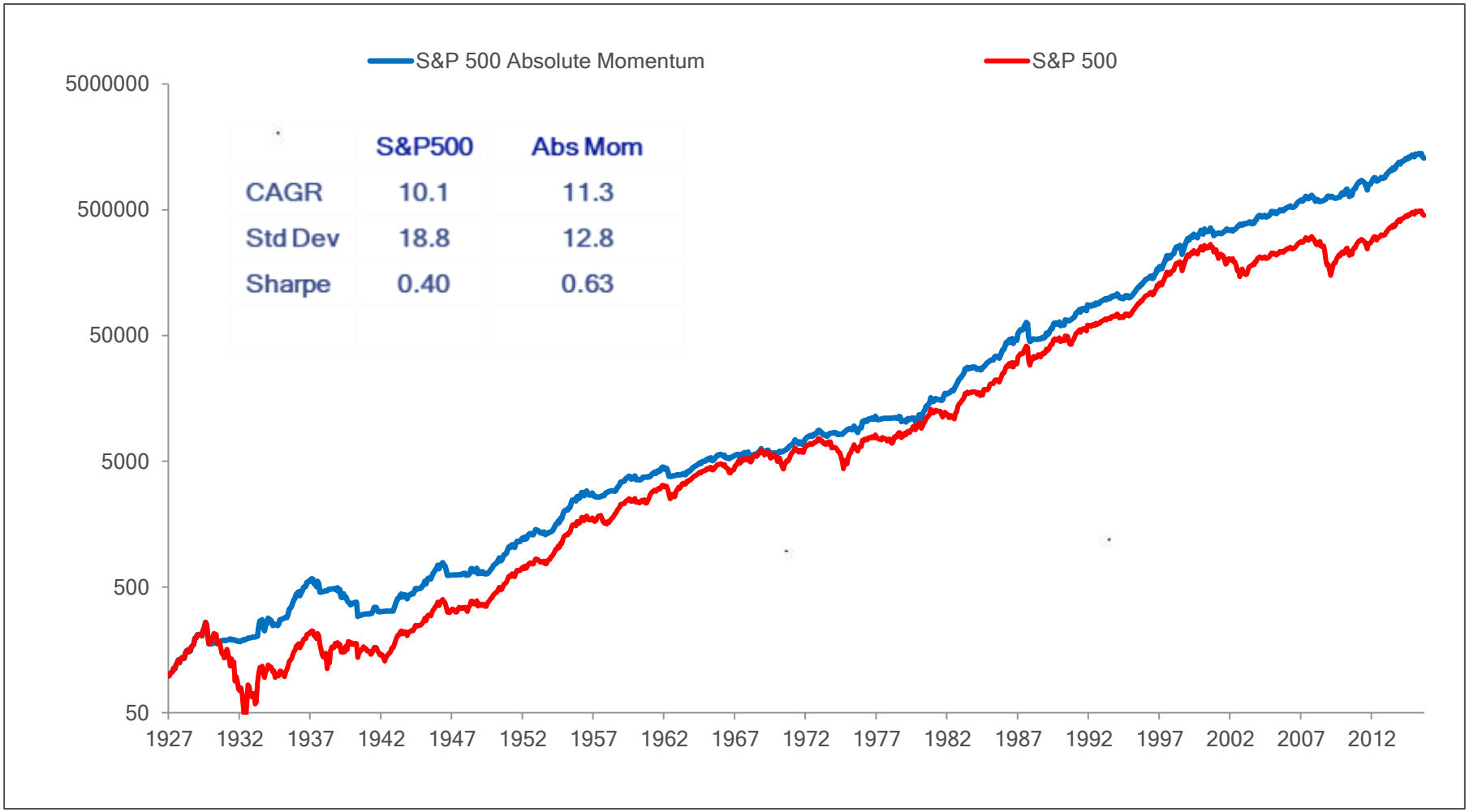
- **Relative (cross-sectional)**
  - **compare performance to peers**
- **Absolute (time-series)**
  - **compare performance to self**

Absolute Momentum

- **Switch between the S&P 500 and the Barclays US Aggregate Bond index**
- **Monthly rebalancing, 12-month look back**



Results are hypothetical, are NOT an indicator of future results, and do NOT represent returns that any investor actually attained.
Please see disclosures for additional information.



	S&P500	Abs Mom
CAGR	10.1	11.3
Std Dev	18.8	12.8
Sharpe	0.40	0.63

Data from Standard and Poor's and Ibbotson Associates. Results are hypothetical, are NOT an indicator of future results, and do NOT represent returns that any investor actually attained.

Worst Bear Markets

January 1927 – October 2017

Date	S&P 500	S&P 500 Absolute Mom
Jul 2007-Feb 2009	-50.9%	+5.0%
Apr 2000-Sep 2002	-43.8%	+17.4%
Jan 1973-Sep 1974	-41.8%	+2.0%
Nov 1968-Jun 1970	-29.3%	-5.0%
Mar 1937-Mar 1938	-50.0%	-20.4%
Sep 1929-Jun 1932	-83.4%	-27.2%

Results are hypothetical, are NOT an indicator of future results, and do NOT represent returns that any investor actually attained. Indexes are unmanaged, do not reflect management or trading fees, and one cannot invest directly in an index.

