Single Index ETF Strategy

NASDAQ 100 - $NDX and PowerShares ETF QQQ

Figure 1 shows the equity curve for using SPA3ETF to trade the $NDX (NASDAQ 100). It starts in January 1990 and finishes in November 2014.

This excludes dividends and leverage.

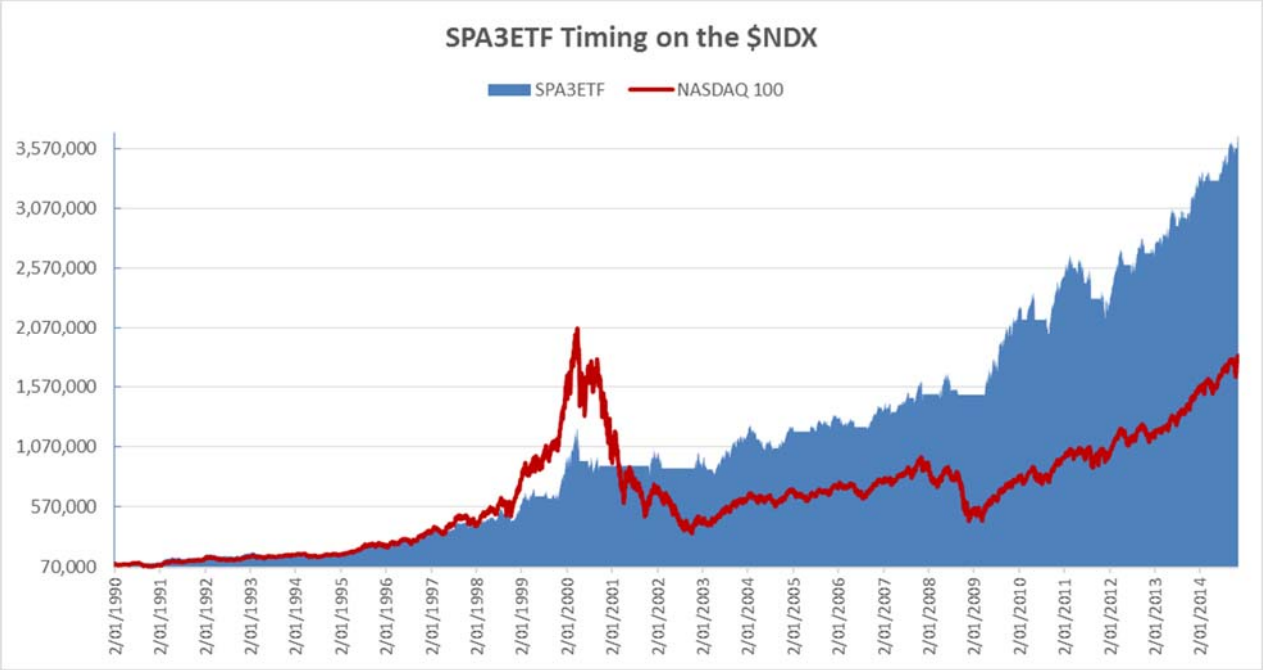


Figure 1

Firstly, a brief explanation of some of the analyses metrics used in the Table 1 below and other statistics tables that are provided in this Manual:

1. **Ending Capital,** which is the value at the end of the research period for a portfolio traded from a starting capital of $100,000. The higher, the better.
   Compare it to the **Buy & Hold** Ending Capital, which should be the benchmark.

2. **Annualised Gain %** which is the CAGR (Compounded Annual Growth Return) or annual geometric average. The higher the better. Compare it to the **Buy & Hold** Annualised Gain %.
   Note that the annual arithmetic mean, or average, is very different to the annual geometric mean and would be much higher but is meaningless as an indicator of

annual growth.

For example, the annual average gain (arithmetic mean) for the Buy & Hold in Table 1 from 1990 – 2014 is 1,723.81% / 24.84 years = 69.4%. This is very different from 12.4% CAGR, as shown in Table 1.

Be careful when reading reports disseminated by the financial industry as most use the arithmetic mean to inflate their annual average returns.

3. **Exposure** over the period - The higher the exposure, the better as the idea of investing in the market is to expose one's capital to the potential that the market offers over alternative investments but to attempt to be on the sidelines when market conditions are not favourable, meaning that the idea is to maximise being in, not to maximise being out.

