

INSIGHT

Actionable perspectives
on topics that impact wealth



Milliman Managed Risk Strategy

CREATING TRANSFORMATIONAL IMPROVEMENT IN THE RETIREMENT SAVINGS INDUSTRY

People nearing or in retirement are faced with a tremendous challenge—generate a reliable lifetime income that will survive an unpredictable story line.

The traditional means by which a reliable retirement income is generated seem all but gone. A slow growing economy, low yields, and the looming threat of inflation are making it difficult to meet both income and risk management needs. Investing too much in stocks may mean too much market risk, while too much in bonds may equate to a lack of growth. In some ways, it has become a zero sum game.

Milliman Financial Risk Management LLC (Milliman FRM)—one of the world's largest and most trusted risk managers—has been pioneering solutions to challenges like these for over 15 years. One of the most widely used solutions is the Milliman Managed Risk Strategy™.

Milliman Managed Risk Strategy

The Milliman Managed Risk Strategy is an intelligent portfolio risk management technique that seeks to:

- ▶ stabilize portfolio volatility around a target level,
- ▶ capture growth in up markets, and
- ▶ defend against losses during sustained market declines.

Milliman's financial risk management techniques were originally developed to help some of the world's largest financial institutions stabilize portfolio volatility and weather market crisis. Today, both institutions and retail investors can access these same risk management benefits through the Milliman Managed Risk Strategy (via certain mutual funds, exchange-traded funds, collective investment trusts, target-date funds, and variable annuities).

Two Part Risk Management Strategy

VOLATILITY MANAGEMENT

The Milliman Managed Risk Strategy's volatility management process seeks to stabilize portfolio volatility around a shorter-term target level (e.g. one month). This aims to keep the risk level of a portfolio from increasing significantly during periods of market turbulence. An additional goal of the volatility management process is to seek additional returns based our expectation that market volatility tends to decrease during extended periods of favorable market returns.

CAPITAL PROTECTION STRATEGY

The Milliman Managed Risk Strategy also employs a capital protection strategy that seeks to provide put-like protection on a portfolio in an effort to reduce losses during periods of significant and sustained market decline. One of Milliman's core disciplines is the operational capability to use futures contracts to manufacture a long-dated put option on a portfolio. When combined with volatility management, the strategy has the potential to be very powerful.

RISK MANAGEMENT PROCESS

1 BEGIN WITH FULL EXPOSURE

- ▶ Broad market access (e.g., U.S. large-cap, U.S. small-mid-cap, international, emerging).

2 APPLY MILLIMAN MANAGED RISK STRATEGY



- ▶ **Volatility management:** seeks to stabilize portfolio volatility around a target level.
- ▶ **Capital protection strategy:** seeks to defend against losses during sustained market declines.
- ▶ Risk management calculations are performed daily, and carried out via a global trading platform.

3 RESULT: RISK MANAGED EXPOSURE

- ▶ Hedge asset positions within a portfolio are continuously changed in an effort to stabilize volatility and reduce the impact of sustained market declines.

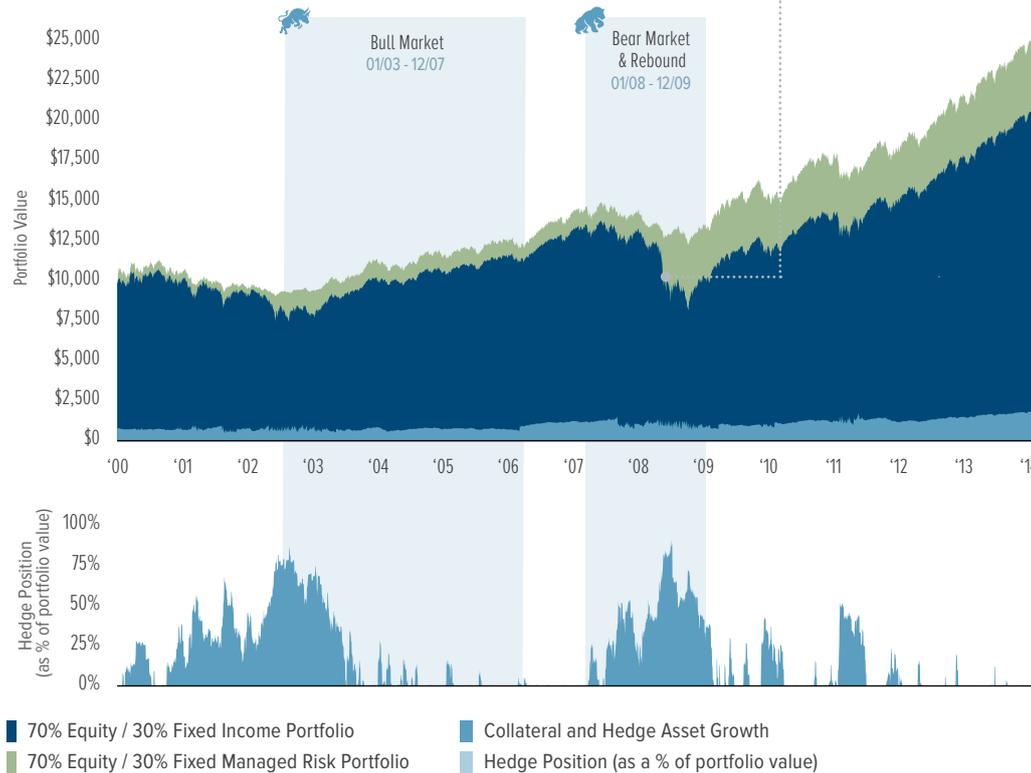
Dynamic hedge asset position typically includes holdings in cash and futures contracts, subject to market based thresholds. The charts above are for illustrative purposes only and do not represent the performance of any investment or index. Milliman Managed Risk Strategy does not manage the underlying portfolio. No strategy or technique can guarantee returns or prevent losses.

