Leveraged and Inverse ETFs

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by Larry Swedroe

Leveraged funds may seem like a good idea – if we expect the S&P 500 to be positive, for instance, then getting four times its return seems even better – but long-term investors (and there shouldn't be any other kind) should be skeptical.

The use of exchange-traded funds (ETFs) has exploded recently, to the benefit of investors. The structure of ETFs operate more tax efficiently than mutual funds. They also generally have lower operating costs than a mutual fund, resulting in lower expense ratios.

Within the ETF world, leveraged and inverse ETFs have also exploded in popularity. Leveraged funds, often called "ultra" funds, attempt to capture two or three times an index's daily return. Inverse ETFs, also called "short" ETFs, attempt to capture -100%, -200% or -300%% of an index's daily return.

These products exist for various indexes, including broad market indexes (like the S&P 500), sector-specific indexes or even commodity indexes (like oil and gas). In May 2017, the SEC even approved a request to list quadruple-leveraged ETFs, which will target a return that's four-times larger than the daily return of a broad index.

Leveraged funds attempt to capture some multiple of the *daily* return of an index. Investors should question whether these funds actually are able to accomplish that objective and whether that multiple translates into long-term results. Daily returns are for speculators and day traders, but investors care about how the performance of an investment fits into their overall portfolio.

To capture the higher returns, leveraged funds use a variety of derivative products, including futures, swaps and options. This type of strategy is good for traders who want to make a tactical move to capture some anticipated short-term shift in the market. However, these funds capture a multiple of both the good and the bad. For example, if the daily return of the S&P 500 is -2%, then a fund leveraged to a level double that index would return -4%.

Practically, this means much higher volatility from leveraged funds.

To see the impact of this increase in volatility, along with the higher operating costs from employing derivatives, my colleague, Daniel Campbell, reviewed 10 years of history for some of the market's largest leveraged and inverse ETFs compared to the indexes they track. Data is as of March 31, 2017. For funds with multiple share classes available over the entire period, we used the lowest-cost share class. Funds were grouped by index, and we made every effort to present all leveraged and inverse funds with sufficient history that track the specific indexes. Data is from Morningstar and the presented statistics are calculated from returns retrieved from Bloomberg.

First, I'll assess how effective the strategies were at capturing the daily return. No triple-leveraged funds existed over the last 10 years, so I can't evaluate those explicitly, but the table below gives an indication of the difficulty in employing these strategies. For context, I also present results for one low-cost ETF that tracks the given index and was available over the entire period.

10 Years Ending 3/31/2017					
Fund Standard Name	Ticker	Target Leverage	Avg. Daily Return (%)	Target Return* (%)	Daily Volatility (%)
S&P 500 Index			**0.037**	**N/A**	**1.3**

iShares Core S&P 500	*IVV*	*1.0*	*0.037*	*0.037*	*1.3*
ProFunds UltraBull Fund	ULPIX	2.0	0.062	0.075	2.6
ProShares Ultra S&P500	SSO	2.0	0.064	0.075	2.5
Rydex S&P 500 2x Strategy Fund	RYTNX	2.0	0.062	0.075	2.6
Rydex Nova Fund	RYNVX	1.5	0.048	0.056	2.0
ProShares Short S&P500	SH	-1.0	-0.035	-0.037	1.3
ProShares UltraShort S&P500	SDS	-2.0	-0.071	-0.075	2.6
Russell 2000 Index			**0.041**	**N/A**	**1.7**
iShares Russell 2000	*IWM*	*1.0*	*0.041*	*0.041*	*1.6*
ProFunds UltraSmall Cap Fund	UAPIX	2.0	0.072	0.082	3.3
ProShares Ultra Russell 2000	UWM	2.0	0.074	0.082	3.3
Rydex Russell 2000 2x Strategy Fund	RYRUX	2.0	0.072	0.082	3.3
Rydex Russell 2000 1.5x Strategy Fund	RYMKX	1.5	0.055	0.062	2.5
ProShares Short Russell 2000	RWM	-1.0	-0.044	-0.041	1.6
ProShares UltraShort Russell 2000	TWM	-2.0	-0.087	-0.082	3.3
Dow Jones Oil & Gas Index			**0.026**	**N/A**	**1.9**
iShares US Energy	*IYE*	*1.0*	*0.029*	*0.026*	*1.9*
ProFunds UltraSector Oil & Gas Fund	ENPIX	2.0	0.034	0.053	2.8
ProShares Ultra Oil & Gas	DIG	2.0	0.046	0.053	3.6
ProFunds Short Oil & Gas Fund	SNPIX	-1.0	-0.032	-0.026	1.9