   Given that indices have upward bias **Exposure** when using timing should be > 60% and closer to 2/3rds, or 67%, than not.
4. **Number of Trades** over the period - The lower, the better, provided other metrics measure up.
5. The **Avg Bars Held** indicates how long the average trade lasts. This metric is in trading days, i.e. it excludes weekends. Therefore, 15 days would be 3 weeks. Too low is not good.
6. **Winning %,** which is the Win Rate, i.e., wining trades divided by the total number of trades. The higher, the better.
7. **Max Drawdown % -** This is the single maximum decline in an equity curve from the previous highest equity peak. The lower, the better, but should be > -25%, that is -30% is unacceptable for an Index and around -20% is acceptable.
8. **Sharpe Ratio,** which is a measure of return taking into consideration the volatility of the equity curve experienced to achieve that return. The higher the Sharpe Ratio, the better. A rule of thumb is that a good Sharpe Ratio should be 60% (1.6x) better than the Buy & Hold of the index.

   Note the Sharpe Ratio for Buy & Hold of the index and use that as the benchmark to indicate the base return-to-volatility for the given period under research.
9. **Expectancy -** The higher the better. This measures the Winning % relative to the size of the average winner, divided by size of the average loser. The formula is E = [(Payoff Ratio + 1) * Winning %] – 1, where Payoff Ratio = Abs(Avg Profit % / Avg Loss %).

Some points to bring to the reader's attention when looking at the statistics in Table 1 and in this section for all the research results provided hereafter:

1. The **Sharpe Ratio** of SPA3ETF on the $NDX, at 0.9412, is nearly 57% better than that of the $NDX itself at 0.5997, over this period.
2. A difference of 3.21% in **Annualised Gain %** (=CAGR), excluding dividends, achieves nearly double the absolute return over nearly 25 years. Over this period the S&P500 ($SPX) achieved an Annualised Gain % of 7.2%, or 8.4% CAGR less than SPA3ETF timing on the $NDX.
3. **Maximum Drawdown %** at -32.4% is on the high side but still a lot lower than Berkshire Hathaway (BRK.A NYSE), which had two 50% drawdowns during this time, and both the $COMP and S&P500.
4. **Expectancy** of 2.363.
5. **Payoff Ratio** (also called Profit Ratio) of nearly 4. The Payoff Ratio is calculated by Abs (Avg Profit % ÷ Avg Loss %)
6. **Annualised Gain %** (=CAGR) of 15.61% which is greater than BRK.A over the same period.

7. **Exposure** of 65.86% meaning that the strategy would have been in cash 34% of the time. (Cash on interest not included in simulation).
8. The average hold period per trade is 97 bars, or 19 weeks, or 136 days elapsed time, or 4.5 months.

	SPA3ETF	Buy & Hold
Starting Capital	$100,000.00	$100,000.00
Ending Capital	$3,669,289.94	$1,823,314.25
Annualized Gain %	**15.61%**	**12.40%**
Exposure	**65.86%**	**100.00%**
Number of Trades	44	1
Avg Profit/Loss %	9.98%	1723.81%
Avg Bars Held	96.98	6,262.00
Winning Trades	30	1
Winning %	**68.18%**	**100.00%**
Avg Profit %	16.62%	1723.81%
Avg Bars Held	121.8	6,262.00
Max Consecutive	8	1
Losing Trades	14	0
Losing %	31.82%	0.00%
Avg Loss %	-4.23%	0.00%
Avg Bars Held	43.79	0
Max Consecutive	3	0
Max Drawdown %	**-32.35%**	**-82.89%**
Max Drawdown % Date	30/10/2001	7/10/2002
Payoff Ratio	3.9324	INF
Sharpe Ratio	**0.9412**	**0.5997**
Expectancy	**2.363**	**0**

Table 1

The $COMP, the NASDAQ Composite Index, research results are documented in the Appendix of this Reference Manual. The $NDX has a better outcome over this near 25 years period. It is understandable that the $NDX results are better than the $COMP, as the January 1990 Base Ref semi-log chart shows in Figure 2, where the blue line is the $NDX and the green and red bar chart is the $COMP. This is contrary to common belief.

