

Name:

Quiz 2: Corporate Finance - Spring 1998

Please answer all questions. This is an open-book, open-notes exam. You have 30 minutes.

Reader's Digest has asked you to analyze an investment proposal that it has received. This proposal relates to Reader's Digest producing a CD-ROM version that will contain the text of all of the articles published in the magazine since its inception. You have also been given the following information from the proposal:

1. The firm has already completed market testing that suggests that there is a market for this product. This market testing cost \$ 5 million, which will be capitalized and depreciated straight line over 4 years.
2. Reader's Digest will have to invest \$ 25 million in new computers, CD-ROM drives and other equipment. This equipment will have a life of 4 years, at the end of which period it is estimated to have a value of \$ 5 million.
3. During the 4-year period, the equipment will be depreciated straight line down to its salvage value of \$ 5 million.
4. It is anticipated that 300,000 CD-ROMs will be sold each year for the next 4 years, at a price of \$ 50 per CD-ROM. The cost of producing and packaging each CD is \$ 10.
5. There will be 10 full time employees and the payroll (and other associated costs) for these employees is expected to be \$ 2 million a year, for the next 4 years.
6. The firm will have to maintain an inventory of 10% of revenues. This investment will have to be made at the beginning of the year, and can be entirely salvaged at the end of the four years.
7. The total annual advertising budget for Reader's Digest, which is currently \$ 25 million, is expected to increase to \$ 27.5 million as a consequence of this new product. The firm is planning to allocate 5% of this total expense to this project each year for the next 4 years.
8. The firm has a tax rate of 40%.
9. Reader's Digest has no debt and a beta of 0.80. The average unlevered beta of firms that produce educational and informational CD-ROMs is 1.20. The treasury bond rate is 6%.

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- a. Estimate the annual after-tax operating income from taking this project. (You need to do this only for the first year, since none of the items are expected to change over time)
- b. Estimate the return on capital on this project. (Note that since the depreciation method is straight line, you can just take the average of the initial investment and the salvage value to compute average book value)
- c. Estimate the incremental after-tax cashflow on this project. (Again, you need to do this only for the first year)
- d. Estimate the net present value of this project.

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Quiz 2: Spring 1999

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. You are trying to estimate the incremental after-tax cash flow for an investment analysis for ChemCare, a specialty chemical company. You have been provided with the operating income for the first year of the project:

Revenues	\$ 250 million
- Cost of goods sold	\$ 100 million
- Depreciation	\$ 50 million (Includes \$10 million depreciation on existing assets)
- Allocated overhead	\$ 50 million (60% of this is a fixed cost)
EBIT	\$ 50 million
Taxes	\$ 15 million
Oper. Inc after tax	\$ 35 million

It is estimated that accounts receivable will increase by \$ 35 million and accounts payable by \$ 15 million during the year, while inventory will be unchanged. The firm has a capital maintenance investment that is 10% of revenues. Estimate the incremental after-tax cash flow in year 1. (3 points)

2. You are comparing the costs of leasing a distribution system versus buying the system. The present value of the after-tax lease expenses over the life of the lease, which is 6 years, is – \$ 750 million. The cost of buying the system, which has a 15-year life, is -\$ 1.2 billion, but the firm will have to bear the annual maintenance costs if it chooses this option. Assuming that the maintenance costs are tax-deductible (tax rate = 40%), and that the appropriate discount rates are 10% for the lease option and 8% for the buy option, how much would the annual maintenance cost have to be for you to be indifferent between the two choices? (3 points)

3. You have just analyzed the option of Ann Taylor expanding its business online, and have concluded that it will cost firm \$ 400 million today to do the expansion. The online store will generate \$ 80 million in after-tax cash flows each year for the next 5 years, and there is no anticipated salvage value for the assets. Ann Taylor has a beta of 0.9. and has no debt outstanding. The unlevered beta for online retailers is 1.80. (The riskfree rate is 5%, and the risk premium is 5.5%)

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b. Now assume that you could continue in business after 5 years. Assuming that the annual cash flows after year 5 remain at \$ 80 million, how long would the project have to continue to justify the expansion decision?

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Quiz 2A: Spring 1999

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. You are analyzing the project cash flows for an investment bank that is considering creating a new asset-backed securities division. The division is planning to use excess capacity on the bank's computer system, which is currently utilized only 70% (You can assume this usage is year 1 usage); the new project will utilize 20% of the capacity in year 1. You can assume that the cost of buying a new system is currently \$ 40 million, that this cost will drop 5% a year over time and that the cost will be expensed. You can also assume a tax rate of 40% and a cost of capital of 10%. If the expected growth in usage for both the new project and existing projects is 10%, estimate the opportunity cost of using the excess capacity.

