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How does Leverage Work?

By Gil Hanoch, June 1, 2007

Leverage is a powerful tool that can be used to magnify the returns on your investments. Understanding the financial results of leverage requires some mathematical calculations. If the calculations presented below are not interesting to you, feel free to skip them and focus on the results.

How does leverage work? A mechanical lever can help you lift large objects with less force. In investing, you can spend a certain amount of money and borrow additional money, to buy a larger investment and enjoy the appreciation of the full investment (minus the interest paid on the loan). If the investment goes up in value more than the interest on the loan, you make extra money. If the investment goes up in value less than the interest on the loan, you make less money, or even lose some. In both cases, leverage magnifies the change in the investment returns relative to the interest rate paid.

Let's review how this works with the most common use of leverage: buying real estate. A common case involves putting a 20% down payment on a piece of property and borrowing 80% of the property value. Note that the financial analysis of real estate investing is significantly more complicated, but this article reviews the concept of leverage alone. Your actual returns of real estate are likely to be very different than shown below because of the other expenses and income from the property.

The following table shows the gain or loss from the investment assuming a 7% interest-only loan. (If the loan involves paying the principal, the effect of the leverage declines over time.)

The return is calculated as follows:

Down payment = the amount you put down to buy your investment

Growth = the percentage growth of the property value

Borrowed = the borrowed amount

Interest rate = the interest rate on the borrowed money

Investment Return =

$$[\text{Down payment} \times \text{growth} + \text{borrowed} \times (\text{growth} - \text{interest rate})] / \text{down payment} =$$

$$\text{Growth} + (\text{borrowed} / \text{down payment}) \times (\text{growth} - \text{interest rate}) =$$

$$\text{Growth} + (80\% / 20\%) \times (\text{growth} - 7\%) =$$

$$\text{Growth} + 4 \times (\text{growth} - 7\%)$$

Property Growth	Investment Return	Calculation
20%	72%	$20\% + 4 \times (20\% - 7\%)$
14%	42%	$14\% + 4 \times (14\% - 7\%)$
10%	22%	$10\% + 4 \times (10\% - 7\%)$
7%	7%	$7\% + 4 \times (7\% - 7\%)$
4%	-8%	$4\% + 4 \times (4\% - 7\%)$
0%	-28%	$0\% + 4 \times (0\% - 7\%)$
-20%	-128%	$-20\% + 4 \times (-20\% - 7\%)$

Note the following:

- Every 1% of growth above the interest rate of 7% increases the investment return by 4%.
- Every 1% of growth below the interest rate of 7% decreases the investment return by 4%.

The benefit: If the property value grows at a rate higher than 7%, the return on your investment becomes significantly higher. This is exactly how homeowners and real estate investors made large gains in recent years up until the recent real estate recession.

The risks: If the property value (plus income minus expenses) grows at a rate lower than 7%, the return on your investment becomes significantly lower. Note the following:

1. The investment return can be negative even when the property value goes up! For example, when the property value grows by 4%, your return is -8%.
2. If the property value stays the same, you are at a significant loss. In our example, the return is -28% (0% growth minus 7% interest rate magnified by 4, the leverage multiplier).
3. With leverage, you can lose more than you invested! In our example, if the property value declines by 20% you lose your full investment and more, for a total return of -128%. You lose your entire investment and need to come up with additional money to cover the interest on the loan.
4. The length of the investment period also magnifies the returns. For example, if you held a property for 10 years in which its value stayed the same (as happened with real estate in the 90's), your loss is multiplied by the number of years. In our example, you would lose 28% in one year, resulting in returns of -280% over 10 years. Note again that in practice the numbers are different, because of additional expenses and income from the property.

Summary

Leverage, or borrowing to invest, is a very powerful tool. It can make you rich or send you to bankruptcy. Because of this tremendous power, you would be smart to shy away from leverage in most cases. You should consider using it in rare cases, when even if everything goes wrong you still expect to handle the situation without facing financial hardship. Future articles will analyze certain uses of leverage.

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