

The Next Bubble

Swap leveraged ETF

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1 Introduction A leveraged ETF is designed to replicate X times the daily investment return of an index or asset class before fees and expenses. A swap based leveraged ETF is a leveraged ETF that utilizes swaps transactions to reproduce the desired leveraged return. Due to the basic nature of these funds, increasing fees and risks, swap based leveraged ETFs are going to experience a significantly fall in value. Let's take a closer look.

2 How it works In a leveraged ETF swap transaction, the fund enters in an agreement with a counterparty where the latter delivers the performance of the index to the fund and the fund delivers the performance of a basket of securities it holds which can be completely unrelated to the index it's tracking. Prospectuses from Proshares and Direxion indicate the use of swaps to replicate the desired return and alert investors about several risks (counterparty, credit) involved but there are other factors to consider.

2.1 Counterparties The names and credit rating of the counterparties it's not disclosed. If counterparty defaults on the swap, the fund NAV will be significantly reduced regardless of the performance of the index.

2.2 Collateral The liquidity and quality of the collateral or the basket of securities used to back the ETF in the swap transaction have to be considered. Direxion and Proshares disclose the holding of each ETF daily but it is unknown which securities are used as collateral.

2.3 Fund Manager The name of the fund manager for ProShare Funds (Proshare Advisor) and for Direxion Funds (Rafferty Asset Management LLC) is disclosed but the fund manager track record, its ability to monitor counterparty exposure and performing fiduciary duties are unknown.

2.4 Fees Transaction fees are a fixed cost. The desired leveraged return is replicated before fees and expenses, therefore higher fees will significantly impact performance. Counterparties will start charging higher fees to enter in a swap transaction with ETF issuers due to increasing credit risk. In June, FINRA issued a [regulatory notice](#) alerting brokerage firms that suitability and sales material have to be updated for investors looking to buy a leveraged ETF.

3 Leveraged ETF Trading Pattern Holding a leveraged fund for more than a day can cause unintended consequences. Some factors become evident after analyzing returns for a period that is longer than one day. We look at returns of FAZ and FAS that follow an asset class, the Russell 1000 Financial Services Index.

3.1 Tracking Error The actual performance of a leveraged ETF significantly deviates from the predicted performance when we look at a time frame longer than one day, especially for volatile funds that track an asset class (FAS and FAZ) rather than a large cap index. This demonstrates that a buy and hold strategy can result in a significant reduction of value over time as the funds tend to largely underperform the predicted performance.

3.2 Confidence Interval of Errors It indicates what the upper and lower levels are for the tracking error of monthly returns with a 95% confidence. For example, looking at the data

below, we observe that there is a 95% possibility to have a tracking error between -1.66% and -15.40% from its mean for FAS and between -5.01% and -38.69% from its mean for FAZ. The upper and lower limits are significantly wide, especially for FAZ, indicating a high deviation of the tracking error when we look at monthly returns.

RIFI.X		
Date	Index	Return (y [^])
02/23/09	406.68	
03/23/09	523.92	0.2533
04/20/09	532.75	0.0167
05/18/09	651.15	0.2007
06/15/09	638.83	(0.0191)
07/13/09	625.24	(0.0215)
08/10/09	749.24	0.1809
10/05/09	750.86	0.0022
11/02/09	746.49	(0.0058)

FAS (3xBull)			FAZ (3xBear)			
Date (x)	4W NAV	4W Return (y)	4W Error (y-y [^])	4W NAV	4W Return (y)	4W Error (y-y [^])
02/23/09	4.41			79.72		
03/23/09	7.33	0.5081	(0.2518)	18.45	(1.4635)	(0.7035)
04/20/09	6.41	(0.1341)	(0.1843)	11.83	(0.4444)	(0.3943)
05/18/09	10.44	0.4878	(0.1143)	4.75	(0.9125)	(0.3104)
06/15/09	9.69	(0.0746)	(0.0172)	4.71	(0.0085)	(0.0658)
07/13/09	8.82	(0.0945)	(0.0300)	4.64	(0.0148)	(0.0793)
08/10/09	14.93	0.5271	(0.0157)	2.58	(0.5875)	(0.0448)
10/05/09	15.73	0.0519	0.0454	2.13	(0.1927)	(0.1862)
11/02/09	13.78	(0.1322)	(0.1147)	2.24	0.0535	0.0360

Mean	(0.0853)
SEE	0.0992

(0.2185)
0.2584

Confidence	(0.0166)
	(0.1540)

(0.0501)
(0.3869)

Mean= Average of the tracking errors

SEE (Standard Error of Estimate) =Standard deviation of the tracking errors

Confidence Interval= Mean+/-1.96*(SEE/square root of Mean)

Tracking error= ETF Return – Leverage Factor*(Index Return)

Prices for FAS and FAZ are adjusted for a reverse stock split

3.3 Rebalancing Most funds rebalance their holdings at 15:00 EST or right before the close in order to maintain their target debt/equity. The rebalancing effect is magnified by the presence of a trend and volatility of returns. The highest returns are obtained in trend markets with low volatility. The lowest returns are in volatile and non trending markets.

3.4 Negative Bias There is a natural negative bias embedded in leveraged ETFs. We can calculate the return needed to bring the value of an asset to par as $R=1/(1-R)-1$ which means that if the asset declines 10%, we would need a return of 11.1% to bring the value back to one. Given $R_u=2[(1+R_d)/1]-1$ the predicted return on a index and $R_d= [(1/1+R_d)-1]$ the return on the leveraged ETF based on that index, the first equation will always be larger than the second one when the return is negative and will always be larger when the return is positive. The equation will hold for short term trades and in absence of a trend. An investor who wants to capitalize on the fall of a particular index is better off shorting the long bull leveraged fund rather than go long the bear leveraged fund for that same index.

4 Conclusion Swap based leveraged ETF like FAS, FAZ, DIG and DUG that track a certain asset class (financials, oil and gas) rather than a large/small cap index, are the most likely to fall first because of higher volatility of returns and the nature of the funds.