IVOL: Construction & Applications

Examining the Potential for this First-of-its-kind ETF in Various Market Environments and IVOL's Role in a Balanced Portfolio

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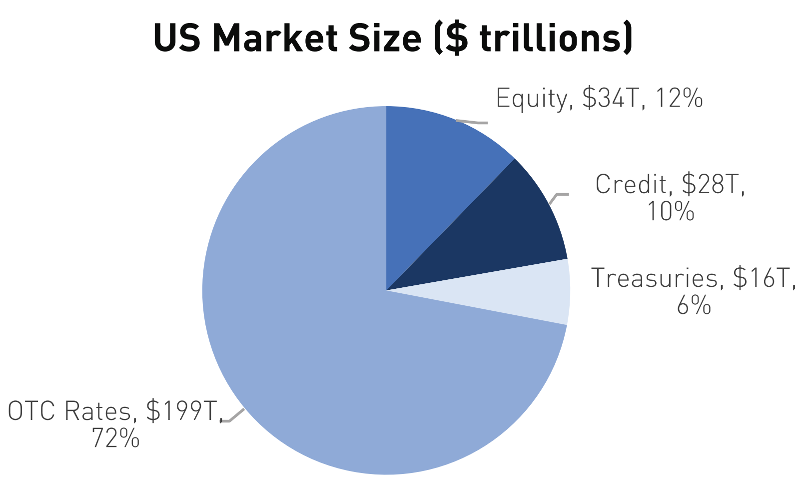
Introduction

The Quadratic Interest Rate Volatility and Inflation Hedge ETF (NYSE ticker: IVOL) is a first-of-its-kind fixed income ETF that seeks to hedge relative interest rate movements, whether these movements arise from falling short-term interest rates or rising long-term interest rates, and to benefit from market stress when fixed income volatility increases, while providing the potential for enhanced, inflation-protected income.

IVOL is unique because it is long interest rate volatility via its access to the Over-the-Counter (OTC) fixed income options market. This is one of the largest asset classes in global markets, as the rates market is nearly 5 times larger than the US stock market (see pie chart below).



Source: Nasdaq, SIFMA and BIS. "OTC Rates" defined as the notional value outstanding in interest rate contracts denominated in USD as of H1 2019.

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But, as the name implies, the Over-the-Counter Rates market is almost exclusively an institutional market. An allocation to IVOL gives investors exposure to this large, often inaccessible, part of the market very different from their usual stock and bond portfolios. No other active or passive ETF has provided its investors exposure to this options market before. IVOL's access to this institutional market is key to its many applications.

The portfolio uses TIPS and options based on the shape of the yield curve. IVOL's options are agnostic in terms of the direction of changes in interest rates. They aim to profit whether interest rates fall in the short end, rise in the long end or simply become more volatile.

Environments Where IVOL May Perform Well

Risk On | **Risk Off** | **Stagflation**

As such, IVOL has the potential to perform well in "Risk On," "Risk Off" and "Stagflation" environments. By doing so, it looks to accomplish many of the same objectives that investors are attempting to address using TIPS, bonds, floating rate notes, and "min vol" stocks. It does so in a way that avoids many of the downsides associated with these assets. Investors who currently own any of these assets may wish to consider whether IVOL works as an enhancement to their current allocation or could better accomplish their portfolio goals.

The purpose of this white paper is to explain how IVOL can be used and where it may fit in an investor's portfolio. We will examine how IVOL may perform in "Risk On," "Risk Off" and "Stagflation" environments. We will then compare IVOL to several other assets that investors are currently using to address these risks. In some cases, we believe IVOL works well to enhance current allocations. In other instances, we believe it works better than other tools investors may currently be using.

IVOL's Potential in Various Market Environments

As investors, we spend a lot of time thinking about what is coming next. Will markets continue to climb? Are they due for a correction? Could something even worse be around the bend? Below, we discuss IVOL's potential performance in three very different market environments – "Risk Off," "Risk On," and "Stagflation."

IVOL during Periods of Recession ("Risk-Off")

Many investors are concerned that the post-crisis boom is near its end and the next move for stocks and credit is down, perhaps significantly. Investors with this view may wish to consider IVOL as a potential hedge for their equity and credit holdings. How can a portfolio which invests in US Government bonds and interest rate options potentially benefit equity and credit holders?

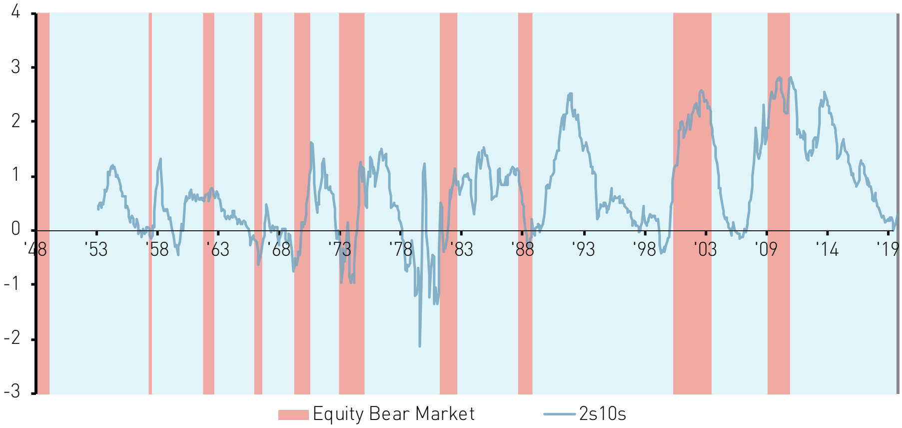
Equity and bond market sell-offs have historically been associated with three factors, each of which has the potential to benefit IVOL's performance: 1) a steepening of the yield curve, 2) increases in volatility, and 3) a flight to safety with government bonds. Let us consider each of these factors in turn, and then examine IVOL's correlation with several asset classes.

