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Understanding Expected Performance of Leveraged Index Funds

Understanding Expected Performance of Leveraged Index Funds provides a framework for advisors and investors to grasp more clearly the expected performance of leveraged index funds. We focus on two fundamental aspects of seeking leveraged returns: (A) potential for greater gains and losses relative to benchmark performance and (B) the financing implications associated with seeking these returns.

By way of definition, a leveraged index fund is an index-based mutual fund that seeks to return a multiple of the daily return of its benchmark index. To illustrate some of the concepts behind these funds, we have selected a financial instrument with which most investors are familiar: a home mortgage.

The Power of Leverage

Assuming he has good credit, Mr. Smith can purchase a \$100,000 house without paying \$100,000 in cash. Rather, he might make a \$20,000 down payment and get an \$80,000 mortgage. (Figure 1.)

Mr. Smith has leveraged exposure to the real estate market (\$80,000 of his \$100,000 home). Dividing his purchase price into two pieces illustrates the relationship between the down payment and the mortgage amount, thus providing a measure of the leverage in the transaction. Such a measure is key to understanding the magnitude of the risk (the potential for gain or loss caused by the movement in the house price) associated with Mr. Smith's initial investment.

By using a mortgage, Mr. Smith has leveraged his down payment by 5 to 1. (Figure 2.)

If he sells his house for \$120,000 one year later, he will have a gain of \$20,000, which equates to 20% of the \$100,000 purchase price and 100% of the \$20,000 down payment. Conversely, if he sells his house for \$80,000 a year later, he will have a loss of \$20,000, which is 20% of the \$100,000 purchase price and 100% of his \$20,000 down payment. (Figure 3.)

Leverage increases buying power and thus magnifies the impact of movements in the price of the asset purchased using leverage. Through his mortgage, Mr. Smith has leveraged his down payment by 5 to 1 which causes a 20% change in the home price to

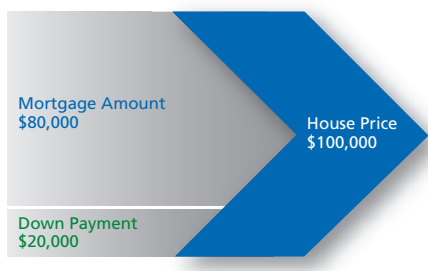


Figure 1



Figure 2



Figure 3

produce a 100% impact on his down payment. The magnification of the 20% move in the house price into a 100% movement in his equity position in the house illustrates the power of leverage.

What about the cost?

As noted above, dividing Mr. Smith's purchase price into the down payment and the mortgage amount provides a measure of the leverage in the transaction. It also divides the portion of the purchase price with no interest charges (the down payment) from the portion that has interest charges (the amount of the mortgage). Although there may be an opportunity cost to making a down payment on a house, and there may be a cost associated with home ownership generally in addition to the mortgage, there is no explicit cost to the amount of the down payment. Mortgages have stated terms and interest rates. Borrowers are required to pay interest and repay principal over time. These interest charges represent the explicit cost of a mortgage. (Figure 4.)

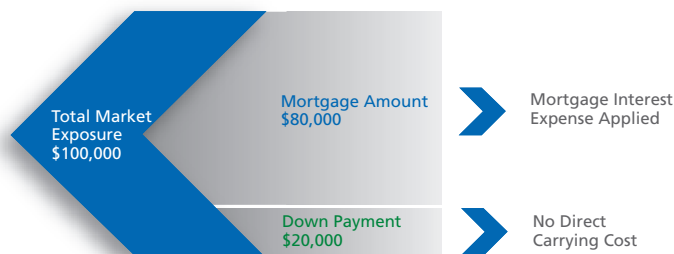


Figure 4

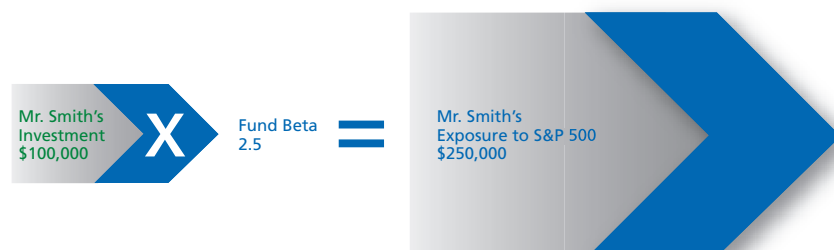


Figure 5

When we discussed the gain or loss on Mr. Smith's house, we oversimplified the analysis by ignoring mortgage interest charges. To determine the gain or loss on the sale of a house, we must reduce the proceeds by the aggregate interest payments. If after one year he sold his house for the original \$100,000 purchase price, he would have incurred a loss due to interest expense associated with the mortgage. To simplify, (ignoring real estate taxes and maintenance costs associated with the house and the benefits of mortgage interest deductions, the expected gain or loss on the sale of the house is (A) Sales Price minus (B) Purchase Price minus (C) Mortgage Interest Payments). In order to calculate actual gain or loss, it is imperative not to overlook interest expense.

