

## Rethinking Modern Portfolio Theory

*Are we all doing it wrong — or is the theory in need of updating and repair?*

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February 1, 2010

Poor Harry Markowitz. Every time investors get whipped in the financial markets, they take it out on his Modern Portfolio Theory (MPT). Never mind that the groundbreaking concept has governed investment discipline for more than 40 years and that Markowitz won a Nobel Prize for it in 1990. Its central tenet—that diversification mitigates portfolio risk—seemed to collapse in 2008 when the bear market left no asset class unmauled. Only Treasuries provided a haven, and according to MPT, Treasuries don't even count. They're just the risk-free baseline at the bottom of the return axis. If you had furious clients asking what the hell happened to your age-appropriate asset allocation strategy, you weren't alone.

[Investors don't kick Markowitz only when they're down.](#) MPT also came under gleeful attack during the technology boom of the late 1990s, when "risk" was a dirty word. What sense does it make to diversify out of an asset class that's returning 30%? Plenty, of course—but try telling clients to keep a little money in cash during a raging bull market.

[Why does MPT look so good on paper,](#) yet fail so spectacularly every few years? Many veteran advisors say the problem isn't with the theory but with its implementation. Others insist MPT doesn't define risk properly. And at banks and universities across the country, experts are tweaking Markowitz's formula to make it more predictive of real-world investment outcomes. (Read how one MIT professor is taking a stab at [updating MPT.](#))

So far, no other single method has knocked MPT off its perch as a coherent way of structuring portfolios and pricing assets. But more and more practitioners believe the theory doesn't deal adequately with today's world. For one thing, 21st-century market volatility would have boggled Markowitz's mind. Indexes now move up or down by 1% or 2% in 24 hours, changes that historically would have taken place over a month.

More to the point, the classical approach to asset management has let an entire generation down. According to MPT, stock market crashes like those of 1987, 2000 and 2008 are supposed to be outlier events, happening so rarely that a diversified portfolio with a long time horizon can survive and recover. Advisors recite the mantra that stocks outperform other asset classes in the "long term," and financial institutions have produced hundreds of "lifestyle" and "target-date" products built around that assumption. Yet an investor who bought nothing but 20-year Treasury bonds from February 1969 to February 2009 would have made slightly more money than one who stayed in an S&P 500 fund throughout the same period, without suffering a single sleepless night.

"Target funds are marketing gizmos," declares [Bryce James, founder and chief executive of Seattle-based Smart Portfolios, which provides asset allocation software to investment professionals.](#) "They take long-term averages and totally ignore fear and greed," the irrational forces that push markets to un-MPT-like extremes. His firm's proprietary Dynamic Portfolio Optimization technology uses a fund of exchange-traded funds (ETFs) to gain broad exposure to various asset classes. But instead of assuming that over time these ETFs will remain uncorrelated enough to sufficiently diminish risk, James switches holdings—sometimes radically—[as correlations change.](#)

He uses value at risk as a metric, watching how much the investor stands to lose in the worst case. He also superimposes a "z" axis on the distribution curve that tracks how asset returns are correlated. If the correlation between two ETFs gets too close, he rethinks the mix. For example, from October to November of last year, he reduced the number of ETFs in his portfolios from 13 to nine, boosting real estate exposure to capture the market bottom and slicing short-term bond holdings to hedge against looming inflation.

Smart Portfolios has been around for just a few years, but in back tests its strategy outperformed a composite index of stocks and bonds from June 2006 to September 2009 with significantly less volatility. James is almost evangelical about weaning advisors from what he calls the *Farmer's Almanac* approach to portfolio management. "If the mean temperature on June 1 is 60 degrees Fahrenheit, but last year it snowed on June 1, you'd better find a new way to save your crops," he says.

