FIVE

Trend Index

Munich RE
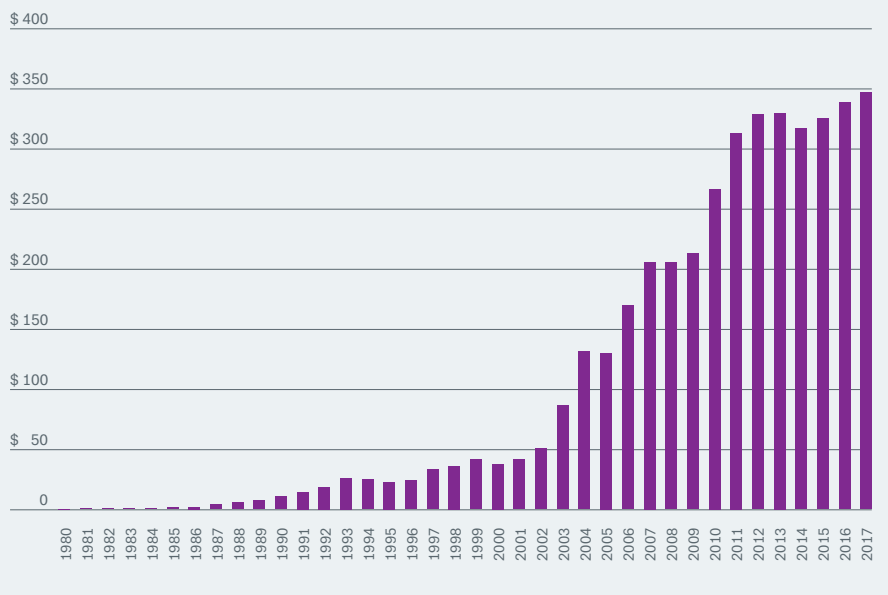
FIVE

We believe in numbers.

Introduction

The FIVE Trend Index tracks the performance of a rules-based trend following trading system which seeks to exploit price trends in various futures markets globally.

During the past 40+ years, trend following trading strategies have been able to generate attractive long-term investment results in both up and down markets. Moreover, they were one of the few trading strategies that performed well during the Global Financial Crisis – a period during which most other investments, both traditional and alternative, suffered.

Investors' interest in trend following has grown substantially during the past decades. Today, the so-called Managed Futures industry – an industry which specializes in systematic trend-following trading systems – manages more than $300 billion totally.

Managed futures AUM in $ bln

Source: BarclayHedge, September 2017

Index overview

The FIVE Trend Index is a rules-based trend following index which is sponsored and owned by Munich Re.

In simple terms, trend following refers to a trading approach that buys assets whose prices are rising while selling those whose prices are falling. As such, trend following seeks to capitalize on the "momentum" in market prices; that is, the tendency of assets which have produced positive returns in the past to continue producing positive returns in the future, and vice versa.

Most trend following strategies use liquid exchange-traded futures contracts to buy and sell markets from various sectors including equities, currencies, bonds, and commodities. This also applies to the FIVE Trend Index, which currently references 30 futures markets globally.

Markets by asset class

Asset class

Asset class	
● Equities	23.33%
● Commodities	33.33%
● Currencies	20.00%
● Interest Rates	23.33%
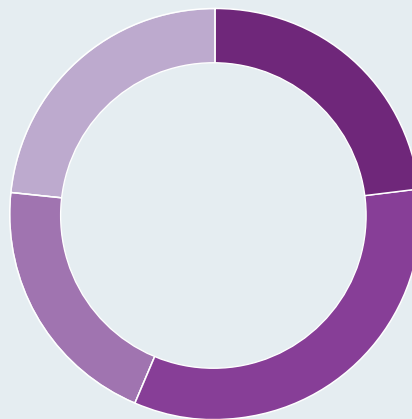
Investment universe

Equities

DAX[1], EURO STOXX 50[1], FTSE 100[2], HANG SENG[3], NASDAQ-100[4], NIKKEI 225[5], S&P 500[4]

Commodities

BRENT CRUDE OIL[6], WTI CRUDE OIL[7], LS GASOIL[6], RBOB GASOLINE[7], ULS DIESEL[7], NATURAL GAS[7], COPPER[8], GOLD[8], SILVER[8], PLATINUM[8]

