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## **HEDGING VS. DIVERSIFICATION**

### Comparing the Cost of Hedging to the Cost of Diversification

*By Dominick Paoloni, CIMA®, and Patrick Hennessy, CMT®*



**INVESTMENTS & WEALTH INSTITUTE®**

# Hedging vs. Diversification

## COMPARING THE COST OF HEDGING TO THE COST OF DIVERSIFICATION

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### ABSTRACT

Given a low-interest-rate environment, the authors examine whether holding debt is still an optimal asset allocation in a portfolio framework compared with using a negative carry protective-put strategy. The basic premise is to examine utilizing direct equity hedges in a portfolio and compare the cost of these hedges with the potential cost of bonds as interest rates have set near multi-decade lows. The protective-put strategy is presented as an alternative to debt in a portfolio framework. This paper examines the performance of a portfolio that is more heavily weighted toward equity than a traditional portfolio and uses a small amount of the portfolio to directly hedge the equity exposure. The performance is compared with that of a 60-percent equity/40-percent bond portfolio. The paper also examines how adding a reliably negatively correlated asset to a portfolio can enhance risk-adjusted returns via a systematic rebalancing approach. The strong performance of the hedged equity approach, specifically since 2017, is attributable to the large presence of option sellers in the market. The authors find that the performance of the hedged equity portfolio is competitive with that of a traditional 60/40 portfolio.

### INTRODUCTION

This paper is a quantitative study of a basic protective-put strategy within a portfolio framework compared with a traditional 60/40 stock-bond mix. The study analyzed holding a one-year 15 delta protective-put option on the S&P Index rebalanced quarterly and compared the performance with a 60/40 stock-bond mix rebalanced quarterly. Different time periods were analyzed to show when the two approaches underperformed or outperformed. The scope of the paper covers just the S&P 500 (SPX) and does not address optionality in other indexes or markets.

Traditional financial models are built on the premise that a portfolio with a set of assets that move in different directions over the same period can deliver the sum of the weighted average products of the correlation coefficients and the variances to calculate risk and the sum of the weighted average returns to calculate portfolio returns. If the correlation coefficient of the combined assets is less than one, the product of the variance multiplied by the correlation coefficient will be less the sum of

the weighted variances, and thus the risk-return relationship will be improved, i.e., the investor will bear less risk. This diversifying correlation, i.e., the relationship of how assets move over the same period, was used in 1952 by Harry Markowitz. History of the Markowitz mean-variance framework has shown that as markets crash, correlations converge toward one, which has been a primary criticism of modern portfolio theory.

This paper does not dispute Markowitz's seminal, Nobel-awarded work. It instead helps to identify whether hedging with a negatively carrying asset with dependable correlation is a viable alternative or addition to a traditional 60/40 mix.

It is a core belief in the financial community that the expected returns of a tail-hedging strategy over long periods of time are negative, so hedging with options is not a viable strategy. As Benn Eifert, founder and chief investment officer of QVR Advisors, points out in a series of tweets on the topic:

*What this argument is missing is the portfolio effect. Tail risk hedges are inversely correlated with the performance of risk assets and produce outsized returns during times of crisis ... the outsized performance of a tail hedge during large market drawdowns allows a regularly rebalanced portfolio to have more dollar exposure to risky assets in the periods immediately following those large market drawdowns.<sup>1</sup>*

This study examined whether a portfolio allocated 97.5 percent to the S&P 500 and 2.5 percent to a protective-put strategy historically has been competitive with a 60/40 stock-bond mix going back to 2007. The study also focused on the period from 2017 to 2020, looking at the basic protective-put strategy and how it compares with a 60/40 stock-bond mix.

Although 2017 to 2020 is a short sample period, this timeframe covers certain economic conditions and micro-investment practices that are expected to persist into the future, which the investment community may want to explore.

The rebalancing approach is outlined in depth to describe a simple yet effective way to think about rebalancing within a

portfolio framework. As with any negative carry asset, e.g., long options, without a rebalancing strategy, hedging is a waste of time and capital.

### THE 2008 CREDIT CRISIS

The yield on a U.S. 10-year Treasury bond peaked at 5.30 percent in mid-2007 before dropping as low as 2.05 percent by the end of 2008. This 3.25-percent drop, combined with accommodative Federal Reserve policy, helped bonds to appreciate nicely through the credit crisis. When examining the returns

of the 60/40 portfolio throughout this period, the negative correlation between equity and bonds provided substantial benefit to the traditionally diversified portfolio (see figure 1).