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ILLUSTRATION

The chart below illustrates the hypothetical backtested returns of a portfolio allocation between 70% equities, and 30% fixed income.

MILLIMAN MANAGED RISK STRATEGY HYPOTHETICAL RETURNS



HYPOTHETICAL

SECOND WEEK OCTOBER 2008

- ▶ During the second week of October 2008, the unhedged portfolio model would have lost 11.03%.
- ▶ The managed risk portfolio offset these losses by 8.03%, finishing down -3.00% for the week.
- ▶ This was accomplished by systematically increasing the protected portfolio's hedge asset level in an effort to maintain the target volatility level, and by harvesting gains from the hedge assets as they became deep in-the-money.
- ▶ Equity exposure was significantly reduced, and then increased steadily throughout 2009. This allowed the managed risk portfolio to participate in the rebound following the financial crisis. There is no guarantee that the strategy will meet its objectives.

MILLIMAN MANAGED RISK STRATEGY

BULL MARKETS

- ▶ Detect decreases in volatility
- ▶ Adjust hedge assets in order to increase effective equity exposure and seek to preserve market participation
- ▶ Dynamically adjust capital protection strategy level after favorable market performance to shield against potential market downturn

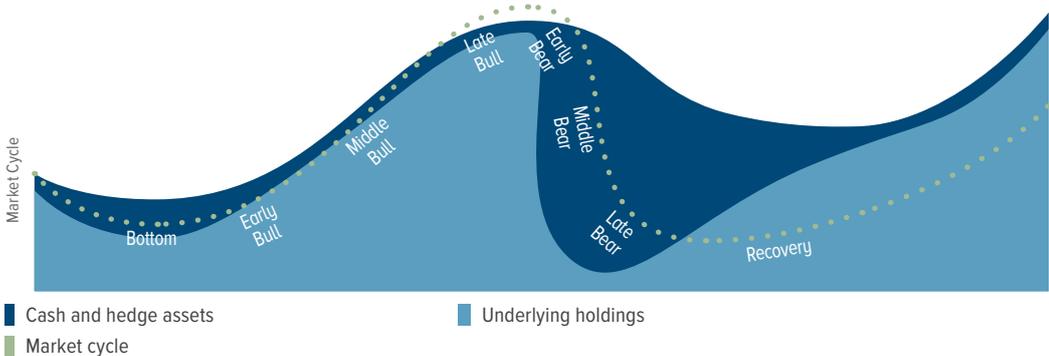
BEAR MARKETS

- ▶ Detect increases in volatility
- ▶ Adjust hedge assets in order to decrease effective equity exposure and seek to mitigate loss
- ▶ Dynamically adjust capital protection strategy level after major market decline to harvest any gains from the hedge assets, and reset market participation to a "normal" level