A Steepening of the Yield Curve:

Investors unfamiliar with the over-the-counter rates market are sometimes surprised by its application as a hedge against equity price declines. But there is often curve steepening during "risk off" periods when expectations for Fed rate cuts increase.

In the chart below, we see clearly how large declines in equity markets have usually been accompanied by a marked increase in the steepness of the yield curve.

Relationship Between US Equity Market Sell-Offs and the Yield Curve



Source: Goldman Sachs and Quadratic Capital as of Q1 2020.
S&P 500 is the equity index and 2s10s is defined as the difference between the 10y and the 2y swap rates. Past performance does not guarantee future results.

Increases in Volatility When Equities Sell Off:

Additionally, the options owned by IVOL are designed to benefit from an increase in yield curve steepness and thus may work as a potential hedge against equity losses. IVOL is currently the only ETF which owns these sorts of options. Please see the chart on the next page.

S&P500 vs. IVOL's volatility

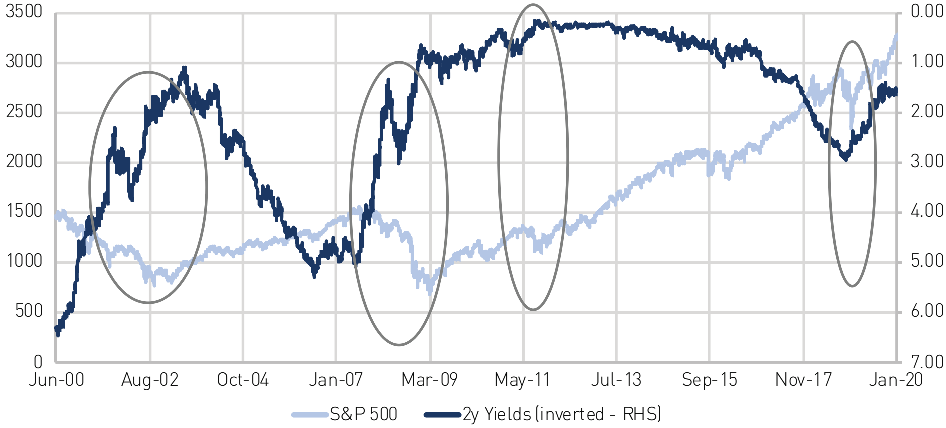
Source: Bloomberg and Quadratic Capital as of January 2020

Flight to Safety with Government Bonds

Investors are familiar with the "flight to quality" that often occurs during times of turbulence or uncertainty. US government debt is often considered amongst the safest assets to hold. A majority of IVOL's portfolio is at all times held in a combination of cash and US government debt. IVOL already owns the asset that many investors think of first when they think of a "flight to quality."

Historically, the price of government bonds tends to increase in periods when equities decline and during periods of market stress. Please see the chart on the next page.

2y Bond Yield vs. S&P500



Source: Bloomberg and Quadratic Capital as of January 2020

Investors should understand that IVOL is designed to benefit from three factors present during most market corrections – increasing curve steepness, increasing volatility, and the desire for safe assets like US government debt. This may make IVOL appealing to investors worried about potential upcoming sell-offs in risk assets.

Low Correlations to Common Asset Classes

IVOL's diversification potential is further illustrated by its correlation data. For example, since its launch in 2019, IVOL has had very low correlations with most asset classes. Please see the table on the next page.

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IVOL Correlation To:	DOW	S&P 500	MSCI EM	Barclays Agg	HY Credit	VIX
Overall	-0.08	-0.07	0.04	0.4	-0.07	0.06
On Down Days	-0.34	-0.27	0.02	0.24	-0.31	-0.01
On Up Days	0.07	-0.01	0.05	0.44	0.18	0.13

Source: Bloomberg and Quadratic Capital from 5/14/19 to 12/31/19
Please see pages 35-36 for index definitions.

For investors unfamiliar with correlation, a negative correlation means that the two assets being compared tend to move in opposite directions. A positive correlation means that the two assets tend to move in the same direction. The closer the correlation comes to 1 or -1, the stronger it is.

The data in the table above tells us that IVOL has a low correlation to the Dow, S&P 500, MSCI EM, Agg, HY Credit or the VIX. This tells us that IVOL may have value as a diversifier in a portfolio which owns any of these assets. Since IVOL owns bonds it is expected that it would have a positive correlation to "the Agg," but note that this correlation is low, especially on down days.

(Please see the 'IVOL for Passive Fixed Income Investors' section below for more details about how IVOL can act as a completion portfolio and potential diversifier to a fixed income portfolio centered on the Agg.)

More interestingly, the correlation data tells us that IVOL's correlation with US equities (as represented by the Dow and S&P 500) and US credit (as represented by US HY bonds) is more strongly negative on those days that those indexes are down. This means that, since its inception, IVOL has typically increased in value on days that those other assets have fallen in value.

Finally, it is worth noting that, while IVOL is negatively correlated with these three “risk on” assets on days that they trade down, that does not hold on days that they trade up. Note that IVOL has almost no correlation – positive or negative – on days that these three asset classes trade higher.

In conclusion, investors who expect a “risk off” environment in the coming months have to be concerned about their exposure to equities and credit. One option is simply to cut exposure and raise cash. Over the last decade that has been a one-way ticket to underperformance. Investors may be right that a crash is coming. But if they are wrong on timing, their performance may be even worse.

