

Recovering After A Bear Market?

by *Guy R. Fleury*

No matter how we trade stocks, our long-term objectives are pretty much the same as everyone else.

We want our portfolios to go up in value, not down.

We find the upside the most reasonable outcome for our investment strategies since it is why we made them in the first place.

Nevertheless, we have to plan for our portfolio's recovery after a significant decline. Not by planning for what was or could have been, but for what will be coming our way.

We are averse to market drawdowns, no surprise there, we all are. Unfortunately, we have a really hard time avoiding them. The market can go down, but, it is our job to recover from them and do even better. My recent articles (see page 4) provided recovery equations to do just that.

The last article ([Portfolio Drawdown Protection](#)) used the 5 most significant drawdowns of the last 40 years to show how to compensate for those declines. Was given the equation to protect one's portfolio (using a portfolio level trailing stop-loss) and how to supercharge its recovery.

A 40-Year Portfolio Scenario

The 40 years under consideration has the following portfolio equation:

$$F(t) = F_0 \cdot (1 \pm r_1) \cdot (1 \pm r_2) \cdots (1 \pm r_{t-1}) \cdot (1 \pm r_t) = F_0 \cdot (1 + \bar{g})^t \quad (1)$$

where $\pm r_i$ is the return in any of those years, F_0 the initial capital, \bar{g} the average overall growth rate, and t the 40-year time interval.

Replacing the last year with a -50% decline would generate the following:

$$F_{40} = F_0 \cdot (1 \pm r_1) \cdot (1 \pm r_2) \cdots (1 \pm r_{38}) \cdot (1 \pm r_{39}) \cdot (1 - 0.50) = F_0 \cdot (1 + \bar{g})^{39} \cdot (1 - 0.50) \quad (2)$$

Figure 1 presents year 39 and 40 using Equation 1 and Equation 2 to show the impact this -50% drawdown would have at the specified growth rates.

Fig. 1: 50% Drawdowns

			Portfolio Performance				
Initial Capital	100,000		With a 50% Drawdown on Year 40				
Growth Rate	5.00%	10.00%	15.00%	20.00%	25.00%	30.00%	35.00%
Year 39	670,475	4,114,478	23,292,482	122,480,964	601,853,108	2,778,374,216	12,106,454,421
Year 40	703,999	4,525,926	26,786,355	146,977,157	752,316,385	3,611,886,481	16,343,713,468
Drawdown 0.50							
Year 40 =							
39 x 0.50	335,238	2,057,239	11,646,241	61,240,482	300,926,554	1,389,187,108	6,053,227,210
Impact of DD	-368,761	-2,468,687	-15,140,113	-85,736,675	-451,389,831	-2,222,699,373	-10,290,486,258
Effective CAGR	3.07%	7.85%	12.63%	17.40%	22.17%	26.93%	31.69%
Lost CAGR Points	-1.93%	-2.15%	-2.37%	-2.60%	-2.83%	-3.07%	-3.31%
Percent Reduction	-38.59%	-21.47%	-15.80%	-12.99%	-11.32%	-10.23%	-9.46%
Value of those							
lost CAGR points	368,761	2,468,687	15,140,113	85,736,675	451,389,831	2,222,699,373	10,290,486,258
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Evidently, the impact depends on the long-term CAGR.

If not corrected, a -50% drawdown can permanently reduce one's portfolio value.

The -50% decline did not cut the CAGR in half, as some might have expected. The *Lost CAGR Points* show about a -2 to -3% decline in CAGR points.

Nonetheless, the CAGRs did decline. The CAGR after the decline is displayed as the *Effective CAGR* line in the above chart. Percentage-wise, the damage gets to be less and less as the CAGR goes up (see the *Percent Reduction* line in the above chart). Even though the impact is reduced in CAGR terms, the monetary impact does grow drastically the higher the growth rate.

The value of those lost points is given on the last line in the chart for the corresponding CAGR. As expected, the value grows in line with the average growth rate \bar{g} . As you raise the average CAGR, the lost value gets bigger and bigger. Compared to year 39, those amounts are not trivial.

Going from the 20% CAGR column to the 25% level, the rise in the value of the *lost CAGR points* is 526%. Yet, we only added 5% to the long-term CAGR.