Currencies

AUD/USD[4], CAD/USD[4], CHF/USD[4], EUR/USD[4], GBP/USD[4], JPY/USD[4]

Interest Rates

CANADA 10Y GOVT BONDS[9], GERMANY 10Y GOVT BONDS[1], GERMANY 30Y GOVT BONDS[1], JAPAN 10Y GOVT BONDS[4], UK 10Y GOVT BONDS[2], USA 10Y GOVT BONDS[10], USA 30Y GOVT BONDS[10]

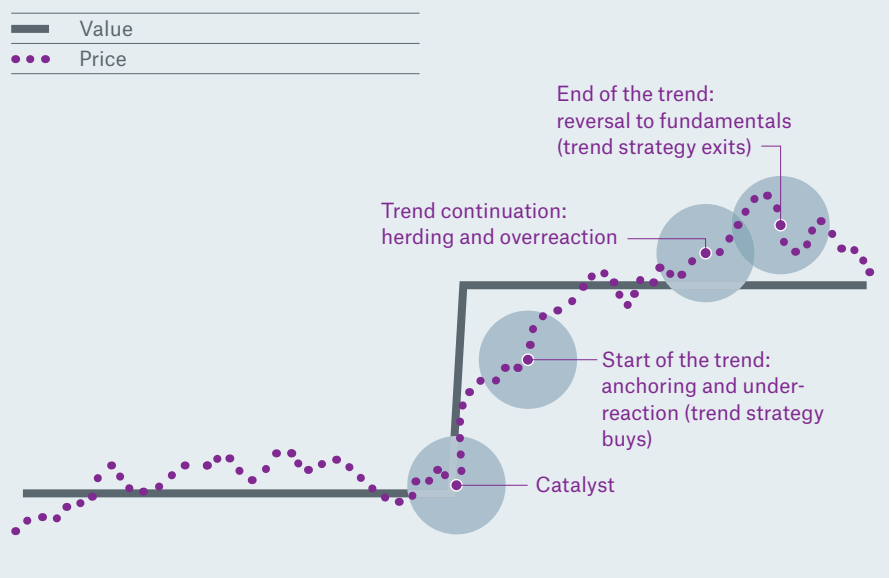[1] Eurex (EX)
[2] Intercontinental Exchange Futures Europe (ICE EU)
[3] Hong Kong Futures Exchange (HKFE)
[4] Chicago Mercantile Exchange (CME)
[5] Osaka Exchange (OSE)
[6] Intercontinental Exchange Futures Europe (ICE EU)
[7] New York Mercantile Exchange (NYMEX)
[8] Commodities Exchange (COMEX)
[9] Montréal Exchange (MX)
[10] Chicago Board of Trade (CBOT)

About price trends

For trend following to work, prices need to trend. When prices move sideways, reversing from tops to bottoms and bottoms to tops, trend following trading systems are unlikely to perform well. But why should prices trend? And what initiates a trend in the first place?

One explanation is given by Kahneman and Tversky's Nobel-Prize winning work on behavioral economics, which links certain human biases to an under-reaction in market prices. If prices initially underreact to new information (e.g., a change in estimated earnings), trends tend to continue as prices slowly move to fully reflect changes in fundamental value. These trends, reinforced by investor herding, have the potential to overshoot, thus causing a move beyond fair value. Since too large a deviation from fair value cannot continue forever, the trend will reverse and the cycle starts again.

Stylized lifecycle of a trend

- **Value**
- **Price**

End of the trend:
reversal to fundamentals
(trend strategy exits)

Trend continuation:
herding and overreaction

Start of the trend:
anchoring and under-
reaction (trend strategy
buys)

Catalyst

Source: Hurst, Ooi, Pedersen (2013)[1]

To determine the start and end of a trend, many rules-based trend following systems use statistical indicators such as, for instance, moving averages or the slopes of regression lines, to determine the start and end of a trend. Those indicators are never exact, which is why trend following trading systems are unlikely to sell at the top and buy at the bottom. Rather, those systems tend to capture the "belly" of the trend or, in other words, the "fat in the middle." Instead of buying low and selling high, trend following trading systems are designed to buy high and sell higher. Likewise, they will sell low to buy lower.