An allocation to IVOL may allow cautious investors, concerned about their exposure to equity and credit, to retain their allocation and add one of the few asset types that has historically performed strongly during sell-offs. And they may do so without hoarding cash or locking themselves into illiquid positions. In fact, they continue to have the potential for inflation-protected monthly income.

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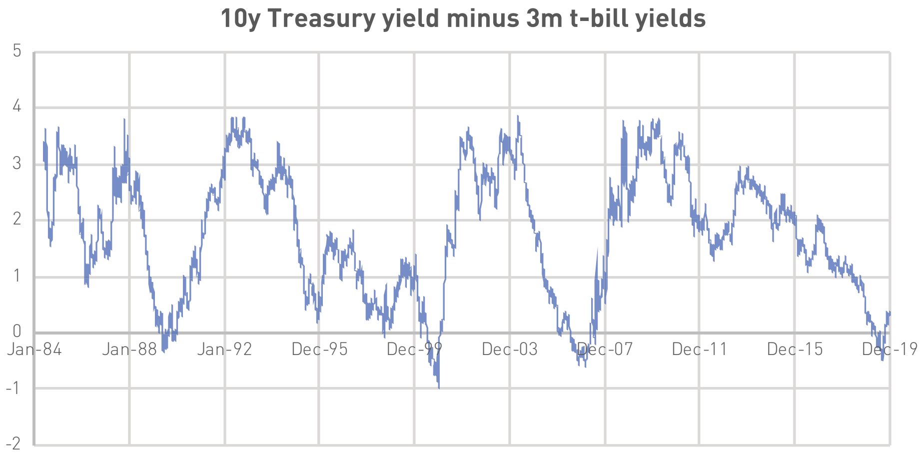
IVOL during Periods of “Risk On”

The Federal Reserve has succeeded in nearly all of its post-crisis goals with the exception of inflation. Unemployment is at 50 year lows. Equities, bonds and real estate have all seen tremendous price appreciation, with many assets near all-time highs. Surely, if the appetite for risk remains high and unemployment remains at generational lows, the Fed will be hoping to see inflation expectations normalize.

Chairman Powell has said that inflation expectations are “the most important driver of actual inflation.”[1] As long as the economy continues to grow and the market remains strong, the Fed will certainly be focused on trying to increase these expectations.

Investors who believe in a continuing “Risk On” environment accompanied by increasing inflation expectations could benefit from having IVOL in their portfolios. IVOL may profit from a "Risk On" environment if the Fed is successful in achieving its goals for inflation, or if inflation expectations rise organically.

After the past decade's tremendous asset returns, there are very few assets available today that could be considered inexpensive. Investors who expect "Risk On" to continue must hunt for value in other places. Interest rate volatility and inflation expectations are one such place. See the chart below to see today's curve flatness in its historic context. Rarely in recent history has the curve been this flat.



Source: Bloomberg and Quadratic Capital as of January 2020

Because interest rate volatility and inflation expectations are so low, the options owned within IVOL are incredibly inexpensive. Should volatility and/or inflation expectations increase, these options should increase in value. Therefore, investors who don't want to fight the Fed can use IVOL as a way potentially to benefit from a successful resetting of inflation expectations.

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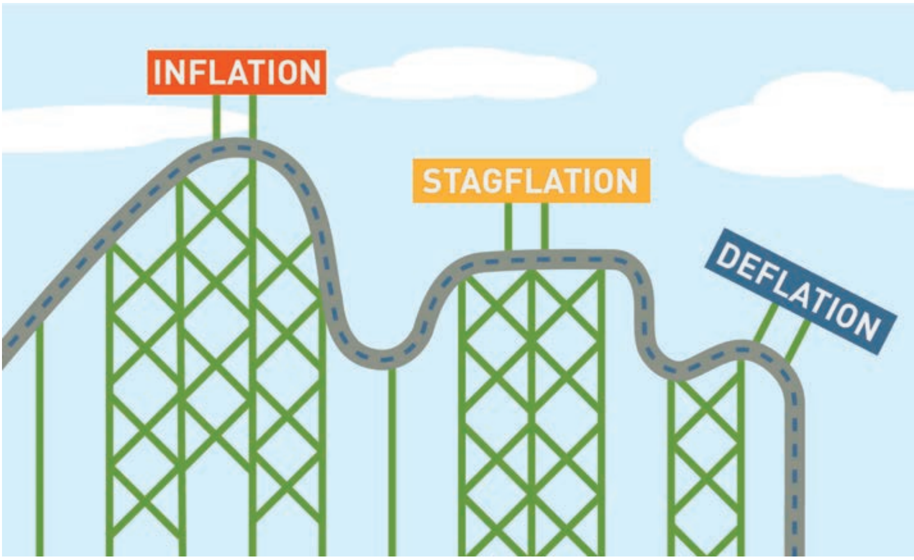
IVOL during Periods of High Inflation and Lower Growth (“Stagflation”)



Stagflation is a disastrous outcome for investors. Higher inflation coupled with lower growth is a potentially terrible environment to generate positive real returns. With the potential for trade wars and an aging economic recovery, investors are vulnerable to higher prices coupled with lower growth. Investors should not dismiss stagflation as some banished relic of the 70’s.

A trade war could be one possible catalyst. Tariffs could lead to higher prices while growth could decelerate due to market fear and policy uncertainty. Add in the possibility of a major trading partner dumping their holdings of US Treasuries in retaliation and we could see low growth and a steeper curve return with a vengeance.