If Mr. Smith purchases a house for \$100,000, owns it for one year (during which he pays \$6,000 in interest charges) and then sells the house for \$120,000, his gain on the transaction is:

(A)	\$120,000 Sale Price
(B)	- \$100,000 Purchase Price
(C)	- \$6,000 Interest Charges
	<hr/>
	= \$14,000 Gain

Mr. Smith's \$14,000 gain equates to a 70% return on initial \$20,000 investment/downpayment.

Leveraged Index Funds

A look at the basics

A leveraged index fund seeks to magnify the daily investment performance of a benchmark index. The multiple is also known as the "Beta" of the fund. For example, the Direxion S&P 500 Bull 2.5x Fund seeks to achieve a daily return that is 2.5 times (or 250%) of the daily return of the S&P 500. If Mr. Smith makes a \$100,000 investment in the Fund, he will receive \$250,000 of exposure to the S&P 500. (Figure 5.)

If the value of the S&P rises by 1% the next day, he should expect a gain of 2.5% on his \$100,000 investment. If the S&P 500 declines 1%, Mr. Smith would have a 2.5% loss on the \$100,000 investment. In our example of his house purchase, we determined the amount of leverage by relating the size of the down payment to the amount of the mortgage.

To be able to achieve a return that is a multiple of an index, a leveraged index fund must create exposure to the benchmark with a dollar value equal to

the product of (A) the beta of the fund and (B) the fund's assets. For instance, if the Direxion S&P 500 Bull 2.5x Fund has \$100m in assets, it must create \$250m of exposure to the S&P 500. The term "leverage" describes the difference between the Fund's assets (\$100m) and its economic exposure (\$250m).

Unlike borrowing money to buy a house, leveraged index funds generally do not borrow but rather invest in financial instruments which have implicit leverage, such as futures contracts, or explicit leverage, such as swap contracts. Like a mortgage, however, these financial instruments can be purchased for a fraction of the market exposure they provide. The following section outlines the unique aspects of expected returns for bull funds and bear funds.

Expected return of a bull fund

A bull fund seeks to provide a return that is a multiple of the daily return of a target benchmark. Subtracting 1 from the beta of a leveraged index bull fund illustrates the amount of the portfolio which is leveraged (the leverage of the S&P 500 Bull 2.5x fund is 150% (2.5 minus 1 = 1.5)). Determining the amount of leverage in a leveraged index fund's portfolio has the same implications as dividing the purchase price of a house into the down payment and the amount of the mortgage: it indicates the risk of the investment and the part of the portfolio which must be financed. The Direxion S&P 500 Bull 2.5x Fund seeks exposure to its benchmark in an amount equal to 250% of its assets which means it has leverage equal to 150% of its net assets. (Figure 6.)

With these facts in mind, we can see that the expected return of a bull fund is equal to (A) the daily benchmark return multiplied by (B) the fund's beta minus (C) daily interest expense of positions (fund beta minus 1). In practice, because a fund has an expense ratio which accrues daily, we must also subtract the daily ratio from the expected performance. (Figure 7.)

In general, daily interest expense can be assumed to be the 3-month Libor rate divided by 365. Note that the interest expense is charged on the fund beta minus 1 (e.g. 2.5 minus 1 = 1.5), while the fund's expense ratio is assessed on its net assets, which are expressed as 1 in this formula. With the 3-month Libor rate at 5.25%, the daily interest expense for a 2.5 Beta Bull Fund is slightly in excess of two basis points (0.022%) while the 1.75% expense ratio impairs performance by about one half a basis

point (0.0048%) per day. If the S&P 500 returns 2% on a given day, the gross expected return for the Direxion S&P 500 Bull 2.5x Fund would be:

The net expected return, which factors in the cost of financing the portfolio and the impact of the expense ratio, would be:

$$2\% \times 2.5 = 5\%$$

(The expected return does not include transaction costs in creating the relevant positions because these costs are a product primarily of transfer agent activity which creates portfolio turnover.)

$$5.00\% - 0.022\% - 0.0048\% = 4.973\%$$

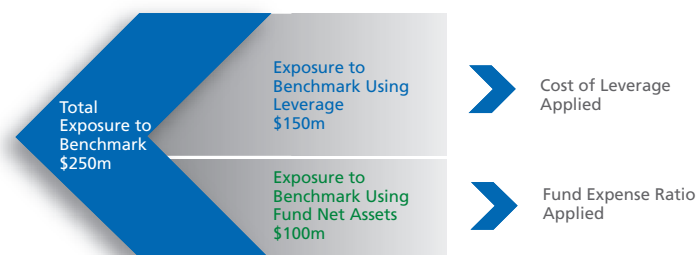


Figure 6



Figure 7

Expected return of a bear fund

A bear fund seeks to provide a return which is a multiple of the inverse of the daily return of a target benchmark. For instance, the Direxion S&P 500 Bear 2.5x Fund seeks to provide a daily return which is 250% of the inverse of the return of the S&P 500 Index. To create the necessary exposure, a bear fund engages in short selling (borrowing and selling securities it does not own). The money that the fund receives from short sales (the short sale proceeds) is an asset that can be invested. Since the fund actually receives cash as it sells borrowed positions, it does not spend its net assets, meaning it has both the short sale proceeds and the net assets to invest in cash instruments, generally at the Fed Funds rate.