### TAMING THE FAT TAIL

The most widespread criticism of MPT is that it treats both upside and downside volatility as risk. At the heart of Markowitz's theory is a bell-shaped curve that shows the "normal distribution" of portfolio returns above and below a mean, known as mean variance. Each unit above or below the mean is a standard deviation. But real investors don't experience upside volatility as risky at all. "Investors aren't risk-averse, they're loss-averse," says Harold Evensky, who has piloted fee-only planning firm Evensky & Katz in Coral Gables, Fla., through numerous booms and busts.

Furthermore, real market returns aren't symmetrical. According to MPT, the S&P 500 should have shown a monthly decline of more than 15% (three standard deviations) only once between January 1926 and November 2008. But it happened 10 times. Put differently, domestic equities should hand investors an annual loss of 15% or more about once every 111 years. Instead, the S&P 500 drops by that much every 40 years or so.

Reality's tendency to drag Markowitz's bell curve away from orderly distribution around the mean is called "skewness," and the extra-bad outcomes on the negative side of the mean are commonly known as the curve's "fat tail." To deal with fat tails, an alternative called Post-Modern Portfolio Theory (PMPT) is gaining traction among some practitioners by concentrating on downside risk. Believers say that focus makes PMPT more descriptive of market performance and allows managers to construct more defensive portfolios.

The tools for such analysis are gradually becoming available. One is *The Sortino Framework for Constructing Portfolios* by Frank A. Sortino, who helped birth PMPT in the late 1980s at the Pension Research Institute and recently launched Sortino Investment Advisors to manage 401(k) accounts. Another is asset allocation software from Information Technologies, a New York firm whose founder, Brian T. Rom, updated the Sharpe Ratio to reflect more downside risk in asset pricing. (Rom named his new measurement the Sortino Ratio.) His program "Expert Allocator" lets you incorporate skewness into return forecasts, and you can use either mean variance or downside deviation to measure risk.

James Breech, who manages \$250 million for high-net-worth individuals at Cougar Global Investments in Toronto, used Rom's software for 16 years before developing proprietary technology. An early convert to PMPT, he says his professional goal is to keep clients from losing money. "We take that mandate very seriously," he says. "For our most conservative clients we have no more than a 5% chance of going negative, and for more aggressive clients no more than 20%. If that means accepting very low returns, we will." Cougar builds on Sortino's work using a "minimum acceptable return"-the rate an investor must earn to accomplish a particular goal. Any return below that level is downside risk, so it must be hedged.

Breech's strategy has paid off for his investors. His portfolios returned 2.8% in 2008. And in a performance audit by Brockhouse & Coopers, Cougar has ranked in the first percentile among 145 global money managers for eight years running, earning an annual average of 11.9% by flattening out the booms and busts since 2001.

Acknowledging more downside risk can also help advisors communicate to clients the true probability of reaching their wealth and income goals, thus better managing their expectations. "Standard simulation analysis probably overestimates what you can earn in a down market," says Peng Chen, president of Ibbotson Associates, the asset allocation services firm acquired by Morningstar in 2006. Chen and colleagues are building portfolios that move the efficient frontier curve to address fat tails. Instead of using standard mean variance to measure volatility, Chen uses Truncated Lévy Flight, a distribution curve applied in physics before it moved over to finance that "does a much better job of modeling tail risks," he says.

For instance, where a normal distribution curve might result in a projection that a client's account will reach \$1 million after 20 years, Truncated Lévy lowers that estimate to \$850,000 to \$900,000. To protect against downside risk in a 20-year retirement income portfolio, the advisor might suggest adding [equity-linked CDs](#). To hedge against downside risk and provide longevity insurance to a 30-year portfolio, he could add variable annuities with living benefit riders.

The pain of 2008 eroded confidence in the whole notion of a "policy portfolio" that reflects long-term expectations about various assets' risks and returns. Shortly before his death in June, Peter L. Bernstein-author of *Against the Gods* and many other finance classics-published an article called "Where Did the Long Run Run?" arguing that static asset allocation is obsolete in these uncertain times. A month earlier, veteran planner Kenneth L. Solow, founding partner and chief investment officer of Pinnacle Advisory Group in Columbia, Md., published *Buy and Hold is Dead (Again): The Case for Active Portfolio Management in Dangerous Markets*.

