

# FIN460: Real Estate Finance and Investment

## Exercise 4: The Power Of Leverage

### Objectives

In home ownership, paying off the mortgage loan is a goal for many home owners and is often equated with retirement. However, maintaining a level of debt in the house could make more sense financially, depending on one's risk preferences and investment alternatives.

In finance, increasing leverage means borrowing more to increase your assets under management. This can occur in many situations, such as an investor buying stocks on margin, a company issuing debt to raise more capital, or in this case, a real estate investor considering a lower down payment. Typically, increasing leverage improves the expected return of your investment, but at a cost of increased volatility.

In this exercise, you will investigate the effect of leverage on the internal rate of return of your investment. You will:

- Create a detailed discounted cash flow (DCF) model for a real estate investment from the perspective of an investor/landlord rather than an owner occupant
- Use scenario manager to consider the base, best and worst case scenarios

### Deliverable

Create a Word doc with answers to the **10 questions** highlighted in the directions.

**Due Date:** Upload your completed Word doc to the Blackboard link by Tue, June 30<sup>th</sup> 11:59pm.

**Grading:** This will be graded on a 0/1.5/2.5 scale, where:

- 0: Less than 50% correct
- 1.5: Between 50 and 75% correct
- 2.5: Greater than 75% correct

# Directions

1. First create the discounted cash flows model for the low leverage scenario. Use the following template. Your assumptions will be based on the premise that this will be a rental property.

The Power of Leverage	
<b>Property Info</b>	
Purchase Price	
Acquisition Expenses	<i>Not including down payment</i>
Property Growth Rate	
Initial Rent	
Rental Growth Rate	
Vacancy Rate	
Hazard Insurance	
Property Taxes	
Maintenance	
HOA Fees	
HOA & Maintenance Growth	
Marginal Tax Rate	
Selling Expenses	
Useful Life for Depreciation	
Required Rate of Return	
<b>Loan Information</b>	
Percent Down	
Interest Rate	
Loan Term	
<b>Loan Calculations</b>	
Loan Amount	
Monthly PI Payment	
Annual Debt Payment	
Down Payment	

2. Fill in the inputs using the documents from the 1003 Alabaster property. Refer to the appended documents to estimate values.
  - Since you are first examining a low leverage scenario, make the down payment 75%.
  - Choose a ten year holding period. That is, plan to sell the property after 10 years. This is not necessarily the useful life for depreciation.
3. **Question 1:** In your own words, in one sentence, explain your choice in the required rate of return.
4. Next, create the Loan Timeline and Property Timeline.
  - The yearly depreciation will be calculated using straight line with a 27.5 year useful life and no salvage value.

$$\text{Yearly Depreciation} = \frac{\text{Initial Cost} - \text{Salvage Value}}{\text{Useful Life}}$$

Loan Timeline	0	1	2	3	4	5	6
Loan Balance							
Debt Service - P&I							
Principal Paid							
Interest Paid							
Property Timeline	0	1	2	3	4	5	6
Property Value							
Yearly Depreciation							
Accumulated Depreciation							
Adjusted Cost Basis							
Capital Gain for Tax Purposes							

5. Next, create the Operating Free Cash Flows (FCF) Time Line.

- **Question 2:** Why is depreciation subtracted before EBIT, but then added back in before calculating the Operating FCF?
- **Question 3:** Why are Principal Paid and Interest Paid separated out? Why is Principal Paid considered after taxes are calculated?

Operating FCF	0	1	2	3	4	5	6
Rent							
Less Vacancy							
Hazard Insurance							
Property Taxes							
Depreciation							
Maintenance							
HOA							
EBIT							
Interest Expense							
EBT							
Taxes							
Net Operating Income							
Principal Paid							
Add back Depreciation							
Operating FCF							

6. The last major impact to the incremental free cash flows is the sale of the real estate.

- **Question 4:** Explain how the Capital Gain and Taxes on Capital Gains are calculated.

Proceeds from Sale	0	1	2	3	4	5	6
Sale Price							
Less selling expenses							
Less Taxes on Capital Gain							
Less Loan Balance							
Net Proceeds from Sale							

7. Now, calculate the Incremental FCF, the NPV, and IRR.

- Add conditional formatting to the NPV and IRR based on whether to accept or reject the project.

Incremental FCF	0	1	2	3	4	5	6
Down Payment							
Acquisition Expenses							
Operating FCF							
Net Proceeds from Sale							
Incremental FCF							
NPV							
IRR							

8. **Question 5:** Based on 75% down, would you accept or reject the project? Justify your answer with a screenshot of the Incremental FCF, NPV and IRR of the project.

9. Now, increase the leverage by decreasing the down payment to 5%. **Question 6:** After increasing the leverage what happened to the IRR of project.

While leverage appears to be beneficial, our initial results are under expected conditions. Clearly, our assumptions of 5% growth and a vacancy rate of 8% could vary. To better understand the effects of leverage, we should consider different scenarios, and the effect of leverage on both the mean *and variance* of those outcomes.

10. You will create a base, best and worst case scenario for both the low leverage and high leverage options.
- Increase the down payment back to 75%.
  - Open scenario manager under Data. Click add and create the Base Case Scenario.
  - For changing cells, consider inputs which could vary in the next 10 years. You will vary these in the best and worst case scenarios as well.
  - In the scenario manager, click Summary, and choose the IRR as your result variable, and click OK. The IRR for the 3 scenarios can be found on a table in a separate worksheet.
  - Relabel the descriptions for the Changing and Result Cells
  - Create a table which considers the probability of the base, best, and worst case scenarios, as shown below:

	Probability	IRR	Prob x IRR
Worst Case	0.25		
Base Case	0.50		
Best Case	0.25		

- Calculate the Expected IRR and the volatility (=stdev.s).
  - Repeat these steps using high leverage, with a down payment of 5%. You will end up with a third worksheet in your file with the scenario manager summary for high leverage. Calculate the expected IRR and the standard deviation for high leverage.
11. **Question 7:** What did increasing the leverage do to the expected return and volatility of the investment? Provide a screen shot of the Scenario Summaries for Low Leverage and High Leverage. Which is the better strategy? Why?

In financial theory, there is a tradeoff between risk and reward. Riskier investments should reap a higher reward, as is the case this example. In order to compare two investments with varying levels of risk, we use the Sharpe ratio.

$$\text{Sharpe Ratio} = \frac{\text{Reward}}{\text{Risk}} = \frac{E(r_i) - r_f}{\sigma_i}$$

Where  $E(r_i)$  is the expected return of the investment,  $r_f$  is the risk free rate, and  $\sigma_i$  is the standard deviation of the returns of the investment.

12. **Question 8:** Which is better, a high Sharpe Ratio, or a low Sharpe Ratio? Why?
13. Calculate the Sharpe Ratio for the high leverage scenario and the low leverage scenario.
- Question 9:** Which condition had the better Sharpe ratio? The high level of leverage or the low level? Provide a screen shot (or copy part of the table) from Excel to show your results.
14. **Question 10:** In summary, which would you prefer, higher leverage, or lower leverage? Why?