

## Sell in May, and Go Away?

We're not inclined to automatically buy in to perceived wisdom, and you probably aren't either; but that shouldn't stop either of us from at least exploring market proverbs to see if there a kernel of truth within them. With that, several years ago, we found an article that took a stab at return seasonality<sup>1</sup>, specifically where stock market performance seems to be better in the winter than in the summer.<sup>2</sup>

In the spirit of Edward Tufte, the author created an excellent infographic describing the seasonality of stock market returns. We've pasted it in to the right. It highlights (in dark red) the best six months in any given year – but instead of simply looking at one single year, it analyses the average returns in any given month for the next twenty years. The conclusions one can immediately draw from the table struck us as almost too good to be true.<sup>3</sup>

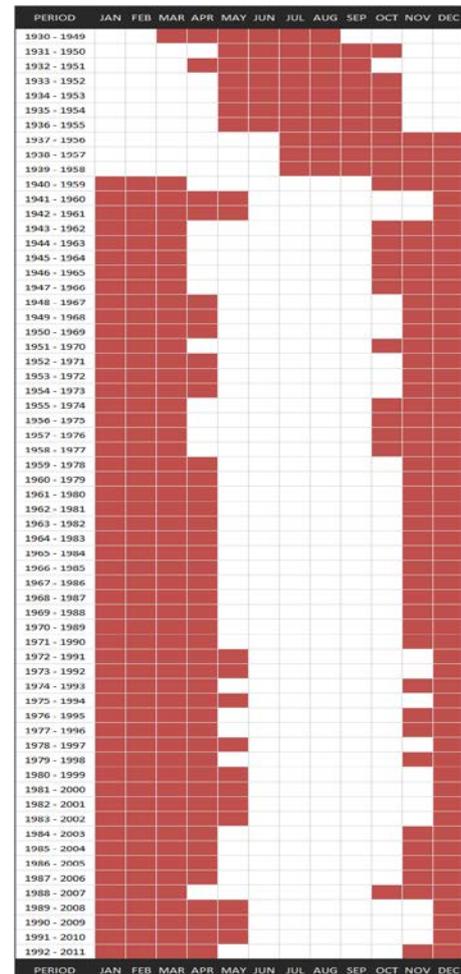
Over a ~70 year period (1940-2011), the consistency of returns by month appeared remarkable. Essentially, the best six months of the year seem to almost always include Jan-March and Nov-Dec, with April and October fighting over the final spot. The six worst months seem to reliably begin in May (sometimes April) and run through October (sometimes September). So, perhaps there was some truth to the old adage "sell in May, and go away"?

Curiously, the creator of the table also added a comment "the 'best' six month period was chosen based on volatility-adjusted (not absolute) dividend adjusted S&P 500 returns". This made us wonder if he perhaps massaged the data to tell his story (perhaps using Sharpe ratios as the proxy?).

So, wondering if that clouded the analysis, we were curious enough to pull down some data ourselves and play with it. We pulled an end-of month total return series (thus, including dividends) on the S&P 500 since December of 1939. Before presenting similar tables of our data, there is one broad point that is worth making. **Since 1940 – which was 78 years ago – every single month has shown an average positive return.**

However, there has been a significant difference in "performance" by each month (if we can call it that) which may or may not be random. We're not going to prove the non-randomness of this here, but plenty of papers out there have made this attempt. In any event, on to our observations:

MAY 20XX						
SUN	MON	TUE	WED	THU	FRI	SAT
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		



<sup>1</sup> <http://marketsci.wordpress.com/2012/05/03/sell-in-may-debunked/>

<sup>2</sup> *The northern hemisphere winter, that is. Someone else can compare southern and northern hemisphere returns.*

<sup>3</sup> *The author implicitly thought the data was too good to be true as well, as it was part of a larger article attempting to debunk the seasonality implicit in the "Sell in May and go away" trading adage. As part of this article, he showed an impressive cumulative outperformance of a trading strategy long from November to April and then neutral from May to October – but suggested that it was backward looking – and that if any investor had simply been long the six best months from over the previous ten or twenty years to that date – there was no outperformance as you "walked the test forward". Interestingly, however, when he based the investment decision on thirty years of data instead of ten or twenty, the seasonality reared itself again.*

