

The ETR Comfort Ratio by Tom Basso of enjoytheride.world:

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Every time I did research on new and better ways of trading for money management clients back in the day or currently when I do it for myself, I look at statistics on return to risk to compare various approaches and ideas on trading strategies. With most research platforms you will end up with one or more of the following popular return to risk measurements:

Sharpe Ratio

MAR Ratio

Return/Max Drawdown

Return/Average Drawdown

Treynor Ratio

Sortino Ratio

All these ratios yield return-to-risk ratios where higher is better: more return for less risk.

Issues with measuring return-to-risk using these approaches:

I need to start this discussion with some of the shortcomings of these popular return-to-risk definitions.

Sharpe Ratio: Uses return divided by standard deviations which presumes variations to the downside in the portfolio are equivalent to the upside. No client I have ever managed money for ever complained about the upside deviations in their account!

MAR Ratio: This ratio takes the annual compound growth rate over time and divides it by the maximum drawdown over that same history. The problem here is that largest drawdown is taking into account only the depth of the SINGLE largest drawdown and doesn't look at all the other smaller drawdowns that may have been long in duration and cause clients to leave or traders to abandon a strategy due to fatigue or boredom.

Return to Average Drawdown: This corrects the flaw mentioned in MAR Ratio on the single drawdown by using an average of all drawdowns. Might be more useful, but still doesn't consider the consistency of the returns and the impact the maximum drawdown could have to investors' psychology.

Treynor Ratio: This one is like the Sharpe ratio, but uses beta of the portfolio relative to a suitable index, rather than standard deviation of the portfolio. If you pick various benchmarks, you will get a different beta versus the measured portfolio and therefore obtain a different Treynor Ratio. I don't like the dependence on human judgment to select the suitable benchmark to create the beta of the portfolio.

Sortino Ratio: Probably one of my favorites of the often-included return to risk measurements offered on the popular research platforms. This one starts with the Sharpe Ratio which uses the returns of the portfolio divided by the standard deviation (up and down) of the portfolio. It then changes the calculation to measure risk as only the downside deviations of the portfolio. This is closer to what investors and traders would view as risk but doesn't consider time spent in the risk period.

A Better Way to Calculate Return-to-Risk, The ETR Comfort Ratio:

My 28 years of trading money for clients and almost 50 years managing my own portfolios taught me a lot about how the way an equity curve can cause the human element involved in the process to step into the investing process and modify, mess up, or cease using a trading strategy. It always amazes me to see those flashy track records out there with 50% drawdowns that show very excellent long-term Compound Average Growth Rate (CAGR) performances that are sold to investors. There is almost no way that any typical human being on the planet will stick around for that long-term record when they are seeing their portfolio down 50%. Most can't even last through more than a 15 to 20% down period!

So what causes clients and traders to pull the plug on a strategy due to performance? I would propose two different things: depth of a drawdown past what they are comfortable with and the time spent in those down periods. In other words, very few investors would be rattled with a 5% down period, but after a few years it would wear thin. On the other hand a quick 30% down period might also cause many to abandon their plans immediately.

Having an engineering degree gives me some different views of what I see out there in the world and the calculation of return-to-risk is one of them. To me traders and their clients need comfort to keep doing what they are supposed to be doing. As soon as discomfort sets in past a pain or patience threshold, it is on to the next great idea.

I decided to use concepts from integral calculus to create a measure the amount of discomfort caused by the magnitude of the down period AND the time spent in that period of discomfort. On the other side of things, I don't remember having any of my clients complain about making new equity highs. I started seeing the math develop into:

ETR Comfort Ratio = Amount of Comfort/Amount of Discomfort

Next, we need to include a few parameters that capture how much of a down return causes discomfort (**Drawdown Return Threshold**) and how long could a drawdown last before you or the money management client would have discomfort with the strategy (**Drawdown Time Threshold**). For most investors maybe something like anything greater than 10% down or over 6 months in a drawdown would start making you think about changing what you are doing.

The Amount of Discomfort would be the sum of magnitude of the current drawdown during each period spent in that drawdown over the selected drawdown thresholds. As soon as the thresholds are exceeded, you would start summing each period's current drawdown value until the portfolio gets back to new highs and you return to comfort levels.

