

Inverse and Leveraged ETFs: Considering the Alternatives

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Have you used leveraged or inverse exchange-traded funds (ETFs) with your clients? In June 2009, FINRA released Regulatory Notice 09-31 warning about misconceptions prevalent among investors of inverse and leveraged ETFs. In response, many custodians limited both their clients' ability to trade these securities and their advisers' discretion in recommending them as suitable investments. Furthermore, in August 2009, FINRA announced increased margin requirements for leveraged funds (and associated uncovered options) with Regulatory Notice 09-53. Are these products that dangerous? Are they unsuitable for all investors? Our research demonstrates that, while these securities can be a great asset for a specific set of investors, they can pose real hazards for the wrong client. For the typical investor looking for a longer-term (greater than one day) exposure or hedge, we

Executive Summary

- Inverse and leveraged exchange-traded funds (ETFs) have been developed to allow market participants to engage in short-term hedging or speculation across any array of market indexes and sectors.
- Though some long-term investors have used these funds to speculate or hedge, they are less than ideal for many reasons; chief among them the daily rebalancing that causes a divergence between the benchmark index and the typically expected long-term returns of the ETF.
- ETFs with different rebalancing periods are coming and might be more effective for certain investors, but other alternatives already exist.
- Exchange-traded notes (ETNs) have been developed for the S&P 500 Total Return Index, and an investor who purchases the notes and holds them in any period up to their five-year lifespan should have returns that are closer to the expected benchmark.
- Futures contracts can provide the desired exposure and are available for many indexes and sectors, but have some of their own quirks that must be addressed to be effective for particular clients' needs.
- Options strategies provide even more customization for a desired risk profile.
- Tax implications are a consideration for all of these strategies, and tax-deferred accounts require particular attention.

believe there are alternative derivatives strategies worth consideration.

For those unfamiliar with the products: inverse and leveraged ETFs (and similarly designed mutual funds) have been developed, in theory, to allow market participants to engage in short-term (usually on the order of one trading day) hedging or speculation across any array of market indexes and sectors. Indeed, a large portion of inves-

tors in these securities are institutional, and for those seeking to increase or limit short-term exposure, such ETFs are a valuable tool. Unfortunately, many investors, particularly in the retail sector, misunderstand the purpose and price behavior of these securities, thinking them appropriate long-term investment vehicles. Over any extended period, these ETFs tend to diverge from what would be expected from a simple

multiple of the cumulative return. The single largest cause of divergence is the daily rebalancing necessary for the current breed of ETFs to maintain constant leverage of the daily returns; this can cause underperformance because of path-dependency of the fund returns, particularly in higher-volatility markets. Other potential negatives include high transaction costs, tax inefficiencies, and even potential “front running” by other market participants on the expected daily rebalancing.

Theoretical Example

The vast majority of current inverse and leveraged ETFs are designed for a very specific purpose—to reflect their benchmark index on a daily time frame—and artifacts of this design make them substandard for longer periods. Because all leveraged funds, including inverse funds, target a constant daily leverage, there is a persistent daily effect of buying notional when the index is up and selling when it is down, usually through the utilization of total return swaps. One beneficial result from this daily rebalancing is that, unlike actually shorting the underlying index, the maximum losses are capped at the amount invested in the fund. Other consequences of this design are less ideal: the greater the realized volatility and the longer the ETF has been held, the more the funds underperform their benchmarks (Cheng and Madhavan 2009).

Consider the example in Table 1. Daily returns for each of the leveraged and inverse funds are precisely as advertised; however, over time, both funds lose money relative to the “expected” benchmark. Note the path dependency: if the ETF had stayed at 100 for all three days, then the leveraged and inverse funds would also have had zero gain or loss. An interesting corollary is that, during periods of relatively low volatil-

	ETF		2x ETF		Inverse ETF	
	Level	Return	Level	Return	Level	Return
Day 1	100.00		100.00		100.00	
Day 2	110.00	10.00%	120.00	20.00%	90.00	-10.00%
Day 3	100.00	-9.09%	98.18	-18.18%	98.18	9.09%

	ETF		2x ETF		Inverse ETF	
	Level	Return	Level	Return	Level	Return
Day 1	100.00		100.00		100.00	
Day 2	101.00	1.00%	102.00	2.00%	99.00	-1.00%
Day 3	102.00	0.99%	104.02	1.98%	98.02	-0.99%

ity, these ETFs can actually outperform their benchmarks.