ProShares UltraShort Oil & Gas	DUG	-2.0	-0.058	-0.053	3.6
Dow Jones Industrial Average			**0.038**	**N/A**	**1.2**
SPDR® Dow Jones Industrial Average ETF	*DIA*	*1.0*	*0.038*	*0.038*	*1.2*
ProFunds Ultra Dow 30 ProFund	UDPIX	2.0	0.062	0.076	2.4
ProShares Ultra Dow 30	DDM	2.0	0.066	0.076	2.3
Rydex Dow 2x Strategy Fund	RYCVX	2.0	0.062	0.076	2.4
ProShares Short Dow 30	DOG	-1.0	-0.037	-0.038	1.2
ProShares UltraShort Dow 30	DXD	-2.0	-0.074	-0.076	2.3
Rydex Inverse Dow 2x Strategy Fund	RYCWX	-2.0	-0.075	-0.076	2.4
Bloomberg Barclays US Treasury Long Index			**0.028**	**N/A**	**0.8**
Vanguard Long Term Treasury Fund	*VUSUX*	*1.0*	*0.029*	*0.028*	*0.8*
Rydex Government Long Bond 1.2x	RYGBX	1.2	0.057	0.034	2.6
Rydex Inverse Government Long Bond	RYJUX	-1.0	-0.032	-0.028	1.1
* The target return is simply the leverage multiplied by the average daily return of the index.					

Given that each of these funds targets a certain multiple of the daily return of the index, I expect its average daily return to roughly equal the leverage multiplied by the average daily return of the index. For example, the ProFunds UltraBull Fund (ULPIX) targets double the daily return of the S&P 500. Thus, because the average daily return of the S&P 500 was 0.037% during this period, I would expect the fund to have provided a daily average return of roughly 0.075%. While the fund did produce twice the daily volatility of the index, its 0.062% daily return fell short of its objective.

Even on a daily basis, most of the funds were not able to fully capture their return objective over the last 10 years.

Of course, part of the shortfall is explained by the funds' expenses. Returning to our example, ULPIX's net expense ratio of 1.46% is way above the 0.04% net expense ratio of the iShares Core S&P 500 ETF (IVV). In other words, investors were not being fully compensated for leveraged funds' greater volatility risk.

Given the difficultly in meeting the daily return objective and the higher volatility, investors should be skeptical about how these funds translate into a long-term strategy. In looking at the 10-year total return of the funds compared to the target

strategy, the skepticism is well-founded.

10 Years Ending 3/31/2017					
Fund Standard Name	Ticker	Net Expense Ratio	Target Leverage	Annualized Return (%)	Annualized Volatility* (%)
S&P 500 Index				**7.5**	**15.3**
iShares Core S&P 500	*IVV*	*0.04*	*1.0*	*7.4*	*15.3*
ProFunds UltraBull Fund	ULPIX	1.46	2.0	7.0	31.0
ProShares Ultra S&P500	SSO	0.89	2.0	8.3	31.2
Rydex S&P 500 2x Strategy Fund	RYTNX	1.76	2.0	7.2	31.2
Rydex Nova Fund	RYNVX	1.25	1.5	7.4	23.3
ProShares Short S&P500	SH	0.89	-1.0	-10.5	14.7
ProShares UltraShort S&P500	SDS	0.90	-2.0	-23.1	28.0
Russell 2000 Index				**7.1**	**20.1**
iShares Russell 2000	*IWM*	*0.20*	*1.0*	*7.1*	*20.1*
ProFunds UltraSmall Cap Fund	UAPIX	1.60	2.0	4.4	40.2
ProShares Ultra Russell 2000	UWM	0.95	2.0	5.3	40.2
Rydex Russell 2000 2x Strategy Fund	RYRUX	1.78	2.0	4.0	40.3
Rydex Russell 2000 1.5x Strategy Fund	RYMKX	1.70	1.5	6.1	30.1
ProShares Short Russell 2000	RWM	0.95	-1.0	-13.4	19.4
ProShares UltraShort Russell 2000	TWM	0.95	-2.0	-29.9	37.5
Dow Jones Oil & Gas Index				**3.1**	**21.2**

