# Solution for Obtaining Exemptive Relief for Leveraged Index ETFs


## Summary

Since enacting a moratorium on new leveraged index ETF issuers in 2010, no new fund managers have dared to seek the exemptive relief from the SEC necessary to offer their own leveraged index ETFs. While the SEC officially lifted its moratorium actively managed fund in December, 2012, it retains its position on ETFs using leverage. And because the evaluators remain steadfast in their concerns about the detrimental effects of such investment vehicles, fund managers interested in the space have remained unwilling to risk the time and effort of applying for exemptive relief. They feel certain that such relief would not be forthcoming. In the meantime, the market for such products in foreign markets continues to expand. This paper first provides a brief understanding of the SEC's resistance to new offerors of such products. It then describes a solution that could serve to reopen this market to new offerors by fully addressing the SEC's concerns.


## The SEC's Position

Shortly after the financial calamity of 2008 (in March 2010), the SEC came out with a moratorium on ETFs that offered leveraged returns tied to the change in various underlying indices. The three fund managers who had already obtained exemptive relief in the US (Proshares, Direxions, and Rydex - now part of Guggenheim) were grandfathered. They have been able to continue to offer new ETFs based on their previously obtained exemptive relief. But no new fund managers were allowed to even apply.

The SEC remains steadfast in its resistance to such products for the same reasons that the original ban had been instituted. Even though new fund managers could now apply for exemptive relief, there appeared little likelihood that such relief would be granted. Unsurprisingly, no new fund managers have entered this market in the US -- even as overseas markets have been expanding.

### Rationale for the ban

The rationale provided by the SEC was two-fold. First, the SEC was concerned with the valuation uncertainty: the unpredictability of returns for a buy-and-hold investor -- even if the investor corrected guessed the direction of the underlying index. Second, the SEC argued that the rebalancing requirements of all leveraged index ETFs listed at that time could exacerbate market dislocations.

#### Valuation Uncertainty

The three current US-based leveraged index ETF providers have constructed all of their leveraged index ETFs to provide leveraged *percentage* returns over a fixed time frame. The time frame is called the reindexing period and is typically one day. (Some funds are structured to reindex monthly.) As such, if the underlying index increases 1%, its 2X leveraged index ETF counterpart would rise 2% and a -3X fund would decline 3%. This is intuitive.

What is not intuitive is that when such funds are held beyond the reindexing period (e.g., overnight in the case of a daily reindexing fund), their behavior becomes unpredictable. If you knew only that the underlying index of a 2X fund that reindexes daily went from 100 to 110 over two trading days, this information is insufficient to calculate the value of the fund at the end of day 2. While it would appear "obvious" that the fund should have risen approximately 20%, in fact, the return could range from an appreciation of nearly 21% to losses of 21% or more.

This is not the result of exorbitant fees or trickery by the fund managers. It is the result of simple arithmetic. If over the 20-day period, the value of the index steadily increases, the fund value will increase more than 2X because of the compounding effect introduced by re-indexing. For example, if the index goes from 100 to 105 on Day 1 (an increase of 5%), the fund will go up 10% (2*5%). This would place a fund that started at 100 at 110 after the first trading day.

If the next day, the index rises another 5 points to 110 (an increase of 4.76%), the fund will rise 9.52% (2*4.76%). But the percentage increase will not be applied to the original base of 100, it will be applied to the new index value of 105. As a result, the value of the fund will not be 120, but 120.48. The same five point rise, now causes a rise in the fund value of 10.48. When the market moves steadily in one direction, the value of a leveraged index fund constructed on a percentage-change basis will outperform its multiple, as shown in Table 1.

**Table 1: Excessive benefits are obtained from a typical 2X leveraged index fund during two consecutive days of rising index values.**

| DAY | INDEX | | | CONVENTIONAL 2X FUND | | |
|---|---|---|---|---|---|---|
| | VALUE | DAILY PERCENT Δ | DAILY NOMINAL Δ | VALUE | DAILY PERCENT Δ | DAILY NOMINAL Δ |
| 0 | 100 | | | 100.00 | | |
| 1 | 105 | 5.00 | 5.00 | 110.00 | 10.00 | 10.00 |
| 2 | 110 | 4.76 | 5.00 | 120.48 | 9.52 | 10.48 |

More disturbing to investors, however, is the case where the market is choppy with lots of volatility. Volatility erodes profits. Using the example above, if on Day 2 the index declines 5 points to its starting value of 100, the decline in the value of the fund will be 2*-4.76%*110 = 10.48 points. This will result in a fund value of 99.52. Even though the index is now unchanged, investors in the fund have incurred a loss, as shown in Table 2.