In the scenario outlined in Table 2, both funds outperform their “expected” benchmarks. This behavior is similar to what option investors experience when they are short option contracts (in option parlance, being “short gamma”). Therefore, any investor holding these securities for longer than one day is necessarily taking on volatility risk, benefiting from low volatility and losing money when volatility is high.

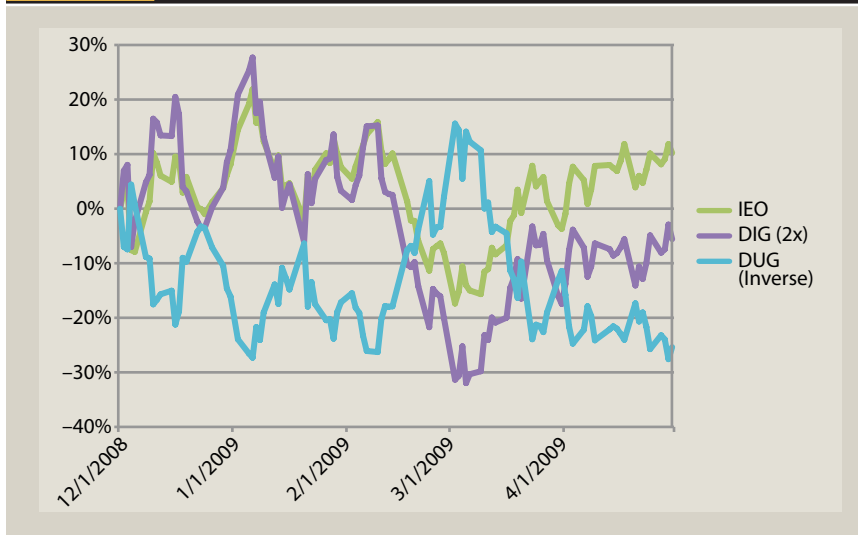
Empirical Results

In Figure 1, IEO is an ETF tracking the Dow Jones U.S. Oil and Gas Index. DIG and DUG are ETFs: DIG aims to have 2x leverage to the daily returns, and DUG tracks the inverse of the daily returns. In the period from December 1, 2008, to April 30, 2009, IEO has a holding period return of positive 10.2 percent, while DIG and DUG both underperform with a loss of 5.6 percent and 25.4 percent, respectively. This is just one example from the relatively short history of these ETFs. Monte Carlo simulation using historical data for leveraged ETFs demonstrates that, while there is a possibility of outperformance, over any appreciable length of time, the median

and mean performance ratios are well below the naïve benchmark (Trainor and Baryla 2008).

Other Issues

To produce these returns based on the daily movements of the underlying ETF, fund managers need to make large transactions at the end of the day to adjust their exposure. Specifically, managers need to increase notional when the benchmark index has risen for the day, and to decrease it when the benchmark has fallen. This needs to be done as near to market close as possible for optimal tracking. Given the predictability of these actions and the growing size of assets under management, Cheng and Madhavan estimate that the re-balancing from a 1 percent daily broad-market move would cause MOC demand to rise 17 percent, and a 5 percent move would increase demand 50 percent! The potential for “front running” these trades, given the size and predictability, is high, which could further exacerbate volatility, add momentum effects, and induce serial correlation in returns. As the assets under management of these funds increase, there is a potential for serious market impact along the lines of the contribution of program trading

Figure 1: Cumulative Returns of DIG and DUG vs. Benchmark

to the 1987 market crash (Cheng and Madhavan 2009).

Regardless of these drawbacks, a sophisticated investor might still be attracted by the exposure and volatility risk profile of leveraged ETFs. Used to take on volatility exposure or to hedge a one-day position, these ETFs would require constant monitoring to maintain the proper exposure to both volatility and market direction. For the typical client looking for leverage or a hedge, however, this is often the opposite of the desired exposure to volatility. Particularly because the borrowing costs for ETFs are often prohibitive for retail investors, clients need some alternative to short selling for reducing exposure. Due to their quirks, these ETFs are best left for sophisticated clients with specific needs, and better alternatives found for more traditional clients. There appears to be room in the landscape for alternate ETFs that have longer times between rebalancing or other longer-term strategies to cater to investors with a longer time horizon; Direxion has already filed to launch ETFs that would magnify index returns on a monthly basis (Spence 2010). These products will need to be

evaluated carefully for their design and, once they have some price history, for their observed performance, but there is certainly a potential market for a different breed of ETF.