Pinnacle, which serves high-net-worth clients and has about \$750 million under management, uses tactical asset management. Its planners pay attention to asset valuations-which MPT ignores-and to macroeconomic factors that might provide a headwind or tailwind to returns. Solow absolves Markowitz for investors' catastrophic losses, blaming his own industry instead. "There's no justification for the crazy way we have interpreted Markowitz's work," he says. "It's scandalous."

Markowitz never recommended building a portfolio and then just walking away. But ever since a 1986 paper was misinterpreted to mean that 94% of portfolio returns depend on strategic asset allocation rather than tactical management, such as stock-picking, investors have thought "buy-and-hold" meant "set and forget." The diversified asset allocation model, Evensky believes, has lulled investors into a false sense of security. Many can't even be talked into rebalancing their portfolios during favorable markets.

Debate over MPT therefore often merges into the ongoing dialogue over passive versus active management. "I think MPT died 30 years ago," says [Jeffrey Saut, chief investment strategist at Raymond James](#). "If the theory were correct, Warren Buffett, Peter Lynch and Paul Tudor Jones wouldn't have their track records." He says that although 60% of Lynch's trades resulted in losses, he could manage downside risk precisely because he wasn't tied to a strategic asset allocation. "Asset allocation-and just about any other model-works in a bull market," Saut scoffs. "But the driver of returns in a bear or range-bound market is stock selection and risk management."

Unfortunately, we can't all be Peter Lynch. [In fact, active trading does the average investor more harm than good](#). In one famous study that tracked investment activity in 66,465 households from 1991 to 1996, the people who traded most frequently earned annual returns of 11.4%, while the broad market returned 17.9% and the average household earned 16.4%. Even "experts" tend to wind up with egg on their faces in shaky markets. Evensky cites the billions that private equity and hedge funds lost by making huge bets on real estate companies, automakers and retailers in 2006 and 2007. That's why many experts want to update Markowitz's theory while retaining its disciplinary aspects, which help protect investors from their own worst impulses.

## IRRATIONAL BEHAVIOR

Interestingly, some of the most innovative revisions to MPT are coming from big banks. Last May, research director Abdullah Sheikh and advisor Hongtao Qiao at JPMorgan Asset Management published a paper arguing that Markowitz's mean variance measure of risk is obsolete and replacing it with conditional value at risk, which the authors define as the average return in the worst 5% of cases.

Their research also found that whereas MPT treats each investment period as independent, real-life returns are "serially correlated," especially for alternative assets. That is, returns in March often mimic returns in February. Unless it's corrected, serial correlation, like a normal distribution curve, hides the true extent of volatility in an asset class and can lead managers to underestimate risk. JPMorgan applies a new asset allocation tool to institutional portfolios that fixes these flaws and, presumably, will protect clients from getting blindsided. As for returns, risk management is much more geared toward capital preservation than capital appreciation. You may not participate in the headiest bull markets, but you also don't get creamed. That's another way PMPT flies in the face of target-date and lifestyle funds, which insist young people have forever to ride out bad markets.

Markowitz has also been blamed for assuming that investors behave rationally, an assumption that grew into the Efficient Market Hypothesis. It turns out that during extreme bull and bear markets, investors behave anything but rationally. So new models account for the way people act under varying economic conditions. Fred Dopfel, a managing director at BlackRock in San Francisco, headed the client advisory group at Barclays Global Investors before BlackRock absorbed BGI at the end of last year. In his September 2009 paper, *The New Policy Portfolio: Navigating Through Good and Bad Regimes*, Dopfel argues that you can't use the same asset class assumptions under different economic conditions. In fact, you need four sets of assumptions: one for good regimes, one for bad, one for recoveries (bad to good) and one for crashes (good to bad).