(4 points)

2. You are comparing three separate options that the investment bank has for getting a computer system.
- The first option is to lease the system for \$ 13 million growing at 5% a year for 5 years. The lease expenses would be treated as operating and therefore would be tax-deductible.
 - The second option is to buy the system for \$ 40 million and depreciate it over 4 years, which is the expected project life.
 - The third option is to buy the system for \$ 40 million and expense it immediately. The system will still have an expected life of 4 years.

If the tax rate is 40% and the cost of capital is 10%, estimate the equivalent annual costs of each option.

3. You have been asked to analyze the net present value of a project. The project has expected after-tax cash flows of \$ 10 million for the first year, \$ 15 million for the second year and \$ 20 million for year 3. The cash flows are expected to grow at a constant rate after year 3, forever. If the initial investment is \$ 120 million and the cost of capital is 12%, how high would the growth rate have to be after year 3 to justify taking this project?

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Quiz 2: Spring 2000

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. Hefler Healthcare, a pharmaceutical firm, is considering investing in a new business - cosmetics. Hefler has 250 million shares outstanding trading at \$ 20 per share; its stock has a beta of 1.20. The firm has \$ 1 billion in interest bearing debt outstanding (in market and book value terms), and has operating lease commitments of \$ 300 million each year for the next 5 years. The long term treasury bond rate is 6.5% and the market risk premium is 6%. The unlevered beta for other cosmetics firms is 1.05. If the pre-tax cost of borrowing for Hefler is 7%, estimate the cost of capital that you would use to analyze this project. (The tax rate is 40%) (4 points)
2. Now assume that the accounting after-tax return on capital on this project is estimated to be 10% on an average book value of investment of \$ 1 billion, and that accounting earnings will be constant each year for the 10-year life of the project. The accounting earnings are estimated after subtracting depreciation expenses of \$ 50 million, and after deducting an allocated G&A expense of \$ 240 million, each year. If only one quarter of the G&A expense is variable (due to this project) and the tax rate for the firm is 40%, estimate the annual after-tax incremental cash flow on this project. (2 points)
3. Signet Bank has a mainframe computer that is currently being utilized 60%, though usage is increasing 10% a year (66% in year 1...). It is considering a large portion of the excess capacity (30% of the total computer capacity) to create an online database that it will sell to its clients. This usage is expected to stay constant over the next 5 years and is expected to generate after-tax cashflows of \$ 25 million a year for the next 5 years. If the bank runs out of capacity, it will have to outsource the extra work and outsourcing is expected to cost \$ 2 million, after taxes, for every 1% of computer capacity (For example, if you are 5% over capacity, it will cost you \$ 10 million). Should Signet Bank invest in the database, if its cost of capital is 9%? (4 points)

Quiz 2: Corporate Finance (Spring 2001)

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

Litton Telephone is a company that provides residential and business phone service.

Litton is considering investing \$ 1 billion in a segment of the telecommunication equipment business, and you have been supplied with the following information:

- a. The investment is expected to have a life of 5 years, over which period it will be depreciated straight line to a salvage value of \$ 250 million.
- b. The annual revenues are expected to be \$ 1.8 billion a year, each year for the next 5 years, and the earnings before interest, taxes, depreciation and allocated G&A is expected to be 25% of revenues in each of those years.
- c. Litton's S,G and A annual expenses are currently \$ 100 million. If Litton decides to invest in this project, the annual expenses will increase to \$ 120 million, and a third of these expenses will be allocated to this project.
- d. The working capital investment (in inventory and accounts receivable) is expected to be 10% of annual revenues, with the investment occurring at the beginning of each year (when such investment is needed).
- e. If this investment is made, Litton will have to buy a new computer to manage inventory in year 2 for \$ 200 million. If the investment is not made, Litton would have had to buy a new computer anyway at the end of year 5 for \$ 200 million. These cost would be expensed for tax purposes.
- f. When the project ends, the investment in working capital will be fully recouped and the book value of the fixed assets will be recovered.

g. The cost of capital for this project is 10%.

