



The End of the Trend

Introduction

Trend analysis is viewed one of the cornerstones of trading academics, and is certainly one of the most intuitive concepts for even the most novice of investor. Whether one is actively *trend trading* or simply trying to determine directional bias, recognizing the existence of a trend is essential in order to trade with the current, rather than against it.

In this paper we will try to determine to what extent the US stock market has shown a propensity towards trending, and whether this has changed, if at all, over the past few decades.

Analysis

There are many possible ways to define the term "trend" within a time series. The simplest, and the one that we will use here, is to define a trend as a string of consecutive days that close in the same direction. So an "up trend" exists when there have been a minimum of two consecutive up days, and a "down trend" exists when there have been a minimum of two consecutive down days.

Let us now look at the numbers of consecutive up/down days over the past 4 decades. For this analysis we will use the S&P500 Index (SPX) from 1970 to 2010.

Decade	Up Days in a Row					
	1	2	3	4	5	Over 5
1970 - 1979	206	125	89	53	20	30
1980 - 1989	268	155	88	50	16	28
1990 - 1999	264	142	107	47	28	22
2000 - 2009	377	189	91	47	20	22

Table 1 above shows the number of X consecutive up days per decade. Most noticeable are the first two columns that show the number of times the market closed up only 1 or 2 up days in a row. These have increased quite markedly from the 1970's through to the 2000's, indicating a rise in the market's tendency to "chop" from one day to another. The last column also shows that the number of extended run ups in the market has somewhat declined over the past 40 years.

Decade	Down Days in a Row					
	1	2	3	4	5	Over 5
1970 - 1979	204	144	76	47	24	27
1980 - 1989	311	146	75	36	18	19
1990 - 1999	306	151	92	35	16	10
2000 - 2009	420	178	91	36	17	4

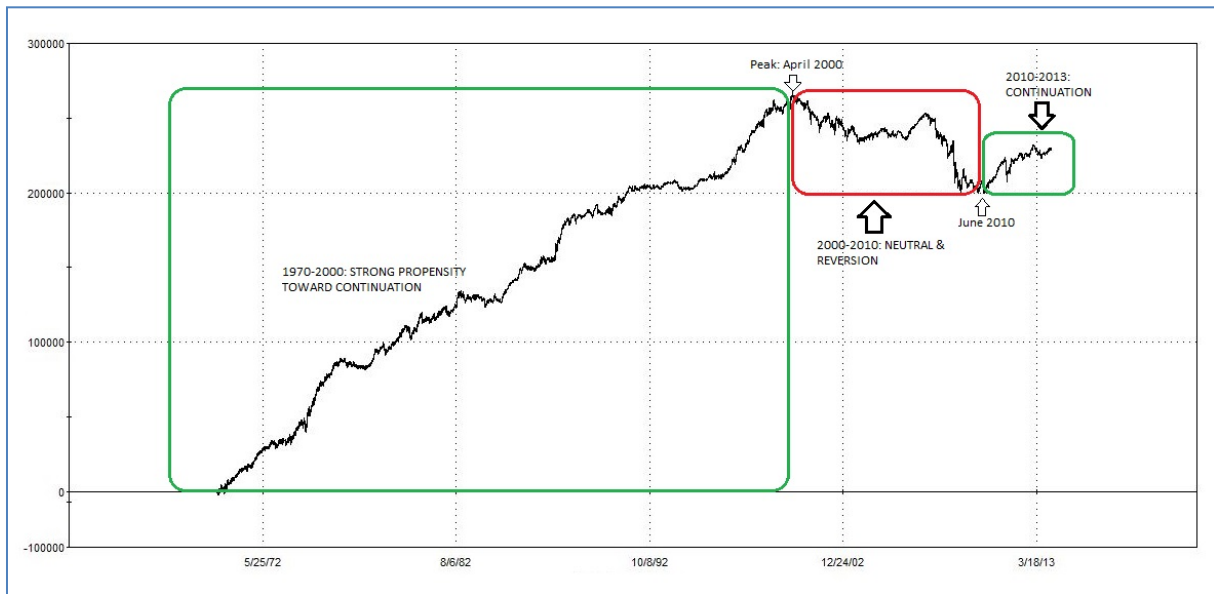
Table 2 lists the number of consecutive down days per decade. Here too the numbers have changed quite markedly over the years. The instances of single down days (i.e. down days immediately followed by an up day), has more than doubled from the 1970's to the 2000's. The increased chop seen on the long side seems to have also affected the short side. Moreover, the number of instances of 5 down days or more in a row has dropped quite markedly, from 27 in the 1970's to only 4 in the 2000's. This indicates that the runaway downward movements that existed in the 70's and 80's have all but disappeared, and have been replaced by choppy, mean-reverting chart patterns.