The Amount of Comfort would be the reverse of the Amount of Discomfort. Whenever you get to new highs and move up from there, you would keep track of that surge up. The surge is the amount that the current upswing climbs above the current surge low after the last drawdown ended. You would sum every period's current surge until the next drawdown threshold is exceeded. At that point you would be back to summing the period's current drawdown to the Amount of Discomfort. The Amount of Comfort would essentially be the time and magnitude spent in periods of comfort.

The ETR Comfort Ratio would then be a simple ratio of the Amount of Comfort/Amount of Discomfort.

A simple example, T-Bills:

If you think about risk free rate and ignore the dangers of runaway inflation or other risks, T-Bills are used in calculations all over the financial universe as "Risk-Free Rate". If the amount of time spent in a drawdown with a T-Bill with very

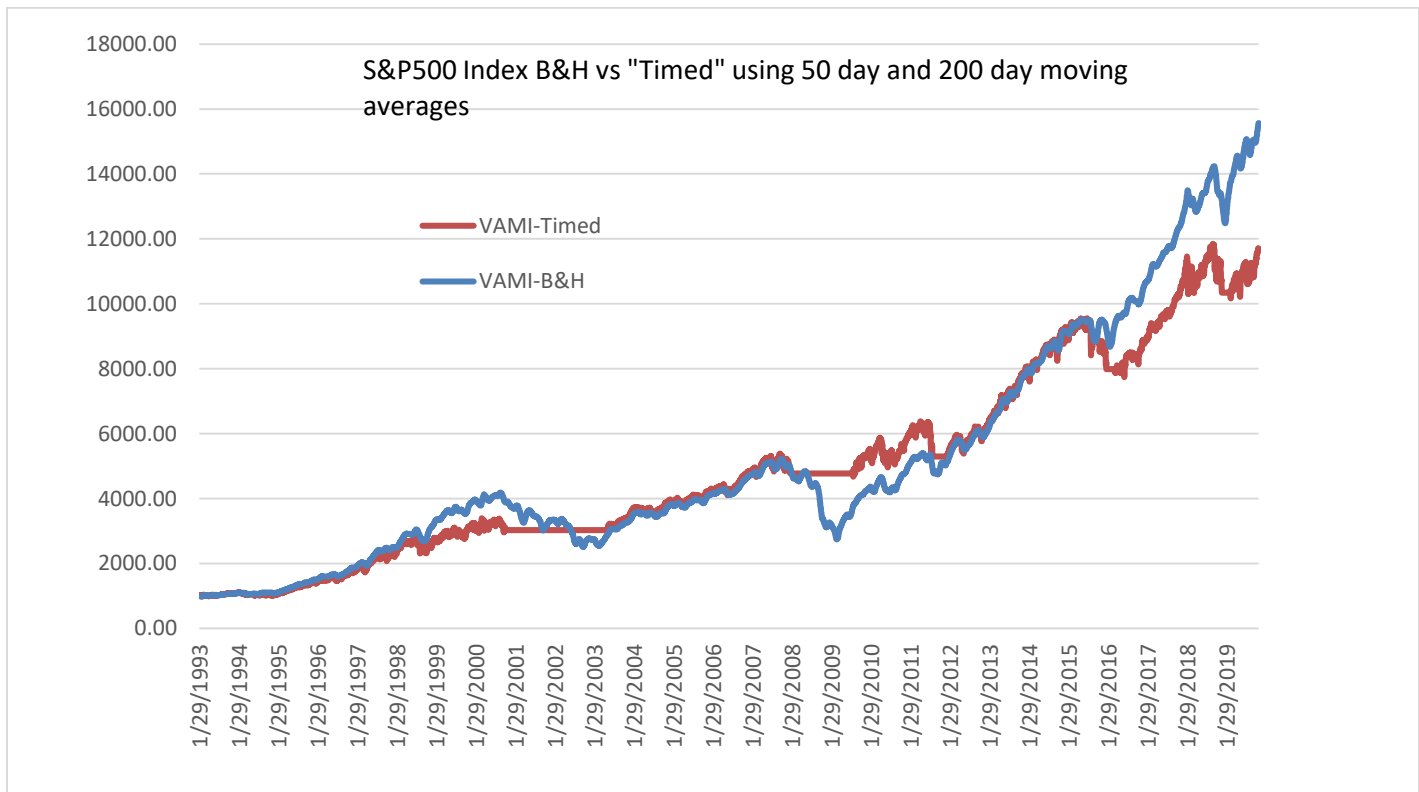
short duration is near or at 0, then almost every day would be a comfort day, making a new high. Almost no days would be spent in down days, so the sum of those days would be near 0.