The Correction Factor

$$cf_i = (1 - 0.10) \cdot \left[\left(1 + \left(1 + \frac{dd_i}{1 - (dd_i + oc f_i)} \right) \cdot (1 + \hat{g})^2 \right) \right] \quad (3)$$

Using [Equation 3](#), we could remedy the situation by applying the over-compensation factor with its trailing stop-loss for downside protection.

Over-compensating the drawdown is what your trading program needs to do. And [Equation 3](#) with its 10% trailing stop-loss could do just that.

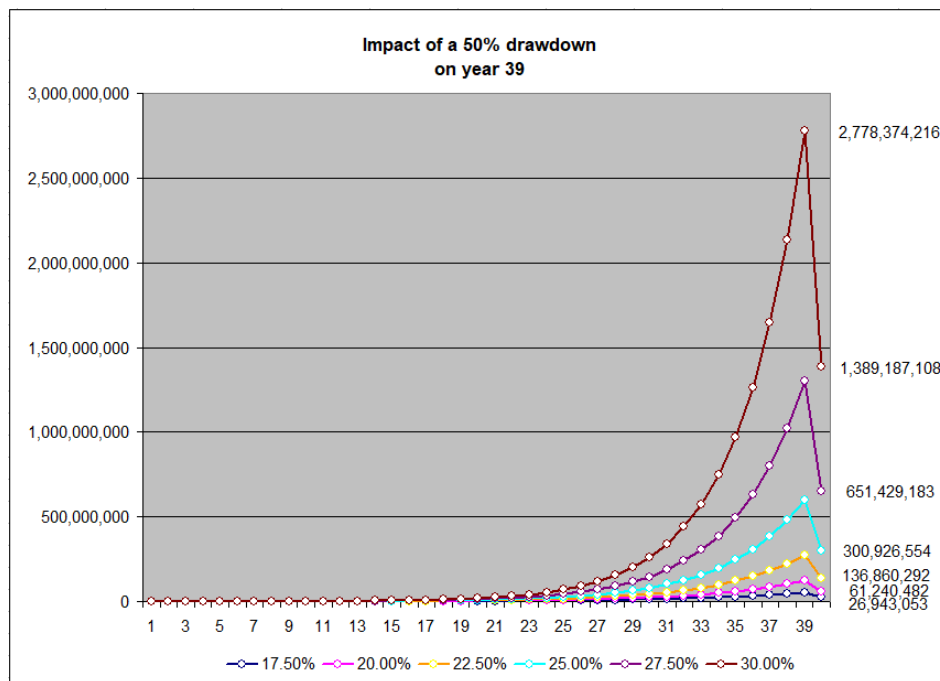
The -50% decline gets more dramatic as we raise the average growth rate \bar{g} over the 40-year interval, as should be expected.

If you could choose any of the CAGRs, you would, most probably, pick the highest one even after considering the damage a -50% decline would bring.

Another View

The right-hand side of the [Equation 2](#) is displayed in *Figure 2* for a few CAGR values.

Fig. 2: Impact of a 50% Drawdown on Year 40



[Equation 2](#) puts you at the right edge of the chart on year 39. All went well up to that point. Then you got year 40, an unforeseen market event partially destroying your portfolio after 39 years on the job. Half of what you have made over the years evaporated in a single year.

A reminder that any year going forward has the potential for a significant drawdown. It is what we can observe when viewing historical market data. Going forward, you

will be confronted with the same thing. Your portfolio is always at the right edge looking at what is coming next.

There will be a year 41 and more after that. So, do not worry. With time, you should be able to get your average CAGR back on track. [Equation 3](#) should help, at least, it could maintain the average CAGR on pace going forward. Meaning, that it could recuperate the drawdown and return the CAGR to its average cursing speed. In the previous article, it was also shown that a portfolio-level trailing stop-loss could improve overall performance in conjunction with the over-compensation factor.

Over-compensating the decline is what your trading program needs to do.

A drawdown can be over-compensated using [Equation 3](#) or something equivalent to do the job. The compensation factor is designed to replace a down year r_i .

Regardless, there is a need to recover from market drawdowns, and you are the one to do it.

Plan not for what was, but for what is coming your way.

Related Articles:

[Portfolio Drawdown Protection](#)

[Compensate For Portfolio Drawdowns](#)

[Surviving Market Drawdowns](#)

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