Alternatives to Leveraged ETFs

Despite the lack of perfect direct or inverse correlation and a slew of other issues, traditional clients without alternatives might still look to these ETFs to meet their investment goals. Fortunately, there exist better investment choices that allow for leverage and have either minimal or positive exposure to volatility: exchange-traded notes and futures and option contracts. Unfortunately, some custodians restrict or forbid trading of these securities, despite their potential for reducing risk. Some even allow trading in the leveraged ETFs while forbidding the alternatives entirely! While it is true that derivatives can be perilous if used unwisely, a few simple option strategies or derivative positions can accomplish much to shape an investor's risk profile. More restrictive custodians should consider allowing some of these alternatives to better manage clients' risks.

Exchange-Traded Notes. For most

clients looking to adjust their exposure without complicated strategies or constant trade monitoring, one innovation has been the development of exchange-traded notes (ETNs) that are leveraged and inverse trackers of the S&P 500 Total Return Index, without a daily reset feature. The initial leverage was set at their inception in November 2009, and an investor who purchases the notes and holds them in any period up to their five-year lifespan should have returns that are closer to the naïve path-independent benchmark (minus fees). These notes can be redeemed in large blocks with the issuer for their intrinsic economic value, so they should track their benchmarks well. Because these notes don't reset daily, an investor who purchases these notes now won't have exactly the same amount of leverage as someone who purchased at inception, but the level of leverage from the time of the purchase should remain fixed over the life of the note.

For example, an investor purchasing the 3X leveraged version of the ETN on June 30, 2010, would actually have a "participation" rate (an approximation of the ratio of exposure to the value of the security) of 3.49 times the return of the index, due to the S&P 500 Total Return Index dropping from 1825.18 at inception to 1715.23. The "participation" rate will continue to fluctuate over the life of the security as the index moves, but our investor will realize a holding period return that is 3.49 times the performance of the index, minus fees.

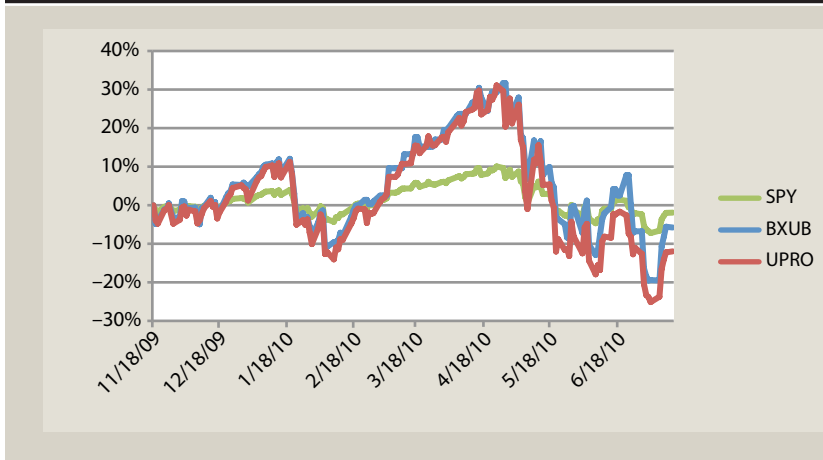
Comparing the ETN (BXUB) with the leveraged S&P 500 ETF (UPRO) in Figure 2 demonstrates the following: while both the ETN and the ETF track well at first, BXUB has tracked the benchmark better for the buy-and-hold investor. Because of its lack of path dependency, the ETN will continue to have superior tracking and, in volatile markets, consistently outperform the corresponding ETF.

