



Risk and Return
of Equity Index
Collar Strategies

RONI ISRAELOV AND MATTHEW KLEIN

Risk and Return of Equity Index Collar Strategies

Overview

Aversion to loss leads many investors to seek tail-protection strategies, and they may turn to an equity index collar strategy to reduce downside risk. A collar is constructed by offsetting the cost of a put option (which provides downside protection) by selling a call option (which limits upside potential). The offsetting transactions may require zero initial outlay, which makes collars appear attractive. However, it's not a zero-cost strategy, and investors often fail to account for the significant drag a collar may impose on returns.

Roni Israelov and **Matthew Klein** of **AQR** analyze the collar strategy's profit-and-loss impact on a portfolio to understand its precise dynamics. In decomposing equity index collar returns, they find that the expected return is lower than that of the underlying index, primarily because the strategy earns less equity risk premium. They also find that collars with net long volatility exposure may further reduce expected returns because of the volatility risk premium. The authors then compare the collar to other ways of reducing downside risk, such as selling equity, buying only a put option, or selling only a call option to construct a covered call. Their analysis in **Risk and Return of Equity Index Collar Strategies**, published in the Summer 2016 issue of *The Journal of Alternative Investments*, shows that historically, the collar strategy is a relatively poor performer.

Practical Applications

- **Think about both sides of the trade.** Investors must consider not only the entry price, but also the exit price.
- **Consider the exposures that may be introduced and their impact on returns.** A collar strategy introduces equity-timing exposure, which results in potentially high levels of unintended volatility, for example.
- **Consider the alternatives.** Other strategies may provide similar downside risk with higher returns.

Practical Applications Report

Equity index collars are typically described as a low-cost way to obtain downside protection for those who are willing to forgo some upside potential. But do collar strategies actually achieve this goal? The answer depends on how an investor defines cost: a collar's upfront cost may be low, but its drag on performance may be significant.

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KEY TAKEAWAY >>>
>>> COLLARS
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Key Definitions

Call option (European)

An option to buy an asset at an agreed-upon price on a particular date.

Covered call option

An option strategy whereby an investor holds a long position in an asset and sells call options on that same asset.

Equity collar

A strategy that is long equity and both long a put option and short a call option on the underlying equity.

Gap protection

Downside protection against a dramatic or sudden loss in the value of an asset.

Path dependence

The idea that a present decision depends on a trajectory of past decisions made, and is thus limited by current circumstances.

Put option (European)

An option to sell an asset at an agreed-upon price on a particular date.

Many investors like to buy downside protection through put options, but the options can be expensively priced. One common solution to this conundrum is to offset its purchase price by selling a call option, which creates a collar. While the initial collar outlay may be close to zero, this alone reveals nothing about the investment attractiveness of the trade and its impact on returns. “Investors think that the collar is a zero-cost way of buying downside protection, but this didn’t sit well with us,” says Israelov. He and co-author Klein believe that focusing only on the entry price ignores the exit price and other risks that a collar strategy introduces to a portfolio. “In order to figure out if a trade makes sense, you have to think about the entry and the exit, the intended and the unintended exposures. There may be a drag on performance,” says Israelov.

They examine the effects that selling the call option has on a portfolio’s returns, the effects that buying the put option has on a portfolio’s returns, and then they evaluate the total net results. “We attribute the returns of a collar strategy to the exposures that you get from each leg of the trade,” says Klein. They find that even if the dollar “costs” offset, a collar is usually a bad deal relative to the alternatives. By design, a collar reduces a portfolio’s equity risk premium. Buying a put option reduces the portfolio’s equity exposure, as does selling a call option. Therefore, a collar has lower equity beta than the equity index, indicating that it collects less equity risk premium. In the case of the volatility risk premium, there is a netting of volatility exposures from the long put and short call options. Investing in a typical collar implementation has historically provided lower returns and a lower Sharpe ratio than investing directly in the S&P 500 Index.¹

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—Matt Klein

IMPLICIT ZERO COST

The **CBOE S&P 500 95-110 Collar Index (CLL)** is a useful example of a collar implementation, and Israelov and Klein believe it is reasonable to treat its performance as representative, or at least illustrative, of collars in general. “CLL is not explicitly described as being zero-cost,” says Israelov, “but materials that describe collar strategies highlight the benefits of their being zero-cost. We found that the actual implementation of the CLL index is not zero-cost.” Lower-strike options tend to be more expensively priced than higher-strike options, so collar strategies tend to buy the more expensively priced option and sell the less expensively priced option.