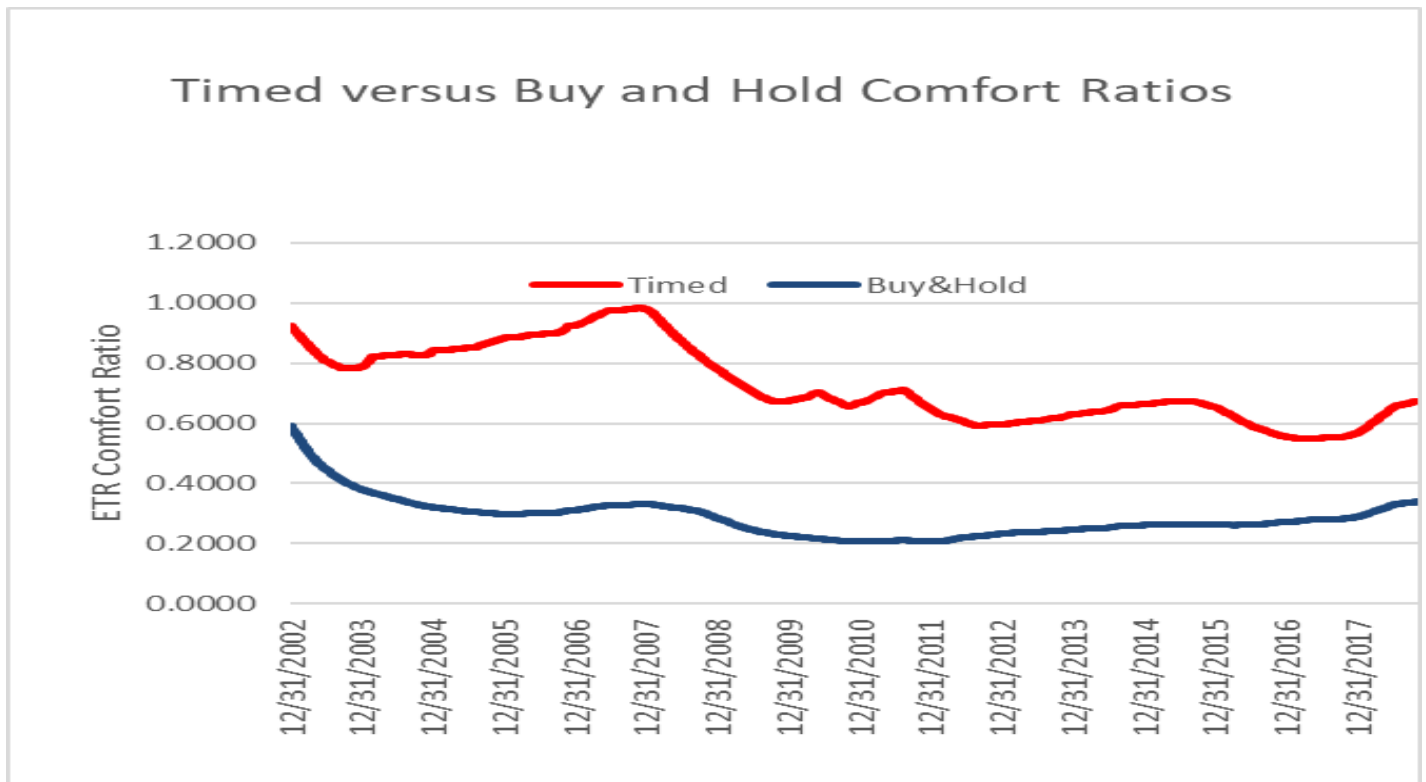
ETR Comfort Ratio (of T-Bills) = A positive increasing number / 0 = infinity

In other words T-Bills should and do have a very high ETR Comfort Ratio.