The average total returns by month of the SPX from December of 1939 through January of 2018 are below:

January	February	March	April	May	June	July	August	September	October	November	December
1.13%	0.13%	1.63%	1.41%	0.37%	0.97%	1.11%	0.10%	0.12%	1.15%	1.19%	2.46%

Since *all* of the months are winners, the adage “sell in May and go away” seems like a misnomer at first blush. But let’s explore it a little bit further. A great deal of empirical work has been done on seasonality and return anomalies, including some suggesting that the “Sell in May” or “Halloween Effect” has been persistent not just in the US, but in the UK – and for over 300 years.<sup>4</sup> However, we have not seen any similar infographics accompanying this kind of work – and we think they are fascinating, and perhaps illuminating. When we rank the months above by colouring the top six performers in green, and inserting the monthly ranking – some seasonality does indeed start to emerge:

1 Yr Data												
Average	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ranking	6	10	2	3	9	8	7	12	11	5	4	1

And if we take the returns five years at a time (so, from 1940-1944, 1941-1945....2013-2017):

5 Yr Data												
Average	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ranking	5	11	2	3	9	8	7	10	12	6	4	1

And with ten year data:

10 Yr Data												
Average	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ranking	5	12	2	3	9	8	7	10	11	6	4	1

And with twenty year data:

20 Yr Data												
Average	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ranking	5	11	3	4	9	8	7	10	12	6	2	1

So, a few observations:

- *At least in the period from 1940 through 2017, the gains from buying in late-September and selling in late April have exceeded those from May to September.*
- *The difference is stark. In the five months from May to September, the average gain has been 2.7%. In the seven months from October to April, the average gain has been 9.4%.*
- *Cumulatively, over the past 78 years, the S&P 500 has seen May to September gains of 455%. The October to April period has experienced gains of over 70,000%.*

To see how the seasonality really emerges as we go from shorter to longer time horizons, the tables on the following page emulate the infographic from the website. Our results use actual returns rather than Sharpe ratios (or other volatility-adjusted metrics), and we haven’t done anything special with any factors. In any event, however, we think it is fair to conclude (as many empirical studies already have) that there may be something to this “selling in May and going away” thing, especially over very long time horizons.

Not practical, perhaps, but interesting.

<sup>4</sup> *Are Monthly Seasonals Real? A Three Country Perspective.* Jacobsen Yang (2010). Abstract: Over 300 years of UK stock returns reveal that well-known monthly seasonals are sample specific. For instance, the January effect only emerges around 1830, which coincides with Christmas becoming a public holiday. Most months have had their 50 years of fame, showing the importance of long time series to safeguard against sample selection bias, noise, and data snooping. Only- yet undocumented- monthly July and October effects do persist over three centuries, as does the half yearly Halloween, or Sell-in-May effect. Winter returns – November through April- are consistently higher than (negative) summer returns, indicating predictably negative risk premia. A Sell-in-May trading strategy beats the market more than 80 % of the time over 5 year horizons.