Investors might hope that a large bond portfolio would provide some protection in this stagflation environment, but stagflation could be difficult for holders of fixed income instruments. Bonds could be just as likely to sell off as equities, foiling the popular "risk parity" strategy.

Additionally, the bond market is also susceptible to supply and demand dynamics that could lead to a decoupling of normal correlations. A classic example occurred during the immediate aftermath of the financial crisis from January to March 2009. During these months, the equity market deteriorated along with the economic data. Investors who looked for a haven in Treasuries were not successful. 2 year (2Y) United States Treasuries (UST's) sold off by 19 basis points (bps) and 10Y USTs sold off by 41bps due to higher supply as the Treasury sought to finance increasing deficits.

As assets of all stripes decline, investors could be hard-pressed to find a safe harbor. The type of options held by IVOL has the potential to benefit from this environment. As inflation picks up, overall prices increase, and inflation expectations take hold, these options would be expected to do very well. This is because the interest rate curve is likely to steepen in such an environment. These positive returns could be even further enhanced by any rate cuts the Fed might undertake to stimulate the economy. We certainly do not hope for a stagflation scenario in the US, but under such an interest rate scenario as described, IVOL's options portfolio may help mitigate investor losses elsewhere in their portfolio.

Investors need to prepare for the possibility of all three of the market environments discussed above: "Risk On," "Risk Off," and "Stagflation." Even those with high conviction on a likely outcome need to be prepared to be wrong. We believe that IVOL has the capability to work well in all three scenarios, potentially functioning as a yield generator, a low correlation allocation, a value play and/or a hedge depending on how it is used in a portfolio. Now we will compare IVOL with other tools investors are currently using to achieve these goals.

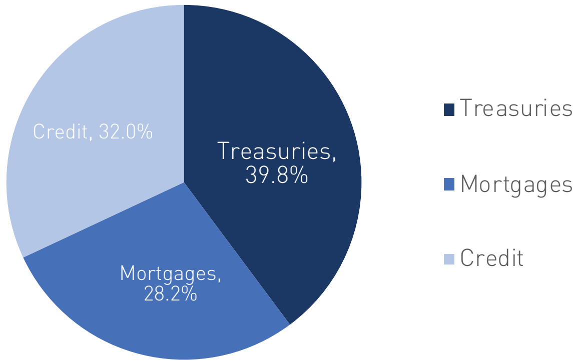
IVOL Compared with Other Investments

Investors have been trying to deal with "Risk On," "Risk Off" and sideways markets since the crisis. They have used a number of tools to attempt to meet their objectives depending on which of these environments they expect to encounter next. Some investors simply apply a passive approach to their fixed income allocations. Others look to specific types of assets to manage these risks. The assets we see investors using most often to address these risks are fixed income, Treasury Inflation Protected Securities (TIPS), floating rate notes, real estate and "min vol" stocks. Some of these trades have become so crowded that they no longer make sense. Others may work well in one scenario and poorly in another. We believe that IVOL can complement many of these positions and potentially replace others.

IVOL for Passive Fixed Income Investors

Many investors use investments designed to track the Bloomberg Barclays US Aggregate Bond Index ("the Agg") for their passive fixed income exposure. IVOL may serve as a diversifier for such investors. There are several issues with the "Agg" that investors should keep in mind. First, roughly 28% of the Agg's holdings are short volatility, while 32% of the Agg is exposed to credit spread risk.[2] Also, the Agg does not contain any inflation protected bonds (TIPS). These shortcomings may leave investors exposed in ways they did not anticipate, with gaps in their bond portfolio. Please see the chart below.

Bloomberg Barclays US Aggregate Bond Index ("the Agg")



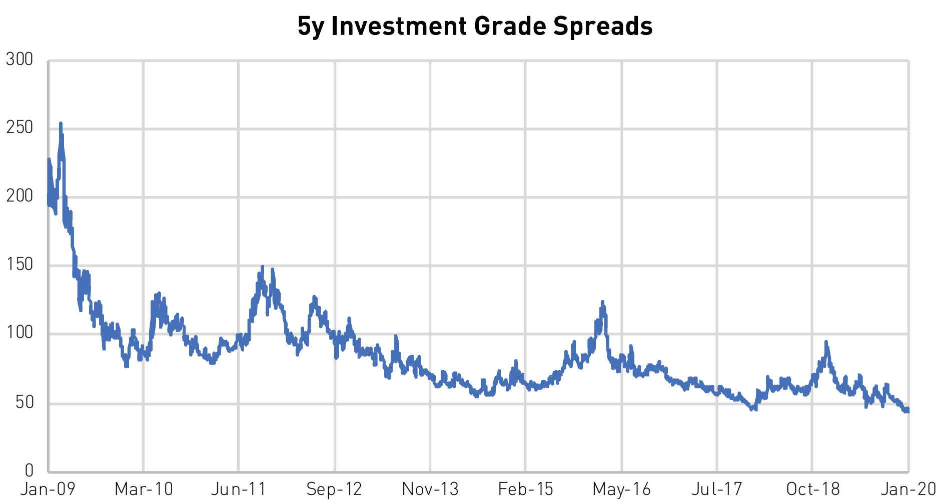
Source: Bloomberg and Quadratic Capital as of January 2020

Roughly 28% of the Agg is composed of mortgages. Mortgages are short volatility because the borrower has the option to pre-pay at any time. Mortgage holders may find their securities exposed just when they hope to use them to preserve value. Investing in funds that passively track the Agg (or any similarly-benchmarked fund) has led a whole group of investors to be short volatility, potentially without even realizing it.