Even though the grandfathered fund managers explained this in their prospecti, most investors don't read these and were unpleasantly surprised at such unexpected, non-intuitive, results.

**Table 2: Though the index is unchanged, the conventional 2X fund has lost money.**

| DAY | INDEX | | | CONVENTIONAL 2X FUND | | |
|---|---|---|---|---|---|---|
| | VALUE | DAILY PERCENT Δ | DAILY NOMINAL Δ | VALUE | DAILY PERCENT Δ | DAILY NOMINAL Δ |
| 0 | 100 | | | 100.00 | | |
| 1 | 105 | 5.00 | 5.00 | 110.00 | 10.00 | 10.00 |
| 2 | 100 | -4.76 | -5.00 | 99.52 | -9.52 | -10.48 |

So many investors were surprised by investments in these funds during the volatile period following the market collapse in 2008, that many retail brokers placed their own restrictions on clients seeking to trade in such funds. And, the SEC issued their moratorium.

### Exacerbating Market Dislocations

The second major reason that underlies the SEC's moratorium is the logical conclusion that the natures of such funds could exacerbate market dislocations.

In order to maintain its leverage ratio, current leveraged index ETFs have to buy more collateral after their underlying index rises and sell more collateral when the index declines. For funds the re-index daily, this means that somewhere near the close of business each day, they need to chase the market. During periods of dislocation when markets make big moves, this means that the fund managers may, indeed, exacerbate these trends.

A recent research paper from the Federal Reserve Bank observes that the impact of this market chasing behavior is much less than initially imagined. Because investors in such funds tend to sell fund shares when the market rises and buy shares when the market declines, the impact of re-indexing is not large. But even with their impact diminished by capital flows, the impact of such funds is in un undesirable direction.

## The Nominal Change Solution

There are constructions of leveraged index ETFs that address both of the SEC's concerns. In addressing these concerns, such constructions also offer investors the opportunity to make buy-and-hold investments that behave as they would intuitively expect, without regard to market volatility. In this way, funds constructed using the alternate approach meet the needs of both the SEC and a large contingent of investors currently unable to avail themselves of the benefits of leveraged index ETFs.

### Nominal vs. Percentage Change

A starting point for alternative constructions is to base the fund on the nominal change in the underlying index, rather than the percentage change. Using leverage based on nominal change rather than percentage change would yield provides returns that mirror intuitive expectations as shown in Table 3 for the volatile market characterization.

**Table 3: When the index of a nominal fund returns to "unchanged", so does the value of the fund.**

| DAY | INDEX | | | NOMINAL 2X FUND | | |
|---|---|---|---|---|---|---|
| | VALUE | DAILY PERCENT Δ | DAILY NOMINAL Δ | VALUE | DAILY PERCENT Δ | DAILY NOMINAL Δ |
| 0 | 100 | | | 100.00 | | |
| 1 | 105 | 5.00 | 5.00 | 110.00 | 10.00 | 10.00 |
| 2 | 100 | -4.76 | -5.00 | 100.00 | -9.09% | -10.00 |

Basing fund values on a nominal change, rather than percentage change does have consequences. An investors goal is typically return on investment measured as a percent. Current percentage-change-based funds appear to make such calculations easy. When, in Tables 1 and 2, the index rose 5% on Day 1, the fund rose 10%, a healthy return, if sold at the end of that day. But, as evidenced by Table 2, once the investment is held for more than one day, the percentage return becomes unpredictable -- even when we know what the final value of the index is on the day we decide to close out the position. In Table 2, though the index was unchanged, any conventional fund (regardless of the amount of leverage it uses) would have lost money. There is no meaningful value for the leverage obtained by an investor who sells at this point. (Mathematically, the leverage is minus infinity.) For this reason, the percentage change basis of current funds is of little value to the buy-and-hold investor.

