

Finance 445, Exam 3 study guide  
Spring 2002

1. Exam dates and times – be in class 5 minutes early
  - 8:00 AM Section: 10:30 AM, Thursday 5/2/2002
  - 2:00 PM Section: 1:00 PM, Monday 4/29/2002
  - All exams are in the regular classroom
2. 100 points
3. Coverage: Chapter 10 – Starting with the section titled “The value (and costs) of gathering more information” and Chapters 11, 12, 13, 17, 18, Problem sets 5 and 6
4. Exam format - All multiple choice (approximately 33 questions, worth 3 points each)
5. Grading of multiple choice questions (similar to the other exams – can give more than one answer for reduced credit)
6. What can you bring to the exam? Calculator, calculator manual, time value of money tables, crib sheets [two sheets of paper (8.5 x 11) for formulas and notes, no restriction on content], pencils, pens, and erasers
7. Office hours during Final Exam Week
  - Monday: 8:00 – 9:45 am, 11:30 – 12:45 pm
  - Wednesday: 3:00 PM – 5:00 PM
  - Thursday: 8:00 – 10:15 AM
8. Important deadline. Makeup for the “FMA extra credit” is due Wednesday, 5/1/02, (Thursday, 5/2/02, by 5:00 pm).

Write a short paper (2 – 3 pages) on “The effects of Enron on the stock market in 2002,” or “The effects of low interest rates on the stock market in 2002”

9. Study hints
  - Start putting together your crib sheet as soon as possible
  - Study the practice problems (included with this study guide and in the chapter notes) and the problem sets
  - Come by and ask me questions
10. Expect to see multiple choice questions based on the following problems. (In addition to the following problems, there are additional multiple choice questions covering other topics.)
  - A. Determination of the break-even point for a project (similar to problem set 5)
  - B. Calculation of the accounting and economic ROI for a project (similar to problem set 6)
  - C. Calculation of the effects of a capital structure change on the expected return, required return, beta, and current market value of a firm’s stock

Practice Problem. ABC Inc. is currently highly levered, and as a consequence, has very high-risk equity. The president wants you to put together an analysis of how the firm will be affected by a reduction in the amount of debt. Currently, ABC Inc. has risk-free (perpetual) debt with a market value of \$40 million. The beta of this debt is 0 and its interest rate is 5%. Your analysis will include calculations based on the current debt level, as well as a reduction of debt down to \$30 million.

Some other facts:

The existing assets of ABC Inc. (which have a beta of 1.0) produce one of three possible annual cash flows each year in perpetuity:

- 25% probability of a \$2,000,000 cash flow (pessimistic outcome for the year)
- 45% probability of a \$3,000,000 cash flow (middle outcome for the year)
- 30% probability of a \$33,833,333.33 cash flow (optimistic outcome for the year)

All cash flows from the firm’s assets, after payment of interest on the debt, are paid to the firm’s stockholders as a dividend.

ABC Inc. will issue equity to pay down the debt level. Thus, to reduce the debt level to \$30 million, ABC Inc. will issue \$10 million of equity to the public.

The risk-free interest rate is 5% and the market risk premium is 8.4%. Use the CAPM. Also, use the Chapter 17 (perfect capital market) assumptions in your analysis. Assume the market is efficient and in equilibrium.

Base Case Analysis: \$40 million of debt

- What is the expected cash flow from the firm's assets?  $\$12,000,000$
- What are the interest payments to debt in the three states (pessimistic, middle, and optimistic)?  $\$2\text{ million}, \$2\text{ million}, \$2\text{ million}$
- What are the dividend payments to equity in the three states (pessimistic, middle, and optimistic)?  $\$0, \$1,000,000$  and  $\$31,833,333.33$
- What is the expected dividend for the firm's stock based on the dividends listed in the previous question?  $\$10.0\text{ million}$
- What is the CAPM required return for the firm's assets?  $13.4\%$
- What is the market value of the firm's assets?  $\$12,000,000 / 0.134 = \$89,552,239$
- What is the market value of the firm's stock?  $\$89,552,239 - \$40,000,000 = \$49,552,239$
- What is the expected return for the firm's stock?  $\$10,000,000 / \$49,552,239 = 20.1807\%$
- What is the beta of the firm's stock?  $1.8072289$
- What is the required return for the firm's stock?  $5\% + 1.8072289(8.4\%) = 20.180723\%$
- What is the market value of the firm's stock?  $\$10,000,000 / 0.20180723 = \$49,552,239$
- Explore the effects of the \$30 million debt level on the solutions to the 11 questions given above.