Figure 2

In Figure 3 the two blues area is the equity curve for SPA3ETF trading the PowerShares QQQ ETF with the start date of 19th June 2000 until 5th November 2014.

The red line is the 'buy & hold' of the QQQ ETF, which basically equals the $NDX.

The light blue shaded areas are periods that SPA3ETF was in cash and the dark blue shaded areas are when SPA3ETF was in the market with an open trade.

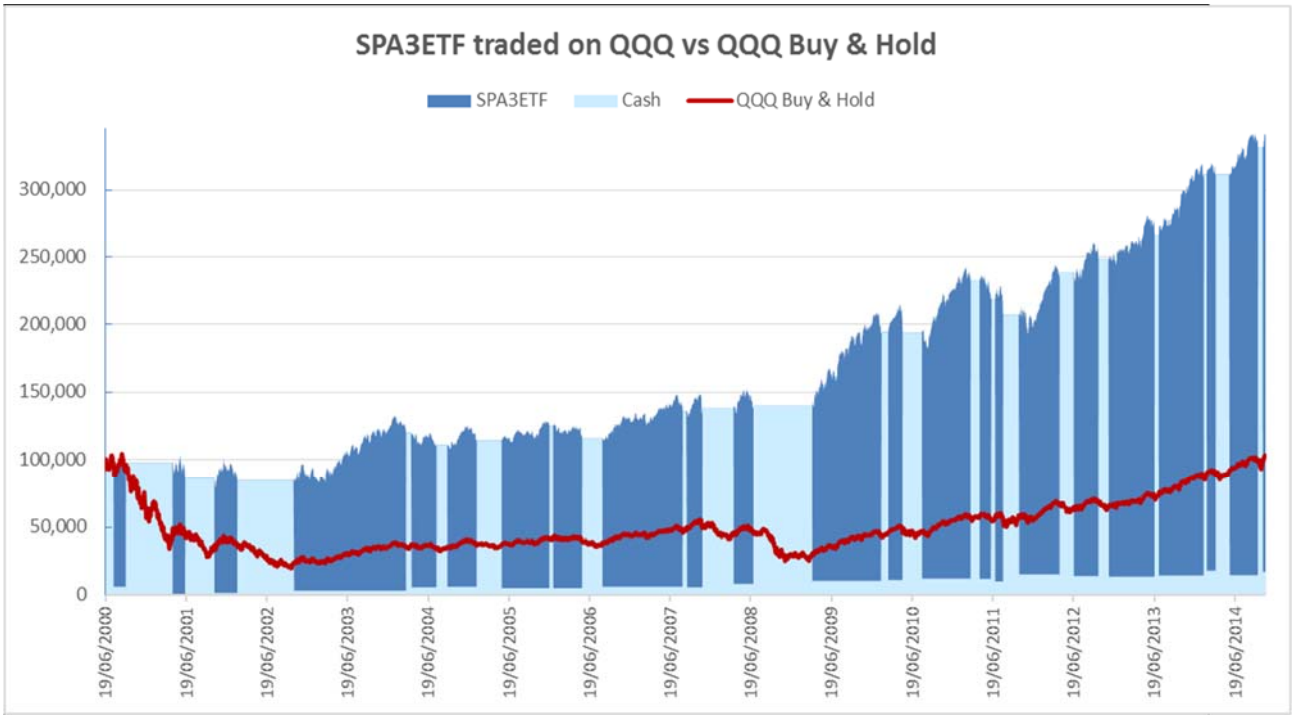


Figure 3

The statistics in Table 2 show SPA3ETF outperformed buying and holding the QQQ, or NASDAQ 100 index ETF, by more than 8.5% CAGR with a **Max Drawdown %** of around a 1/3rd, -27.4% compared to -80.8%.

Note that along the bottom of the chart in Figure 3 that the light blue shaded area when there is an 'open trade', which is cash not invested in the open position, steadily gets larger. This is due to the simulation tools not using all the cash available that an investor would be able to do in live trading. This means that the returns could have been even a little better but SWS is comfortable erring on an understated outcome rather than erring on an overstated outcome.