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[1] Hurst, B., Ooi, Y.H. & Pedersen, L.H. (2013), *"Demystifying Managed Futures"*, Journal of Investment Management, vol. 11, no. 3, pp. 42–58

The FIVE Trend Index

The FIVE Trend Index is designed to detect price trends across a number of different time horizons spanning weeks to months and sometimes even years. Each time horizon is given an equal chance to contribute to the returns of the overall portfolio. Moreover, each position, both long and short, is automatically managed such that it can add an approximately equal portion of risk to the portfolio, thus avoiding the dominance of one market, or one sector, over another at the expense of portfolio diversification. Finally, all index returns are hedged into USD.

To determine the direction of the trend in an asset's price, up or down, the FIVE Trend Index uses the excess return over cash of each asset for the prior 3, 6, 9 and 12 months. If such return is positive at the end of a given calendar month, the system will take on a long position for the following calendar month; else, it will take on a short position. Thus, the index will always hold a position in each of the 30 markets, either long or short. Additionally, in order to risk-control each market and the overall portfolio during the month, the system may alter the size of an existing position in a response to changing volatilities.

Index highlights

1. Disciplined, fully rules-based investment approach
   → Excluding behavioral biases

2. Based on a robust return source
   → Trend following across various asset classes, long and short

3. Uncorrelated to other investments in the long-term
   → Improving risk-adjusted portfolio returns

4. Attractive performance potential in bull and bear market environments
   → Potential source of stability during market crises

5. Clear design and transparent investment rules
   → No secret "investment magic"

6. Daily liquidity, hedged into USD
   → No lock-ups, no currency risks

Historical performance analysis

Compared to many other investment choices, the FIVE Trend Index would have produced a more consistent return stream during the period 1988 to 2018. That is, lower drawdowns and higher risk-adjusted returns. And because its returns have been uncorrelated to those of most other investments in the past, the index would have been a valuable addition to investors' portfolios.

Historical performance of the FIVE Trend Index (ER, 5% TV, USD)
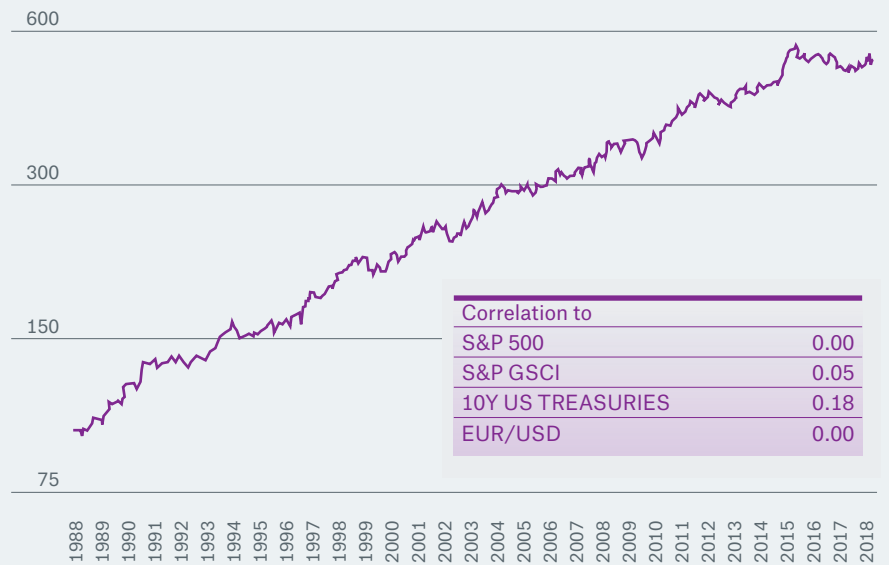
Correlation to	
S&P 500	0.00
S&P GSCI	0.05
10Y US TREASURIES	0.18
EUR/USD	0.00

Source: Munich Re, Bloomberg L.P. Based on daily data starting 4 January 1988 and ending 30 March 2018. ER means excess return. TV means target volatility.

