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 have to look at statistics on return to risk to compare various approaches and ideas on trading strategies. With most research platforms you will end 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 of 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 take into account the consistency of the returns and the impact the maximum drawdown could have to investors' psychology.

Treynor Ratio: This one is similar to 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 take into account 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 or cease using a trading strategy. It always amazes me to see these flashy track records out there with 50% drawdowns that show very long term performance that is 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 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

The Amount of Discomfort would be the sum of magnitude of the current drawdown during each period spent in that drawdown. As soon as the current drawdown starts happening, you would start summing each period's current drawdown value until the portfolio gets back to new highs.

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 starts. 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 1978, some 40 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 over time. A chart of the results can be seen below:

S&P 500 Index versus ETR Comfort Ratio
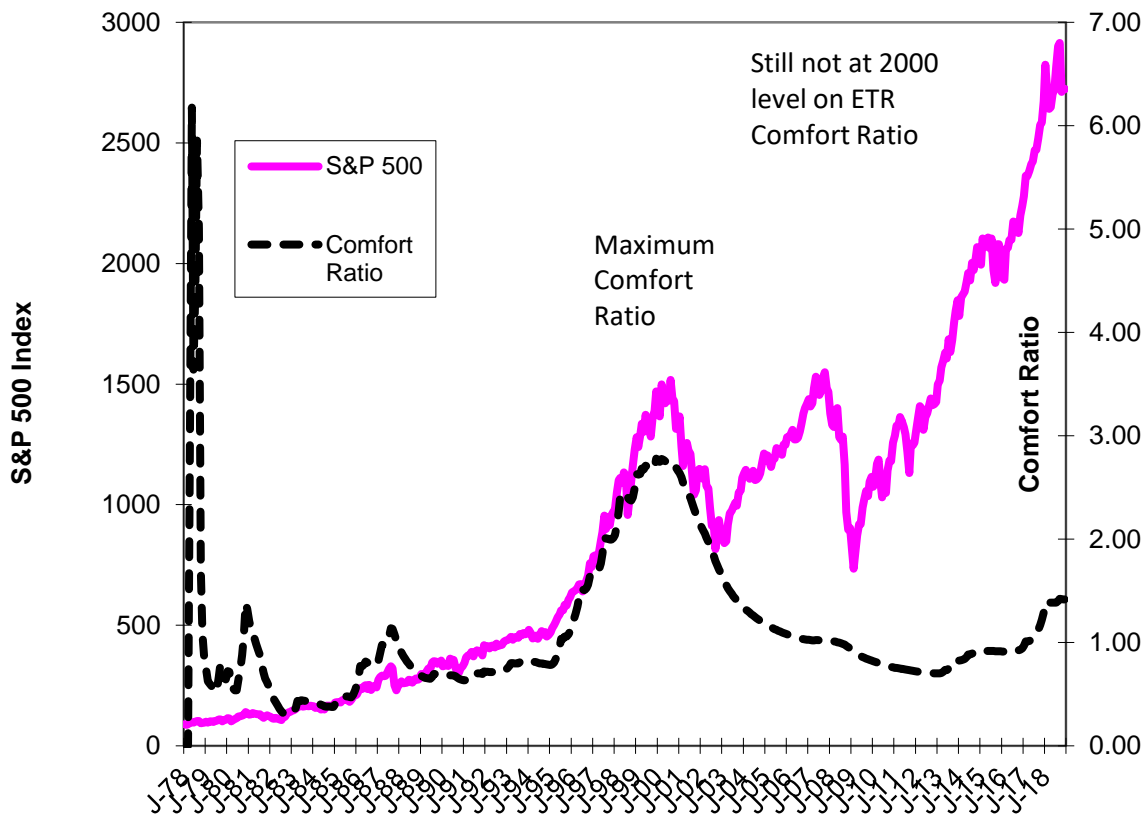
In the chart you can see that after you initialize the ETR Comfort Ratio back in 1978 through 1980, the index stays between 0.5 and 1.5 all the way to 1995. The tech bubble of the late 90's and 2000 really moved the index to extreme highs, almost to 3.0. Then, the bubble burst and burst badly with the S&P 500 Index going down around 50% and moving the index down around 1.0 in 2009. Finally around 2013, the comfort levels started moving slowly higher with the recent price action after 2016 election moving the index dramatically higher although not to the extreme levels they reached back in 2000.

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, you keep summing the accumulated drawdown. In February, 78, The S&P 500 Index was down 2.48 percent. The next month, the S&P 500 Index almost wiped out the drawdown, but not quite, so we accumulate the -0.04% in the discomfort side of things. By April, 78 we are at new highs and the drawdown has finally ended.

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 or 89.25. Each period we take where we are minus the current surge low to see how much this surge has moved in percent. In April, 78, we were up 7.58% from the surge low and the next month we were up 7.99% off the surge low. Accumulating those two months gives us the Accumulated Surge total of 15.57 in May of 1987.

The next month, June, 78, starts another drawdown and the process repeats. When we get data for both the Accumulated Drawdown and the Accumulated Surge totals, in April, 78, we can finally calculate our first ETR Comfort Ratio, realizing that it has limited data and that the index will stabilize with more data.

Date	S&P 500 Index	S&P500 Max Hi	Curr Draw Down %	Accum. Ddown%	Surge Lows $	Current Surge%	Accum. Surge %	Comfort Ratio
Jan-78	89.25	89.25	0.00	0.00	89.25	0.00		0.00
Feb-78	87.04	89.25	-2.48	-2.48	89.25	0.00	0.00	0.00
Mar-78	89.21	89.25	-0.04	-2.52	89.25	0.00	0.00	0.00
Apr-78	96.83	96.83	0.00	-2.52	89.25	7.58	7.58	3.01
May-78	97.24	97.24	0.00	-2.52	89.25	7.99	15.57	6.18
Jun-78	95.53	97.24	-1.76	-4.28	89.25	0.00	15.57	3.64
Jul-78	100.68	100.68	0.00	-4.28	97.24	3.44	19.01	4.44
Aug-78	103.29	103.29	0.00	-4.28	97.24	6.05	25.06	5.86
Sep-78	102.54	103.29	-0.73	-5.01	97.24	0.00	25.06	5.01
Oct-78	93.15	103.29	-9.82	-14.82	97.24	0.00	25.06	1.69
Nov-78	94.7	103.29	-8.32	-23.14	97.24	0.00	25.06	1.08
Dec-78	96.11	103.29	-6.95	-30.09	97.24	0.00	25.06	0.83
Jan-79	99.93	103.29	-3.25	-33.34	97.24	0.00	25.06	0.75
Feb-79	96.28	103.29	-6.79	-40.13	97.24	0.00	25.06	0.62
Mar-79	101.59	103.29	-1.65	-41.78	97.24	0.00	25.06	0.60
Apr-79	101.76	103.29	-1.48	-43.26	97.24	0.00	25.06	0.58
May-79	99.08	103.29	-4.08	-47.33	97.24	0.00	25.06	0.53
Jun-79	102.91	103.29	-0.37	-47.70	97.24	0.00	25.06	0.53
Jul-79	103.81	103.81	0.00	-47.70	103.29	0.52	25.58	0.54

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 on "staying the course" or "pulling the plug". 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 monthly data because it covered such a long period of time. This is likely the easiest and most common way that the ETR Comfort ratio should be used. I also know that many track their portfolio monthly off of manager statements or brokerage statements.

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. The math is the same and just as easy. 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.