	SPA3ETF	Buy & Hold
Starting Capital	$100,000.00	$100,000.00
Ending Capital	$335,251.77	$103,613.03
Annualized Gain %	**8.78%**	**0.25%**
Exposure	**66.84%**	**100.00%**
Number of Trades	22	1
Avg Profit/Loss %	6.91%	3.60%
Avg Bars Held	108.95	3,618
Winning Trades	14	1
Winning %	**63.64%**	**100.00%**
Avg Profit %	14.15%	3.60%
Avg Bars Held	136.29	3,618
Max Consecutive	4	1
Losing Trades	8	0
Losing %	36.36%	0.00%
Avg Loss %	-5.23%	0.00%
Avg Bars Held	48.50	0
Max Consecutive	3	0
Max Drawdown %	**-27.42%**	**-80.80%**
Max Drawdown % Date	30/10/2001	9/10/2002
Payoff Ratio	2.6461	INF
Sharpe Ratio	**0.6863**	**0.1564**
Expectancy	**1.3202**	**0**

Table 2

Timing makes a massive difference be avoiding nearly all of the large bear market periods. The timing was not a huge task as just 22 trades were completed over 13.65 years, or just 1.6 completed trades (3.2 buy and sell transactions) a year on average.

In Figure 4 the chart shows the SPA3ETF timing indicator in action for QQQ between August 2011 and July 2013.

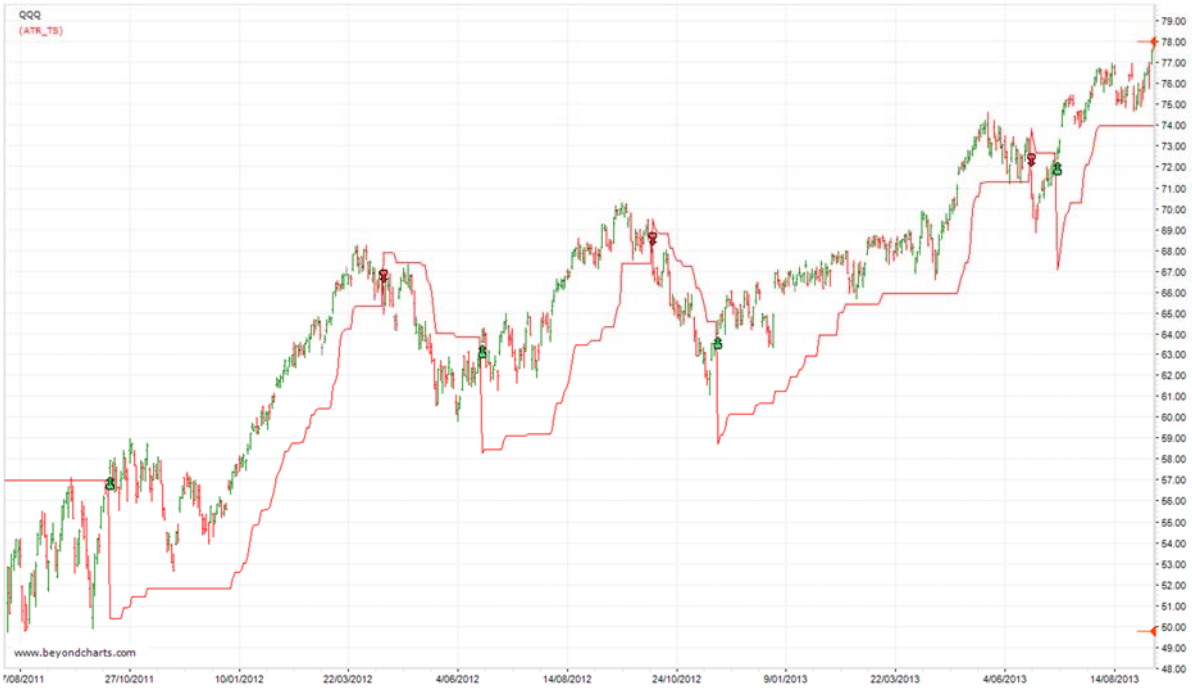


Figure 4

To put the above **Sharpe Ratio** into perspective, a quote from a White Paper called "Buffett's Alpha" published in November 2013:

"Looking at all U.S. stocks from 1926 to 2011 that have been traded for more than 30 years, we find that Berkshire Hathaway has the highest Sharpe ratio among all. Similarly, Buffett has a higher Sharpe ratio than all U.S. mutual funds that have been around for more than 30 years.

