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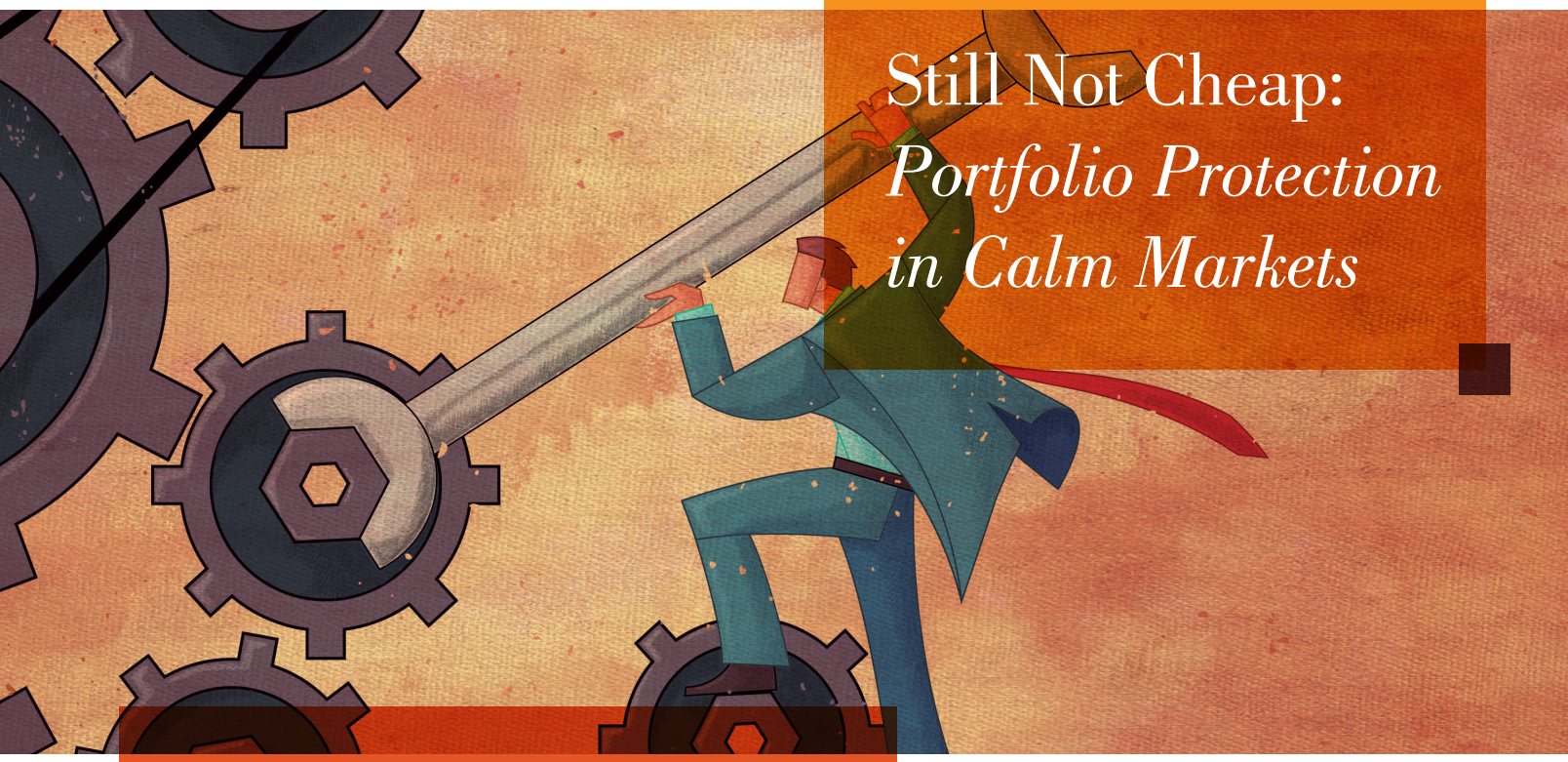

Still Not Cheap: *Portfolio Protection in Calm Markets*

RONI ISRAELOV AND LARS N. NIELSEN

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Overview

Put options are often seen by investors as a means of buying protection against dramatic stock market moves that may take place in the future. However, portfolio insurance is expensive, on average. In calm markets, when option prices tend to be lower, they are often touted as an inexpensive way to obtain portfolio insurance, while also providing long volatility exposure at a time when volatility may be expected to increase.