The strong performance of bonds during the crisis helped the 60/40 portfolio to have a maximum drawdown of only -36.3 percent compared with a -56.8-percent maximum drawdown in the S&P 500 Index. One could conclude that if the correlation between stocks and bonds is negative, as it was throughout most of the 2000s, then the mean-variance framework outlined by Markowitz creates a greater bending of the risk-return efficient frontier, resulting in lower risk for the same level of return within a portfolio framework (see figure 2).

Over the past three decades, as interest rates have dropped, Treasury-note returns have been impressive (see table 1). The question is, given the current environment, can we expect the future to be as impressive?

Since August 2020, U.S. 10-year interest rates have risen from a low of 0.50 percent to more than 1.70 percent as fears surrounding inflation have gripped bond markets. During this time, performance of popular bond exchange-traded funds (ETFs) has faltered (see figure 3).

With real returns on U.S. Treasury bonds still solidly negative, investors continue to rely on historically unstable correlations between equity and bonds to protect their portfolios from equity market volatility (see figure 4). With interest rates still near historical all-time lows, investors are relying on a continued decline in rates to maintain the benefits of traditional portfolio diversification.

This paper examines whether an alternative approach to traditional asset allocation is viable using direct portfolio hedging. The paper demonstrates that investors who are considering the prospect of bonds could potentially look toward hedged equity-based strategies to achieve their investment goals.

### PORTFOLIO REBALANCING

Rebalancing is the core of portfolio risk management and must be addressed in any analysis of tail-risk hedging. To determine a best-case scenario for this approach, this paper examines how a portfolio allocated 97.5 percent to the S&P 500 and 2.5 percent to S&P 500 put options would have performed through the 2008 credit crisis assuming the hedges were rolled with perfect timing. This performance is compared with the performance of the portfolio 100-percent allocated to the S&P 500 Index as well as a 60/40 portfolio that is rebalanced on a quarterly basis (see figure 5).

The perfectly monetized protective-put hedge is not realistic, and the point here is not to dispute whether bonds are a cushion during market turmoil. The question is whether, with

Figure 1

### THE 60/40 PORTFOLIO DURING THE GLOBAL FINANCIAL CRISIS

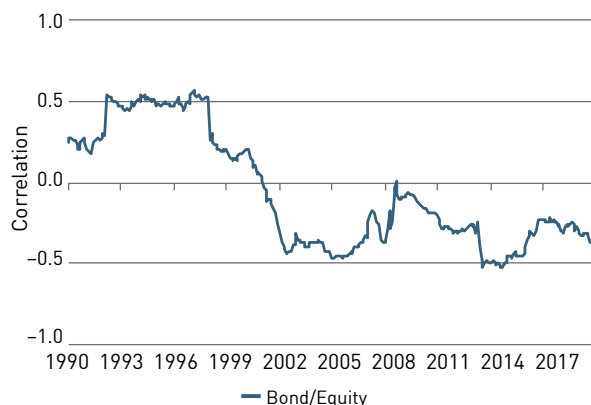


The SPX represents the price return of the S&P 500 Index during the time period. The 60/40 portfolio uses the S&P 500 Index return to represent the 60-percent equity allocation and the Bloomberg Barclays U.S. Aggregate Bond Index (Total Return) is used to represent the 40-percent bond allocation. The portfolio is rebalanced back to the targeted 60/40 weighting on the last trading day of each quarter.

Source: Bloomberg LP Data, IPS calculations

Figure 2

### BOND-EQUITY CORRELATION SINCE THE 1990s



Source: van Dooijeweert (2020)

Table 1

### RETURN FOR 10-YEAR BONDS BY DECADE

Decade	Return
1990–1999	115.6%
2000–2009	91.8%
2010–2019	47.8%
2020–2029	?

Total returns based on portfolio of Treasury notes with average maturity of ten years.

Source: van Dooijeweert (2020)

a rules-based put strategy, a portfolio manager can compete with a 60/40 mix when the mean-variance approach is in an optimal period of falling interest rates and negative stock-bond correlation.