Adding 1 to the beta of a leveraged index bear fund provides the amount of the portfolio which can be invested in interest-bearing instruments. For example, if the S&P 500 Bear 2.5x Fund has \$100m in net assets, it seeks to create short positions equal

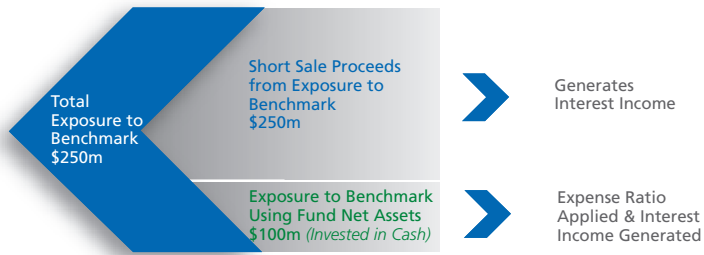


Figure 8



Figure 9

to \$250m in the S&P 500, which provides the fund with \$250m in short sale proceeds. Adding the short sale proceeds to the fund's \$100m in net assets, we see that it has \$350m from which it can generate income. In contrast to bull funds, bear fund portfolios generate daily interest income rather than daily interest expense. (Figure 8.)

The expected return of a bear fund is equal to (A) the daily benchmark return multiplied by (B) the fund's beta plus (C) daily interest income of positions (fund beta plus 1 multiplied by LIBOR divided by 365) minus (D) daily fund expense ratio assessment. Note that the interest income is generated on the fund beta plus 1 (e.g. 2.5 plus 1 = 3.5), while the fund's expense ratio is assessed on its net assets, which are expressed as 1 in this formula. (Figure 9.)

We can assume daily interest income to be the 3-month Libor rate divided by 365. With that rate at 5.25%, the daily interest income for a 2.5 Beta Bear Fund is slightly more than five basis points (0.0503%) while the 1.75% expense ratio impairs performance by about one half a basis point (0.0048%) per day. If the S&P 500 declines 2% on a given day, the gross expected return for the Direxion S&P 500 Bear 2.5x Fund would be:

$$-2\% \times 2.5 = 5\%$$

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An investor should consider the investment objectives, risks, charges, and expenses of any of the Direxion Funds before investing. There is no guarantee that any Direxion Fund will achieve its investment objective. Investors should review the prospectus for more information about investing in Direxion Funds. To obtain a prospectus, please contact the Direxion Funds at 800.851.0511.

Investing in index funds may be more volatile than investing in broadly diversified funds. The use of leverage by a mutual fund increases the risk to the fund. The more a fund invests in leveraged instruments the more the leverage will magnify gains or losses on those investments.

The principal risks of investing in the S&P 500® Bull 2.5x Fund and the S&P 500® Bear 2.5x Fund are Market Timing Activity and High Portfolio Turnover, Risk of Tracking Error, Risks of Aggressive Investment Techniques, Leverage Risk, Counterparty Risks, Risk of Non-Diversification, Interest Rate Changes, Risks of Investing in Other Investment Companies and ETFs, Adverse Market Conditions, Risks of Investing in Equity Securities, and Credit Risk. Additional risks of investing in the S&P 500® Bear 2.5x Fund are Risks of Shorting Instruments and Inverse Correlation Risk. For more information on the risks of the funds, including a description of each risk, please refer to the prospectus.

The net expected return, which factors in the cost of interest income and the expense ratio, would be:

$$5.00\% + 0.0503\% - 0.0048\% = 5.05\%$$

(As with our bull fund example, the expected return does not include transaction costs in creating the relevant positions).

Gross versus net

Interestingly, perhaps because financing a house purchase is a personal decision, a change in house price is usually translated into percentage gains or losses relative to the previous price – we tend to focus on the gross percentage change which does not reflect the financing aspects of a transaction. Assuming that the price of a house is usually a multiple of the equity investment therein, we recognize that percentage gains or losses in the price will usually be magnified substantially when translated into a percentage movement in the value of the underlying equity: favorable in a rising market and vice versa. Furthermore, we recognize that the cost of financing a house will reduce gross returns somewhat.

Conversely, the net asset value of a leveraged index fund indicates the net value of the equity, meaning it reflects the value of the investment in the fund after factoring in the impact of leveraged exposure to the benchmark, both in terms of the increased buying power and the financing implications of the leverage.

Conclusion

In conclusion, we have set out to explain some fundamental features of leverage index fund performance by discussing leveraged index funds in the context of home mortgages to illustrate (a) the power of leverage and (b) the financing implications of leverage. This summary is intended to be educational but is far from comprehensive.

For additional information about how you can use leveraged index funds in your portfolio, please contact us at info@direxionfunds.com.