There is one potential exception when the ETNs do become path dependent: should they drop in value significantly, stop-loss procedures will kick in to liquidate the holdings, preventing the value of the note from dropping below zero. This prevents the investor from potentially losing more than the amount invested, but, because a subsequent rebound in the value of the notes is not possible, any gains in the index after the liquidation won't be captured. Then, too, some additional downsides exist: for one, as of August 2010, the ETN is only available for the S&P 500 Total Return Index, so clients seeking directional exposure to a different index or sector will need to consider other alternatives. ETNs also pose a potential credit risk, because they are medium-term notes secured by a particular bank (Barclays Capital 2009). Despite these concerns, these products are much better suited to the needs and risk tolerances of the typical retail client.

Futures Contracts. As another alternative for the investor looking to reduce or increase market exposure, futures contracts are close to ideal. Longer-term (greater than three months) trades will require maintenance and might have some slippage because of rolling the contracts, but tracking versus the underlying index will be much closer than a leveraged or inverse ETF. Also, compared to the ETFs, futures prices are not affected by volatility ("gamma neutral"). E-mini contracts are available for the S&P 500, Dow, and other major domestic and international indexes, allowing moderate-sized portfolios to hedge or speculate on directional moves.

An example of setting up an appropriate futures-based hedge is as follows: Suppose a client believes that the market will drop over the next two months and intends to invest \$50,000 in a 2X inverse S&P 500 ETF to speculate on this move. The alternative invest-

Figure 2: Cumulative Returns of ETN vs. Leveraged ETF and Benchmark



ment would be shorting two E-mini S&P 500 contracts, which have a multiplier of \$50 times the current price. The actual margin cost will be a fraction of the \$50,000 investment, and the remainder can be placed into a money market fund or marginable securities, to be available to meet margin calls if needed. The leverage won't be exactly two times, as it will depend on the level of index at the time of the trade, but the amount of leverage will be fixed over the period of the contract. Should the client wish to "roll" the contract at settlement (entering into a calendar spread selling the current contract to buy the new front month), there is the potential for slippage; clients should only focus on the more liquid contracts to minimize this cost. Unlike the ETFs and ETNs discussed, however, with futures contracts there is the possibility of losing more than the invested amount, should the market move strongly against the investor; this requires constant monitoring to close out the position before the desired minimum capital level is breached.

E-mini contracts exist for even longer periods (at least a year), though the contract with the nearest settlement date (the "front month" contract) usually has the greatest average daily volume and open interest. There is no explicit

guarantee that futures need to track the underlying index, although market arbitrageurs have historically been quite effective at keeping prices very close to fair value. There are notable exceptions: During the "flash crash" of May 6, 2010, a large sell order of S&P 500 E-mini contracts contributed to the drop in the market, and subsequently led to a five-second suspension in the trading of the contracts. The preliminary findings of the U.S. Commodity Futures Trading Commission and the Securities and Exchange Commission (SEC) suggest that "a significant dislocation of liquidity" occurred in the front month S&P 500 E-mini contract, which, coupled with the background of declining prices over the day, caused prices to drop to a level that triggered the trading suspension. Afterward, prices quickly recovered as the trading imbalance lessened. Also notable in the SEC's findings, though, are the number of ETFs (including many of the leveraged and inverse variety) with "broken trades," or trades that needed to be cancelled because they were determined to be erroneous. This particular deviation was short-lived, but it is important to note that in extreme circumstances, the success of any hedging vehicle is subject to tracking error.

Table 3: Option Premiums for Dec. 2010 Expiry Mini-SPX Options

B/S	Strike	Type	Price (Bid for Sell, Ask for Purchase)	Cash Received (Paid) for Nine Contracts
Buy	110	Puts	8.1	(\$7,290)
Sell	110	Calls	4.9	\$4,410
Buy	130	Calls	0.26	(\$234)

Note: As of August 13, 2010

Unfortunately, clients looking to hedge or speculate on specific sectors or indexes without E-mini contracts will have to deal with the larger notional sizes of full future contracts, which might be prohibitive. Some of the E-mini contracts lack the liquidity desired. For clients seeking other alternatives, options are often a solution.

Option Contracts. Index option contracts are cash settled at expiration, allowing the purchaser to have large upside potential if the index is above (in the case of a call) or below (for a put) the specified strike price. By buying index options, clients can limit their possible losses to the premium paid, yet have large upside potential and the ability to create the desired level of leverage and directional exposure. For investors solely looking for greater insurance against large market moves, purchasing puts can be a one-trade “portfolio insurance.” Not only do they increase in value with the inverse of the market, but the amount of leverage is customizable, the length of coverage is available in numerous increments (often with LEAPS out a year or more), and they (usually) increase in value when volatility goes up. Call options are available for clients looking to have upside exposure, and they too increase in value with volatility. As prices move, however, the amount of leverage can change, necessitating constant monitoring of the position to manage risk.