The distribution curve of returns for each asset class changes depending on the type of regime. Sure enough, when you put all the curves together they produce negative skewness and a fat tail. Dopfel then invents four hypothetical investors with different skills and personalities: Naïve, Smart but Humble (SBH), Myopic and Prophetic. He shows that the SBH investor, who knows that economic regimes vary but doesn't pay attention to the current state and/or try to predict transitions, is best equipped to deal with market uncertainty.

SBH builds a static asset allocation weighted for all states and transitions, an approach that Dopfel also nicknames SBH, for Strategic but Hedged. The portfolio includes protection against bad regimes (TIPS and commodities against inflation, for instance), and rebalances religiously. The result? This investor not only outperforms Naïve (who invests statically for the good state only) and Myopic (who invests tactically for the current state only), but approaches the performance of Prophetic (who perfectly anticipates transitions).

"It takes a lot of discipline to be smart but humble," says Dopfel. "You can't just sit there and wait for a clear sign [that tells you when to hedge or rebalance], because you'll miss it." He notes that many institutional investors missed the market's recovery in early 2009 because they didn't rebalance after their equity allocations shrank. Ironically, that amounted to a tactical move. "They felt like they were doing nothing," Dopfel says, "but they were betting that the market wouldn't recover."

Conversely, investors who did rebalance at the end of last year were being anything but passive. "Most people don't think of rebalancing as an active management process, but it is," says Michael Kitces, publisher of *The Kitces Report*, which provides research and education to financial planners. "It makes sure that your portfolio has the risk and return parameters you want and hasn't drifted. And it's a systematic attempt to buy low and sell high." Kitces' December 2009 report is titled *Revisiting Modern Portfolio Theory*, the first of a series on Markowitz's hallowed precepts. As with many of his colleagues, Kitces seems disinclined to throw out MPT wholesale. He believes the industry will need a new generation of software to perform the integral calculus that will bring the theory's assumptions into better alignment with the 21st century.

In many ways, the markets may have outgrown Markowitz. But MPT still has staunch adherents. "Asset allocation and diversification are the most inexpensive and widely available risk management tools available to investors," declares Don Bennyhoff, senior investment strategist at the Vanguard Investment Strategy Group in Alberton, Pa. He argues that MPT kept its promise in the most recent crisis. While domestic equities lost about 38% in calendar 2008, U.S. investment-grade bonds were up by more than 5% in the same 12 months. Clearly, clients who had a few eggs in the bond basket suffered less than those who didn't.

But investors expected too much from MPT. "They misunderstood what diversification is intended to do," Bennyhoff says. "It's not insurance or protection against loss. It allows you to moderate bad returns with others that are less bad." He insists that advisors who structured their clients' portfolios along Markowitz's efficient frontier back in 2007, after frank conversations about risk tolerance and time horizons, could face clients more confidently a year later.

Bennyhoff's loyalty to classic strategic asset allocation theory isn't surprising. His employer, Vanguard, made its name selling low-cost index funds, and founder John Bogle famously believes that trying to beat market averages over the long term is a "loser's game." Yet Bogleheads aren't the only ones who say investors themselves are the culprits when they suffer heavy losses in a market plunge, not MPT.

"Diversification didn't fail us," says Sam Stovall, chief investment strategist at Standard & Poor's in New York. "It's our interpretation of what a truly diversified portfolio is." Stovall points out that although a classically balanced portfolio is split 60/40 between stocks and bonds, many investors load up on international, emerging-market, large- and small-cap equities and think they've reduced risk. "But they're all stocks," he says.

Millions more people invest than in the 1950s. New measures of risk are probably well overdue: Information and money travel in the time it takes to blink. But MPT's diversification rule remains the most responsible remedy for the investor who doesn't want to get whipped.