Another example using the S&P500 Index:

In a recently completed study, I pulled the S&P500 Index monthly values going back to 1993, over 20 years at the time of writing this paper. I then created a simple spreadsheet to calculate the monthly ETR Comfort Ratio of the S&P 500 Index and a timed strategy of the S&P 500 Index over time. Two charts of the results can be seen below:





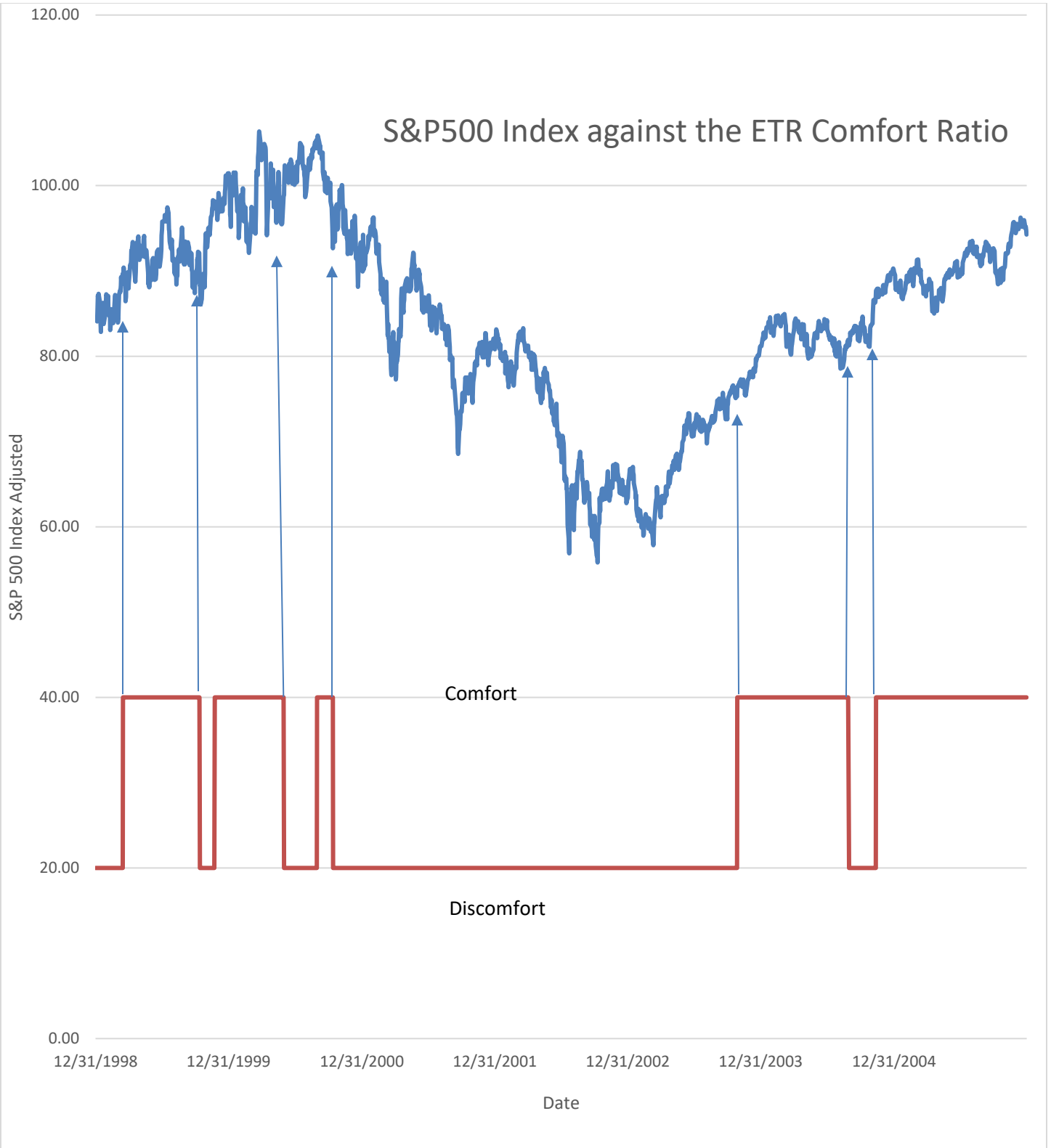
In the chart you can see that after you initialize the ETR Comfort Ratio back from 1993 through 2002, the index stays between 0.2 and 0.6 through the end of the data in 2019. The 2008 bear market really moved the index to extreme lows for the buy and hold approach. However, the timed approach suffered its worst low in 2017. From 2016 on, the comfort ratios of both the timed approach and the buy and hold have steadily moved higher with the recent bull market. The important thing to note is that the comfort ratio of the timed approach is far above the buy and hold over time. It's not surprising that investors feel more comfortable over the long run in a timed approach to investing rather the conventional "buy and pray" strategy that suffers occasional -50% drawdowns.