### A REALISTIC REBALANCING APPROACH

Path dependency plays a huge role in when portfolio managers decide to roll or monetize their long-put option hedges or rebalance a traditional 60/40 portfolio. Throughout the remainder of this paper, all the portfolios are rebalanced back to their target weights on a systematic rebalancing schedule. The long-put hedged equity portfolio is rebalanced back to the desired equity/hedge weights on the quarterly option expiration dates. These quarterly option expiration dates, commonly referred to as “quadruple witching dates,” occur on the third Friday of March, June, September, and December.

Take, for example, a portfolio allocated 97.5 percent to SPX and 2.5 percent to a long-put hedge that has grown to 98.5 percent SPX and 1.5 percent long-put hedge by the third Friday of March. This portfolio would be rebalanced back to the 97.5-percent SPX and 2.5-percent long-put hedge target weights on this date. The backtested data assumes that the long-put option is rolled back to its target maturity and delta at this time, sized to appropriately reflect the original weight targets. This means that the portfolio would be selling shares of SPX to increase the size of the long-put option hedge. In comparing a 60/40 portfolio, we rebalanced at the same time as the equity plus put strategy.

In a traditional portfolio framework, portfolio managers may rebalance portfolios based on specified time periods, e.g., at the end of the month or end of quarter; or risk-based tolerances, e.g., if a 60/40 portfolio has grown to 65/35. One goal of this paper is to identify a systematic, rules-based rebalancing methodology that is simplistic yet effective. Although a time-based rebalancing strategy may seem naïve due to a lack of consideration for the profitability of both the SPX and long-put hedge portion of the portfolio, a surprising dynamic occurs on these quarterly option expiration dates.

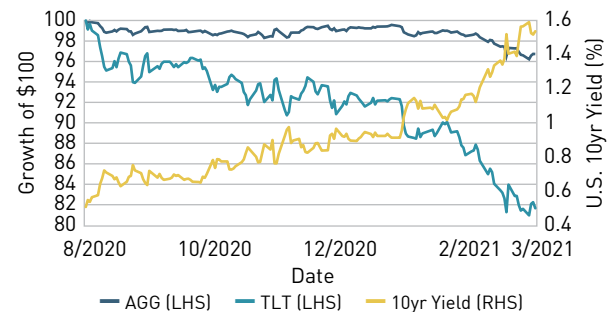
### OPTION EXPIRATION SEASONALITY

The importance of option expiration has long been known by practitioners in the space. The most significant of these option expirations occurs on the third Friday of March, June, September, and December when stock index futures, stock index options, single stock options, and single stock futures all expire. These dates tend to exhibit heavy trading volume in individual equities, ETFs, futures, and options on both stock indexes and equities.

Another important dynamic at play on the quadruple witching dates is the cleansing of positioning as millions of options and futures contracts roll off market-maker trading books. Market

Figure 3

### PERFORMANCE OF FIXED INCOME IN 2020-2021 AS INTEREST RATES RISE



AGG represents the growth of \$100 invested into the iShares Core U.S. Aggregate Bond ETF assuming reinvestment of dividends.

TLT represents the growth of \$100 invested into the iShares 20+ Year Treasury Bond ETF assuming reinvestment of dividends.

The U.S. 10-year yield is represented by the yield of the USGG10YR Index from Bloomberg LP®.

Source: Bloomberg LP Data, IPS calculations

Figure 4

### YIELD ON 10-YEAR U.S. TREASURY INFLATION-PROTECTED SECURITIES SINCE 2003

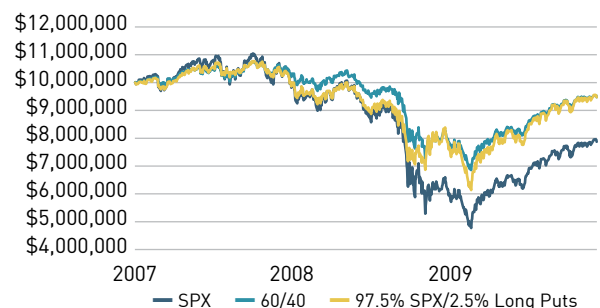


The 10-year TIPS yield represents the yield of the 10-Year Treasury Inflation-Indexed Securities, Constant Maturity

Source: Federal Reserve Economic Data (FRED)

Figure 5

### BACKTEST OF SPX, 60/40, AND PROTECTIVE PUTS DURING GLOBAL FINANCIAL CRISIS



The SPX is represented by the growth of \$10 million invested in the S&P 500 Index.