iShares US Energy	*IYE*	*0.44*	*1.0*	*2.8*	*21.4*
ProFunds UltraSector Oil & Gas Fund	ENPIX	1.54	2.0	-1.2	32.2
ProShares Ultra Oil & Gas	DIG	0.95	2.0	-5.1	43.5
ProFunds Short Oil & Gas Fund	SNPIX	1.78	-1.0	-11.8	20.0
ProShares UltraShort Oil & Gas	DUG	0.95	-2.0	-27.0	39.9
Dow Jones Industrial Average				**8.1**	**14.4**
SPDR® Dow Jones Industrial Average ETF	*DIA*	*0.17*	*1.0*	*7.9*	*14.4*
ProFunds Ultra Dow 30 ProFund	UDPIX	1.79	2.0	8.7	29.2
ProShares Ultra Dow 30	DDM	0.95	2.0	10.1	29.4
Rydex Dow 2x Strategy Fund	RYCVX	1.82	2.0	8.6	29.3
ProShares Short Dow 30	DOG	0.95	-1.0	-10.4	13.9
ProShares UltraShort Dow 30	DXD	0.95	-2.0	-22.6	26.8
Rydex Inverse Dow 2x Strategy Fund	RYCWX	1.82	-2.0	-23.0	27.1
Bloomberg Barclays US Treasury Long Index				**6.7**	**12.0**
Vanguard Long Term Treasury Fund	*VUSUX*	*0.10*	*1.0*	*6.6*	*12.2*
Rydex Government Long Bond 1.2x	RYGBX	0.94	1.2	7.6	19.4
Rydex Inverse Government Long Bond	RYJUX	1.41	-1.0	-9.1	16.4

* Volatility is annualized by multiplying the monthly volatility by the square root of 12.

Not only did the funds generally fail to achieve their target return multiple, but, despite the leverage, most also failed to even achieve the return of the unleveraged index. For example, again looking at ULPIX, the fund returned 7% per year compared to a 7.5% return for the S&P 500. It thus underperformed the index by 0.5% per year over the 10-year period

while experiencing more than twice the volatility. Conversely, if investors had put their money into a simple, lower-cost ETF, such as IVV, they would have received returns of 7.4% per year and matched the index's volatility.

In fact, only five of the 24 funds analyzed in this survey outperformed their unleveraged benchmark over the period we examined. Yet, each of the funds (with the exception of two short funds) experienced much higher volatility. A review of the table shows that a major part of the problem is leveraged funds' high expense ratios. While unleveraged ETFs typically have low expense ratios, the inverse and ultra ETFs we reviewed had an average expense ratio of just greater than 1.3%.

In addition, because the market for these ETFs is less liquid than it is for regular ETFs, trading costs (in the form of greater bid/offer spreads) are higher as well. Thus, the returns that investors would have earned would have been even lower.

The results also demonstrate that higher daily volatility compounds into a much larger problem when holding these funds for an extended period of time. Over longer holding periods, the greater the leverage employed, and the more volatile the market, the greater the negative impact on performance of a leveraged ETF.

Using leveraged or inverse funds as part of a broad portfolio strategy will result in more volatility and, in most cases, *lower* returns than just using a simple, unleveraged index ETF strategy. Long-term investors can put these products straight into the junk pile of Wall Street creations that are meant to be sold but not bought.

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