Constructing a fund that is based on the nominal change in the underlying index causes the actual leverage offered by the fund to change every time the index changes. When the fund in our example rises in value, the leverage offered by the fund declines, as shown in Table 4.

**Table 4: In a nominal change fund, the leverage obtained declines as the value of the fund rises, but it remains constant through the investor's holding period for any particular investment.**

| DAY | INDEX | | | NOMINAL 2X FUND | | | |
|---|---|---|---|---|---|---|---|
| | VALUE | DAILY PERCENT Δ | DAILY NOMINAL Δ | VALUE | DAILY PERCENT Δ | DAILY NOMINAL Δ | DAILY LEVERAGE |
| 0 | 100 | | | 100.00 | | | 2X |
| 1 | 105 | 5.00 | 5.00 | 110.00 | 10.00 | 10.00 | 1.91X |
| 2 | 110 | 4.76 | 5.00 | 120.00 | 10.00 | 9.09 | 1.83X |

And when the value of the fund declines, the leverage increases, as shown in Table 5.

**Table 5: Leverage for a nominal change fund rises as its value declines. But, again, it remains constant over the life of any particular investment.**

| DAY | INDEX | | | NOMINAL 2X FUND | | | |
|---|---|---|---|---|---|---|---|
| | VALUE | DAILY PERCENT Δ | DAILY NOMINAL Δ | VALUE | DAILY PERCENT Δ | DAILY NOMINAL Δ | DAILY LEVERAGE |
| 0 | 100 | | | 100.00 | | | 2X |
| 1 | 95 | -5.00 | -5.00 | 90.00 | -10.00 | -10.00 | 2.11X |
| 2 | 90 | -5.26 | -5.00 | 80.00 | -11.11 | -10.00 | 2.25X |

And even when there is volatility, the fund retains the intuitive relationship with the index, as shown in Table 6.

**Table 6: While the leverage of a new purchase will vary with the value of the fund, the nominal-change-based fund maintains intuitive returns.**

| DAY | INDEX | | | NOMINAL 2X FUND | | | |
|---|---|---|---|---|---|---|---|
| | VALUE | DAILY PERCENT Δ | DAILY NOMINAL Δ | VALUE | DAILY PERCENT Δ | DAILY NOMINAL Δ | DAILY LEVERAGE |
| 0 | 100 | | | 100.00 | | | 2X |
| 1 | 105 | 5.00 | 5.00 | 110.00 | 10.00 | 10.00 | 1.91X |
| 2 | 100 | -4.76 | -5.00 | 100.00 | -9.09 | -10.00 | 2X |

Also shown in the table is that when the value of the index returns to its starting point, the value of the fund also returns *exactly* to its starting point.[1] But while the daily leverage available to new investments changes continuously in an inverse relationship to the value of the index, the leverage that an investor gets at the moment of purchase will remain constant throughout the period of his investment. In our example if he buys the fund when the index is at 100, he will receive 2X leverage and he will continue to receive 2X leverage for the life of the investment, as shown in Table 7.

**Table 7: While the leverage for new investments changes daily with the change in value of the fund, the leverage received for any single investment remains constant through the life of that investment.**

| DAY | INDEX | | | | NOMINAL 2X FUND | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | VALUE | DAILY PERCENT Δ | DAILY NOMINAL Δ | TOTAL Δ | VALUE | DAILY PERCENT Δ | DAILY NOMINAL Δ | TOTAL Δ | DAILY LEVERAGE | EFFECTIVE LEVERAGE |
| 0 | 100 | | | | 100.00 | | | | 2X | 2X |
| 1 | 105 | 5.00 | 5.00 | 5.00 | 110.00 | 10.00 | 10.00 | 10.00 | 1.91X | 2X |
| 2 | 110 | 4.76 | 5.00 | 10.00 | 120.00 | 10.00 | 9.09 | 20.00 | 1.83X | 2X |
| 3 | 112 | 1.82 | 2.00 | 12.00 | 124.00 | 4.00 | 3.33 | 24.00 | 1.81X | 2X |
| 4 | 109 | -2.68 | -3.00 | 9.00 | 118.00 | -6.00 | -4.84 | 18.00 | 1.85X | 2X |
| 5 | 114 | 4.59 | 5.00 | 14.00 | 128.00 | 10.00 | 8.47 | 28.00 | 1.78X | 2X |

Similarly, if he purchases the fund at the end of Day 1, he will receive 1.91X leverage throughout the life of his investment. The leverage value for the fund at the moment you purchase it will remain the leverage you have on e on the day that you purchase a nominal change leveraged index fund, And while the leverage changes constantly with the value of the underlying index, this is the same behavior we expect from stocks or non-leveraged ETFs. The $10 gain on a stock purchased at 30 is a 33% gain, while the same $10 improvement on a stock purchased at 100 is only a 10% gain.