To further understand the evolution of the market's trending profile over the years we will apply a simple continuation strategy to our S&P500 time series. The strategy goes long at the close of an up day and exits on the close of the next day, and goes short on the close of a down day and exits on the close of the next day. So the strategy looks for a continued rise after an up day, and a continued fall after a down day. Detailed results - shown by decade - are listed in the Appendix.



The Mechanical Trader

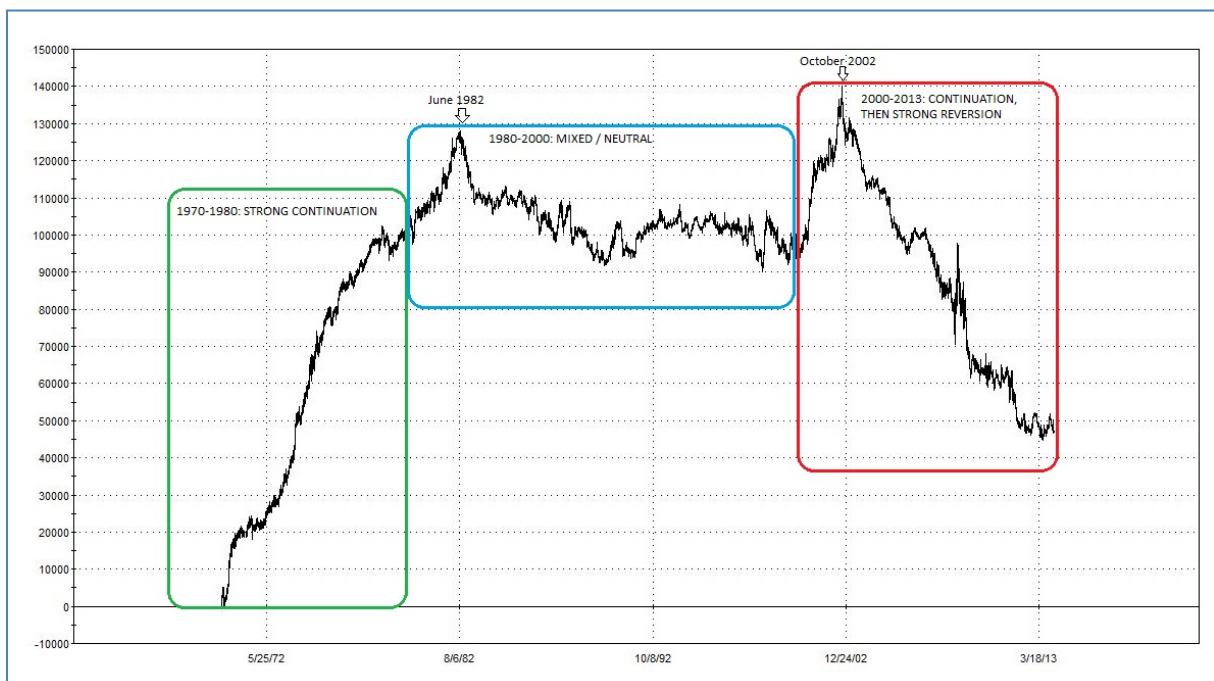
Below is the strategy's equity curve on the long side - i.e. buying when the market has closed up and selling one day later:



The chart shows that throughout the 1970-2000 period the US stock market had a strong tendency to "follow-through". In the 1970's, up days had a 60% chance of being followed by further up days, then 56% in both the 1980's and 1990's. Moreover, up days that followed up days (winning trades) were consistently greater than down days that followed up days (losing trades). The resulting profit factors (see the Appendix for details) would have made for very attractive trend-following systems.