So how large is this Sharpe ratio that has made Buffett one of the richest people in the world? We find that ***the Sharpe ratio of Berkshire Hathaway is 0.76*** *over the period 1976-2011. While nearly double the Sharpe ratio of the overall stock market, this is lower than many investors imagine.*

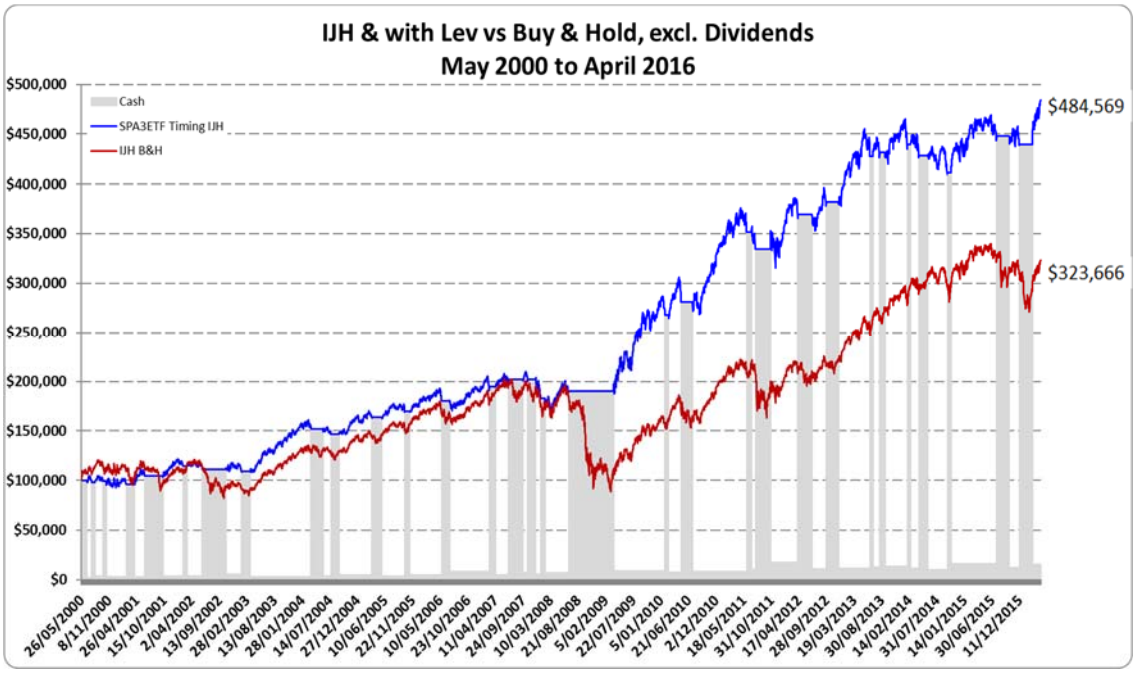
Adjusting for the market exposure, Buffett's information Buffett's Alpha 4 is even lower, 0.66. This Sharpe ratio reflects high average returns, but also significant risk and periods of losses and significant drawdowns.

If his Sharpe ratio is very good but not super-human, then how did Buffett become among the richest in the world? The answer is that ***Buffett has boosted his returns by using leverage****, and that he has stuck to a good strategy for a very long time period, surviving rough periods where others might have been forced into a fire sale or a career shift.* ***We estimate that Buffett applies a leverage of about 1.6-to-1****, boosting both his risk and excess return in that proportion. Thus, his many accomplishments* ***include having the conviction, wherewithal, and skill to operate with leverage and significant risk over a number of decades.*** *"*