Source: Milliman Financial Risk Management LLC, 1/1/00 - 12/31/14. Methodology: The Milliman Managed Risk Strategy typically uses futures to replicate [put] optionality. The above chart was calculated with the following assumptions: Backtesting analysis for the Milliman Managed Risk Strategy relies on historical data, including fund returns, index returns, and interest rates. We assume that all dividends are reinvested. Fees are added to the fund returns when specified. All backtests are based on daily data. All backtests assume that trades can only occur once a day, at end of day prices. We assume that the hypothetical trades in the backtest can be executed at historical prices without affecting market prices. Unless otherwise specified, all performance results show performance for a buy and hold investor. We assume that all cash held in the fund earns interest based on the shortest interest rate input into the model. The underlying investment holdings of each fund are rebalanced on a periodic basis. The 'unprotected' fund consists of static allocations to the underlying investment holdings. The Managed Risk fund includes the static allocations to the underlying investment holdings, as well as a futures overlay to implement the Managed Risk Strategy. The number of futures contracts traded each day in the backtest is based solely on the output of the MMRS algorithm and the pre-specified trading thresholds. The MMRS algorithm has several parameters that must be specified before a backtest can be run. The payoffs for each futures contract is calculated based on index returns, interest rates, and the futures multipliers. The model assumes that cash is needed to support the margin for the futures contracts, and that the initial margin amount for each futures contract is fixed over the time period. The number of futures contracts traded each day in the backtest is based solely on the output of the algorithm and the pre-specified trading thresholds. The payoffs for each futures contract is calculated based on index returns, interest rates, and the futures multipliers. The model assumes that cash is needed to support the margin for the futures contracts, and the initial margin amount for each futures contract is fixed over the time period. The above chart was calculated based on historical data, including fund returns, index returns, and interest rates. If a fund does not have returns that go back to the inception of the backtest, the fund returns are backfilled using returns for an appropriate benchmark. We assume that all dividends are reinvested. Fees are added to the fund returns when specified. All backtests are based on daily data. All backtests assume that trades can only occur once a day, at end of day prices. We assume that the hypothetical trades in the backtest can be executed at historical prices without affecting market prices. Unless otherwise specified, all performance results show performance for a buy and hold investor. We assume that all cash held in the fund earns interest based on the shortest interest rate input into the model. The underlying investment holdings of each Managed Risk fund are rebalanced on a periodic basis. The Unprotected fund consists of static allocations to the underlying investment holdings. Account value investment is based on a 70/30 allocation among the S&P 500 Index and the Barclays U.S. Aggregate Corporate Bond Index. Performance data is hypothetical and for illustrative purposes only and is not reflective of any investment. Past performance is not indicative of future results. The hypothetical results reflected above were calculated with the benefit of hindsight and do not reflect actual trading results. Hypothetical and backtested returns invariably show attractive returns while actual results may not. There are often sharp differences between backtested/hypothetical returns and the results of actual management, including where the decision-making process may be adversely influenced by factors that arise in actual management but which are not anticipated in creating the hypothetical/backtested returns. It is not possible to invest in an index. The hypothetical results reflected above were calculated with the benefit of hindsight and do not reflect actual trading results. Hypothetical and backtested returns invariably show attractive returns while actual results may not. There are often sharp differences between backtested/hypothetical returns and the results of actual management, including where the decision-making process may be adversely influenced by factors that arise in actual management but which are not anticipated in creating the hypothetical/backtested returns. The data shown is hypothetical and does not reflect or compare features of an actual investment, such as its objectives, costs and expenses, liquidity, safety, guarantees or insurance, fluctuation of principal or return, or tax features. The S&P 500 Index is a commonly used benchmark comprised of all the stocks in the S&P 500 weighted by market value. The Barclay's U.S. Aggregate Bond Index is a universally accepted benchmark for bond performance and is comprised of bonds with a maturity over one year.

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MOVEMENT OF MILLIMAN MANAGED RISK STRATEGY THROUGH A MARKET CYCLE



Source: Milliman Financial Risk Management LLC, 1/1/00 - 12/31/13. The above chart does not reflect any particular actual market period but demonstrates the application of the Milliman Managed Risk Strategy to a market cycle. Account value investment is based on a 70/30 allocation among the S&P 500 Index and the Barclays U.S. Aggregate Corporate Bond Index. Performance data is hypothetical and for illustrative purposes only and is not reflective of any investment. Past performance is not indicative of future results. It is not possible to invest in an index. The data shown is hypothetical and does not reflect or compare features of an actual investment, such as its objectives, costs and expenses, liquidity, safety, guarantees or insurance, fluctuation of principal or return, or tax features. The S&P 500 Index is a commonly used benchmark comprised of all the stocks in the S&P 500 weighted by market value. The Barclay's U.S. Aggregate Bond Index is a universally accepted benchmark for bond performance and is comprised of bonds with a maturity over one year.



Milliman

FINANCIAL RISK MANAGEMENT

Creating transformational improvement in the retirement savings industry.

Milliman Financial Risk Management LLC is a global leader in financial risk management to the retirement savings industry. Milliman FRM provides investment advisory, hedging, and consulting services on \$184 billion in global assets (as of March 31, 2015). Established in 1998, the practice includes over 130 professionals operating from three trading platforms around the world (Chicago, London, and Sydney). Milliman FRM is a subsidiary of Milliman, Inc.

Milliman, Inc. (Milliman) is one of the world's largest independent actuarial and consulting firms. Founded in Seattle in 1947, Milliman has 55 offices in key locations worldwide that are home to over 2,600 professionals, including more than 1,300 qualified consultants and actuaries.

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