The first decade of the 21st century saw an abrupt change in the market, with only 49% of up days being followed by further up days. And with average losers greater than average winners, the market chopped its way sideways and downward. The more recent and extremely bullish 2010-2013 period, on the other hand, has seen the return of follow-through days (57%), but with somewhat greater volatility than during the 1970-2000 period.

Now let's look at the strategy's equity curve on the short-side - that is, selling short when the market has closed down and exiting one day later:



The steep upward slope throughout the 1970's and up to the mid-1980's indicates that down days tended to be followed by further down days (again approximately 60% of the time). Moreover, as



we saw in Table 2, the 1970's saw a great number of multi-day market drops. There was even one instance of a 10 day losing streak and one instance of an 11 day losing streak, never to occur again in the years that followed. So, despite a 23% market *gain* from 1970-1979, our continuation strategy would have yielded a profit factor of 1.91 on the short side during the 1970's!

The unprecedented bull-run from 1982 to 2000 saw the equity curve flatten out during this period. The probability of a losing day being followed by another losing day dropped to approx 50%. Furthermore, the number of extended losing streaks dropped significantly.

Finally, the consistent fall in the equity curve over the last 10-12 years suggests the end of any "controlled" downward trend in the US stock market. There have of course been some memorable market crashes during this period, notably in 2008. But these events have become both extremely short-lived and violent. No longer does the market drop in drips and drabs over several years. When it falls, it tanks, and then most often quickly recovers.

Summary

As we have seen, the 1970's were the years of winning and losing streaks - "the decade of follow-through". Simple breakout or trend following systems - both on the long and short side - would have been extremely profitable. This was the high-days of the Turtle Traders, where buying winning streaks and shorting losing streaks was the way to go.

The 1980's and 1990's were extremely bullish, offering some fairly good opportunities for long-side trend-following systems. However, long winning streaks became rarer and rarer, possibly due to the extreme rise in trading volumes and to the coming of age of machine trading systems.

Lastly, the past 10 years have seen a marked rise of market chop, even within sustained directional trends. Upward trends are now characterized by rougher, more erratic chart patterns, while long continuous downward streaks have all but disappeared.

So what can be system developers learn from the above? Firstly, that trading the long-side will almost always prove more profitable than trading the short-side since the market's inflationary directional bias gives long positions an inherent edge. Secondly, that continuation-type systems, on the short side, are highly unlikely to prove profitable in today's market as the long losing streaks seen in the 1970's have become increasingly rare. Rather, any sustained downward movement is likely to be a prime entry-point for a mean-reverting system. And lastly, that long-side trend-following and breakout systems need to adapt to increased market chop to continue to prove profitable going forward.



APPENDIX

Strategy rules (long)

Entry on close of an up day

Exit on the close of the following day

Data: S&P500 Index from 1970-2013

From	To	WR	PF	Avg Win	Avg Loss	Tendency
1970	1980	60.45	1.91	0.71%	-0.57%	Strong continuation
1980	1990	56.16	1.48	0.76%	-0.66%	Continuation
1990	2000	56.79	1.42	0.67%	-0.62%	Continuation
2000	2010	48.97	0.84	0.89%	-1.02%	Neutral & Reversion
2010	2013	57.55	1.31	0.79%	-0.81%	Continuation

Strategy rules (short)

Entry on close of a down day

Exit on the close of the following day

Data: S&P500 Index from 1970-2013

From	To	WR	PF	Avg Win	Avg Loss	Tendency
1970	1980	60.44	1.86	0.69%	-0.59%	Continuation
1980	1990	48.60	0.95	0.69%	-0.69%	Mixed / Neutral
1990	2000	49.92	1.01	0.65%	-0.65%	Mixed / Neutral
2000	2010	44.15	0.91	1.01%	-0.88%	Mixed
2010	2013	43.27	0.85	0.86%	-0.77%	Reversion