How Do You Calculate the ETR Comfort Ratio?

A small part of the very large spreadsheet used to create the chart above is shown below. There are two conditions you are summing as you go. First, when in a drawdown that exceeds the Drawdown Return Threshold or the Drawdown Time Threshold, you keep summing the accumulated drawdown.

As soon as new highs are achieved, we start concentrating on the surge accumulation. The bottom of this surge is the previous equity high when the last drawdown started. When we get data for both the Accumulated Drawdown and the Accumulated Surge totals, we finally calculate our first ETR Comfort Ratio, realizing that it has limited data and that the index will stabilize with more up and down periods.

S&P500 Index against the ETR Comfort Ratio



Example of the ETR Comfort Ratio Calculation in Excel Spreadsheet:

	Adjusted	Performance	Daily Avg	VAMI of			Drawdown	Current		Accum.			Accum.	
	S&P 500	S&P 500	X Day	X Day	VAMI	Curr Draw	in Excess	Days in	Comfort?	Discomfort	Surge	Current	Comfort	Comfort
Date	Index	X Days	Performance	Avg	Max Hi	Down %	of Comfort	Drawdown	Y or N?	%	Lows \$	Surge%	%	Ratio
3/29/2019	279.82	1.81%	0.09%	13978.24	14239.66	-1.84%	0.00%	117	N	-45116%	13495.84	5.5115%	13715%	0.3040
4/1/2019	283.14	2.38%	0.11%	13994.07	14239.66	-1.72%	0.00%	118	N	-45117%	13495.84	5.5115%	13715%	0.3040
4/2/2019	283.28	2.80%	0.13%	14012.75	14239.66	-1.59%	0.00%	119	N	-45119%	13495.84	5.5115%	13715%	0.3040
4/3/2019	283.72	3.10%	0.15%	14033.46	14239.66	-1.45%	0.00%	120	N	-45120%	13495.84	5.5115%	13715%	0.3040
4/4/2019	284.48	4.01%	0.19%	14060.24	14239.66	-1.26%	0.00%	121	N	-45122%	13495.84	5.5115%	13715%	0.3040
4/5/2019	285.85	5.39%	0.26%	14096.35	14239.66	-1.01%	0.00%	122	N	-45123%	13495.84	5.5115%	13715%	0.3039
4/8/2019	286.07	5.68%	0.27%	14134.51	14239.66	-0.74%	0.00%	123	N	-45123%	13495.84	5.5115%	13715%	0.3039
4/9/2019	284.61	3.64%	0.17%	14159.01	14239.66	-0.57%	0.00%	124	N	-45124%	13495.84	5.5115%	13715%	0.3039
4/10/2019	285.58	3.60%	0.17%	14183.30	14239.66	-0.40%	0.00%	125	N	-45124%	13495.84	5.5115%	13715%	0.3039
4/11/2019	285.50	2.89%	0.14%	14202.84	14239.66	-0.26%	0.00%	126	N	-45125%	13495.84	5.5115%	13715%	0.3039
4/12/2019	287.43	3.66%	0.17%	14227.57	14239.66	-0.08%	0.00%	127	N	-45125%	13495.84	5.5115%	13715%	0.3039
4/15/2019	287.24	3.08%	0.15%	14248.42	14248.42	0.00%	0.00%	0	Y	-45125%	14239.66	0.0615%	13715%	0.3039
4/16/2019	287.43	2.77%	0.13%	14267.24	14267.24	0.00%	0.00%	0	Y	-45125%	14239.66	0.1937%	13715%	0.3039