But are put options really economical in calm markets? Will they meet expectations in the future? **Roni Israelov** and **Lars Nielsen** of **AQR Capital Management** discuss these questions in ***Still Not Cheap: Portfolio Protection in Calm Markets***, from the Summer 2015 issue of ***The Journal of Portfolio Management***.

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- **Context matters.** Knowing the current price of an option without a sense of its fundamental value is misleading. A lower price today, relative only to past option prices, is not enough.
- **It's all in the vol.** The "volatility risk premium," or the spread between the option price and fundamental value, is directly tied to implied volatility and subsequent realized volatility. The magnitude of the "volatility risk premium" paid by the option purchaser to the seller will impact his or her expected returns. Contrary to what many investors believe, the premium is not necessarily negative in calm markets.
- **Protection through diversification.** Some investors may be willing to pay for protection, despite its cost. However, astute asset allocation can provide diversification for most investors during extreme market events that may lie ahead.

Practical Applications Report

Prior to the extreme market gyrations kicked off by the sell-off in China in August this year, volatility was at historic lows. Some investors were gravitating toward the purchase of put options as a seemingly inexpensive way to protect their portfolios from future market events. Indeed, a look at historic data shows that prior to the August volatility, the **S&P 500 Index** and the **VIX Index** were at historic lows dating back to 1950 and 1990, respectively. In addition to providing a form of portfolio insurance, put options offer long volatility exposure. During calm markets, when many investors believe that volatility is more likely to increase than to further decline, the long volatility exposure provided by put options appears to be the correct directional trade.

Someday the markets will be *calm* again...

...And during *calm* markets put options appear to be the correct directional trade.

Key Definitions

Options

Financial derivatives that offer the buyer the right, but not the obligation, to buy (call) or sell (put) a security at an agreed-upon price at a specified time.

Tail risk

A measure of extreme losses in a security or portfolio that can occur in severe market downturns; it is the most negative (left tail) part of the return distribution.

Volatility

The standard deviation of the total returns of a security, portfolio or market, which is usually annualized. High volatility means the returns can vary across a wider range, increasing the amount of uncertainty.

> "Buying put options is on average a negative return transaction; even when volatility is low, this will hurt portfolio returns."
>
> —Roni Israelov

However, as Israelov and Nielsen remind us, investors must consider option prices in the context of their value, or their embedded volatility risk premium, which hinges on the difference between implied and realized volatility. The so-called volatility risk premium paid by the purchaser to the seller of a put option will naturally impact portfolio returns, and further study is required before determining if the portfolio protection is cost effective, Israelov and Nielsen advise. Seen in this light, it turns out that put options are not quite the bargain that they appear to be when markets are calm.

CALCULATING THE VOLATILITY RISK PREMIUM

One way to examine the volatility risk premium paid is to observe the option implied volatility as expressed by the VIX Index level and then to subtract the S&P 500's realized volatility over the same time period. Israelov and Nielsen plot the resulting volatility risk premium from January 1990 to June 2014 and find that it is positive 88% of the time, with an average risk premium of 3.4%.

Since this risk premium accrues to the option seller and is paid by the option buyer, the bar is set fairly high for making a positive and significant return on the investment. The laws of supply and demand play a role, as well. As Israelov explains, the perception that quiet periods in the market are good times to buy options merely serves to increase demand for them, and with that, prices rise. "When we look at the motivations of the participants," Israelov observes, "we can see that the purchasers want protection and the sellers are looking for profits. Buying put options is on average a negative return transaction; even when volatility is low, this will hurt portfolio returns."