Additionally, through its allocation to corporate bonds, about 32% of the Agg has credit spread risk. Typically credit spreads widen when equities fall, causing bonds with credit risk to fall in price terms. This is a particularly timely risk now.

Central bank purchases of sovereign debt globally has led to lower risk premiums and the now-familiar “reach for yield.” Spreads across the fixed income spectrum have tightened dramatically. Investment Grade and High Yield bonds spreads are currently in their 1st percentile since the crisis (in the last 10 years), expensive by almost any measure. Please see the charts on the next page.

Source: Bloomberg and Quadratic Capital as of January 2020



Source: Bloomberg as of January 2020

If/when credit spreads widen again, the price of corporate bonds will decline accordingly. For example, a 5 year High Yield par bond that currently trades at US Treasuries +280bps would lose about 4.5% in mark-to-market if the credit spread widens by 100 basis points. During the financial crisis, High Yield credit spreads widened to over 1,800bps over US Treasuries.

Lastly, while the Agg owns Treasuries, it does not own any inflation protected bonds. Whether you are a deflationist or an inflationist, inflation is an important risk to manage as part of a diversified portfolio. The Agg offers no solution to this problem.

IVOL can help diversify or complete a portfolio currently invested in the Agg, and may help hedge many of these exposures inherent in it. As we have discussed, IVOL is long fixed income volatility. Holding IVOL along with the Agg may help hedge investors against losses in the short volatility portion of their passive exposure.

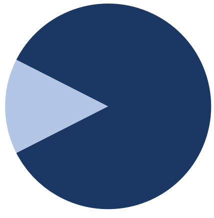
Also, IVOL owns only two things – US government debt and interest rate options. It owns no IG or HY bonds of any sort. As such, it may help hedge investors against losses if credit spreads widen when equities sell-off. Lastly, IVOL is built using TIPS instead of plain vanilla Treasuries. So investors can potentially gain inflation protection which they might otherwise lack. To be clear, IVOL does not offer the broad exposure of the Agg. But owning IVOL along with the Agg may give investors a better overall diversified fixed income exposure, especially in times of market stress.

IVOL vs. TIPS

Many investors may hope to protect themselves from possible rising inflation by owning TIPS. IVOL is built using TIPS. They form the majority of our portfolio, so clearly we like the asset class. But TIPS have one drawback as an inflation hedge – they are tied to the Consumer Price Index (CPI), whereas it is really inflation expectations for the future which have a stronger impact on the rate sensitivity of bond portfolios. Thus, we believe bond investors should care far more about inflation expectations than current CPI.

That is why we add long interest rate options to our TIPS portfolio. We believe that these relatively inexpensive options gives us a way to own inflation expectations which are currently priced at a discount, and gives investors a potentially better risk/reward profile than TIPS alone.

IVOL Portfolio Composition



Our interest rate options are similar to options on inflation expectations, because the yield curve is largely a result of inflation expectations. As such, IVOL gives investors another way to potentially profit from inflation rather than just waiting for their TIPS to reset to the then-current CPI level. We believe this gives investors the benefit of TIPS with the possibility of improved returns in a number of scenarios.

Adding IVOL to a portfolio of TIPS – or replacing TIPS with IVOL - could cause that portfolio to outperform during periods of heightened inflation expectations, fixed income volatility or any time the curve steepens, either from short rates falling or long rates rising. Additionally, in the current environment, adding IVOL is a potential value play because inflation expectations are below realized inflation. (IVOL's portfolio would potentially underperform a portfolio of TIPS alone during periods of falling interest rate volatility or flattening yield curves.)

Consistent with Chairman Powell's focus on inflation expectations, the Fed now seems to be working to increase inflation expectations by steepening the yield curve with their purchase of Tbills. The Fed seems to hope that they can make the curve steeper by trying to bring down short-term rates. We see these purchases as an attempt to normalize inflation expectations by returning the yield curve to its customary steepness.

If the Fed is successful in normalizing inflation expectations and/or pushing inflation expectations higher, we would expect the yield curve to steepen. In that case, IVOL is designed to profit from a normalization of inflation expectations by owning options on the shape of the yield curve, in addition to its TIPS positions.

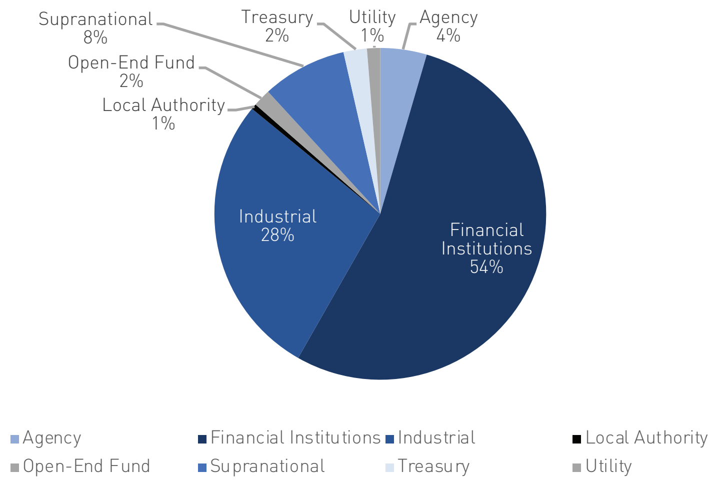
IVOL vs. Floating Rate Notes

Unlike standard bonds, the price of floating rate notes ("floaters") have almost no sensitivity to interest rates. Because of this, investors have piled into floaters in hopes of earning yields now while also benefiting from an eventual rise in rates. But floating rate notes now suffer from several drawbacks.