## Seasonality of Stock Market Returns (S&P 500, Including Dividends):

### Rankings on Individual Monthly Returns:

Ranking of Individual Month Performance  
S&P 500

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1940	10	8	7	9	12	1	3	6	4	2	11	5
1941	10	7	3	11	4	1	2	6	5	12	9	8
1942	7	10	12	11	2	4	6	8	5	3	9	1
1943	2	4	3	8	6	5	11	9	7	10	12	1
1944	5	10	4	11	3	1	12	6	8	9	7	2
1945	8	2	12	1	9	10	11	3	4	5	6	7
1946	1	10	3	4	5	9	8	11	12	6	7	2
1947	4	9	8	12	7	1	3	10	6	5	11	2
1948	9	10	1	5	2	6	11	7	8	3	12	4
1949	8	12	4	10	11	6	2	7	3	5	9	1
1950	7	8	6	4	3	12	9	5	1	10	11	2
1951	2	7	9	4	12	10	1	5	6	11	8	3
1952	7	11	2	12	5	1	6	10	9	8	4	3
1953	8	10	9	11	7	6	2	12	4	1	5	3
1954	5	10	7	6	8	9	4	12	1	11	2	3
1955	6	8	9	4	10	1	3	11	5	12	2	7
1956	9	5	1	6	12	3	2	11	10	7	8	4
1957	10	9	3	1	2	6	5	12	11	8	4	7
1958	4	12	5	7	10	6	3	11	2	8	9	1
1959	9	10	7	1	4	8	3	11	12	6	5	2
1960	12	6	8	9	4	3	10	5	11	7	2	1
1961	1	5	6	9	8	12	3	7	11	4	2	10
1962	8	4	7	10	12	11	2	5	9	6	1	3
1963	1	12	4	3	7	11	8	2	9	6	10	5
1964	2	8	4	10	7	3	5	12	1	9	11	6
1965	3	8	9	2	10	12	7	5	1	4	11	6
1966	4	10	9	2	11	7	8	12	6	1	5	3
1967	1	8	2	4	12	7	3	10	5	11	9	6
1968	12	10	4	1	7	5	9	6	3	8	2	11
1969	6	10	3	4	5	11	12	2	8	1	9	7
1970	11	3	7	12	10	9	1	5	6	8	4	2
1971	2	6	3	4	12	7	10	5	9	11	8	1
1972	4	3	9	8	5	12	10	2	11	7	1	6
1973	7	10	5	11	8	6	2	9	1	4	12	3
1974	3	2	6	8	7	4	10	11	12	1	9	5
1975	1	3	8	4	6	5	12	10	11	2	7	9
1976	1	10	4	9	11	3	8	6	5	12	7	2
1977	12	9	6	4	10	1	7	8	5	11	2	3
1978	11	10	4	1	7	9	2	3	8	12	5	6
1979	4	11	1	8	10	5	7	2	9	12	3	6
1980	3	10	12	5	4	6	2	9	7	8	1	11
1981	10	4	3	8	5	7	6	12	11	1	2	9
1982	9	12	7	3	11	8	10	1	6	2	4	5
1983	3	5	4	1	10	2	12	7	8	11	6	9
1984	8	11	4	5	12	3	10	1	7	6	9	2
1985	1	7	8	9	3	6	10	11	12	5	2	4
1986	8	1	4	9	5	7	11	2	12	3	6	10
1987	1	5	7	9	8	4	3	6	10	12	11	2
1988	4	1	11	7	8	2	9	12	3	5	10	6
1989	2	12	6	3	4	10	1	8	9	11	7	5
1990	11	5	4	9	1	8	6	12	10	7	2	3
1991	4	2	6	9	5	12	3	7	10	8	11	1
1992	10	4	11	3	7	9	1	12	6	8	2	5
1993	7	5	3	12	2	8	9	1	10	4	11	6
1994	2	10	12	7	5	9	3	1	8	4	11	6
1995	8	4	6	7	3	9	5	11	2	12	1	10
1996	3	9	8	7	5	10	12	6	2	4	1	11
1997	2	9	11	4	3	7	1	12	5	10	6	8
1998	8	2	6	9	11	7	10	12	3	1	4	5
1999	4	11	5	6	9	3	12	8	10	1	7	2
2000	10	7	1	9	8	3	6	2	11	5	12	4
2001	3	12	10	1	6	8	7	9	11	4	2	5
2002	6	7	3	9	5	10	11	4	12	1	2	8
2003	12	11	8	1	3	7	6	5	10	2	9	4
2004	4	6	10	11	7	3	12	9	8	5	1	2
2005	12	4	10	11	3	6	2	8	5	9	1	7
2006	2	10	8	7	12	11	9	4	3	1	5	6
2007	5	10	7	1	3	9	11	6	2	4	12	8
2008	8	7	5	1	3	10	6	2	11	12	9	4
2009	11	12	2	1	5	9	3	7	6	10	4	8
2010	9	6	4	7	12	11	2	10	1	5	8	3
2011	4	2	6	3	8	9	10	11	12	1	7	5
2012	1	2	4	10	12	3	7	6	5	11	9	8
2013	1	10	4	9	8	11	2	12	5	3	6	7
2014	12	1	7	8	5	6	10	2	11	4	3	9
2015	11	2	7	5	4	9	3	12	10	1	6	8
2016	12	10	1	6	5	7	3	8	9	11	2	4
2017	6	1	12	9	7	10	5	11	4	3	2	8