To neutralize the volatility exposure, clients can go “synthetically” long or

short by simultaneously purchasing and selling contracts of the same strike and maturity. For example: An investor considering investing \$50,000 in a 2X inverse S&P 500 ETF could instead purchase Mini-SPX puts and sell calls. If the S&P 500 Index is currently 1083.61, the Mini-SPX would represent 1/10, or 108.36. As each contract has a \$100 multiplier, the notional per contract would be \$10,836.10. Our client could buy nine puts and sell nine calls (the level of the strikes won't matter for our exposure, as long as they are the same for both calls and puts; though the liquidity is usually highest “at-the-money,” or nearest to where the index is currently trading) for the contract month desired, giving exposure of \$97,524, or 1.95 times inverse leverage of the planned \$50,000 investment.

As with investment in futures, it would be possible to lose more than the original notional using this strategy, should the market rise strongly causing the calls to rise significantly in value. Those desiring protection, however, could purchase additional options guaranteeing a maximum loss. Our hypothetical client could purchase nine calls struck at 130, limiting losses to the difference between the strikes, times our \$100 per-contract multiplier, plus the net premiums paid for the options. Thus, if our puts and calls had a 110 strike, the maximum loss would be $(130 - 110)(100 \times 9) = \$18,000$, plus the net premiums paid for the options, illustrated in Table 3.

Another opportunity for hedging is provided by the CBOE Volatility Index (VIX). This index, often called the “fear index,” captures the implied volatility for the S&P 500 Index from a range of SPX options.¹ This index rises when investors expect markets to become more volatile, and historically this has been negatively correlated with market moves. By hedging volatility using options or an exchange-traded note tied to the VIX, investors could take a position on the direction of volatility. VIX-oriented strategies, however, as well as being potentially costly, have the potential to create still larger tax burdens; they are not recommended for the typical client because of their need for constant monitoring and the unusual price behavior caused by the rolling of front month contracts.

Tax Issues

When using call options in tax-deferred accounts, the purchase will usually need to be “cash secured,” meaning enough cash will need to be in the account to cover the strike should the options be exercised (otherwise, contribution limits might prevent the depositing of enough cash to exercise).² Option contracts exist for many of the same ETFs upon which the leveraged and inverse ETFs are based, and for many more sectors, indexes, and individual stocks as well. Care must be taken with the tax consequences of option and futures strategies (such as the mark-to-market and 60/40 rules), but tax treatment in most cases is no worse than that of leveraged ETFs.

Conclusions

Given the numerous potential downsides to the current breed of leveraged and inverse ETFs, why have assets under management ballooned in recent years to \$30 billion as of April 2010, according to Morgan Stanley? Because many of the desired effects of these

ETFs could be replicated by longer-term investors using ETNs, futures, or option strategies, the popularity of leveraged and inverse funds with these investors must either be attributed to an imposed restriction (such as custodians not allowing options to be traded in an IRA but allowing a leveraged ETF), unavailability of appropriate option contracts, or a fundamental misunderstanding of the risks or payoffs. We feel that custodians who restrict option or futures positions but allow leveraged and inverse ETFs for clients with long-term investment goals should reevaluate their policies, and financial planners should consider educating investors in alternate strategies involving ETNs, options, and futures. Only the lack of the necessary listed securities would be a hurdle for investors, but this is less of an issue for many of the more popular ETFs, and would be self-correcting as volume

moved into the options or futures markets. A more widespread awareness of the varied and promising alternatives to leveraged ETFs should help investment professionals meet their clients' longer-term needs while avoiding many of the downsides of current ETF-based strategies.



Endnotes

1. For detailed information on the VIX from the Chicago Board Options Exchange (CBOE): www.cboe.com/micro/vix/vixwhite.pdf.
2. The CBOE has an excellent primer on options in retirement plans: www.cboe.com/Institutional/pdf/ira4x92001.pdf.

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