

The Case for Risk Management

Drawdown Math, Volatility Drag, and the Power of Market Breadth

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Executive Summary

This paper makes three interconnected arguments about long-term investing success.

1. Large losses are more expensive than they appear

A 50% decline doesn't need a 50% gain to get back to even. It needs a 100% gain. At a 7% annual return, that's roughly a decade of work just to return to where you started. Losses and gains simply aren't symmetrical, and that math is unforgiving. Avoiding severe drawdowns isn't a conservative preference. It's a compounding imperative.

2. Volatility quietly erodes wealth even when averages look equal

Two portfolios with the same average return over 20 years can end up more than \$1 million apart, purely because one was more volatile than the other. The smoother one compounds better. This isn't theory, it's arithmetic. Managing how much a portfolio bounces around is one of the highest-impact levers a long-term investor has.

3. Market breadth signals rising risk before index prices confirm it

The Standard & Poor's 500 Index (S&P 500)¹ is dominated by its biggest names. When those names hold up while the rest of the market weakens, the index can look healthy even as its foundation cracks underneath. Breadth measures (advance-decline lines, the percentage of stocks above key moving averages, new highs versus new lows) pick up that weakness as it develops. Across many market cycles, breadth has consistently rolled over weeks to months before major declines, giving a heads-up that price alone doesn't.

THE BOTTOM LINE

Long-term wealth can be built through compounding. Compounding requires staying invested. And staying invested requires a portfolio you can actually hold with confidence through the hard stretches, not one that forces painful decisions at the worst possible time.

¹ The Standard & Poor's 500 Index (S&P 500) is a market-capitalization-weighted index of 500 of the largest publicly traded U.S. companies and is widely used as a benchmark for large-cap U.S. equities. It is not possible to invest directly in an index.

Section 1: The Mathematics of Drawdowns

Why Losses Hurt More Than They Look

Here's the most important and most overlooked fact in investing: losses and gains aren't symmetrical. A 50% loss doesn't require a 50% gain to recover. It requires a 100% gain.

Take a simple example. An investor starts with \$100,000. A 50% decline leaves \$50,000. To get back to \$100,000, they have to double what's left, and at a 7% annual return, that takes about 10 years. A full decade just to get back to where they started.

You can't do math on money you don't have. The hole gets deep faster than most people expect, and it takes a lot longer to climb out.

The Recovery Curve

The table below shows how this plays out at different loss levels. Notice how fast the required recovery climbs, and how quickly the time to get back grows with it.

Loss	To Break Even, You Need...	Recovery Time*	Severity
-10%	+11%	~1.5 years	Minor
-20%	+25%	~3.3 years	Meaningful
-30%	+43%	~5.3 years	Severe
-40%	+67%	~7.5 years	Damaging
-50%	+100%	~10 years	Catastrophic

* This table is a hypothetical illustration of a mathematical principle, not a forecast, and does not represent the past or future performance of any security, asset class, or investment product, including the Defender Risk Adaptive 500 ETF (SPDF). The gain needed to break even equals $\text{loss} \div (1 - \text{loss})$; a 50% loss, for example, requires $0.50 \div 0.50 = 100\%$. Recovery time assumes a constant 7% annual total return with all earnings reinvested and no contributions or withdrawals, calculated as $\ln(1 \div (1 - \text{loss})) \div \ln(1.07)$, and is rounded. A constant rate is used only to illustrate the math; actual returns vary, and compounding works in both directions, amplifying losses as well as gains. Past performance does not guarantee future results.

The takeaway is simple. A portfolio that sidesteps a severe drawdown, even if it gives up some upside on the way up, can finish well ahead of one that rode the market all the way down and back. You don't have to predict the future to benefit from this. You just have to respect how expensive big losses are to dig out of.

It isn't the depth of the loss alone that does the damage. It's the depth, the time it takes to recover, and everything that money could have earned in the meantime.