Momentum Since 1223, Really!

TABLE 1.1 Performance statistics for buy-and-hold and trend following portfolios from 1223 to 2013.

	Buy-and-Hold Portfolio	Trend Following Portfolio
Average Return (annual)	4.8%	13.0%
Standard Deviation (annual)	10.3%	11.2%
Sharpe Ratio	0.47	1.16

Source: Greyserman and Kaminski, *Trend Following with Managed Futures,* John Wiley & Sons, Inc, 2014

Momentum Since 1223, Really!

84 Different Markets Over 800 Years:

Absolute Momentum Sharpe Ratio 1.16 vs 0.47 for Buy-and-Hold

Absolute Momentum Worst Drawdown 25% Less than Buy-and-Hold

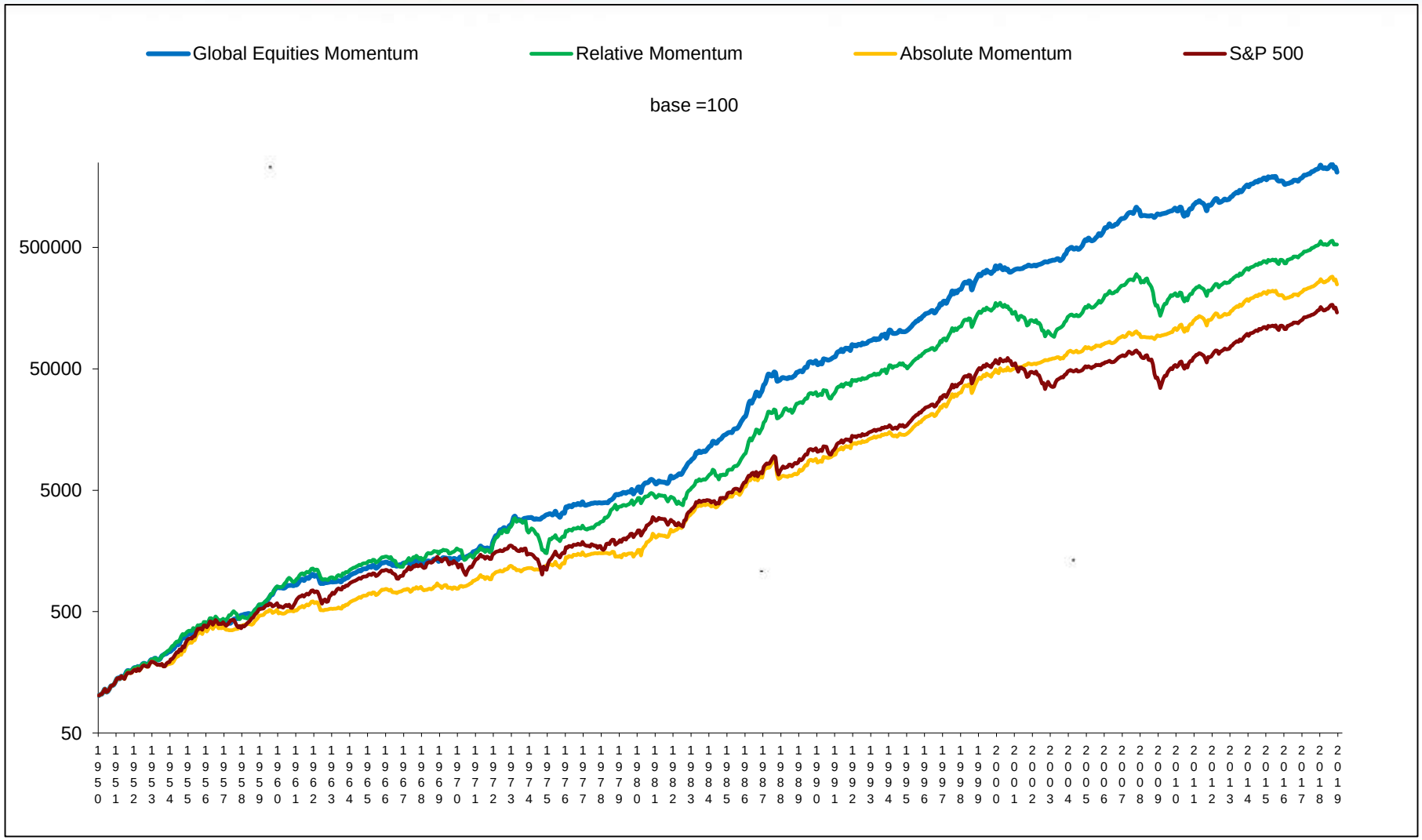
Absolute Momentum Duration of Worst Drawdown 90% Less

Absolute Momentum Duration of 5 Worst Drawdowns 80% Less

Source: Greyserman and Kaminski, *Trend Following with Managed Futures,* John Wiley & Sons, Inc, 2014