<i>\$40 million of debt</i>	<i>Assets</i>	<i>Debt</i>	<i>Equity</i>
25%	2,000,000	2,000,000	0
45%	3,000,000	2,000,000	1,000,000
30%	<u>33,833,333</u>	<u>2,000,000</u>	<u>31,833,333</u>
<i>Exp Cash flow</i>	12,000,000	2,000,000	10,000,000
<i>Market Value</i>	89,552,239	40,000,000	49,552,239
<i>Beta</i>	1.0000	0.0000	1.8072289
<i>Required Return</i>	13.40%	5.00%	20.180723%
<i>Expect Return</i>	13.40%	5.00%	20.180723%
<i>\$30 million of debt</i>	<i>Assets</i>	<i>Debt</i>	<i>Equity</i>
25%	2,000,000	1,500,000	500,000
45%	3,000,000	1,500,000	1,500,000
30%	<u>33,833,333</u>	<u>1,500,000</u>	<u>32,333,333</u>
<i>Exp Cash flow</i>	12,000,000	1,500,000	10,500,000
<i>Market Value</i>	89,552,239	30,000,000	59,552,239
<i>Beta</i>	1.0000	0.0000	1.5037594
<i>Required Return</i>	13.40%	5.00%	17.631579%
<i>Expect Return</i>	13.40%	5.00%	17.631579%

- D. Determination of how an investor can structure the purchase of an unlevered firm's stock and make it have the same expected return and risk as the stock of a levered firm (and vice versa)

Practice Problem. Assume that Firm U (an all equity corporation) has the exact same assets as ABC Inc. (described above). Firm U manages its assets the same way that ABC Inc. manages its assets. Assume you have \$50 to invest.

How can you structure your investment in Firm U stock to make it look like ABC Inc. stock? (Assume that ABC Inc. has \$40 million of debt as originally assumed. Use the Chapter 17 perfect capital market assumptions, and assume the market is in equilibrium.) *Borrow \$40.3614 and buy \$90.3614 of stock of Firm U.*

How can you structure your investment in ABC Inc. stock to make it look like Firm U stock? *Buy \$27 2/3 of ABC Inc. stock and make a \$22 1/3 risk free perpetual debt investment.*

- E. Calculation of firm cash flows and the value of a firm after taking into account the tax benefits of debt financing

Practice Problem. Refer back to the previous two problems. Assume there is a corporate income tax, all corporations are in the 34% tax bracket, and there is a tax deduction for interest payments. Besides this one change in assumption, use all of the other Chapter 17 assumptions. Also, assume the market is in equilibrium. Use the discount rates calculated above.

Expected taxable income for Firm U is \$12 million a year (same as expected asset cash flow before taxes).

Expected taxable income for ABC Inc. is \$10 million a year (same as expected asset cash flow minus interest on \$40 million of debt, but before taxes).

- What is the expected cash flow for Firm U's assets after payment of income tax?  $\$7,920,000$
- Using the 13.4% required rate of return for Firm U's assets (and stock), what is the market value of Firm U's stock?  $\$7,920,000 / 0.134 = \$59,104,478$
- What is the expected cash flow for ABC Inc. after payment of income tax?  $\$8,600,000$  ( $2,000,000$  to owners of debt and  $\$6,600,000$  to the owners of equity)
- What is the market value of ABC Inc.?  $\$59,104,478 + \$40,000,000 (0.34) = \$72,704,478$
- What is the market value of ABC Inc.'s equity?  $\$32,704,478$