Time Is the Hidden Cost

Recovery periods are rarely short. The S&P 500 took about seven years to recover from the 2000–2002 bear market on a total-return basis, and roughly as long after the 2008–2009 financial crisis. An investor who sidestepped most of either decline and stayed constructively positioned through the recovery came out well ahead of buy-and-hold. Not because they picked better stocks, but simply because they managed risk better.

KEY TAKEAWAY

The asymmetry of losses is the core case for risk management. A 50% loss requires a 100% gain to recover, which is simple arithmetic. At a 7% annual return, earning that back takes about a decade. Avoiding large drawdowns isn't a conservative preference. It's a compounding imperative.

Section 2: Volatility Drag, the Silent Return Killer

Two Portfolios. Same Average. Different Outcomes.

Here's a question that surprises a lot of investors: if two portfolios earn the exact same average annual return over a long stretch, do they end up in the same place?

No. And the gap can be big.

The reason is volatility drag: a bumpy ride costs you more than a smooth one, even when the averages look the same. Think of it like driving. A car that holds a steady 60 mph gets there sooner than one that keeps swinging between 30 and 90, even though both average the same speed. The table below puts numbers to it. Both portfolios start with \$1 million and both earn the same 8% average return over 20 years. The only difference is how much they bounce along the way.

	Avg. Annual Return	\$1M Grows To (20 yrs)*
Portfolio A: Smoother Ride (~8% volatility)	8.0% average / ~7.7% compound	~\$4,390,000
Portfolio B: Roller Coaster (~20% volatility)	8.0% average / ~6.0% compound	~\$3,210,000
Difference	Same average return	>\$1,000,000 less

** Hypothetical illustration of a mathematical principle; not a forecast and not representative of any actual security, asset class, or investment product, including the Defender Risk Adaptive 500 ETF (SPDF). Both hypothetical portfolios assume the same 8.0% average annual return on a \$1,000,000 starting value over 20 years, so the difference in ending value reflects volatility alone. Compound return is approximated as average return – (variance ÷ 2): about 7.7% at 8% volatility and about 6.0% at 20% volatility. Ending values are illustrative, do not reflect any fund's fees, expenses, or taxes, and would be lower after such costs. Volatility affects compounding in both directions. Past performance does not guarantee future results.*

That difference, more than \$1 million in ending wealth on the same \$1 million starting stake, comes entirely from managing volatility. Not from picking better investments. Just from smoothing out the ride.

The Math Behind It

Compound Return $\approx$ Average Return – (Variance $\div$ 2). Variance is just a measure of how widely returns swing around. More volatility means more variance, which means a bigger drag on the wealth you actually keep, even when the simple average looks identical to a calmer strategy. This isn't a textbook idea. It shows up in every real portfolio, every single year.

The Behavioral Cost of Volatility

Beyond the pure mathematics, high-volatility strategies exact a cost that does not show up on a spreadsheet: investor behavior.

Big drawdowns are painful to live through. When a portfolio drops 30%, 40%, or 50%, the natural human reaction is fear, and fear can lead to selling. Investors who bail near the bottom can lock in the worst possible outcome: they take the full loss and miss the recovery that follows.

Study after study shows the typical investor earns quite a bit less than the funds they own, because they get in and out at the wrong times, usually out of panic. A framework built to manage drawdowns doesn't just improve the math. It makes it far more likely people actually stay put when staying put is hardest.

A portfolio someone can actually stick with is worth far more than a technically better one they abandon at the bottom.

KEY TAKEAWAY

Two portfolios with the same average return can finish more than \$1 million apart over 20 years, purely because of volatility. Managing how much a portfolio swings is one of the highest-impact levers a long-term investor has.

Why Not Just Watch the S&P 500?

If risk management matters this much, the obvious question is: why not just react to the price of the S&P 500 itself? When it drops, play defense. When it rises, stay invested.

The trouble is that by the time the index shows a serious problem, a lot of the damage is already done. The biggest stocks in the index are often the last to crack. Because the index is weighted by size, it can act

as a lagging read on the market's real health, telling you what already happened instead of what's building underneath.

Price Tells You the Score

The S&P 500 shows you what the market's biggest stocks are doing. It reflects what has already happened. It is the scoreboard.

