



## Investors Should Mind Their Tails

By Lawrence Jones

The market experiences more shocks than investors think. PIMCO's Vineer Bhansali thinks he has a way to guard against these events.

Like many great ideas, this one came together unexpectedly at a meeting between old colleagues. The story of the development of PIMCO's tail-risk hedging strategy began as a casual chat between two highly respected scholars of finance: Vineer Bhansali and Mohamed El-Erian.

Bhansali, head of PIMCO's 14-person analytics team, was in Boston delivering a conference paper. El-Erian, who had worked at PIMCO, was president and CEO of Harvard Management Co., the firm charged with managing

Harvard University's endowment. Bhansali met up with his former colleague to discuss a novel hedging approach he was developing at PIMCO. As it turned out, El-Erian was doing something similar at Harvard.

The approach, called "tail-risk hedging," aims to protect portfolios that deploy the strategy from rare and systemic shocks. Popularly referred to as "black swans," these events can greatly damage investor results. They are the dramatic losses that appear on the far left end—the "tail"—of the probability distribution

curve of investment returns. Their chances of happening are supposed to be minute, but some in finance and economics believe that the shocks occur more frequently than commonly thought, and people are developing ways to hedge against the risks posed by these shocks.

Bhansali first implemented tail-risk hedging several years ago in a hedge-fund-like strategy he was running at PIMCO for an insurance company. The client became more interested in how Bhansali was hedging away the portfolio's tail risk than in the overall hedge fund. The

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## Vineer Bhansali

client asked Bhansali to create a distinct tail-risk hedging portfolio. Soon after, many other PIMCO clients became interested in disaggregated hedging portfolios of this kind. Of course, the current financial crisis has only intensified the demand.

Meanwhile, El-Erian returned to PIMCO in January 2008. (He is now CEO and co-CIO.) His return intensified efforts to expand the strategy. PIMCO now uses the tail-risk hedging approach at open-end mutual funds PIMCO Global Multi-Asset Fund PGAIX and PIMCO RealRetirement target-date funds. The strategy is also being used at many of the firm's institutional and separate account mandates. All in all, the tail-risk hedging part of PIMCO's business has grown into several billion dollars in assets under management.

### Lessons from Science for Investing

Bhansali's views on the management of investment risk and its mitigation have been informed by his unconventional background. He obtained a Ph.D. from Harvard in theoretical particle physics. In his early years as a professor, Bhansali's reputation for high-level mathematical abilities and his rigorous thought process attracted the attention of New York investment firms, which were always looking for "rocket scientist" researchers to develop highly complex trading strategies. One of his callers, from Goldman Sachs, was Fischer Black, who is best known for his work on options pricing and the Black-Scholes equation. Black recruited Bhansali for a position on his research team. Bhansali turned him down to continue teaching physics.

Many more solicitations later, however, Bhansali relented and took a position at

Salomon Smith Barney/Citigroup as a derivatives specialist. "I figured that if I did that for a few years, I could always return to academia," he says.

He found he enjoyed the work, and he hasn't looked back. He later worked at Credit Suisse First Boston on the firm's proprietary fixed-income trading desk, and he joined PIMCO in 2000. He has continued his scholarly bent and has written many scientific and financial journal articles, as well as *Pricing and Managing Exotic and Hybrid Options* (1998).

Bhansali might have changed careers, but he has never completely left behind his previous field. In fact, Bhansali frequently finds himself returning to physics to find insights into finance—especially recently. He argues in a PIMCO research piece that in times of dramatic market stress it is often the more unorthodox viewpoints, drawn from other fields, such as the physical sciences, that can provide the most useful intellectual tools. The article draws an analogy between dramatic changes in the financial markets to the phase transitions in states of matter, such as when water goes from being a liquid to a gas when it's boiled.

Bhansali argues that, much like in the physical world, dramatic transitions in financial markets are often messy—expected patterns of cyclical change in asset classes, such as "reverting to the mean," don't always pan out in an orderly fashion. Instead, he says, these patterns can give way to disorderly momentum factors, and investors should not confuse the wild swings for "genuine," or valuation-based, mean reversion.

More broadly, Bhansali sees equilibrium as rarely the state of affairs in the world. Whereas someone using risk analytics based on the efficient-market hypothesis sees equilibrium as the norm, Bhansali, the particle physicist, assumes there is no norm. This perspective has profound implications for someone working on tail-risk hedging.