Dual Momentum

- **Absolute momentum switches between stocks and bonds**
- **Relative momentum switches between the S&P 500 and the ACWI ex-US**
- **Monthly rebalancing, 12-month look back**



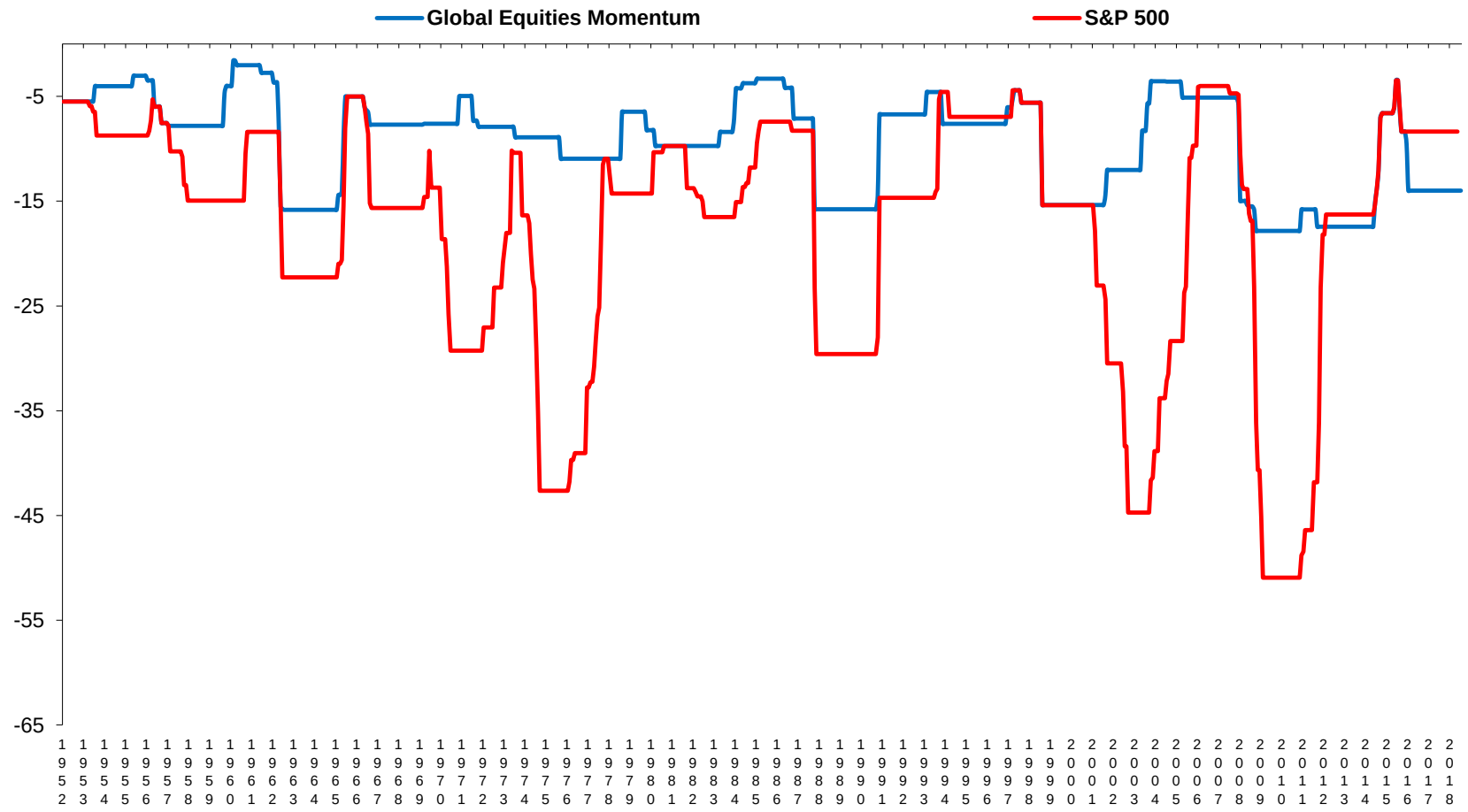
Results are hypothetical, are NOT an indicator of future results, and do NOT represent returns that any investor actually attained.
Please see disclosures for additional information.

Dual Momentum

Jan 1950 - Dec 2018	CAGR	Standard Deviation	Sharpe Ratio	Worst Drawdown
Dual Momentum	**15.5%**	**11.6%**	**0.95**	**-17.8%**
Absolute Momentum	**12.0%**	**11.3%**	**0.69**	**-29.6%**
Relative Momentum	**13.2%**	**14.4%**	**0.65**	**-54.6%**
S&P 500 Index	**11.1%**	**14.3%**	**0.52**	**-51.0%**
MSCI ACWI ex-US	**10.5%**	**15.2%**	**0.44**	**-57.4%**

Results are hypothetical, are NOT an indicator of future results, and do NOT represent returns that any investor actually attained. Indexes are unmanaged, do not reflect management or trading fees, and one cannot invest directly in an index.

Rolling 3 Year Worst Drawdown



Results are hypothetical, are NOT an indicator of future results, and do NOT represent returns that any investor actually attained.
Please see disclosures for additional information.