Breadth Tells You the Conditions

Breadth shows how many stocks are actually taking part. It tells you what's happening beneath the surface, before the score changes. It's the condition of the team.

A sports analogy makes it concrete. A team can keep winning even as more and more players struggle, as long as a couple of stars keep carrying the load. The scoreboard still looks fine. But the depth is quietly thinning out. When the stars finally have an off night, there's nobody left to pick up the slack, and things fall apart fast.

Breadth works the same way. An index can keep climbing while fewer and fewer stocks join in, as long as a handful of giants do most of the lifting. The index level stays strong, but the foundation underneath is getting shaky. Breadth measures that participation. When breadth starts to slip while the index keeps rising, it tells you the rally is leaning on a shrinking group of leaders.

Price is the scoreboard. Breadth is the condition of the team. A few stars can carry things for a while, but not forever.

Section 3: Understanding Market Breadth

What Breadth Actually Measures

Breadth describes how widely gains, or losses, are spread across individual stocks. In a healthy advance, most stocks are moving up together. In a weakening one, that participation narrows: a shrinking group of big, familiar names keeps rising while most stocks have already started to roll over.

Because indexes like the S&P 500 are weighted by size, a small number of very large companies can drag the whole index to new highs even while the average stock is already falling. Breadth cuts through that by looking at all the stocks, not just the biggest ones.

It helps to picture the market as a train. The more cars rolling in the same direction, the more momentum is behind the move, and the harder it is to stop. When most stocks are advancing together, the advance

is a long, heavy train that takes real force to derail. When just a few big names are pulling it along, it's a short one, and short trains stop, and reverse, a lot more easily.

Why Breadth Often Leads Price

Market tops are rarely a single moment. They're a process. What usually happens is a slow rotation: the economically sensitive sectors weaken first, then smaller companies roll over, and finally the mega-cap leaders hang on, propped up by their sheer size, while the rest of the market has already turned.

Breadth indicators pick up that process as it happens. Because they measure participation across all stocks, not just the largest, they often flag trouble weeks or months before the index confirms it. That lead time is the whole practical value of watching breadth.

When prices make higher highs but breadth doesn't follow (a setup known as a breadth divergence), it's a sign that fewer and fewer stocks are holding the advance up. The market is standing on a narrowing foundation. Sustained breadth divergences have preceded nearly every major market decline across multiple market cycles.

Key Breadth Indicators

The indicators below are among the most widely used for reading breadth. The focus here is on what each one is telling you, not on how it's calculated.

Indicator	What It Measures	Warning Sign
Advance-Decline Line	Net advancing vs. declining stocks each day	Price makes new high; A-D Line does not follow
% Above 200-Day Moving Average (MA)	How many stocks are in long-term uptrends	Falls below 50% while the index holds near highs
New Highs vs. New Lows	Whether leadership is expanding or shrinking	New lows begin to outnumber new highs
McClellan Summation Index	Breadth momentum over time	Turns negative while price is still rising
Up/Down Volume	Where trading volume is concentrated	Volume tilts toward declining stocks on up-price days

Advance-Decline Line

Each day, some stocks advance and some decline. The Advance-Decline Line keeps a running tally of the net difference. When the line rises right along with prices, most stocks are participating. When the index makes new highs but the A-D Line doesn't, fewer stocks are carrying the rally, a warning that the gains are getting narrow.

Percentage of Stocks Above Their 200-Day Moving Average

A stock above its 200-day moving average is generally in a long-term uptrend. When more than 70% of stocks clear that bar, the market's foundation is broad and healthy. When the figure drops below 50% while the index sits near its highs, it means more than half of all stocks are already in downtrends, no matter what the headline index number says.

New Highs vs. New Lows

In a healthy bull market, more and more stocks set new 52-week highs. As things weaken, the opposite happens: new lows quietly pile up even while a few large-cap names keep printing highs. When new lows start to outnumber new highs, especially while the index looks calm, it's a real sign that weakness is spreading underneath.