### Rankings on 20 Year Average of Monthly Returns

Ranking of Individual Month Performance (average of 20 years of observations)  
S&P 500

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1940 - 1959	6	12	4	7	9	2	3	11	5	8	10	1
1941 - 1960	7	12	3	6	5	2	4	11	8	9	10	1
1942 - 1961	6	12	3	7	5	2	4	11	9	8	10	1
1943 - 1962	7	11	2	6	8	4	3	12	10	9	5	1
1944 - 1963	8	12	2	6	9	4	3	11	10	7	5	1
1945 - 1964	7	12	3	5	9	6	2	11	10	8	4	1
1946 - 1965	5	12	2	6	9	7	3	11	10	8	4	1
1947 - 1966	8	12	3	7	10	6	2	11	9	5	4	1
1948 - 1967	6	12	3	5	10	9	2	11	8	7	4	1
1949 - 1968	7	12	4	5	11	8	2	10	6	9	3	1
1950 - 1969	6	12	4	5	10	9	2	11	7	8	3	1
1951 - 1970	8	11	4	5	12	9	2	10	7	6	3	1
1952 - 1971	9	11	3	5	12	8	4	10	7	6	2	1
1953 - 1972	8	11	3	5	12	9	4	10	7	6	2	1
1954 - 1973	7	11	2	5	12	9	3	10	6	8	4	1
1955 - 1974	7	9	2	5	12	8	4	10	11	3	6	1
1956 - 1975	6	8	3	4	12	10	7	9	11	2	5	1
1957 - 1976	4	9	3	5	12	11	7	8	10	2	6	1
1958 - 1977	3	9	4	6	12	11	7	8	10	2	5	1
1959 - 1978	5	9	2	3	12	11	7	8	10	4	6	1
1960 - 1979	3	11	2	5	12	10	8	7	9	6	4	1
1961 - 1980	1	11	5	4	12	10	7	8	9	6	3	2
1962 - 1981	3	11	5	4	12	10	7	8	9	6	1	2
1963 - 1982	3	11	5	1	12	9	10	7	8	2	6	4
1964 - 1983	2	11	6	1	12	7	10	8	9	4	3	5
1965 - 1984	5	11	7	1	12	8	10	6	9	3	2	4
1966 - 1985	3	11	6	1	12	8	10	7	9	5	2	4
1967 - 1986	5	9	4	3	12	8	10	2	11	6	1	7
1968 - 1987	2	9	4	6	10	7	11	1	12	8	5	3
1969 - 1988	1	9	5	7	10	4	11	2	12	8	6	3
1970 - 1989	1	8	6	7	11	4	9	3	12	10	5	2
1971 - 1990	1	9	6	4	8	3	11	7	12	10	5	2
1972 - 1991	1	9	6	4	7	3	11	8	12	10	5	2
1973 - 1992	1	8	7	4	6	3	9	10	12	11	5	2
1974 - 1993	1	9	7	5	6	4	11	8	12	10	3	2
1975 - 1994	1	10	8	4	6	7	9	5	12	11	3	2
1976 - 1995	1	10	9	5	6	8	7	4	12	11	3	2
1977 - 1996	3	10	9	5	6	8	7	2	12	11	1	4
1978 - 1997	1	9	10	4	3	8	6	7	11	12	2	5
1979 - 1998	1	6	9	5	4	8	7	10	12	11	2	3
1980 - 1999	1	7	10	5	4	6	9	11	12	8	2	3
1981 - 2000	2	8	3	6	4	7	11	10	12	9	5	1
1982 - 2001	1	9	6	3	4	7	11	10	12	8	5	2
1983 - 2002	1	8	5	6	3	7	10	11	12	9	4	2
1984 - 2003	2	9	5	6	3	8	10	11	12	7	4	1
1985 - 2004	3	8	7	6	2	9	10	11	12	5	4	1
1986 - 2005	3	7	6	5	1	9	10	11	12	8	4	2
1987 - 2006	2	9	7	5	3	10	6	12	11	8	4	1
1988 - 2007	6	9	7	5	1	10	8	12	11	3	4	2
1989 - 2008	7	9	6	3	1	10	8	11	12	5	4	2
1990 - 2009	8	11	5	3	1	9	7	10	12	6	4	2
1991 - 2010	8	11										