Depending upon the frequency and magnitude of the individual floaters reset, they may not profit right away when interest rates rise. They may reset only periodically and gradually.

Currently 91% of the bonds trading in the Bloomberg Barclays Floating Rate <5 Year Index, a floating rate index commonly used by ETFs, are trading above par.[3] Given their popularity, investors seem to have shrugged off this potential downside in light of the fact that credit is priced near all-time highs since the financial crisis. Investors cannot treat these instruments as risk free. If the perceived credit risk of issuers increases, the spreads on the floating rate notes are likely to widen, reducing the price of those instruments and consequently causing a loss for investors in what some expect to be one of their "safe havens." Typically credit spreads widen when equities fall. Investors who buy floaters seeking to reduce their exposure to interest rates might be better off with a more direct exposure using IVOL.

Composition of the Bloomberg Barclays Floating Rate <5 Year Index



Source: Bloomberg and Quadratic Capital as of January 2020

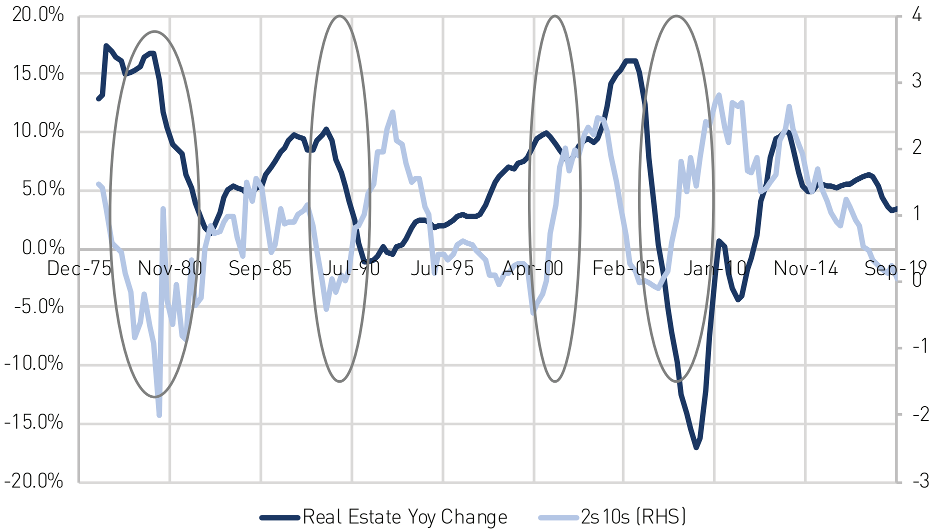
IVOL seeks to accomplish many of the goals investors have for their floating rate notes without these drawbacks. IVOL's options portfolio has the potential to appreciate when the interest rate curve steepens and long dated inflation expectations move higher, giving investors a similar benefit to the one they are expecting from their floating rate notes. But IVOL does so without the exposure to mark-to-market losses arising from the credit exposure of the notes' issuers.

IVOL vs. Real Estate / REITs

For most investors, the majority of their net worth is in real estate, not stocks and bonds. Higher interest rates increase the all-in cost of buying a home or other property using debt. Higher mortgage costs can also lower buyers' budgets and depress demand. These effects may have a profound impact on the prices of residential and commercial property and therefore an investor's overall net worth.

Additionally, increased volatility can reduce mortgage lenders' appetite for new loans, causing them to insist on higher down payments or to restrict lending to more creditworthy borrowers. Lastly, demand for commercial space and rental rates are likely to suffer in any sustained "Risk Off" environment.

The options portfolio held by IVOL has the potential to perform well under conditions that are difficult for real estate and may help those who own or develop property preserve value during what might be very difficult times for their real estate investments. Note in the chart on the next page how the curve often steepens during times of large price falls in residential real estate.



Source: BIS, Bloomberg and Quadratic Capital Calculations as of January 2020. Real Estate Index used was the United States Residential Property Prices Existing All Types of Dwellings SA

Investors who own real estate – either through REITs, commercial property, mortgages or homes – may consider IVOL. Mortgage investors are particularly exposed, as they are by definition short volatility and sensitive to increases in longer-dated yields.

Other direct owners of real estate may want to consider if IVOL could accomplish their objectives of diversification and yield without the potential illiquidity and cost of carry associated with real estate portfolios.

IVOL vs. "Min Vol" Stocks

Investors own these dividend-paying stocks to be "defensive" and to generate yield while taking what they hope will be less equity risk than the broader market. But with most major indexes near all-time highs, investors are often overpaying for "safe" names. These stocks have nothing to do with owning "volatility." They are just less volatile than other stocks.

IVOL's strategy has the potential to provide yield and also to benefit in a "Risk On" environment, when all equities are appreciating. Just like "min vol" stocks, IVOL may benefit from certain conditions that also may cause stock prices to rise, including Fed rate cuts and increasing inflation expectations which would accompany a growing economy. Yet IVOL does not have any exposure to equities. Therefore, investors can enjoy these possible benefits without taking more equity risk. In fact, the type of options held by IVOL have historically done very well during times of equity market stress, even when min vol stocks declined along with the general equity market. Please see the chart on the next page.

Source: Bloomberg and Quadratic Capital Calculations as of January 2020, with data starting on April 14th 2008. The index used to represent MinVol is the The MSCI World Minimum Volatility (USD) Index

(Please see the "IVOL during Risk Off: Recession" section above for more detail about how IVOL may provide a tail hedge for an equity portfolio.)