### Tail-Risk Hedging in Practice

When discussing the practicalities of his approach, Bhansali likes to draw the distinction between what he calls "just-in-time" risk management and a "just-in-case" risk strategy. He argues that the former view, where investors attempt to rush into hedge positions at the start of a market downdraft, doesn't work well. The timing can be difficult to get right, he says, and the costs of many hedging avenues spike up.

Instead, he advocates the style of a long-term insurance policy, "just in case" it is required. Tail risk is always a concern, he says, and portfolios that are using the strategy employ pre-emptive hedges when they're cheaper to obtain. Of course, during times of extreme market stress many tail-risk hedging vehicles become very pricey, but Bhansali argues that the approach PIMCO uses accounts for that problem.

When addressing the issue of costs, Bhansali says that although tail-risk hedging is supposed to protect investments from rare periods of financial stress and other systemic shocks to the financial markets, these black swan events occur more frequently than we might think, and this is an important consideration when addressing the cost issue. For example, over the past three decades, Bhansali says that the

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financial markets have experienced significant shocks roughly every five to seven years. He points to events that have occurred just in the past 12 years: the Asian financial crisis in 1997; the Russian debt default and the collapse of hedge fund Long Term Capital Management in 1998; the tech-stock bubble burst and consequent recession from 2000 to 2002; the 9/11 terrorist attacks; and the current financial crisis, which began in early 2007 and has resulted in extraordinary financial market stress, unprecedented government response, and threatens to end in a potentially deep and protracted recession.

Instability characterizes modern capitalism. "The question shouldn't be whether you can afford to hedge, but whether you can afford not to," Bhansali says.

Based on estimates for PIMCO Global Multi-Asset Fund, which is run by Bhansali, El-Erian, and Curtis Mewbourne, the costs are manageable. PIMCO says that the tail-risk hedging strategy adds 25 to 50 basis points to the expenses of running the fund.

Another common objection to tail-risk hedging is the assumption that it needs to identify the exact sources of financial market stress to be effective. Very few in the investment industry were wary of the subprime sector before 2007, and virtually no one can predict something like a terrorist attack. Bhansali argues that he doesn't need to know the precise catalyst of a crisis before it occurs. His hedging approach does not target specific sectors of the market, but rather it works at the level of the macro effects that result from the crisis and the policy responses to it.

"While the origins of financial crises can be very distinct and hard to predict," he says, "they all tend to have similar macro consequences. For macro hedges to be successful, we don't need to correctly predict exactly which tail events will happen. We simply need to protect against the range of responses to those events."

At the Global Multi-Asset fund, this protection could be acquired through a variety of methods, such as by purchasing short-term Treasuries or eurodollar futures. Both tend to rally during market crises, as capital seeks a flight to quality. Similarly, certain currencies, such as the U.S. dollar, Japanese yen, and Swiss franc, have traditionally been seen as safe havens.

Moreover, the fund will also use option-like approaches on credit indexes, using deeply out-of-the money segments of the CDX and iTraxx. Or it will use managed-futures-styled strategies. Beyond these approaches to hedging risk, the managers will simply dial down the portfolio's level of risk when they think the market isn't offering attractive valuations or adequate compensation for risks.

### Unknowns and the Unknowable

Attempting to gauge improbable risks and protect portfolios against them inevitably leads one to humility. They are too many unknowns out there, Bhansali says. He refers to 17th-century French philosopher Blaise Pascal's famous propositions regarding the existence of God. Pascal's wager suggests that although we lack knowledge and proof of God's existence, the best bet is to believe, given the cost-benefit analysis in place for Pascal. Similarly, Bhansali says, tail-risk hedging encompasses many uncertainties, but it is best to recognize that and protect oneself in the best possible manner.

Bhansali says that he also understands his limitations. The tools he uses to evaluate risk and determine how to hedge against it are just that, merely tools. They are not to be overly trusted or relied upon in all situations, he says. As an aircraft pilot, and underscoring his cautious style, he mentions an old adage that counsels aviators: In the event that an instrument malfunctions during flight, cover the instrument, because you'd rather not have it at all than mistakenly rely on it.

In the end, while this approach is very new to the open-end mutual fund universe, its initial results look promising. The Global Multi-Asset

fund and the RealRetirement target-date lineup, both launched last year in the midst of the financial crisis, have held up well, in large part because of Bhansali's tail-risk hedging.

It remains to be seen how the approach works in various environments, but Bhansali is already looking to the next possible crisis—an unexpected, sharp jump in inflation down the road—and is protecting his portfolios appropriately. He admits that it's a fairly unlikely scenario right now, but surely his shareholders are glad that he has it on his radar screen. And should that inflation come, we wouldn't bet against Bhansali beating out his unprepared rivals. ■■■

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