The 60/40 is represented by a portfolio that invests 60 percent in the S&P 500 Index and 40 percent in the Bloomberg Barclays U.S. Aggregate Bond Index (Total Return), LBSTRUU Index in Bloomberg, rebalanced on the last trading day of each quarter. Both are unmanaged and un-investable indexes and therefore do not account for any management fees or expense ratios. The long-put hedge targets S&P 500 put options on the SPX with a maturity date of approximately one year and a delta of -0.15. The 97.5-percent SPX/2.5-percent Long Puts portfolio is rebalanced using a methodology that provided “optimal” rolls through the time period.

Source: Bloomberg LP Data, ORATS Data, IPS calculations

makers in options markets partake in “delta hedging,” i.e., buying or selling the underlying asset to remain hedged against price fluctuations in the underlying. Options expiring in the quarterly option expiration cycle—March, June, September, and December—tend to have the highest open interest of any option expirations. This is caused, in part, by the length of time these options contracts are available to trade. In the S&P 500 options markets, some of these options are listed three years prior to their expiration dates, which allows large amounts of open interest to accumulate in the options. Once these positions have rolled off market makers’ trading books, the need for the market makers to delta hedge these positions is no longer necessary.

Given the explosive growth of options in the past decade, the magnitude of these delta-hedging flows has grown accordingly. It is not uncommon to see option expiration mark significant turning points in the trend of both the price of the S&P 500 as well as realized and implied volatility. Although it is

impossible to attribute the cause of these turning points to this dynamic, this paper explores a reliable correlation.

Take, for example, a simple strategy that goes long or short the S&P 500 Index based on the returns of the index from the previous option expiration date to the current option expiration date, subsequently referred to as “opex return.” The opex long-short strategy goes long the S&P 500 Index at the closing value on option expiration if the opex returns are negative and short the S&P 500 Index at the closing value on option expiration if the opex returns are positive. The positions for the opex long-short strategy are held from the date of the close of trading on opex to the end of the month, and thus are invested for only one to two weeks per month. Figure 6 shows the results of this hypothetical backtest from 2005 to 2020.

The results of the backtest are surprising because the opex long-short strategy outperforms the S&P 500 Index over the backtesting period while being invested for only the portion of the month between opex and the end of the month (EOM).

Figure 7 shows the performance of the S&P 500 from the previous month’s opex to the current month’s opex on the x-axis compared with the subsequent returns of the S&P 500 Index from opex to EOM.

The correlation of these return series is  $-0.19$ , showing a relationship between the performance of the S&P 500 from opex to opex compared with the subsequent performance of the S&P 500 from opex to EOM (see figure 8). Looking further into the data, when separating the data series into only positive opex returns versus only negative opex returns, the tendency for the S&P 500 to rally after a negative opex return cycle is much higher than the tendency for the S&P 500 to fall following a positive opex return cycle.

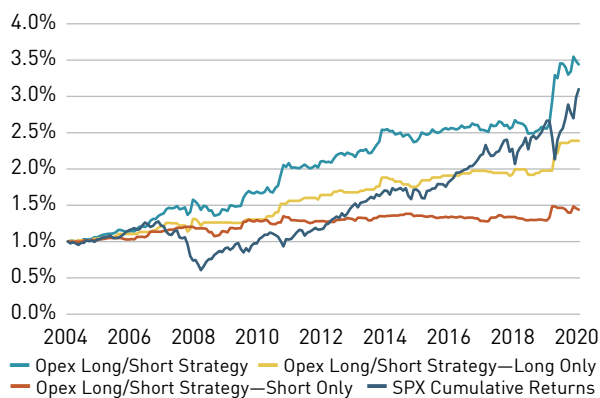
Table 2 breaks down statistical information on the returns of the S&P 500 from opex to opex, opex to EOM, and filtered returns of opex to EOM when opex returns are positive and negative.

Given this observed dynamic around opex, the methodology used in this paper rolls the long-put option hedges and rebalances the portfolio back to the target weights every three months on the date of opex occurring in March, June, September, and December, and also rebalances the traditional 60/40 portfolio on the same dates.