Other U.S Listed ETFs

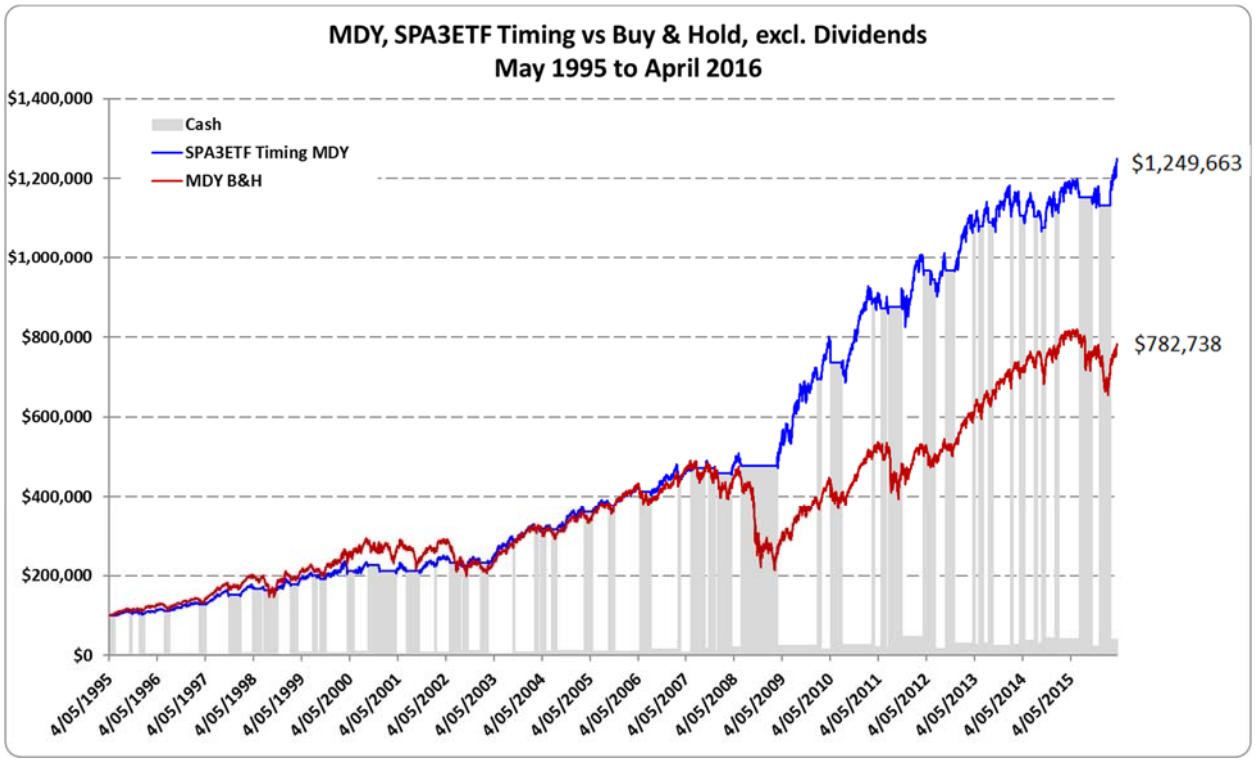
This section compares the researched performance of each ETF/Stock to buying and holding the ETF/Stock over the period shown in the date axis on each chart. A statistics table is also included for each ETF/Stock. No dividends are included in the SPA3ETF timing or Buy & Hold equity curves.