## Resolving the SEC's Concerns

The beauty of this approach is that it resolves both of the SEC's primary concerns.

### Intuitive, Predictable Returns

Investments in leveraged index funds based on nominal change are intuitive for the investor. And there is no additional risk inherent in the fund construction for holding the investment for unlimited amounts of time.

### No Need to Chase the Market

A leveraged index fund that tracks the nominal change in an underlying index does not need to re-index. The collateral required to cover an investors position on the date of purchase does not vary as the value of the underlying index changes. It remains constant.

And if the capital flow argument raised in the FRB paper holds, such funds might actually have a mollifying effect on market dislocations because the sale of funds on rising prices would have a leveraged impact in the opposite direction of the change in value. And, of course the same would hold for a decrease in the value of the index prompting leverages purchases in the face of falling prices.

[1] All calculations ignore fees that apply equally to both percentage and nominal funds.

## Complicating Factors

There is one serious shortcoming of a leveraged index fund based solely on nominal change: The fund value can drop to (or below) zero.

This is most easily illustrated using a 3X leveraged fund. If an investor purchases the fund at an initial value of 100 and the underlying index declines by 34 points, the value of the investment would decline 3 * 34 = 102 points -- 2% more than the value of their investment as is illustrated in Table 8.

**Table 8: Without additional mechanisms, leveraged nominal-change-based funds run the risk of declining below zero.**

| DAY | INDEX | | | | NOMINAL 2X FUND | | | |
|---|---|---|---|---|---|---|---|---|
| | VALUE | DAILY PERCENT Δ | DAILY NOMINAL Δ | TOTAL Δ | VALUE | DAILY PERCENT Δ | DAILY NOMINAL Δ | TOTAL Δ |
| 0 | 100 | | | | 100.00 | | | |
| 1 | 93 | -7.00 | -7.00 | -7.00 | 79.00 | -21.00 | -21.00 | -21.00 |
| 2 | 83 | -10.75 | -10.00 | -17.00 | 49.00 | -37.97 | -30.00 | -51.00 |
| 3 | 87 | 4.82 | 4.00 | -13.00 | 61.00 | 24.49 | 12.00 | -39.00 |
| 4 | 75 | -13.79 | -12.00 | -25.00 | 25.00 | -59.02 | -36.00 | -75.00 |
| 5 | 66 | -12.00 | -9.00 | -34.00 | -2.00 | -108.00 | -27.00 | -102.00 |

In rapidly declining markets such as those in 2008 or oil price indices in 2015, it may be impossible for the fund manager to close at all positions at 0, causing investors to incur a margin call for an investment that is more than worthless.

An even greater risk may affect investors in leveraged inverse funds. For a -3X fund, a market rise of 34% would pose the same problem.

No one invests with the intention of being wiped out. And because one of the advantages of current leveraged index ETFs is that losses are limited to the initial investment, the ability of a fund's value to decline below zero constitutes a major problem.

## The Φ-Fund™ Solution

There remains a solution that combines the benefits of a leveraged index fund based on nominal change with the additional ability to avoid a drop to (or below) zero: the Φ-Fund™. Φ-Funds™ combine the best of both worlds. The Φ-Fund™ platform allows the construction of a leveraged index fund whose change is based on a defined function. Theoretically, this function can be of any shape as long as there is a 1:1 relationship between the value of the underlying index and the value of the fund.

Figure 1 displays a chart comparing two notional 2X leveraged index funds providing initial inverse leverage of 2X for the S&P500 Index. During this period (10 OCT 2008 to 10 DEC 2008), the S&P500 opened at 899 and closed at 899. But over the 60-day period the index was volatile. It rose over 100 points and fell over 100 points from its initial level, before closing unchanged. Because of the volatility, the standard 2X fund declined in value 9%. The 2X Φ-Fund™ maintained fidelity with the underlying S&P 500 and also closed unchanged.