When portfolio managers decide to rebalance portfolios, there is always a degree of rebalance-timing luck. This paper aims to exploit this observed opex dynamic to increase the odds that rebalance-timing luck works in the portfolio manager’s favor.

Another interesting piece of research that is outside of the scope of this paper but certainly worth analyzing further is the

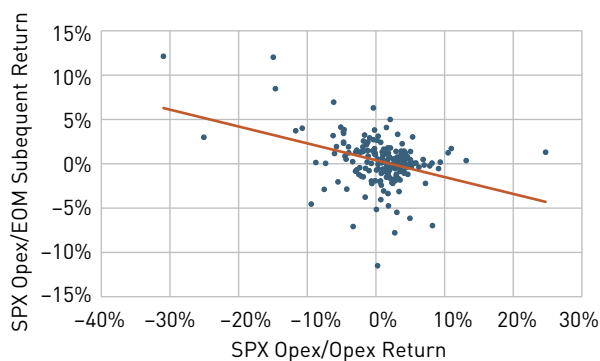
**Figure 6** BACKTEST OF OPEX STRATEGY COMPARED WITH S&P 500



The SPX is represented by the returns of the S&P 500 Index using price returns (no dividend reinvestment)

Source: Bloomberg LP Data, IPS calculations

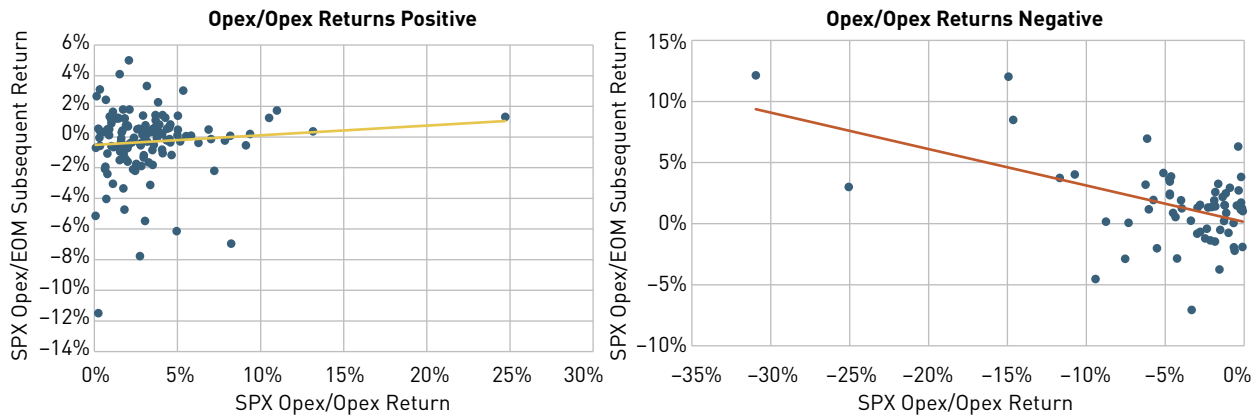
**Figure 7** SCATTERPLOT OF OPEX/OPEX RETURNS VS. SUBSEQUENT OPEX/EOM RETURNS



Source: Bloomberg LP Data, IPS calculations

Figure  
8

## COMPARISON OF OPEX RETURNS TO OPEX/EOM RETURNS WHEN OPEX RETURN IS POSITIVE/NEGATIVE



Source: Bloomberg LP Data, IPS calculations

Table  
2

## DESCRIPTIVE STATISTICS OF OPEX RETURNS AND OPEX/EOM RETURNS

Return Period	Average	Median	Minimum	25th percentile	75th percentile	Maximum	Standard Deviation
OpeX to opeX returns—all	0.8%	1.5%	-30.9%	-1.2%	3.3%	24.7%	5.4%
OpeX to EOM returns—all	0.3%	0.3%	-11.5%	-0.7%	1.3%	12.1%	2.7%
OpeX to EOM returns—opeX return negative	1.4%	1.3%	-7.1%	-0.4%	2.8%	12.1%	3.2%
OpeX to EOM returns—opeX return positive	-0.3%	0.0%	-11.5%	-0.8%	0.7%	5.0%	2.2%
Return Period	Correlation to opeX return						
OpeX to EOM returns—all	-0.19						
OpeX to EOM returns—opeX return negative	-0.30						
OpeX to EOM returns—opeX return positive	+0.06						

OpeX to opeX returns represent the returns of the S&P 500 Index from the date of the previous month's option expiration to the current month's options expiration date, both generally occurring on the third Friday of the month. The opeX to EOM returns represent the returns of the S&P 500 Index from the date of the current month's opeX to the end of the current month. These returns are subsequent to opeX date and thus used to test the predictability of the opeX to opeX returns.