Even if the upfront cost of the collar nets to zero, the entry prices of the options traded are not really what matter: The option prices relative to their fundamental or actuarially fair values are what matters. Equity index options tend to be expensive because of investor preference for loss avoidance, and out-of-the-money put options

¹ In general, a typical collar strategy should have lower expected returns and a lower expected Sharpe ratio than its underlying, assuming a positive equity risk premium and volatility risk premium for that underlying in the long term. However, a collar strategy is likely to outperform during market downturns, owing to its lower equity exposure and often its net long volatility exposure as well. Szado and Schneeweis [2010], for example, found that a passive collar strategy on the PowerShares QQQ ETF outperformed its underlying from 1999 to 2009, a period that included both the technology bubble collapse and the financial crisis of 2007-2009.



Four ways to address downside risk:

1. Sell equity
2. Covered calls
3. Risk-managed covered calls
4. Protective puts

tend to be more expensive than out-of-the-money call options. Therefore, buying protection is expected to hurt performance on a risk-adjusted basis because put options are expensive. Selling upside helps risk-adjusted performance for the same reason, but not to a great enough extent, which is why the collar strategy has realized negative alpha.

As a collar's limited loss and capped gain reduce equity exposure, Israelov and Klein found the collar earned significantly less return than the S&P 500 Index: 3.2% per year for CLL versus 7.3% per year for the S&P 500. It has also had significantly lower volatility: 10.7% for CLL versus 15.7% for the S&P 500, and a 35% lower Sharpe ratio. However, had lost equity risk premium been the only issue, the collar would have had 4.5% annualized excess return. The options significantly detracted from performance, even after accounting for their reduced equity exposure. The collar's negative 1.3% of alpha to the S&P 500 Index is due to the strategy being net long volatility, buying more expensively priced options than it sells, and path-dependent outcomes leading to potentially unintended exposures.²

Israelov and Klein found that path dependence is a significant challenge. The portfolio's exposure to equity and volatility is affected by its options' strikes and maturities and by changing market conditions. Assuming the option positions are not rebalanced, their strikes remain the same as the underlying index moves. "So the equity exposure of the overall position will change as the spot moves, which induces an implicit timing bet," says Klein. The resulting exposures do not necessarily reflect the manager's views.

ALTERNATIVES


If the collar is not the solution to downside risk, then what is? The authors consider four alternatives, three of which have higher risk-adjusted returns than the CBOE Collar Index. First, investors could simply sell some of their equity, a zero-alpha trade that reduces equity exposure. A second alternative is the covered call strategy, which also has lower equity exposure but adds alpha in the form of volatility risk premium through the option's sale. The third alternative is a risk-managed covered

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call strategy (proposed in a previous article co-authored by Israelov), which dynamically trades the equity index to maintain a constant equity exposure, hedging the traditional covered call's time-varying equity exposure. "If you're trying to achieve a certain return target with lower downside risk, you should generally look to increase your overall Sharpe ratio, and you can do that by adding diversifying sources of return and hedging away uncompensated risks," says Israelov.

² The information refers to a table in the above referenced Journal Article, "Risk and Return of Equity Index Collar Strategies," analyzing summary statistics for the S&P 500 Index (SPX) and the CBOE S&P 500 95-110 Collar Index (CLL). The date range is July 1, 1986, to December 31, 2014. Returns are excess of cash. "Excess Return" is an arithmetic average annualized return. Volatility, beta, and upside/downside beta were computed using 21-day overlapping returns. For further information on calculations, please refer to Exhibit 2 within the Journal Article.



For the options portion of traditional collar strategies, consider looking across maturities.

These three alternatives have realized higher Sharpe ratios than the CBOE Collar Index, which means that investors could have used them to achieve the same return as the CBOE Collar Index, but with lower risk. The authors also consider the performance of a protective put strategy. The protective put yielded the lowest Sharpe ratio, underperforming the collar index.

Does the traditional collar ever make sense? “Think about the option part of the collar as a relative-value trade, long one option and short another,” explains Israelov. The traditional approach buys a (more expensive) lower-strike put option and sells a (less expensive) higher-strike call option, for example, which gets the directionality of the relative value trade wrong. “One way to get the directionality correct, perhaps, is to look across maturities,” he suggests. Shorter-dated options tend to be more expensively priced than longer-dated options. One possible strategy would be to sell a short-dated option each month and buy a significantly longer-dated option. “Our paper does not investigate this approach, but it could be worth someone’s time to do so,” Israelov says.

An eight-year veteran of AQR, Israelov spends much of his spare time attending his two daughters’ dance performances and playing tennis. Klein joined AQR right out of college in 2013 and is an avid reader of historical nonfiction and science fiction.

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