1. Estimate the incremental after-tax cash flows you will have on this investment each year for the next 5 years. (4 points)

2. Estimate the net present value of this investment. (2 points)

3. Now assume that you could have used accelerated depreciation on this project and that your depreciation each year would have been as follows:

Year	1	2	3	4	5
Accelerated Depreciation	300	190	104	78	78

What would the effect on net present value be of switching to accelerated depreciation? (2 points)

4. Estimate the net present value assuming that the investment would last forever (rather than just 5 years). You can assume that the depreciation reverts back to straight line depreciation. (2 points)

Quiz 2: Corporate Finance (Spring 2002)

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. You are trying to estimate the cost of capital for Spyriakos Shipping, and have collected the following information:

- The firm has \$ 750 million in interest-bearing debt on its books, on which it pays \$ 40 million in annual interest expenses. The weighted average maturity of the debt is 5 years.
- The bond rating for the firm is A-, and the default spread over the T.Bond rate is 2%.
- There are 200 million shares outstanding, trading at \$ 10 a share.
- The unlevered beta for other shipping firms is 0.80.
- The ten-year T.Bond rate is 5.2% and the market risk premium is 5.17%.
- The marginal tax rate is 40%.

a. Estimate the market value of the interest-bearing debt. (2 points)

b. Estimate the cost of equity for the firm. (1 point)

c. Estimate the cost of capital for the firm. (1 point)

2. You are reviewing a project analysis done by another analyst at your firm, and you note that he has computed a net present value of \$ 250 million for the 3-year project. The project has expected revenues of \$ 2.5 billion each year for the next 3 years and a cost of capital of 12%. You do notice two mistakes in the analysis

a. The analyst forgot to include working capital requirements when computing the net present value. You estimate that working capital will be 10% of revenues and will have to be invested at the beginning of each year. In addition, you believe that you will be able to salvage 100% of working capital at the end of the project life.

b. You also notice that the analyst expensed the initial investment of \$3 billion in the project, when he should have capitalized it and depreciated it straight line down to a salvage value of zero.

The marginal tax rate is 40%.

a. Estimate the effect on the net present value of incorporating working capital into the analysis. (2 points)

- b. Estimate the effect on the net present value of capitalizing and depreciating the initial investment, rather than expensing it. (3 points)
- c. Estimate the correct net present value of the project, with working capital incorporated and capitalizing initial investment. (1 point)

Quiz 2: Corporate Finance (Spring 2003)

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. You have been asked to analyze whether Telco Inc, a computer manufacturer, should invest in producing new software.
 - Telco has already spent \$ 2 million developing pieces of the software; this expense was capitalized and will be depreciated straight line over the next four years.
 - Telco will have to invest an additional \$ 5 million if it wants to commercially develop the software, and this investment will also be depreciated straight line over four years to a salvage value of \$ 1 million at the end of the 4th year.
 - Based upon a market study, Telco concludes that it can generate revenues of \$ 6 million every year for the next 4 years; operating expenses (other than depreciation) are expected to be 60% of revenues each year.
 - Telco does not expect its overall annual G&A expenses, which are \$5 million, currently to change as a result of investing in the software business, but it plans to allocate 10% of these expenses to this project.
 - Telco has an unlevered beta of 0.90 (bottom-up beta for computer manufacturers) but the unlevered beta for computer software companies is 1.50. The market value of equity for Telco is \$ 80 million and the market value of debt is \$ 20 million. Telco plans to maintain this debt to capital ratio for this project. Telco is BBB rated and the default spread on BBB rated bonds is 2%.
 - The riskless rate is 5% and the market risk premium is 4%. The tax rate is 40%.
 - a. Estimate the cost of capital for this project. (2 points)
 - b. Estimate the incremental cash flows on this project. (3 points)
 - c. Estimate the net present value of this project. (2 points)
2. Now assume that you are comparing investing in this project with another (and mutually exclusive) investment that Telco can make in expanding its computer business. The expansion would require an initial investment of \$ 8 million and generate \$ 2 million in after-tax cash flows each year for the next 8 years. Which investment (computer software or expansion) should Telco take? (Assume that I have considered all relevant cashflows including depreciation in coming up with after-tax cashflows) (3 points)

Quiz 2: Corporate Finance (Spring 2004)

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam. **All of the questions relate to the same project.**