Bear Markets

	S&P 500	Rel Mom	Dual Mom
Jan 62-Jun 62	-22.8%	-18.5%	-15.7%
Dec 68-Jun 70	-29.3%	-13.9%	4.3%
Jan 73-Sep 74	-42.6%	-35.6%	15.1%
Dec 80-Jul 82	-16.5%	-16.9%	16.0%
Sep 87-Nov 87	-29.6%	-15.1%	-15.1%
Sep 00-Sep 02	-44.7%	-43.4%	14.9%
Nov 07-Feb 09	-50.9%	-54.6%	-13.1%
Average	-33.8%	-28.3%	0.9%

Results are hypothetical , are NOT an indicator of future results, and do NOT represent returns that any investor actually attained. Indexes are unmanaged, do not reflect management or trading fees, and one cannot invest directly in an index.

Bull Markets

	S&P 500	Abs Mom	Dual Mom
Jan 50-Dec 61	647.7%	608.3%	1014.6%
Jul 62-Nov 68	143.7%	66.7%	58.0%
Jul 70-Dec 72	75.6%	47.2%	84.0%
Oct 74-Nov 80	198.3%	91.6%	103.3%
Aug 82-Aug 87	279.7%	246.3%	569.2%
Dec 87-Aug 00	816.6%	728.4%	730.5%
Oct 02-Oct 07	108.3%	72.4%	181.6%
Mar 09-Dec17	338.7%	177.4%	142.3%
Average	326.1%	254.8%	360.4%

Results are hypothetical , are NOT an indicator of future results, and do NOT represent returns that any investor actually attained. Indexes are unmanaged, do not reflect management or trading fees, and one cannot invest directly in an index.


S&P 500 Rolling 12-month Returns, Jan 1950-Dec 2018
No. of Occurances
130
110
90
70
50
30
10
-10
S&P 500
-50%
-40%
-30%
-20%
-10%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
12-month Returns (%)


GEM Rolling 12-month Returns, Jan 1950-Dec 2018
No. of Occurances
150
130
110
90
70
50
30
10
-10
GEM
-50%
-40%
-30%
-20%
-10%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
12-month Returns (%)

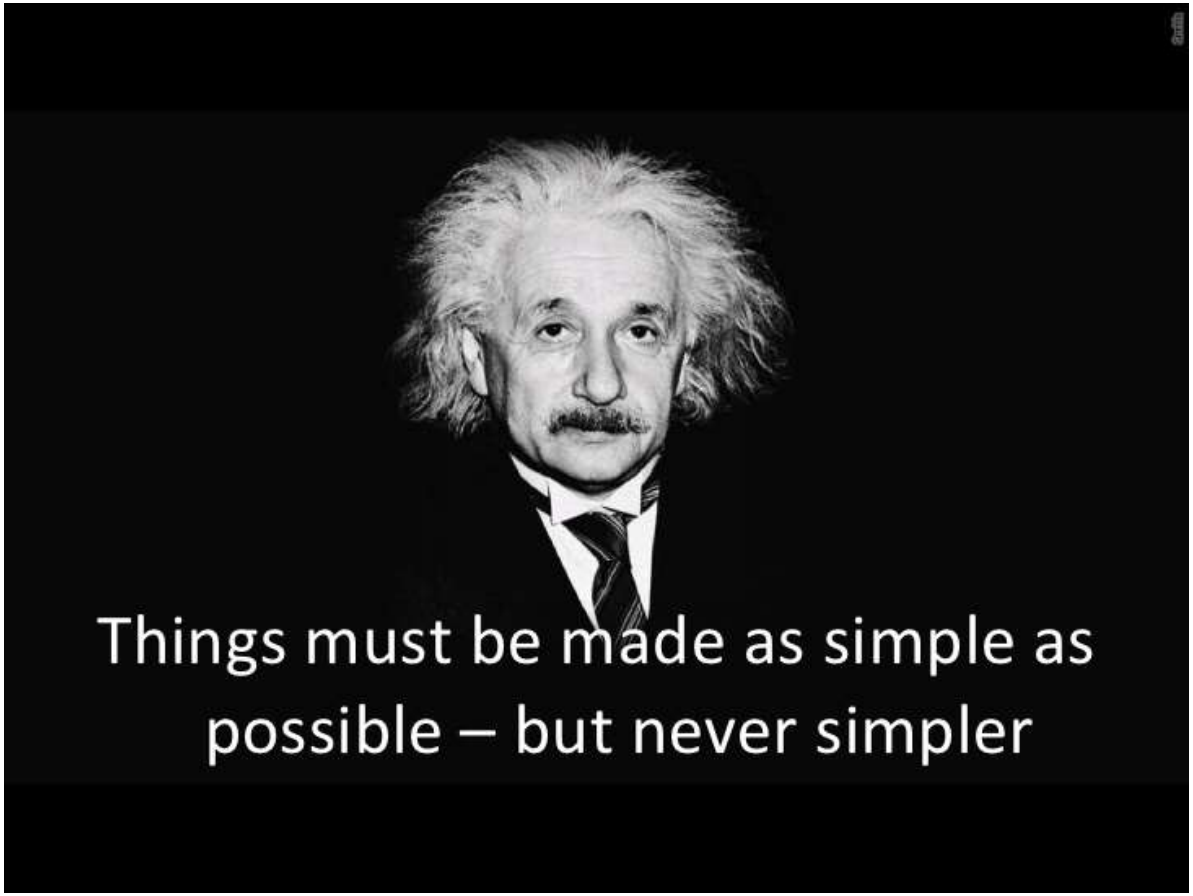

Combined Rolling 12-month Returns, Jan 1950-Dec 2018
No. of Occurances
150
130
110
90
70
50
30
10
-10
S&P 500
GEM
-50%
-40%
-30%
-20%
-10%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
12-month Return (%)