# Monthly, Average, and Cumulative Data:

S&P 500 Total Return Indices (Including Dividends)													
	1	2	3	4	5	6	7	8	9	10	11	12	
	January	February	March	April	May	June	July	August	September	October	November	December	Annual
1939													
1940	-3.29%	0.66%	0.99%	0.08%	-23.95%	10.36%	3.11%	2.04%	2.86%	3.94%	-4.60%	2.08%	-9.55%
1941	-4.82%	-1.49%	1.21%	-6.55%	0.75%	7.78%	5.48%	-1.06%	0.68%	-6.86%	-4.00%	-2.30%	-11.99%
1942	1.84%	-2.94%	-6.05%	-4.37%	6.40%	4.66%	3.13%	0.70%	3.94%	5.76%	-0.75%	7.21%	20.15%
1943	6.86%	5.08%	6.11%	0.09%	3.97%	4.40%	-4.05%	-0.42%	3.39%	-1.41%	-7.47%	7.71%	25.63%
1944	1.54%	-0.25%	2.28%	-1.25%	4.04%	7.04%	-2.08%	0.87%	0.39%	0.31%	0.39%	5.07%	19.54%
1945	1.43%	6.16%	-4.83%	9.68%	1.15%	0.67%	-1.41%	5.80%	4.38%	3.74%	3.24%	2.15%	36.33%
1946	6.97%	-6.95%	4.98%	3.99%	2.24%	-2.66%	-2.55%	-7.29%	-9.25%	-0.80%	-1.08%	5.72%	-8.02%
1947	2.35%	-1.47%	-0.97%	-3.89%	-0.89%	7.20%	3.62%	-2.79%	-0.20%	2.12%	-2.92%	3.94%	5.63%
1948	-4.05%	-5.11%	9.12%	2.65%	7.82%	1.98%	-5.32%	0.76%	-1.75%	6.52%	-10.61%	5.29%	5.37%
1949	0.13%	-3.94%	-4.17%	-2.32%	-3.54%	1.90%	6.21%	1.20%	6.18%	2.95%	0.12%	9.22%	23.61%
1950	1.55%	1.00%	2.15%	3.88%	4.57%	-3.57%	3.25%	0.85%	0.41%	-0.10%	-7.48%	32.62%	32.62%
1951	6.02%	0.65%	-0.32%	4.42%	-4.06%	-0.79%	6.87%	3.93%	1.25%	-1.38%	-0.26%	5.90%	23.84%
1952	1.56%	-3.65%	5.89%	-4.31%	6.37%	1.76%	-1.46%	-0.72%	-0.08%	4.65%	5.18%	18.16%	18.16%
1953	-0.72%	-1.82%	-1.35%	-2.65%	-0.32%	0.12%	2.53%	-5.78%	1.46%	5.10%	0.90%	2.02%	-0.94%
1954	3.12%	0.27%	4.09%	4.90%	3.29%	1.47%	5.72%	-3.40%	9.42%	-1.95%	8.08%	6.60%	52.27%
1955	1.81%	0.35%	0.33%	3.77%	-0.13%	9.34%	6.07%	-0.78%	2.01%	-3.05%	7.49%	1.12%	31.41%
1956	-3.65%	3.47%	6.93%	0.60%	-6.57%	5.00%	5.15%	-3.81%	-3.66%	0.51%	-1.10%	-4.50%	6.48%
1957	-4.18%	-3.26%	2.84%	3.70%	3.69%	0.91%	1.14%	-5.61%	-5.20%	-3.21%	1.61%	-3.02%	-10.72%
1958	4.28%	-2.06%	3.97%	3.18%	1.50%	3.63%	4.31%	1.19%	5.78%	2.54%	2.24%	6.14%	43.15%