The next step is to consider the nature of those returns to the protected portfolio strategy. Israelov and Nielsen carve the prospective returns into three segments: passive exposure to the S&P 500, dynamic exposure to the S&P 500 (which is driven by the time-varying equity exposure of the put option) and exposure to long volatility. They find that the passive exposure generates 5.2% of annualized excess returns. The dynamic exposure reduces the returns by 0.9%, although it also reduces the downside beta of the strategy by 0.28.[1]

Turning to the long vol component sheds greater light on the issue. While it, too, reduces the downside beta exposure, in this case by 0.10, it also reduces performance by 2.0% per year. Israelov and Nielsen assert that this 2.0% is too large a price to pay for mitigation of downside beta.

PROTECTION FOR A PRICE

Looking beyond the S&P 500, one might wonder if the protective put strategy might do well in other segments of the US market or around the world. Again, Israelov and Nielsen turn to historical data to test the hypothesis, using nine additional global indexes: The **DAX**, **Euro Stoxx 50**, **FTSE 100**, **Hang Seng**, **KOSPI 200**, **NASDAQ 100**, **Nikkei 225**, **Russell 2000** and **Swiss Market Index**. The previous observations hold true in the broader picture: Options are expensive across a range of volatility regimes, notes Israelov.

[1] Summary statistics are described for a protective put strategy that is long the S&P 500 Index and long 5% out-of-the-money front-month S&P 500 put options, sized to unit leverage, and held to expiry. Volatility, beta, and skew are computed using overlapping 21-day returns. Please see Exhibit 4 of the above referenced paper, "Still Not Cheap: Portfolio Protection in Calm Markets" for more detailed information.
Sources: AQR, Options Metrics, Chicago Board Options Exchange, Standard and Poor's.

> “Investors naturally want to be able to buy portfolio protection, and nobody likes tail risk. But equity index options are expensive on average in all volatility regimes, and there are other ways to approach the issue.”
>
> **—Roni Israelov**

Are there any circumstances where buying protective puts makes sense? If investors are considering extreme negative events—the black swans of the financial markets—perhaps the prices could be justified, say Israelov and Nielsen. They examine scenarios that are similar to the Crash of October 1987, in which the S&P 500 dropped 20% in a single day and implied volatility hit 150%. They find that a hypothetical black swan event would have to take place at least once every 10 years, on average, for the long put options strategy to break even. For the highest VIX decile, the frequency would be reduced to once every four years, and for the lowest decile, it would increase to once every 21 years. At the time of this writing, the most recent black swan event, October 1987, took place 28 years ago.

For investors who feel that black swan events are not represented adequately in past records, protective puts may be a reasonable investment. However, black swans could also be overrepresented—thus options in the present are more expensive than history would indicate. “Investors naturally want to be able to buy portfolio protection,” states Israelov, “and nobody likes tail risk. But equity index options are expensive on average in all volatility regimes, and there are other ways to approach the issue.”

Israelov and Nielsen pose alternative approaches for pursuing portfolio protection. If investors fear excessive exposure to equity markets, then it would be more efficient to reduce the allocation to equities and supplement the portfolio with fixed income and uncorrelated alternatives that can offer positive expected returns as well as diversification benefits against extreme events, they report.

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Roni Israelov

roni.israelov@aqr.com

Roni is Vice President at **AQR Capital Management**, where he oversees the firm's volatility trading strategies and the management of related portfolios. Prior to AQR, he was a research analyst in the quantitative equities strategies group at Lehman Brothers. He shared the **Graham & Dodd Award** for ***International Diversification Works (Eventually)*** published in ***Financial Analysts Journal***. Roni earned a BS in mechanical engineering from Georgia Institute of Technology, and an MS in mathematical risk management from Georgia State University. He also holds an MS in finance and a PhD in financial economics from Carnegie Mellon University.

Lars N. Nielsen

lars.nielsen@aqr.com

Lars is a Principal at **AQR Capital Management**. He helps oversee research in the firm's Global Stock Selection and Global Asset Allocation teams and is a part of the portfolio management teams for a number of AQR's multi-strategy hedge funds as well as long-only equity portfolios. Prior to AQR, he was a visiting graduate student at Cornell University, where his research interests were finance and econometrics. Before that, he was a quantitative equity analyst at Danske Invest, the largest asset-management firm in Denmark. Lars earned a BSc and an MSc in economics from the University of Copenhagen.