Source: Bloomberg LP Data, IPS calculations

dynamic of quarter-end rebalancing. Deluad (2020) looks at seasonality around the end of the quarter rebalancing tendency of target-date funds.

## USING OPEX TO REBALANCE PROTECTIVE PUTS

Now, consider how the 97.5-percent SPX and 2.5-percent long-put strategy would have performed using the opeX-based rebalancing methodology during 2007–2020. The data is compared with the S&P 500 Index as well as a 60/40 portfolio rebalanced quarterly (see table 3).

The 97.5-percent SPX/2.5-percent long-put strategy showed a maximum drawdown of 47.4 percent during the 2008 credit crisis compared with a drawdown of only 36.3 percent for a 60/40 portfolio. Despite the relative underperformance of the long-put strategy during this period, the hedged strategy was able to produce returns comparable with a 60/40 portfolio over the entire time period, returning 6.5 percent annually compared with 6.4 percent annually for the 60/40 portfolio.

Table  
3

## PORTFOLIO RISK-RETURN STATISTICS OF SPX, 60/40, AND PROTECTIVE PUTS (2007–2020)

	SPX	60/40	97% SPX/2.5% Long Puts
Cumulative return	157.4%	138.0%	138.8%
Annualized return	7.1%	6.4%	6.5%
Volatility	15.6%	9.4%	12.0%
Sharpe ratio	0.45	0.68	0.54
Sortino ratio	1.36	2.13	1.80
Max drawdown	-56.8%	-36.3%	-47.4%
Calmar ratio *	0.12	0.18	0.14

Source: Bloomberg LP Data, ORATS, IPS calculations

\*The Calmar ratio is calculated as Annualized Return / AbsValue(Max Drawdown)

The protective-put strategy improved the risk-adjusted returns of a long-only equity portfolio, lowering volatility and improving the Sharpe, Sortino, and Calmar ratios. This demonstrates that the protective put was able to deliver some edge when



implemented in a portfolio rebalancing framework despite losing money over the entire time. The 60/40 traditional portfolio during this time was a better methodology, as shown by its superior Sharpe, Sortino, and Calmar ratios.

The strong performance of the 60/40 portfolio throughout the 2008 credit crisis, considering the reduction in the correlation coefficient mainly attributable to the fall in interest rates,

showed that the 60/40 portfolio was superior to a protective-put strategy (see figure 9). However, as we broaden our scope to the entire backtest period, we see that the cost of bonds ended up being comparable with the cost of hedging with put options. Figure 10 illustrates the performance of the 60/40 and the 97.5-percent SPX/2.5-percent long-put strategy relative to the SPX. During 2007–2020, the costs of these strategies were effectively the same.

It is our belief that viewing an allocation to bonds as a cost to the portfolio is an appropriate way to approach asset allocation decisions, especially as interest rates rise off historical lows and the outlook on bonds for many portfolio managers is negative in real terms.

Figure 11 shows that the cost of hedging using protective puts was higher than the cost of bonds up until the end of 2017. Since 2017, financial markets have exhibited subpar bond returns combined with above-average equity returns with heightened volatility. This type of environment has proved to be a sweet spot for hedged equity strategies because they are far better equipped to take advantage of the violent sell-offs and subsequent V-shaped recoveries than a traditional diversified portfolio. Investors who believe that the current liquidity dynamics are here to stay should consider using hedged equity strategies as an alternative to bond allocations within their portfolios.

## THE NEW NORMAL

Paoloni and Hennessy (2019) focuses on the rise of volatility-selling strategies that resulted in the “net selling of option premium has far exceeded option buying ... most likely due to the popularity of option selling strategies in both retail and institutional communities starting in 2013.” The authors conclude that the cost of holding long options, i.e., carry cost, has become a more competitive and large-scale option, and volatility-selling programs have drastically reduced the cost of long options.