4/17/2019	286.72	2.50%	0.12%	14284.20	14284.20	0.00%	0.00%	0	Y	-45125%	14239.66	0.3128%	13715%	0.3039
4/18/2019	287.29	3.01%	0.14%	14304.66	14304.66	0.00%	0.00%	0	Y	-45125%	14239.66	0.4565%	13716%	0.3040
4/22/2019	287.54	1.95%	0.09%	14317.92	14317.92	0.00%	0.00%	0	Y	-45125%	14239.66	0.5495%	13716%	0.3040
4/23/2019	290.12	4.88%	0.23%	14351.19	14351.19	0.00%	0.00%	0	Y	-45125%	14239.66	0.7832%	13717%	0.3040
4/24/2019	289.48	4.73%	0.23%	14383.50	14383.50	0.00%	0.00%	0	Y	-45125%	14239.66	1.0101%	13718%	0.3040
4/25/2019	289.30	3.89%	0.19%	14410.13	14410.13	0.00%	0.00%	0	Y	-45125%	14239.66	1.1971%	13719%	0.3040
4/26/2019	290.65	4.92%	0.23%	14443.89	14443.89	0.00%	0.00%	0	Y	-45125%	14239.66	1.4342%	13721%	0.3041
4/29/2019	291.10	4.69%	0.22%	14476.14	14476.14	0.00%	0.00%	0	Y	-45125%	14239.66	1.6607%	13723%	0.3041
4/30/2019	291.25	4.09%	0.19%	14504.30	14504.30	0.00%	0.00%	0	Y	-45125%	14239.66	1.8584%	13724%	0.3041
5/1/2019	289.06	2.09%	0.10%	14518.75	14518.75	0.00%	0.00%	0	Y	-45125%	14239.66	1.9599%	13726%	0.3042
5/2/2019	288.44	1.82%	0.09%	14531.34	14531.34	0.00%	0.00%	0	Y	-45125%	14239.66	2.0484%	13728%	0.3042
5/3/2019	291.26	2.66%	0.13%	14549.73	14549.73	0.00%	0.00%	0	Y	-45125%	14239.66	2.1775%	13731%	0.3043
5/6/2019	290.06	1.96%	0.09%	14563.34	14563.34	0.00%	0.00%	0	Y	-45125%	14239.66	2.2730%	13733%	0.3043
5/7/2019	285.22	-0.22%	-0.01%	14561.80	14563.34	-0.01%	0.00%	1	Y	-45125%	14239.66	2.2730%	13735%	0.3044
5/8/2019	284.82	-0.44%	-0.02%	14558.77	14563.34	-0.03%	0.00%	2	Y	-45125%	14239.66	2.2730%	13737%	0.3044
5/9/2019	283.96	-0.23%	-0.01%	14557.20	14563.34	-0.04%	0.00%	3	Y	-45125%	14239.66	2.2730%	13740%	0.3045
5/10/2019	285.39	-0.07%	0.00%	14556.75	14563.34	-0.05%	0.00%	4	Y	-45125%	14239.66	2.2730%	13742%	0.3045
5/13/2019	278.22	-2.55%	-0.12%	14539.07	14563.34	-0.17%	0.00%	5	Y	-45125%	14239.66	2.2730%	13744%	0.3046
5/14/2019	280.73	-2.33%	-0.11%	14522.94	14563.34	-0.28%	0.00%	6	Y	-45125%	14239.66	2.2730%	13746%	0.3046
5/15/2019	282.38	-1.69%	-0.08%	14511.23	14563.34	-0.36%	0.00%	7	Y	-45125%	14239.66	2.2730%	13749%	0.3047
5/16/2019	284.99	-0.85%	-0.04%	14505.37	14563.34	-0.40%	0.00%	8	Y	-45125%	14239.66	2.2730%	13751%	0.3047
5/17/2019	283.15	-1.25%	-0.06%	14496.76	14563.34	-0.46%	0.00%	9	Y	-45125%	14239.66	2.2730%	13753%	0.3048
5/20/2019	281.28	-2.09%	-0.10%	14482.31	14563.34	-0.56%	0.00%	10	Y	-45125%	14239.66	2.2730%	13756%	0.3048
5/21/2019	283.81	-1.30%	-0.06%	14473.38	14563.34	-0.62%	0.00%	11	Y	-45125%	14239.66	2.2730%	13758%	0.3049