Performance statistics[1]

	FIVE Trend (ER, 5% TV, USD)	S&P 500 (ER, 5% TV, USD)	S&P 500 (ER, USD)
CAGR	5.62%	2.47%	6.49%
Standard deviation	5.49%	4.39%	14.20%
Sharpe ratio	1.00	0.56	0.44
Sortino ratio	1.92	0.84	0.62
Worst drawdown (%)	−10.23%	−17.47%	−62.41%
Longest drawdown (yrs)	2,9	11,1	13,1
Best month (%)	6.77%	3.93%	11.12%
Worst month (%)	−3.80%	−3.56%	−14.06%
Avg. return (%, mth)	0.47%	0.21%	0.61%
Avg. positive return (%, mth)	1.55%	1.01%	2.95%
Avg. negative return (%, mth)	−1.01%	−1.10%	−3.55%
Profitable months (%)	58%	62%	64%
Profitable years (%)	83%	63%	77%

Source: Munich Re, Bloomberg L.P. Based on daily data starting 4 January 1988 and ending 30 March 2018

[1] all numbers annualized, if not indicated otherwise

Calendar month returns (%)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
1988	−0.7	0.5	−0.5	0.8	0.3	−1.6	0.9	1.1	2.1	1.2	0.1	−0.8	**3.5**
1989	1.4	−2.1	4.3	1.2	2.0	1.2	0.3	1.3	0.2	−0.9	1.3	6.8	**17.8**
1990	−0.9	0.1	0.9	1.7	−3.8	2.1	2.9	4.7	2.1	−0.3	−0.6	−0.1	**8.8**
1991	2.2	−0.5	−1.6	1.1	−0.3	1.2	−0.9	2.3	−0.6	1.0	−2.3	2.0	**3.3**
1992	−0.6	0.3	−0.9	−1.0	−0.5	0.7	1.4	1.0	0.1	−1.2	−0.5	0.7	**−0.6**
1993	0.5	3.2	−0.8	2.0	2.6	0.3	2.6	1.7	−0.4	2.0	1.6	2.6	**19.4**
1994	−1.6	−2.0	−1.2	−1.2	0.5	−1.0	−0.4	0.4	−0.7	1.1	−0.6	0.1	**−6.4**
1995	2.4	−0.5	1.4	1.4	1.8	−0.2	−1.6	−1.7	1.7	−0.1	0.5	1.3	**6.6**
1996	0.4	−1.1	1.9	1.1	0.1	0.5	−3.1	3.0	4.5	2.2	2.9	−0.3	**12.7**
1997	1.0	−1.9	0.4	0.8	−0.4	1.0	3.4	−0.8	1.5	−0.3	1.1	3.4	**9.4**
1998	0.1	1.1	1.0	0.0	1.0	2.6	0.9	1.3	−2.0	0.2	0.7	1.1	**8.3**
1999	0.1	−2.2	−2.7	−1.8	0.9	1.3	−1.2	1.1	−1.0	−0.1	4.2	2.5	**0.8**
2000	−0.3	1.5	−1.5	−0.3	1.8	−0.1	0.0	2.9	−0.1	2.5	1.9	0.0	**8.4**
2001	−0.8	2.0	2.9	−0.9	0.6	0.4	−1.3	2.3	2.5	−1.2	−1.4	−1.0	**3.9**
2002	−0.1	−1.6	−3.5	0.0	1.7	1.5	0.2	1.1	2.2	−0.9	−0.1	3.0	**3.6**
2003	3.2	2.0	−1.3	0.0	4.1	−0.6	−2.1	−0.2	0.1	3.2	1.5	2.7	**13.0**
2004	2.1	1.2	0.5	−2.3	0.8	−1.2	1.7	−1.9	0.6	−0.8	2.6	−0.2	**3.0**
2005	−0.8	1.3	−1.1	−1.3	0.1	2.6	0.1	−0.2	1.8	−2.0	3.0	0.7	**4.3**
2006	0.8	−0.2	1.0	1.6	−0.3	−0.4	−1.0	−1.2	0.9	0.4	−0.4	2.6	**3.9**
2007	1.1	−0.9	−0.2	1.1	0.0	1.5	−1.9	0.4	2.8	1.9	1.7	−0.1	**7.7**
2008	−0.9	3.2	1.4	−1.6	1.5	1.2	−1.8	−0.9	0.6	2.6	−0.4	0.8	**5.8**
2009	−0.6	0.5	−0.1	−1.0	−3.1	−2.2	0.9	3.6	1.5	−0.5	3.3	−0.9	**1.2**
2010	−1.3	2.1	2.9	1.8	1.0	−0.1	−1.5	4.3	2.3	1.3	−1.5	1.8	**13.5**
2011	−0.8	2.1	−0.5	3.6	−1.4	−0.3	3.0	1.9	−1.8	−0.8	1.2	1.5	**7.7**
2012	−0.4	−0.2	−0.7	−0.6	−1.4	0.3	−0.5	−0.7	0.1	−1.1	2.6	1.3	**−1.4**
2013	1.0	1.3	1.1	1.2	−1.8	−0.5	0.6	−0.7	−0.3	1.6	2.3	0.2	**6.1**
2014	−0.8	0.6	0.0	−0.2	1.3	0.2	0.4	1.0	1.9	2.5	3.7	3.1	**14.4**
2015	2.9	−1.2	1.6	−1.9	−1.3	−1.4	0.9	−1.4	0.9	−1.6	2.5	−0.4	**−0.5**
2016	0.2	0.4	−2.2	−0.8	−1.5	3.6	0.0	−0.5	−0.3	−2.4	−1.3	0.4	**−4.5**
2017	−1.5	1.2	−0.8	−0.5	1.5	−2.1	1.8	0.0	−1.4	1.2	0.5	1.5	**1.5**
2018	2.4	−1.6	−0.9										**−0.1**