Advantages of Dual Momentum

- **Extensively Researched**
- **High Expected Returns**
- **Low Trading Costs**
- **Low Drawdowns**
- **High Scalability**

Why Isn’t Everyone Doing It?

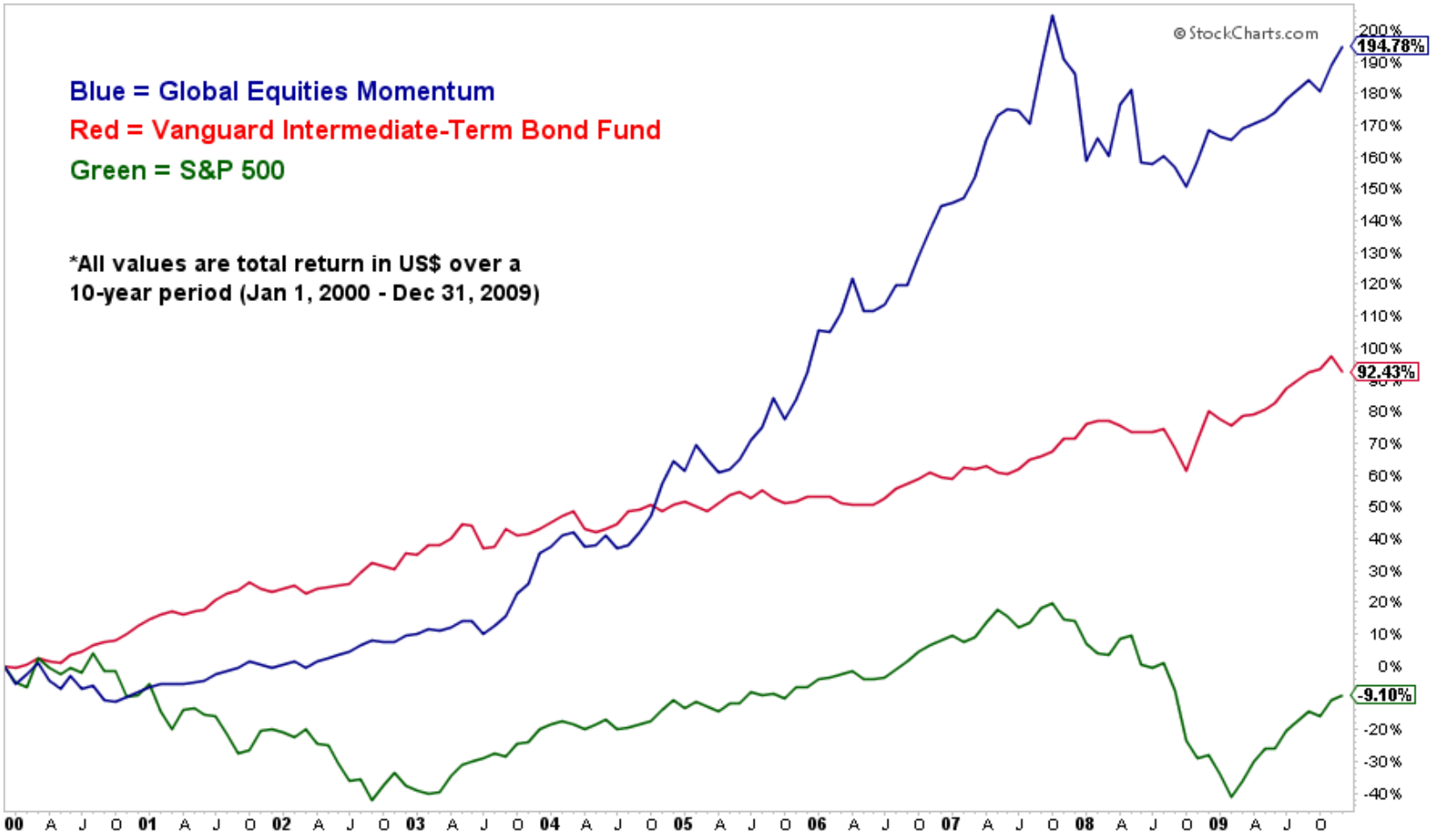
Too Simple


Things must be made as simple as possible – but never simpler

Counter Intuitive

Skepticism toward Models

Valuations


Blue = Global Equities Momentum
Red = Vanguard Intermediate-Term Bond Fund
Green = S&P 500
*All values are total return in US$ over a
10-year period (Jan 1, 2000 - Dec 31, 2009)
©StockCharts.com
194.78%
92.43%
-9.10%
200%
190%
180%
170%
160%
150%
140%
130%
120%
110%
100%
80%
70%
60%
50%
40%
30%
20%
10%
0%
-20%
-30%
-40%
00 A J O 01 A J O 02 A J O 03 A J O 04 A J O 05 A J O 06 A J O 07 A J O 08 A J O 09 A J O