1959	0.38%	-0.02%	0.74%	3.88%	1.89%	0.44%	3.49%	-1.50%	-3.78%	1.13%	1.32%	3.64%	11.95%
1960	-7.15%	0.92%	-0.52%	-1.75%	2.69%	2.81%	-2.48%	2.61%	-5.21%	-0.24%	4.01%	5.55%	0.45%
1961	6.32%	2.69%	2.55%	1.12%	1.91%	-2.16%	3.28%	1.96%	-1.25%	2.83%	3.93%	1.12%	26.88%
1962	-3.79%	1.63%	0.13%	-6.20%	-8.60%	-7.35%	6.36%	1.53%	-3.96%	0.44%	10.16%	2.35%	-8.66%
1963	4.91%	-2.89%	4.36%	-4.85%	1.43%	-1.24%	-0.35%	4.87%	-0.39%	3.22%	-1.05%	3.39%	22.76%
1964	2.69%	0.99%	2.25%	0.61%	1.15%	2.39%	1.82%	-1.62%	3.58%	0.81%	-0.52%	1.28%	16.43%
1965	3.32%	-0.15%	-0.74%	3.42%	-0.77%	-4.12%	1.34%	2.25%	3.92%	2.73%	-0.88%	1.78%	12.46%
1966	0.49%	-1.79%	-1.44%	2.05%	-5.41%	-0.79%	-1.35%	-7.78%	0.19%	0.83%	0.31%	0.83%	-10.02%
1967	7.62%	0.20%	-4.76%	4.22%	-5.24%	2.55%	4.53%	-1.17%	4.04%	-2.91%	0.11%	3.47%	23.89%
1968	-4.38%	-3.12%	1.77%	8.19%	1.12%	1.67%	-1.85%	1.15%	4.61%	0.72%	4.80%	-3.40%	11.04%
1969	-0.82%	-4.74%	3.44%	2.92%	-0.22%	-4.80%	-6.02%	4.01%	-1.70%	4.42%	-3.53%	-0.97%	-8.40%
1970	-7.36%	5.58%	0.44%	-8.75%	-5.78%	-4.66%	7.69%	4.78%	3.62%	-0.83%	5.06%	5.97%	3.94%
1971	4.32%	1.17%	3.94%	3.89%	-4.16%	0.59%	-3.87%	3.88%	-0.44%	-3.91%	0.02%	8.88%	14.30%
1972	2.06%	2.77%	0.59%	0.92%	1.97%	-1.94%	0.48%	3.69%	-0.25%	1.18%	4.81%	1.42%	19.00%
1973	-1.49%	-3.52%	0.08%	-3.83%	-1.63%	-0.40%	4.07%	-3.41%	4.27%	0.17%	-11.09%	1.98%	-14.69%
1974	-0.72%	-0.07%	-2.05%	-3.99%	-3.02%	-1.13%	-7.42%	-8.64%	-11.52%	16.81%	-4.88%	-1.56%	-26.47%
1975	12.72%	6.38%	2.54%	5.10%	4.77%	4.77%	-6.44%	-1.76%	-3.12%	6.53%	2.82%	-0.81%	37.23%
1976	12.17%	-0.84%	3.37%	-0.78%	-1.11%	4.43%	-0.48%	-0.18%	2.58%	-1.86%	-0.41%	5.61%	23.93%
1977	-4.73%	-1.82%	-1.05%	0.42%	-1.96%	4.94%	-1.24%	1.72%	0.16%	-3.90%	3.16%	0.75%	-7.16%
1978	-5.74%	-2.03%	2.94%	9.02%	0.92%	-1.38%	5.83%	3.01%	-0.32%	-8.72%	2.15%	1.96%	6.57%
1979	4.43%	-3.21%	5.96%	0.63%	-2.17%	4.35%	1.34%	5.77%	0.43%	-6.40%	4.75%	2.14%	18.61%
1980	6.22%	-0.01%	-9.72%	4.62%	5.15%	3.16%	6.96%	1.01%	2.94%	2.02%	10.65%	-3.02%	32.50%