McClellan Summation Index²

This one tracks the momentum of breadth over time, smoothing out the daily noise to show the underlying trend. A falling Summation Index while prices are still rising is a classic tell that breadth momentum is fading, well before it shows up in the index itself.

KEY TAKEAWAY

No single breadth indicator is the answer. Their value comes from agreement across several independent measures. When advance-decline lines, moving-average participation, and new high/new low data all weaken together, and stay weak, the weight of evidence has clearly shifted.

Section 4: Breadth Divergences at Historic Market Tops

The Pattern That Repeats

The best case for watching breadth is its track record. In nearly every major market decline across many cycles, several breadth indicators pulled away from index prices, often by months, before the selling really started. These weren't obscure or cherry-picked signals. They were prominent, widely available data points telling the same story: the market was losing its footing underneath before the index ever showed it.

Before every major bear market, participation weakened before prices caught up to the risk. Breadth doesn't ring a bell at the top, but it tells the story plainly enough for anyone paying attention.

² The McClellan Summation Index is a market-breadth indicator calculated as a running cumulative total of the McClellan Oscillator, a measure derived from the net difference between advancing and declining stocks on an exchange. It is used to gauge the longer-term strength or weakness of market breadth. It is not possible to invest directly in an index.

Evidence Across Market Cycles

The table below summarizes what breadth did at six important market peaks. The divergence window, meaning the gap between when breadth weakened and when the index finally peaked, ran from weeks to months in every case, and each time it gave a warning that price alone did not.

One note on the dot-com entry. The 1998 A-D Line divergence was unusually long, which says a lot about how narrow and tech-driven the late-1990s rally became. For more than a year, a shrinking group of large-cap technology names kept lifting the Nasdaq Composite Index (Nasdaq)³ and the S&P 500 even though most stocks had already rolled over. That long stretch doesn't weaken the signal. It shows just how extreme the concentration had gotten. The decline that followed, 49% in the S&P 500 and 78% in the Nasdaq, matched how narrow the market had become.

Market Peak	What the Index Showed	What Breadth Was Saying	Decline That Followed
2000 Dot-Com Top	Nasdaq and S&P 500 made new highs into early 2000	NYSE A-D Line peaked in April 1998, reflecting extreme late-cycle narrowing as the rally became almost entirely tech-driven	S&P 500 -49%, Nasdaq -78% (Mar 2000–Oct 2002)
2007 Housing Crisis	S&P 500 at all-time highs in October 2007	A-D Line, % above 200-day MA, and new highs all weakened from June 2007, a 4-month divergence window	S&P 500 -57% (Oct 2007–Mar 2009)
2011 Correction	S&P 500 near highs into late April 2011	% above 50-day MA dropped sharply in spring 2011	S&P 500 -22% (Apr–Oct 2011)
2015–2016 Correction	S&P 500 churned near highs through mid-2015	McClellan Summation Index turned negative months before the peak	S&P 500 -15%, MSCI ACWI -20%+ (May 2015–Feb 2016)
2018 Q4 Selloff	S&P 500 near highs through September 2018	New lows expanded sharply while the index stalled in October	S&P 500 -20% (Sep–Dec 2018)
2022 Bear Market	S&P 500 near highs into January 2022	% above 200-day MA fell below 50% by November 2021, two months before the index peaked	S&P 500 -25%, Nasdaq -35% (Jan–Oct 2022)

What This Means in Practice

³ The Nasdaq Composite Index is a market-capitalization-weighted index that includes substantially all common stocks listed on the Nasdaq Stock Market and is heavily weighted toward information technology companies. It is not possible to invest directly in an index.

None of this means breadth is a perfect timing tool. It isn't. Divergences can drag on for weeks or months before prices confirm the weakness, and a narrow market can grind higher on a few big names longer than anyone expects.

What breadth gives you is a shift in the weight of evidence. When several indicators diverge in a sustained, meaningful way, the odds go up that the advance is standing on a weakening foundation. The right response isn't to sell everything. It's to get systematically more defensive, trimming risk step by step as the evidence builds, instead of betting on one signal or waiting for the index to confirm a problem breadth already flagged.