Behavioral Biases

- **Familiarity bias**
- **Anchoring/conservatism**
- **Prejudice against tactical trading**
- **Home country bias**
- **Preference for stocks not indices**

Investment Allocations

	MILLENNIALS	GENERATION X	BABY BOOMERS	SILENT GENERATION
Cash	**70%**	**68%**	**60%**	**53%**
Equities	14	17	20	22
Bonds	7	5	5	9
Real estate	4	3	3	4
Alternatives	2	1	1	1
Other	1	3	8	8

Note: Silent generation, boomer and Gen X respondents with at least $100,000 in household assets and millennial respondents with at least $50,000 in household assets.

Source: BlackRock Global Investor Pulse

Compound Annual Returns (1926-2014)

Sources: BlackRock; Morningstar; Tax Foundation. Past performance is no guarantee of future results. Assumes reinvestment of income and no transaction costs. This is for illustrative purposes only and not indicative of any investment. Federal income tax is calculated using the historical marginal and capital gains tax rates for a single taxpayer earning $110,000 in 2013 dollars every year. This annual income is adjusted using the Consumer Price Index in order to obtain the corresponding income level for each year. Income is taxed at the appropriate federal income tax rate as it occurs. Capital gains for stocks are assessed every five years when there is a cumulative gain from the last high and assume a five year holding period to determine the long-term capital gains rate. Bonds are assumed to be held to maturity. No state income taxes are included. Stocks are represented by the S&P 500 Index. Bonds are represented by the Morningstar/Ibbotson Intermediate-Term Government Bond Index. Cash is represented by the Morningstar/Ibbotson 30-Day US Treasury Bill Index. Inflation is represented by the Consumer Price Index. It is not possible to invest directly in an index.

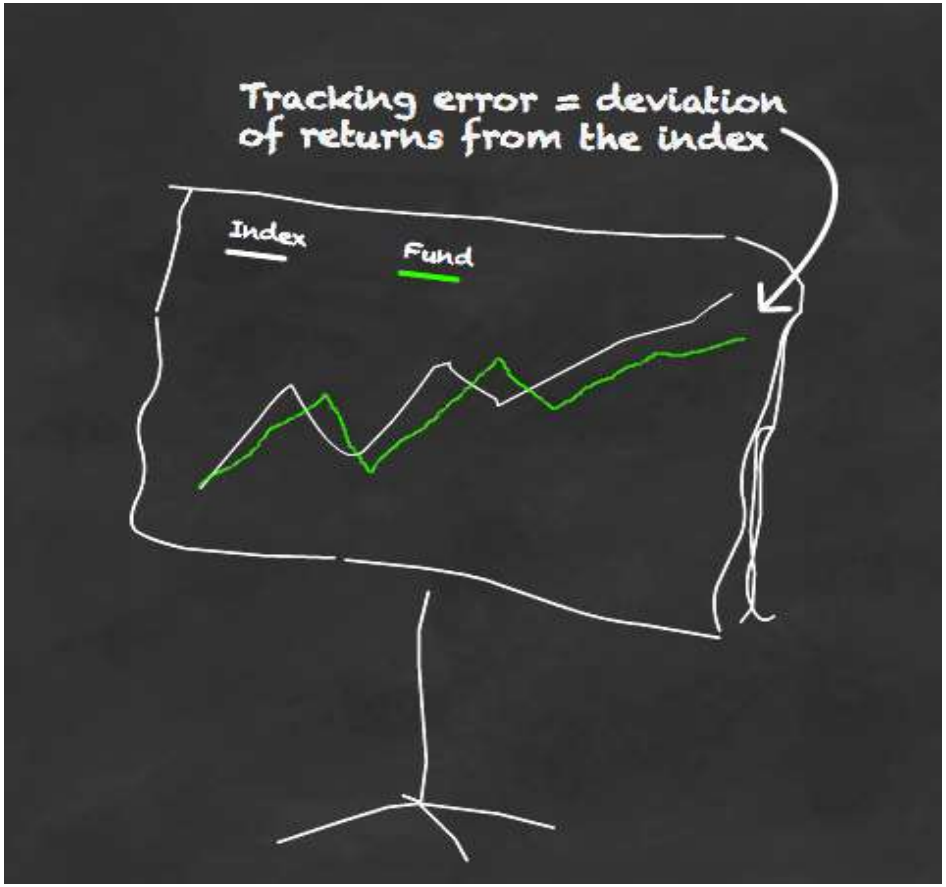
Systematic Withdrawal Rates

Table 1 Withdrawal Rate Risk on GEM data 1971-2017 (2500 Monte Carlo simulations of 30-year sequences; no compounding)				
W/D Rate	Risk of Ruin: Drawdown risk to 50% or less of initial capital	Median Drawdown	Median Return	Probability of surplus greater than initial investment after 30 years
3.4%	0%	9.7%	134%	97%
4.0%	0%	11.0%	132%	98%
5.3%	0%	14.0%	133%	98%
6.0%	0%	15.3%	133%	97%
8.0%	0%	18.9%	133%	97%
9.6%	1%	21.9%	132%	97%
12.0%	5%	25.5%	132%	94%

Results are hypothetical, are NOT an indicator of future results, and do NOT represent returns that any investor actually attained. Indexes are unmanaged, do not reflect management or trading fees, and one cannot invest directly in an index.