Discomfort periods are accumulated in the column colored red and titled Accum Discomfort

Comfort periods are accumulated in the column colored green and titled Accum Comfort

Comfort ratio is the Accumulated Comfort/Accumulated Discomfort

Spreadsheet Example:

In the spreadsheet example above you can see under the “Comfort Y or N?” column that I’ve shown a short slice of time starting with discomfort and switching to comfort. When in the discomfort period, the Accum Discomfort column increases each day by the amount of the current drawdown, while the Accum Comfort column stays constant. When in the comfort period, the Accumulated Comfort column increases each day and the Accum Discomfort column stays the same.

The Drawdown Return and Time Thresholds were set at -5% and 100 days for the example. Obviously setting the Drawdown Return Threshold lower or increasing the number of days in the Drawdown Time Threshold would increase the ETR Comfort Ratio over this same period with this same instrument. This spreadsheet snippet is taken from an updated version of the ETR Trading Tools for Excel available on the enjoytheride.world website.

Conclusions and Suggestions:

I believe that The ETR Comfort Ratio truly measures more accurately what investors and traders are more concerned with when making decisions to “stay the course” or “pull the plug”. The value of the ratio by itself is probably not very useful. The number relative to other strategies or other management programs give the user an ability to compare one against the other. The higher the ratio, the more comfortable the strategy is. The lower the ratio, the more concern you would have investing in the strategy.

Remember that long- term track records are useless unless the client or trader continues the strategy and allows that track record to become a reality. One of my biggest challenges as a money manager was always trying to educate investors on good investment practices and convincing them to use those good practices over the long run, rather than making irrational, emotional decisions. One of the challenges that traders face is feeling comfortable with their strategy when it is being tested with adverse market conditions. Most investors and traders underestimate their tolerance for drawdown magnitudes and their patience with time elapsing without making any money.

The calculations can be done both over any period. The example I showed of the S&P 500 Index was daily data and covered over two decades. This is likely the easiest and most common way that the ETR Comfort ratio should be used. I also know that many investors track their portfolio monthly from manager statements or brokerage statements, so I used 21 days for the calculation which is roughly a month of trading days.

But since we live in the age of instant information, if everyone involved is going to be drilling down to daily data, then calculate the ETR Comfort Ratio daily if you wish. The math is the same and just as easy. However, my experience is that most investing clients are not able to look at daily data and not go crazy with the gyrations the market will put them through, and they would be better served to look at things once a month.

The ETR Comfort Ratio should be an excellent tool in developing investing/trading strategies since it shows how comfortable it would be to use that strategy in investing/trading. Although the old disclaimer on historical simulation results certainly do not predict future profits is true, historical volatility of a strategy tends to be a bit more consistent going forward and I would expect the Comfort Ratio of a strategy to be somewhat stable over time.

Investors have a propensity to invest when markets are strong and making new highs and panic after a drawdown, pulling their money off the table at market lows. Just like a lot of market measurements, the ETR Comfort Ratio may well lend itself to measuring investor/trader sentiment in that as the index gets to very

high levels, the market is likely overbought, and investors are excited. And when comfort in the market is low, investors are likely to not like the market, and it is likely in an oversold condition with the potential to move up from there. More research on using the ETR Comfort Ratio this way is warranted.