Just as important, breadth works in both directions. In the early and middle innings of a bull market (2009 through 2012, 2016 through 2017, 2020 through 2021), breadth expanded right alongside prices and confirmed the advance. Healthy breadth is a reason to stay invested. This isn't a bearish framework. It's a way to tell a broad, healthy advance apart from a narrow, fragile one.

KEY TAKEAWAY

Breadth divergences have shown up before every major market decline across many cycles, with lead times running from weeks to months, a window price alone doesn't give you. And it cuts both ways: expanding breadth confirms healthy advances, while weakening breadth flags rising risk before the index does.

Risk Management Is Also Client Management

Large drawdowns do more than damage portfolios. They test investor discipline at exactly the moment when discipline matters most.

The research is clear and consistent: a lot of investors sell near the lows, driven by fear, recency bias, and the very human urge to make the pain stop. In doing it, they lock in losses and miss the recovery. The result is a return that badly trails the funds they owned, not because the funds failed, but because the investors left.

The Behavior Gap

Studies consistently show the typical investor earns meaningfully less than the average mutual fund, in some periods by several percentage points a year. It's not the manager falling short. It's investor behavior: buying after big gains and selling after big drops, at exactly the wrong times. Managing drawdowns may be the single best way to narrow that gap, because a smaller drawdown is a lot easier to sit through.

That has a direct implication for advisors and clients alike. Managing volatility and drawdown risk isn't only a portfolio-construction decision. It's a behavior-management decision.

A client who lives through a 20% drawdown is rattled but usually stays put. A client who lives through a 45% drawdown may not. And if that second client sells near the bottom, the real cost isn't the extra 25 percentage points. It's potentially years of compounding lost to a decision made under stress.

For advisors, risk management is both a portfolio tool and a relationship tool. Clients who stay invested through hard markets can build wealth. Clients who panic and sell don't.

From Research to Portfolio Construction

Understanding risk management is one thing. Implementing it consistently is another.

Most investors already know, in theory, that they should get more defensive when risks rise. The hard part is seeing those risks clearly, without the pull of recency bias, emotional attachment, or whatever the prevailing story happens to be, and then acting on what they see, consistently and with discipline, through every market cycle.

That gap between knowing and doing is where most investors get tripped up. Markets tend to feel most dangerous at the bottom and safest at the top, so the natural human reaction is usually exactly backward.

At Tamarisk Capital Management, breadth is one piece of a broader weight-of-evidence framework we use to read market health systematically. Instead of leaning on forecasts, narratives, or gut feel, the process responds to what the market itself is saying through how broadly its own stocks are participating.

The goal isn't to call tops or bottoms. The goal is to adapt, shifting the portfolio's risk posture step by step as the evidence builds, and doing it by rules rather than by gut in the heat of the moment.

The goal isn't to be right about the market. It's to have a process that responds to what the market is actually doing, and to follow it consistently.

These principles are the foundation of the Defender Risk Adaptive 500 ETF (SPDF), which puts this disciplined, breadth-based risk process to work inside a transparent, accessible ETF, so investors don't have to run the process themselves.

Conclusion

Markets will always move around. Corrections, bear markets, and stretches of real uncertainty aren't exceptions to investing. They're a permanent part of it. You can't control when they show up. You can control how ready you are for them.

The case for risk management doesn't rest on predicting the future. It rests on three realities that hold up across market cycles: big losses take outsized gains to recover, and the time lost can't be won back; higher volatility quietly eats into compound returns even when average returns look the same; and breadth has reliably weakened underneath before major declines showed up in the index.

Long-term wealth can be built through compounding. Compounding requires staying invested. And staying invested requires a portfolio you can actually hold with confidence through the hard stretches, not one that forces painful decisions at the worst possible time.

Risk management isn't about avoiding markets. It's about staying in the game long enough to let time and compounding do the work.

The best offense is not giving back what you've earned. Keep the compounding going. Let time work for you.

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