Risks ?

Tracking Error



Whipsaws

Short-Term Volatility

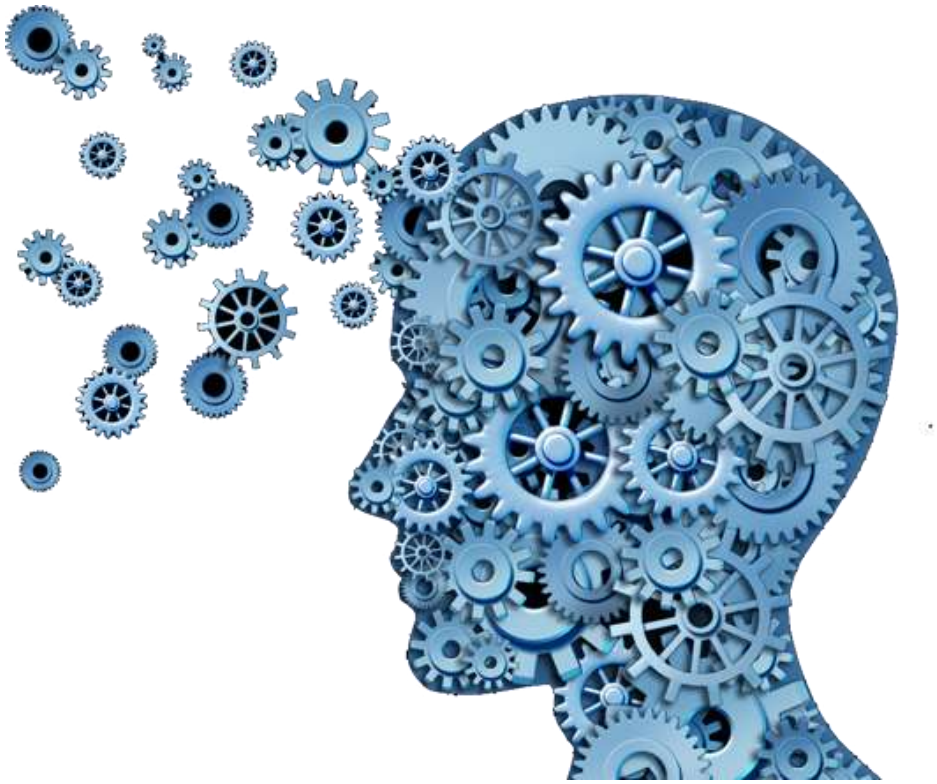
Keys to Success

Patience

Discipline

Confidence

Understanding

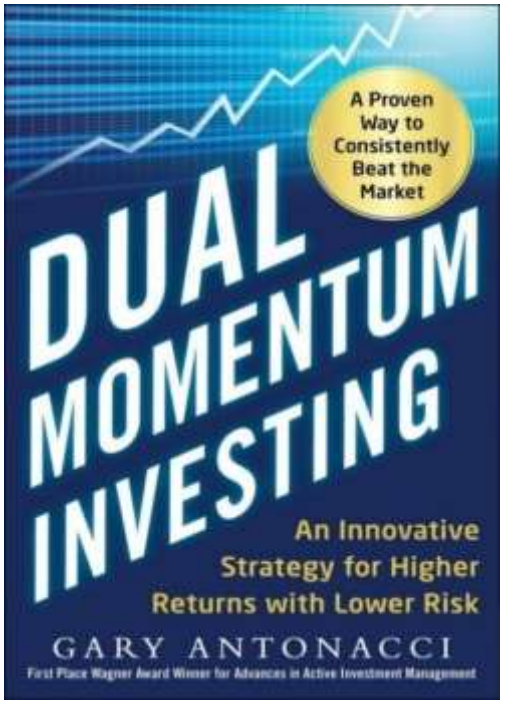


Dual Momentum Investing

USA Best Book Award

Over 300 5 Star Reviews

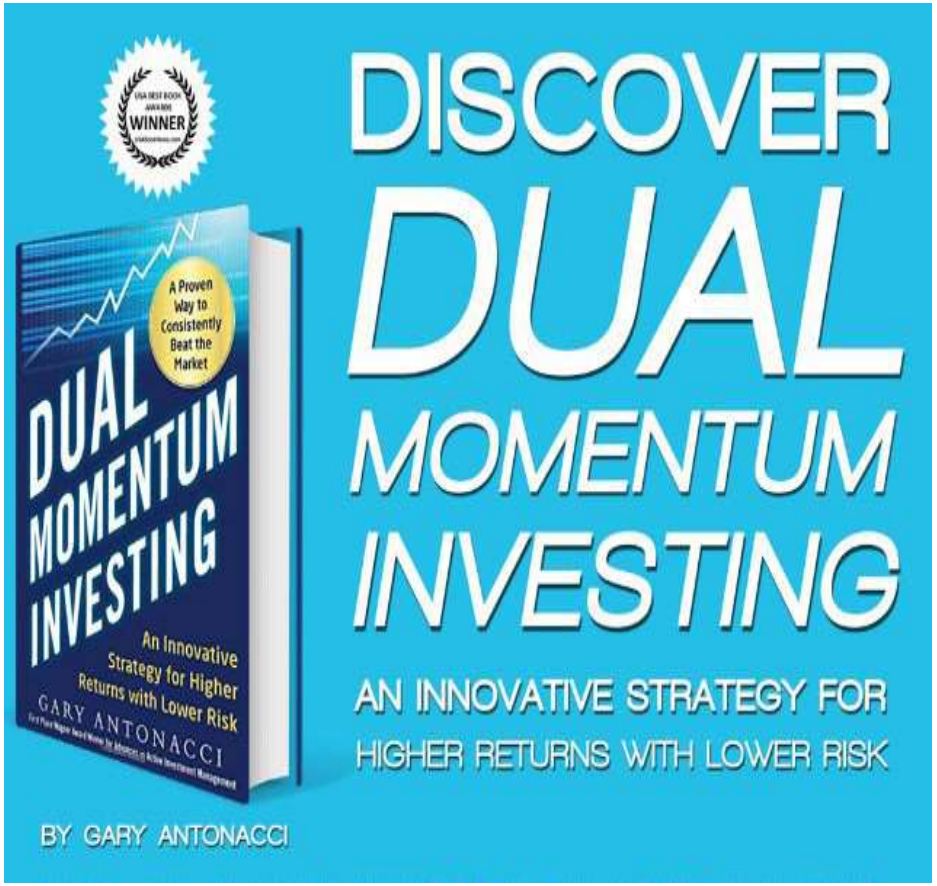
Easy D-I-Y Instructions



The most important metric is not the returns achieved but the returns weighed against the risks incurred.

Nothing should be more important than the ability to sleep soundly at night.

-Seth Klarman


WINNER
A Proven Way to Consistently Beat the Market
DUAL MOMENTUM INVESTING
An Innovative Strategy for Higher Returns with Lower Risk
GARY ANTONACCI
DISCOVER
DUAL
MOMENTUM
INVESTING
AN INNOVATIVE STRATEGY FOR HIGHER RETURNS WITH LOWER RISK
BY GARY ANTONACCI

May the Momentum Be With You

Disclosures

This presentation is for educational and informational purposes only. Nothing contained therein should be interpreted as personalized investment advice. Under no circumstances does this information represent a recommendation to buy, sell or hold any security. Users should be aware that all investments carry risk and may lose value. Users of these sites are urged to consult their own independent financial advisors with respect to any investment. We are not liable for any errors or inaccuracies, regardless of cause, or for the delay or interruptions in the transmission of information to our users. Opinions and analysis included therein are based on sources believed to be reliable and written in good faith, but no representation or warranty is made as to their accuracy, completeness, or timeliness. You should always obtain your own current information and perform due diligence before making any investment decisions. All performance represents total returns and includes reinvestment of interest and dividends but does not reflect management fees, transaction costs, taxes, or other expenses. You cannot invest directly in indexes. Future