Source: Munich Re, March 2018

This chart illustrates the performance of the FIVE Trend Index during various periods of market stress. Historically, the index has been an effective counterweight to equities during turbulent times.
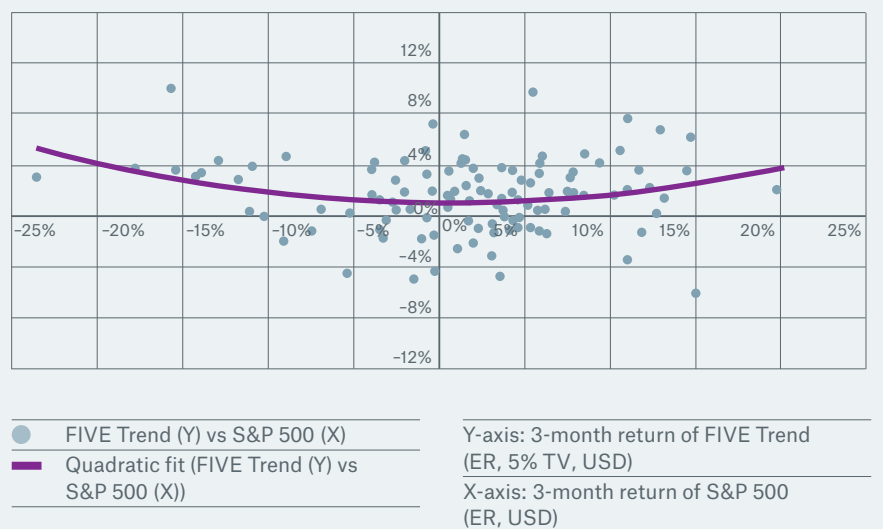
Performance during times of market turbulence

FIVE Trend Index (ER, 5% TV, USD)
S&P 500 (ER, USD)
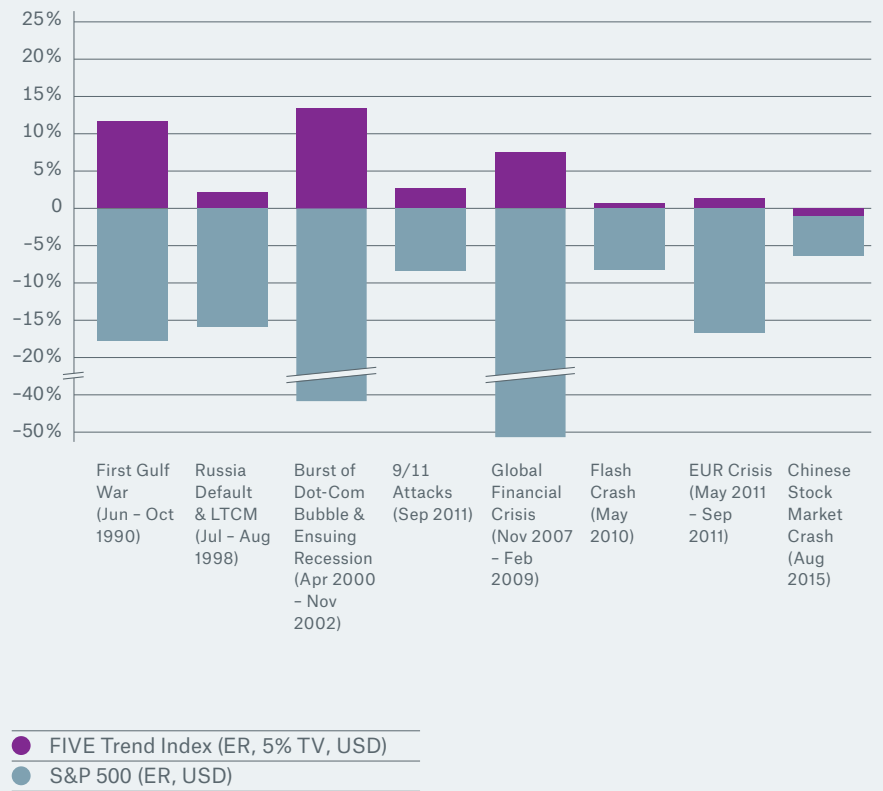
Source: Munich Re, Bloomberg L.P., March 2018