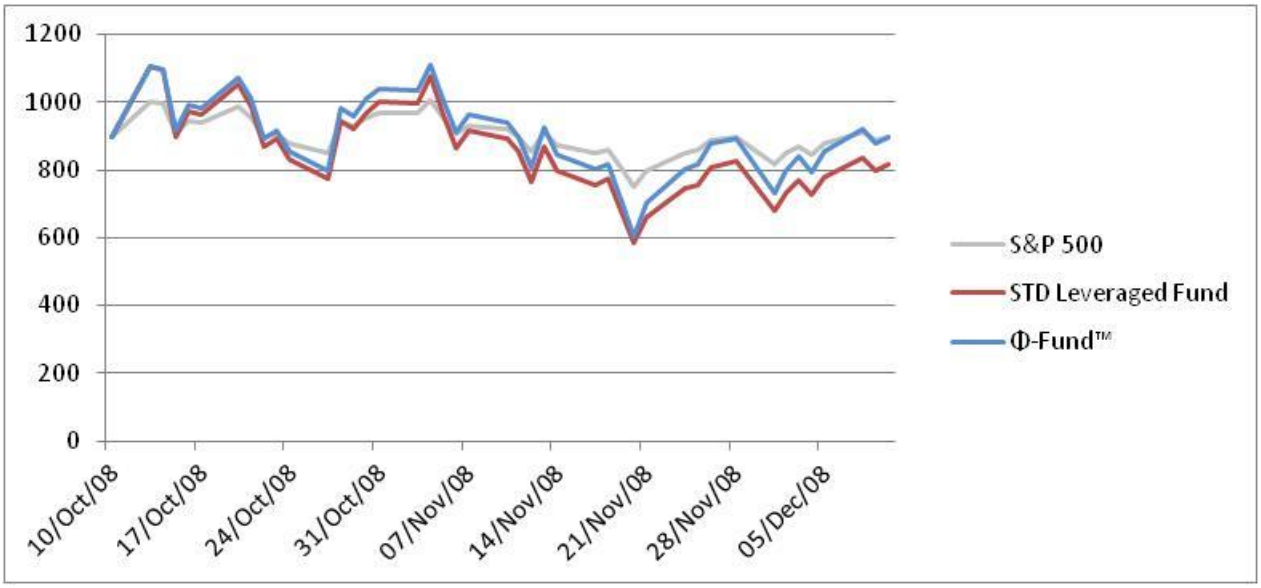


**Figure 1: The Φ-Fund™ maintains fidelity with the underlying index, Standard leveraged index funds would decline 9% in value during this period of neutral performance by the underlying index.**

As can be seen from the chart, the value of the Φ-Fund™ remained either equal to or above the value of the standard fund throughout this period.

## Valuation Uncertainty

Because the Φ-Fund™ value function is pre-defined, an investor knows in advance the value of the fund for any value of the index. This removes the valuation uncertainty that arises from percentage change funds. The investor knows exactly what value the fund will be at for any given value of the underlying index.

## Mollifying Impact on Market Dislocations

Because Φ-Funds™ can be constructed using simple arithmetic leverage, rather than geometric[2] percentage leverage, they have the same impact on the markets as pure nominal change funds. Φ-Funds™ using arithmetic leverage do not require daily portfolio rebalancing. They, therefore, do not exacerbate market dislocations. And, as with pure nominal funds, capital flows may cause them to mollify such dislocations adding demand to falling markets and increasing supply in rising markets.

[2] Geometric leverage refers to the fact that calculation of the value of a standarzd leveraged index fund requires a higher order (geometric) calculation versus the simple arithmetic function used for a Φ-Fund™.

## Never Go To Zero

By selecting a Φ-Fund™ valuation function that uses zero as an asymptote, Φ-Funds™ will never reach - or dip below - zero. Again, this valuation is built-in to the Φ-Fund™, so that it is fully predictable. In fact, a prospectus could publish a table with the value of the Φ-Fund™ for all conceivable values of its underlying index - were it not for the slight adjustments that occur to all funds because of the deduction of fees.