performance of these models may differ significantly from historical performance. Hypothetical performance results are presented for illustrative purposes only and should not be interpreted as an indication of future performance. Hypothetical performance results (e.g., quantitative back tests) have many inherent limitations, some of which, but not all, are described herein. One of the limitations of hypothetical performance results is that they are generally prepared with the benefit of hindsight. In addition, hypothetical trading does not involve financial risk, and no hypothetical trading record can completely account for the impact of financial risk in actual trading. For example, the ability to withstand losses or adhere to a particular trading program in spite of trading losses can adversely affect actual trading results. The hypothetical performance results contained herein represent the application of the quantitative models as currently in effect, and there can be no assurance that the models or portfolio constituents will remain the same in the future or that an application of the current models in the future will produce similar results because the relevant market and economic conditions that prevailed during the hypothetical performance period will not necessarily recur. The term “maximum drawdown” as used on this site refers to means the maximum cumulative peak-to-valley retracement on a month-end basis. Intra-month maximum drawdowns may be substantially higher, and future maximum drawdowns may be higher still. There are numerous other factors related to the markets in general or to the implementation of any specific trading program which cannot be fully accounted for in the preparation of hypothetical performance results, all of which can adversely affect actual trading results.

Gary Antonacci

twitter: @GaryAntonacci

email: gantonacci@optimalmomentum.net

Portfolio Management Consultants

website:

http://optimalmomentum.com

blog:

http://dualmomentum.net