The so-called "Managed Futures Smile" shows that trend following strategies tend to produce positive returns when equities are in a strong – over even extreme – bull or bear market. This chart plots the 3-month return of the FIVE Trend Index against the 3-month return of the S&P 500 Index, showing that the more pronounced the positive or negative 3-month return of the S&P 500, the stronger the positive 3-month return of the FIVE Trend Index. Because trend following strategies tend to perform well during equity bear markets, they are said to produce "crisis alpha."

Return comparison vs. S&P 500

FIVE Trend (Y) vs S&P 500 (X)
Quadratic fit (FIVE Trend (Y) vs S&P 500 (X))

Y-axis: 3-month return of FIVE Trend (ER, 5% TV, USD)
X-axis: 3-month return of S&P 500 (ER, USD)

Source: Munich Re, Bloomberg L.P., March 2018

The Trend Index has recorded more positive than negative calendar month returns in the past. Moreover, the magnitude of the average positive month has been greater than that of the average negative month – an attractive feature for investors.

This chart displays the historical monthly return distribution of the FIVE Trend Index (ER, 5% TV, USD). It shows that **positive** monthly index returns exceed **negative** monthly index returns both by number and magnitude.

Frequency of historical calendar month returns

-40%   +60%
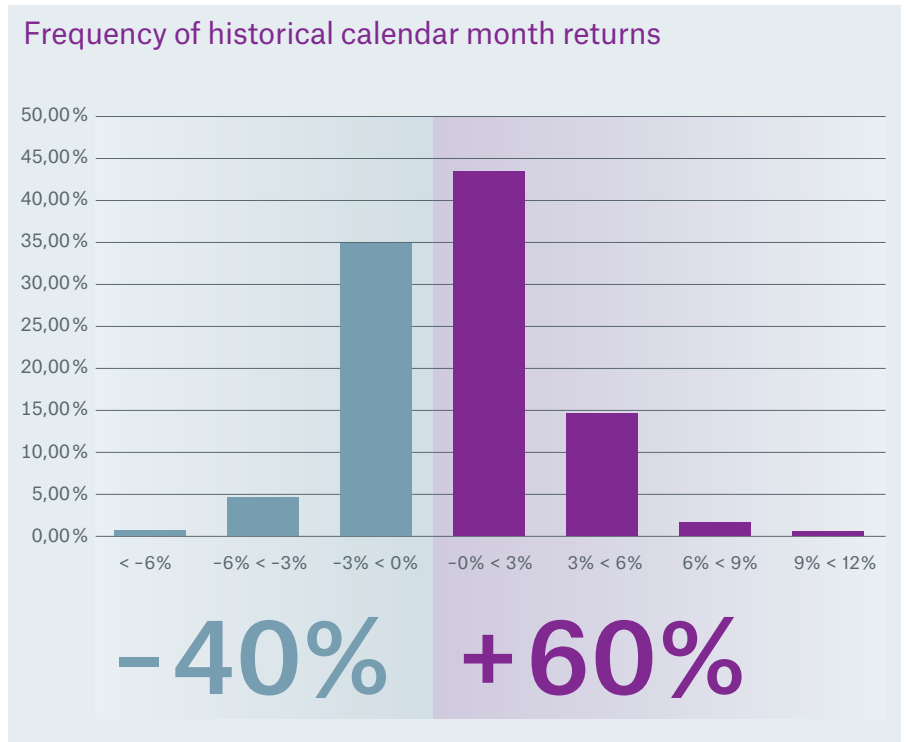
Source: Munich Re, March 2018

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