1981	-4.18%	1.74%	4.00%	-1.93%	0.26%	-0.63%	0.21%	-5.77%	-4.93%	5.40%	4.13%	-2.56%	-4.92%
1982	-1.31%	-5.59%	-0.52%	4.52%	-3.92%	-0.98%	-1.78%	12.14%	1.25%	11.51%	4.04%	1.93%	21.55%
1983	3.72%	2.29%	3.69%	7.88%	-0.87%	3.89%	-2.95%	1.50%	1.38%	-1.16%	2.11%	-0.52%	22.56%
1984	-0.56%	-3.52%	1.73%	0.95%	-5.54%	2.17%	-1.24%	11.04%	0.02%	0.39%	-1.12%	2.63%	6.27%
1985	7.79%	1.22%	0.07%	0.09%	5.78%	1.57%	-0.15%	-0.86%	-3.13%	4.62%	6.86%	4.84%	31.72%
1986	0.56%	7.47%	5.58%	-1.13%	5.32%	1.69%	-5.59%	7.42%	-8.27%	5.77%	2.43%	-2.55%	18.67%
1987	11.47%	3.95%	2.89%	0.87%	5.05%	5.07%	1.73%	-2.19%	-21.54%	-8.24%	7.61%	5.25%	5.25%
1988	4.21%	4.66%	-3.09%	1.11%	0.86%	4.59%	-0.38%	-3.40%	4.26%	2.78%	-1.43%	1.74%	16.61%
1989	7.31%	-2.49%	2.33%	5.19%	4.05%	-0.57%	9.03%	1.95%	-0.41%	-2.32%	2.04%	2.40%	31.67%
1990	-6.71%	1.28%	2.65%	-2.51%	9.74%	-0.68%	-0.33%	-9.05%	-4.87%	-0.44%	6.46%	2.78%	-3.18%
1991	4.35%	7.14%	2.42%	0.23%	4.31%	-4.58%	4.66%	2.36%	-1.67%	1.34%	-4.01%	11.43%	30.40%
1992	-1.80%	1.29%	-1.95%	2.94%	0.50%	-1.49%	4.09%	-2.05%	1.18%	0.35%	3.40%	1.23%	7.62%
1993	0.84%	1.36%	2.11%	-2.42%	0.29%	0.40%	3.79%	-0.77%	2.07%	-0.95%	1.21%	10.07%	10.07%
1994	3.40%	-2.71%	-4.36%	1.28%	1.64%	-2.45%	3.28%	4.10%	-2.45%	2.25%	-3.64%	1.48%	1.31%
1995	2.59%	3.90%	2.95%	2.94%	3.99%	2.32%	3.31%	0.25%	4.22%	-0.36%	4.39%	1.92%	37.54%
1996	3.39%	0.93%	0.96%	1.47%	2.57%	0.38%	-4.42%	2.11%	5.63%	2.75%	7.56%	-1.98%	22.91%
1997	0.24%	0.78%	-4.11%	5.36%	6.09%	4.48%	7.95%	-5.61%	5.48%	-3.34%	4.63%	1.72%	33.32%
1998	1.10%	7.21%	1.72%	1.00%	-1.72%	4.06%	-1.07%	-14.46%	6.41%	8.13%	6.06%	5.76%	28.55%
1999	4.18%	-3.11%	4.00%	3.87%	-2.36%	5.55%	-3.12%	-0.49%	-2.74%	6.33%	2.03%	5.89%	21.04%
2000	-5.02%	-1.89%	9.78%	-3.01%	-2.05%	2.47%	-1.56%	6.21%	-5.28%	-0.42%	-7.88%	0.49%	-9.10%
2001	3.55%	-9.12%	-6.33%	7.77%	-2.43%	-0.99%	-6.26%	-8.08%	1.91%	7.67%	0.88%	-11.89%	-11.89%
2002	-1.46%	-1.93%	3.76%	-6.06%	-0.74%	-7.11%	-7.80%	0.65%	-10.87%	8.80%	5.89%	-5.88%	-22.10%