If we look at the protective-put strategy since 2017, we can see the 97.5-percent SPX/2.5-percent long-put strategy was commensurate with a 60/40 portfolio up until the 2020 coronavirus drawdown (see figure 12). Into the coronavirus drawdown and subsequent recovery, the 97.5-percent SPX/2.5-percent long-put strategy was more efficient when compared with a 60/40 portfolio (see table 4). The paradigm shift through this period is an explosive upside in equities combined with a systematically cheap option premium and lower interest rates offered by debt. Note that much of the outperformance during this period is attributable to the market sell-off surrounding COVID-19 fears.

The annualized return of the protective-put strategy was more than 6 percent better than the 60/40 portfolio. These results

Figure 9

### BACKTESTED PERFORMANCE OF SPX, 60/40, AND PROTECTIVE PUTS DURING GLOBAL FINANCIAL CRISIS

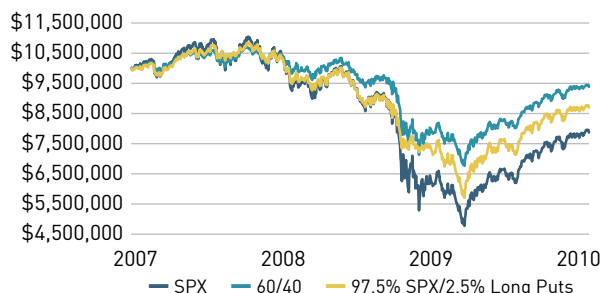


Figure 10

### THE COST OF BONDS COMPARED WITH THE COST OF HEDGING (2007–2020) \$10 MILLION NOTIONAL

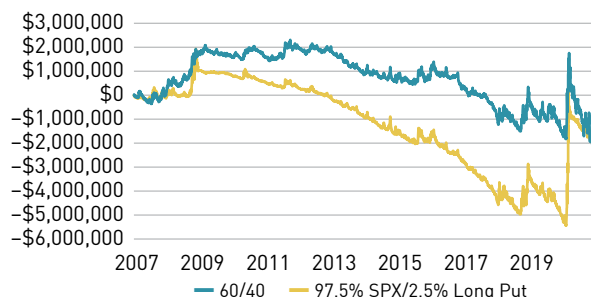
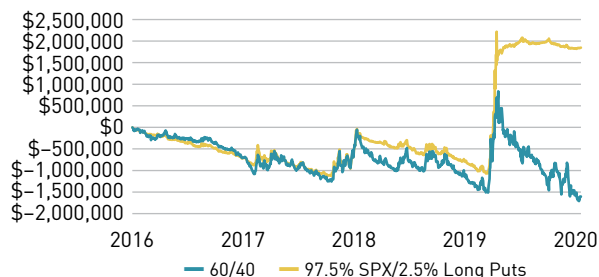


Figure 11

### THE COST OF BONDS COMPARED WITH THE COST OF HEDGING (2017–2020)



demonstrate that the cost of using explicit hedges can be comparable with the cost of owning debt in a low-interest-rate environment.

In addition to the strong outperformance on the upside, the asymmetry provided by using long-put options to hedge an equity portfolio led to very favorable maximum drawdown during this period of only -17.5 percent compared with a maximum drawdown of almost -21 percent for a 60/40 portfolio. The strong performance of put options during the COVID-19 crisis led to a substantial increase in the Calmar ratio of the protective-put portfolio, which was 0.95 compared with only 0.52 for a 60/40 mix.

The takeaway from the past four years is that investors have been able to increase their exposure to risky assets, hedge them directly with strategies such as a protective put, and obtain better risk-adjusted returns than traditional asset allocation models. Given the backdrop of low interest rates and potential for higher-than-average inflation in the future, investors should consider these trade-offs carefully in their asset allocations.

The relatively low yield through this period is worth examining further because the average yield on the 10-year U.S. Treasury from 2017 to 2020 was 2.06 percent and the 10-year U.S. Treasury as of late July 2021 was approximately 1.20 percent. It could be argued that, at the current yield, the upside of holding debt within a portfolio is negligible. van Douijeweert (2020) showed how much yields would need to drop to produce returns on U.S. Treasuries that have been comparable with previous crises (see figure 13).