IVOL: A Potentially Better "Volatility" to Own

We have long been advocates for owning volatility, but IVOL is not a standard "long vol" product. An investor who is convinced of the benefits of owning volatility still has other decisions to make.

Market commentators (and even sophisticated investors) often lump all long volatility into the same bucket. With the exception of IVOL, all other ETFs available today use equity volatility, which is limited only to options on equities. Like equity options, IVOL's options on the shape of the yield curve have an asymmetrically positive upside potential, with a downside limited to the premium paid.

So why did we build IVOL using options on the shape of the yield curve instead of equity options?

First, as discussed, interest rate options may hedge investors against a wider range of negative scenarios than other instruments used to hedge risk, including especially equity options.

Second, we believe that the structure of our options allows for an even more attractive risk/reward relationship. Depending on the prevailing market conditions, the interest rate options owned by IVOL could have their time decay mitigated partially or completely by the roll down in the interest rate curve.

One of the major drawbacks of equity options is the negative carry. Owning an equity option is always negative carry, meaning the investor incurs a small loss every day. Since IVOL's options are not equity options, our options may roll positively in most normal environments when the interest rate curve is upward sloping. Conversely, IVOL's options may have a negative carry if the interest rate curve is not normal.

Additionally, the cost of buying any option depends on the level of implied volatility. Interest rate implied volatility, the type used to buy the options in IVOL, currently sits close to generational lows.

To our knowledge, IVOL is the first and, as of this writing, only ETF in which it is available. We thus see IVOL as an "access" product, and a way for investors to allocate to a market previously unavailable to most.

Conclusion

IVOL's unique structure and defined strategy make it a potential long-term asset allocation diversifier that can outperform in several, very different market environments, including both "Risk On" and "Risk Off" scenarios. It can be used in conjunction with or as a substitute for a number of assets that investors currently use to attempt to navigate today's confusing markets. IVOL can be used as a potential yield generator, a low correlation allocation, a value play and as a hedge against inflation or market corrections in risk assets depending on how an investor combines it with their existing portfolios. And it offers all these benefits with the liquidity and transparency of an ETF.

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IVOL's Risk Profile

Investing involves risk. IVOL has a limited performance history, and there is no guarantee the Fund will achieve its investment objectives. Principal loss is possible.

Non-Diversified Fund Risk. The Fund is non-diversified. Because the Fund (IVOL) is non-diversified and may invest a greater portion of its assets in fewer issuers than a diversified fund, changes in the market value of a single portfolio holding could cause greater fluctuations in the Fund's share price than would occur in a diversified fund. This may increase the Fund's volatility and cause the performance of a single portfolio holding or a relatively small number of portfolio holdings to have a greater impact on the Fund's performance.

There are risks involved with investing in options including total loss of principal. Options investing is not suitable for all investors. This fund utilizes sophisticated options strategies which may not be suitable for all investors. For a more comprehensive discussion of the risks involved in options investing, please review Characterizations and Risks of Standardized Options available at www.theocc.com/about/publications/character-risks.jsp or contact the Options Clearing Corporation directly at 1 N. Wacker Dr., Suite 500, Chicago, IL 60606. (1-888-678-4667)

Since IVOL owns volatility in the portfolio when the curve is inverting or flattening, interest rate volatility may be increasing. IVOL's options portfolio may benefit from this increased interest rate volatility, however, this does not mean there is no risk to owning IVOL. It is important to understand that IVOL may also underperform or lose money when the US interest rate curve flattens or inverts, perhaps significantly.

Additionally, the OTC options used by IVOL may give rise to a form of leverage, which may magnify the fund's potential for gain and the risk of loss. The prices of options can be highly volatile and the use of options can lower total returns.

It is important for investors to understand how OTC options work. OTC options generally have more flexible terms negotiated between the buyer and the seller. As a result, they are generally subject to greater credit risk and counterparty risk. OTC instruments also may be subject to greater liquidity risk. As discussed previously, IVOL seeks to mitigate the risk associated with the potential impact of a steepening swap curve ("curve risk") on the performance of US government bonds by investing in OTC options designed to appreciate in value when the swap curve steepens. There is no guarantee that the Fund's investments will completely eliminate the curve or inflation risk of its long positions in U.S. government bonds.

IVOL's use of such instruments is not intended to mitigate credit risk, or non-curve interest rate risk. In addition, when the swap curve flattens, the Fund's investments will generally underperform a portfolio comprised solely of the US government bonds. In a flattening curve environment, IVOL's hedging strategy could result in disproportionately larger losses in the Fund's options as compared to gains or losses in the US government bond positions attributable to interest rate changes. The Fund's exposure to derivatives tied to interest rates subjects IVOL to potentially greater volatility than investments in traditional securities, such as stocks and bonds. Investing in derivatives tied to interest rates, including through options tied to the shape of the curve, is speculative and can be extremely volatile.

Additionally, IVOL invests in debt securities, which typically decrease in value when interest rates rise. This risk is usually greater for longer term debt securities.

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About Quadratic Capital

Quadratic Capital Management LLC serves as the investment sub-adviser to IVOL. Founded in 2013 by Nancy Davis, Quadratic has utilized its significant expertise in the interest rate volatility and options markets to construct The Quadratic Interest Rate Volatility and Inflation Hedge ETF (NYSE ticker: IVOL) in a way that helps mitigate the downside risk of the strategy while maintaining upside potential.

Quadratic is a registered Small/Minority Business Enterprise and a majority woman-owned firm and is a member of the Sustainability Accounting Standards Board (SASB) Alliance which supports the elevation of financially material ESG standards. The firm is based in Greenwich, CT.