2003	-2.62%	-1.50%	0.97%	8.23%	5.27%	1.28%	1.76%	1.95%	-1.06%	5.63%	0.88%	5.24%	28.66%
2004	1.84%	1.39%	-1.51%	-1.57%	1.37%	1.94%	-3.31%	0.40%	1.08%	1.53%	4.05%	3.40%	10.88%
2005	-2.44%	2.10%	-1.77%	-1.90%	3.18%	0.14%	3.72%	-0.91%	0.81%	-1.67%	3.78%	0.03%	4.91%
2006	2.65%	0.27%	1.24%	1.34%	-2.88%	0.13%	0.62%	2.38%	2.57%	3.26%	1.90%	1.39%	15.78%
2007	1.51%	-1.96%	1.12%	4.43%	3.49%	-1.66%	-3.10%	1.50%	3.74%	1.59%	-4.10%	-0.70%	5.57%
2008	-6.00%	-3.25%	-0.43%	4.87%	1.30%	-8.43%	0.84%	1.43%	-8.91%	16.79%	-7.18%	1.06%	-37.00%
2009	-8.43%	-10.65%	8.76%	9.57%	5.59%	0.20%	7.56%	3.61%	3.73%	-1.86%	5.99%	1.93%	26.45%
2010	-3.60%	3.10%	6.03%	1.58%	-7.99%	-5.24%	7.01%	-4.51%	8.92%	3.80%	0.01%	6.68%	15.06%
2011	2.37%	3.43%	0.04%	2.96%	-1.13%	-1.67%	-2.03%	-5.43%	-7.03%	10.93%	-0.22%	1.02%	2.11%
2012	4.48%	4.32%	3.28%	0.63%	-6.01%	4.12%	1.39%	2.25%	2.58%	-1.85%	0.58%	0.91%	15.99%
2013	5.18%	1.36%	3.75%	1.93%	2.34%	-1.34%	5.09%	-2.90%	3.14%	4.60%	3.05%	2.52%	32.37%
2014	-3.46%	4.57%	0.84%	0.74%	2.35%	2.07%	-1.38%	4.00%	-1.40%	2.44%	2.69%	-0.26%	13.68%
2015	-3.00%	5.75%	-1.58%	0.96%	1.29%	-1.94%	2.10%	-6.03%	-2.47%	8.44%	0.30%	-1.59%	1.37%
2016	-4.96%	-0.13%	6.78%	0.39%	1.80%	0.26%	3.69%	0.14%	0.02%	-1.82%	3.70%	1.97%	11.95%
2017	1.90%	3.97%	0.12%	1.03%	1.41%	0.62%	2.06%	0.31%	2.06%	2.33%	3.07%	1.10%	21.82%
2018	5.72%												

	January	February	March	April	May	June	July	August	September	October	November	December	Annual Return	
Average	1.13%	0.13%	1.63%	1.41%	0.37%	0.97%	1.11%	0.10%	0.12%	1.15%	1.19%	2.46%	12.37%	
Cumulative	122.96%	5.50%	237.17%	180.75%	21.95%	102.28%	122.33%	-0.10%	1.35%	117.90%	132.39%	538.08%	377824.78%	
September 30 - April 30, Average							9.43%	2.69% April 30 - September 30, Average						
September 30 - April 30, Cumulative							71847.36%	455.34% April 30 - September 30, Cumulative						



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