IJH – iShares S&P400 Mid Cap Index



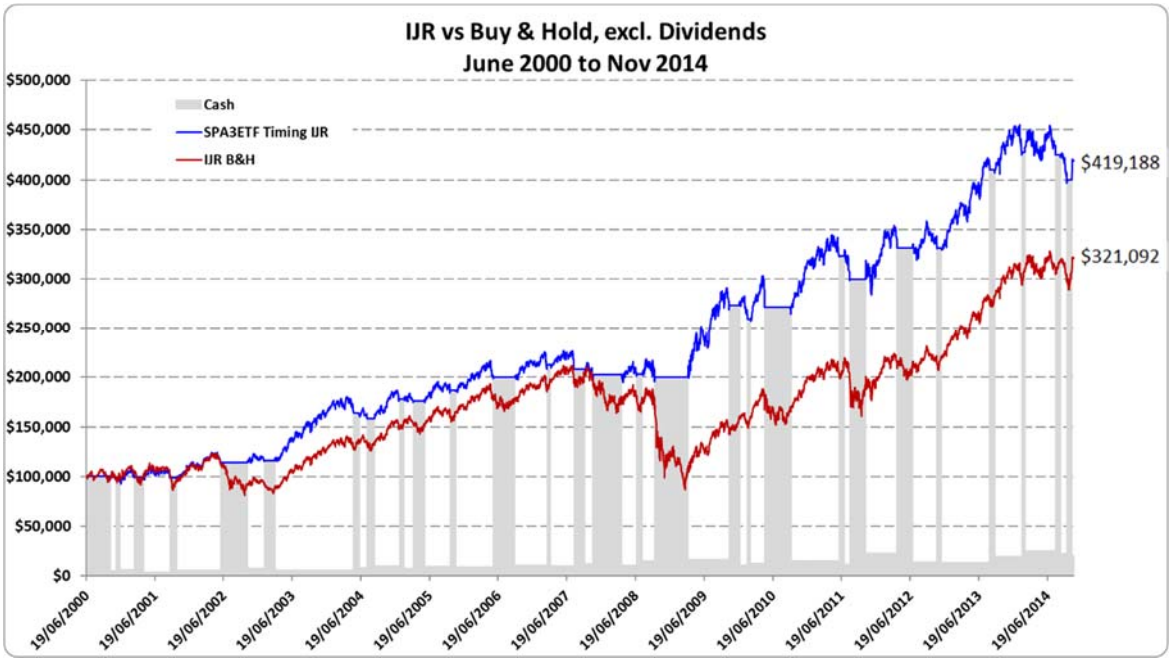
	SPA3ETF	Buy & Hold IJH
Starting Capital	$100,000.00	$100,000.00
Ending Capital	$484,568.57	$320,363.80
Annualized Gain %	**10.43%**	**7.60%**
Exposure	**68.25%**	**100.00%**
Number of Trades	31	1
Avg Profit/Loss %	6.00%	213.37%
Avg Bars Held	88.58	3,998.00
Winning Trades	21	1
Winning %	**67.74%**	**100.00%**
Avg Profit %	10.65%	213.37%
Avg Bars Held	108.57	3,998.00
Max Consecutive	6	1
Losing Trades	10	0
Losing %	32.26%	0.00%
Avg Loss %	-3.78%	0.00%
Avg Bars Held	46.6	0
Max Consecutive	2	0
Max Drawdown %	**-20.03%**	**-57.07%**
Max Drawdown % Date	17/03/2008	9/03/2009
Payoff Ratio	2.8209	INF
Sharpe Ratio	**0.9074**	**0.4537**
Expectancy	**1.5884**	**0**

MDY – SPDR S&P400 Mid Cap index



	SPA3ETF	Buy & Hold MDY
Starting Capital	$100,000.00	$100,000.00
Ending Capital	$1,249,663.30	$783,636.38
Annualized Gain %	**12.80%**	**10.32%**
Exposure	**65.02%**	**100.00%**
Number of Trades	51	1
Avg Profit/Loss %	5.60%	690.66%
Avg Bars Held	68.69	5,277.00
Winning Trades	34	1
Winning %	**66.67%**	**100.00%**
Avg Profit %	9.53%	690.66%
Avg Bars Held	89.56	5,277.00
Max Consecutive	6	1
Losing Trades	17	0
Losing %	33.33%	0.00%
Avg Loss %	-2.25%	0.00%
Avg Bars Held	26.94	0
Max Consecutive	3	0
Max Drawdown %	**-14.42%**	**-56.14%**
Max Drawdown % Date	24/08/2010	9/03/2009
Payoff Ratio	4.2428	INF
Sharpe Ratio	**1.1283**	**0.6051**
Expectancy	**2.4952**	**0**

IJR – iShares S&P600 Small Cap Index



	SPA3ETF	Buy & Hold IJR
Starting Capital	$100,000.00	$100,000.00
Ending Capital	$419,187.89	$320,502.86
Annualized Gain %	**10.48%**	**8.44%**
Exposure	**68.13%**	**100.00%**
Number of Trades	28	1
Avg Profit/Loss %	**6.22%**	**219.38%**
Avg Bars Held	88.82	3,618.00
Winning Trades	16	1
Winning %	**57.14%**	**100.00%**
Avg Profit %	12.99%	219.38%
Avg Bars Held	115.81	3,618.00
Max Consecutive	3	1
Losing Trades	12	0
Losing %	42.86%	0.00%
Avg Loss %	**-2.80%**	**0.00%**
Avg Bars Held	52.83	0
Max Consecutive	2	0
Max Drawdown %	**-17.63%**	**-59.04%**
Max Drawdown % Date	25/11/2011	9/03/2009
Payoff Ratio	4.6473INF	
Sharpe Ratio	**0.8439**	**0.4826**
Expectancy	**2.227**	**0**