Citations:

1. Condon, Christopher. "Fed Puts Inflation Expectations at Heart of Major Policy Review". Bloomberg. March 15, 2019.
2. Bloomberg and Quadratic Capital as of January 2020
3. Bloomberg and Quadratic Capital Calculations as of January 2020

Definitions:

Yield curve: The yield curve shows the prevailing yield of bonds having the same credit risk, but different maturity dates. The most common yield curve is the treasury yield curve that displays the 3m, 2y, 5y, 10y and 30y bond yields. The x-axis displays the maturity and the y-axis displays the yield.

Long interest rate volatility: A strategy that purchases options in the market and benefits if the implied volatility used to price these options increase.

OTC fixed income options: Options whose underlying are fixed income instruments and don't trade in the listed market or on an exchange. The options are traded in the over-the-counter market directly between two parties.

CPI: The Consumer Price Index (CPI) is a metric that measures a basket of consumer goods and services. Changes in the CPI are commonly used to assess changes in the cost of living. It is used to identify periods of inflation or deflation.

Disinflation: It is the slowing of the pace of price inflation.

Risk parity: It is strategy used in portfolio management focused on the volatility of the underlying asset instead of the allocation of capital. It relies on historical volatility and correlation between assets to determine the optimal asset allocation.

Floating rate notes: A floating-rate note is a debt instrument with a variable interest rate. It is commonly based on a benchmark rate plus a spread. The most common benchmark is the London Interbank Offered Rate (LIBOR).

Par: Par value is the face value of a bond. It determines its maturity value. Par value for a bond is typically $1,000 or $100. In the market, bonds can trade above par (at a premium) or below par (at a discount).

Source: the Bank of International Settlements.

Spread: Additional yield that a bond pays above the benchmark rate.

Risk On / Risk Off: Risk On is broadly defined as periods when equity prices are rising, the overall market sentiment is positive, and the perceived risk is low. Risk Off is the opposite of risk On.

Stagflation: Stagflation is an economic condition when there is slow economic growth accompanied by or inflation.

Roll down: A roll-down is the effect that happens to instruments purchased at a future price that is different from the price today. As time goes by, the value of the instrument converges from the future price to the present price as maturity is approached.

Spot: The spot price is the current price at which an asset is traded for immediate delivery.

Carry: Cost or benefit of holding a position over time assuming no changes in the market.

Implied Volatility: Implied volatility is a metric used to measure the market's probability of changes in the price of an instrument. Investors use to price options contracts.

Bloomberg Barclays US Aggregate Bond Index ("Barclays Agg"): The Bloomberg Barclays US Aggregate Bond Index is a broad-based flagship benchmark that measures the investment grade, US dollar-denominated, fixed-rate taxable bond market.

MSCI World Minimum Volatility Net Total Return USD Index: The MSCI World Minimum Volatility (USD) Index aims to reflect the performance characteristics of a minimum variance strategy applied to the MSCI large and mid cap equity universe across 23 Developed Markets countries.

The Dow Jones Industrial Average ("DOW") is an index that tracks 30 large, publicly-owned companies trading on the New York Stock Exchange and the NASDAQ.

The S&P 500, ("S&P 500"), is a stock market index that measures the stock performance of 500 large companies listed on stock exchanges in the US.

The MSCI Emerging Markets ("MSCI EM") Index captures large and mid cap representation across 26 Emerging Markets (EM) countries.

The iBoxx iShares High Yield Corporate Bond Index ("HY Credit") is designed to reflect the performance of USD denominated high yield corporate debt.

CBOE Volatility index ("VIX") is a the which is a calculation designed to produce a measure of constant, 30d expected volatility of the US stock market, derived from real-time, mid-quote prices of S&P 500® Index (SPX) call & put options.

Important Information:

United States Residential Property Prices Existing All Types of Dwellings SA: residential property prices, existing dwellings. Quoted in Source Value Per dwelling.This material represents the opinion of the manager. It should not be regarded as investment advice or recommendation of specific securities.

Shares of any ETF are bought and sold at market price (not NAV) and are not individually redeemed from the Fund. Brokerage commissions will reduce returns.

The fund's investment objectives, risks, charges and expenses must be considered carefully before investing. The prospectus contains this and other important information about the company and may be obtained by calling +1-833-IVOL-ETF. Please read it carefully before investing.

IVOL is distributed by SEI Investments Distribution Co. (SIDCO), 1 Freedom Valley Drive, Oaks, PA 19456. The Fund's sub-adviser is Quadratic Capital Management LLC (Quadratic). SIDCO is not affiliated with Quadratic.

About the Author

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Founding Quadratic Capital Management LLC in 2013, Nancy Davis is the Chief Investment Officer of Quadratic Capital Management LLC and is the portfolio manager for the Quadratic Interest Rate Volatility and Inflation Hedge ETF (NYSE ticker: IVOL).

Ms. Davis began her career at Goldman Sachs where she spent nearly ten years, the last seven at the proprietary trading group where she rose to become the Head of Credit, Derivatives and OTC Trading. Prior to starting Quadratic, she served as a portfolio manager at Highbridge where she managed $500 million of capital in a derivatives-only portfolio. She later served in a senior executive role at AllianceBernstein.

Ms. Davis writes and speaks frequently about markets and investing. She has been published in Institutional Investor, Absolute Return and Financial News, and has contributed papers to two books. She has been interviewed by The Economist, The Wall Street Journal, The Financial Times, New York Magazine and others. Ms. Davis also appears on CNBC, CNN, Reuters, Sina, and Bloomberg.