The van Douijeweert (2020) analysis found

*... rates would need to go decidedly negative for investors to earn the returns they did in prior events. Given Bunds and Japanese government bonds (JGBs) hit lows of negative 90 basis points and negative 15 basis points, respectively, one might question if the rates below negative 1% would at all be reasonable to expect in US Treasuries.*

Across Wall Street, the consensus seems to be that rates are poised to move higher for the first time in decades. In his most recent annual letter, Warren Buffett claimed “bonds are not the place to be these days.”<sup>2</sup>

Bonds remain pricey, however, and they pay out insufficient coupons for many investors. Francesco Sandrini, senior multi-asset strategist at Amundi Asset Management, was quoted in the *Financial Times*, “While bond coupons in some sectors might be appealing at a first glance, the potential capital loss from bonds in a rising yield environment means you should probably avoid them” (Alabi 2021).

Figure 12

### BACKTESTED PERFORMANCE OF SPX, 60/40, AND PROTECTIVE PUTS (2017–2020)



Source: Bloomberg LP Data, ORATS, IPS calculations, \$10 million notional

Table 4

### PORTFOLIO RISK-RETURN STATISTICS OF SPX, 60/40, AND PROTECTIVE PUTS (2017–2020)

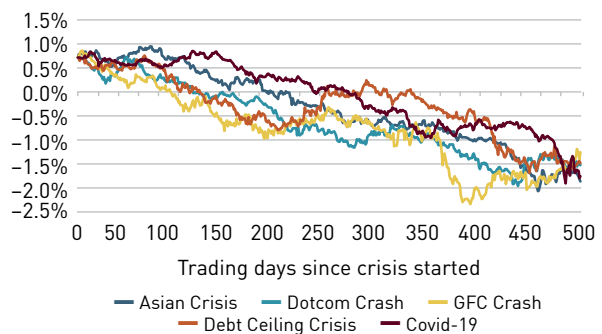
	SPX	60/40	97% SPX/2.5% Long Puts
Cumulative return	66.2%	49.3%	82.9%
Annualized return	13.8%	10.8%	16.7%
Volatility	16.4%	9.9%	12.2%
Sharpe ratio	0.84	1.08	1.37
Sortino ratio	2.28	3.11	4.90
Max drawdown	-34.3%	-20.9%	-17.5%
Calmar ratio *	0.40	0.52	0.95

Source: Bloomberg LP Data, ORATS, IPS calculations

\*The Calmar ratio is calculated as Annualized Return / AbsValue(Max Drawdown)

Figure 13

### HOW BOND YIELDS WOULD HAVE HAD TO EVOLVE TO GENERATE EQUIVALENT RETURNS



Source: van Douijeweert (2020)

## CONCLUSION

This paper makes a strong argument to consider hedging in a portfolio framework, especially as interest rates have approached historical lows and the cost of protective puts has been reduced due to the implementation of large-scale option-selling and volatility-selling strategies over the past several years.

This study was not meant to advance any one strategy but rather to show how systematically owning protective puts rebalanced



quarterly can compete with bonds as a diversifier in the current environment. One can argue these two phenomena are transitory in nature and therefore the portfolio manager would be making a tactical portfolio decision as opposed to being more strategic. From an economic point of view, it would be hard to argue that interest rates are going to remain at historically low levels forever, making 60/40 a more viable strategy in a higher-interest-rate environment. It can be argued that the compression in carry cost of long options due to the popularity of volatility risk premia selling isn't transitory, which should make a protective-put strategy a staple in a portfolio framework.

One should consider the potential value that can be added by firms that specialize in managing hedging solutions as their core business to improve on the basic hedging example. Nicholas Nassim Taleb, author of *The Black Swan*, pointed out in a Bloomberg TV interview: "A lot of people think they can call a broker, buy puts and its done. It's much harder than that."<sup>3</sup>

This study shows that even the most basic protective-put strategy clearly belongs within all portfolio frameworks today. As interest rates bottom out and equities continue to produce above-average yet highly volatile returns, the use of protective puts must be considered as a viable portfolio alternative or, at the very least, an addition to an asset allocation model. Many investors experienced the value of portfolio hedging

during the coronavirus crisis in 2020, and we expect the trend toward using direct portfolio hedges will continue to grow in popularity. ●

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## ENDNOTES

1. See <https://twitter.com/bennpeifert/status/1362908508237090816?s=20>.
2. See <https://www.berkshirehathaway.com/letters/2020ltr.pdf>.
3. See <https://www.youtube.com/watch?v=ePmSa-n7kBA>.

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