1. Solitaire Books is a publishing company that is considering expanding into educational services. Solitaire Books has a levered beta of 0.80 and a debt to capital ratio ($D/(D+E)$) of 20%. The unlevered beta for educational service companies is 1.10 and Solitaire plans to use its existing debt ratio in funding the business. Solitaire's effective tax rate is 30% but the marginal tax rate is 40%. Solitaire is rated A, and the default spread for A rated firms is 2%. Estimate the cost of capital you would use in doing a project analysis of the educational service investment. (You can assume that the riskfree rate is 4% and the market risk premium is 4.82%) (2 points)

2. Now assume that you expect the educational service to generate revenues of \$ 10 million each year for the next 3 years and earnings before interest, taxes, depreciation and allocated G&A to be 30% of revenues each year. The initial investment in the business is \$ 7.5 million and it will be depreciated straight line to a salvage value of \$ 3 million at the end of the third year. You are provided with the following additional information:
 - i. The company existing annual G&A expense of \$ 1.0 million is expected to increase to an annual expense of \$1.5 million for the next 3 years as a result of the investment. The company plans to allocate half of the total G&A expense to the project.
 - ii. The project will use excess space in a building already owned by the firm for classrooms. While the firm has no plans to sell or rent the building, the cleaning expenses are expected to rise from \$ 100,000 a year to \$ 250,000 a year as a result.
 - iii. The working capital is expected to be 10% of revenues and the investment has to be made at the beginning of the year in which the revenues are generated.
 - iv. The effective tax rate is 30% but the marginal tax rate is 40%.Estimate the annual incremental after-tax cash flow from this project from operations for the next 3 years. (4 points)

3. At the end of year 3, the project will be ended and you will sell the assets for book value. Using the cost of capital from problem 1 and your estimates of cashflows from problem 2, estimate the net present value of this project. (2 points)
4. Estimate the net present value if instead of ending the project in year 3, you expected it to continue in perpetuity. (Make reasonable assumptions about capital maintenance in this scenario) (2 points)

Quiz 2: Corporate Finance (Spring 2005)

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. You have been asked to assess whether it makes sense for GeoTech Inc. to invest in a new telecomm investment. The initial investment is expected to be \$ 60 million and the project is expected to generate income for the next 10 years, with the income statement below providing a measure of revenues and expenses (each year):

Revenues	28
- Operating Expenses	12
- Depreciation	5
- Allocated G&A	4
= EBIT	7
- Interest Expenses	3
= EBT	4
- Taxes	1.2
= Net Income	2.8

If the cost of capital for GeoTech is 12% and 75% of the allocated G&A expenses are non-incremental, estimate the net present value for this project.

2. You own a restaurant and are considering buying a liquor license. You estimate that it will cost you \$ 200,000 to buy a five-year license and construct a bar, and that you will generate \$ 40,000 in after-tax cashflows each year for the next five years. (The cost of the license is capitalized and the cashflows already reflect the depreciation)
- a. If your cost of capital is 15%, estimate the net present value of buying a liquor license. (There is no salvage value at the end of the 5th year)
 - b. Assume now that the bar will bring in additional customers to your restaurant. If your after-tax operating margin is 60%, how much additional revenue would you have to generate each year in your restaurant for the liquor license to make economic sense?
3. You own a minor-league baseball team and are considering two competing bids for food service in your stadium.
- You could enter into a five-year rcontract with a national food vendor who will pay you \$ 200,000 upfront and \$ 50,000 each year for the next 5 years. The payment is guaranteed and there is no chance that the vendor will default on payments.

- You could enter into a 12-year joint venture with a local food vendor, where you will receive 50% of the profits from food sales at the stadium, in return for an initial investment of \$ 100,000. The profits from food sales are expected to be \$ 180,000 a year for the next 12 years.

If the riskfree rate is 5%, the unlevered beta of food service companies is 1.50 and the market risk premium is 4%, which option is the more attractive one? (You can assume that profits = cashflows, the firm has no debt and that there are no taxes)

Quiz 2: Corporate Finance (Spring 2007)

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. Zane Natural, a beverage company, is considering expanding into the snack business and you have collected the following information on the investment:
 - The regression beta for Zane Natural is 1.15; the unlevered beta of firms in the snack business is 0.80.
 - The equity in Zane Natural has a book value of \$ 500 million but the market value of equity is \$ 2 billion.
 - The firm has \$ 300 million (in both book and market value terms) in interest-bearing debt and lease commitments of \$ 50 million every year for the next 5 years.
 - Zane Natural has an A rating and the default spread for A rated bonds is 1% over the riskfree rate.
 - The riskfree rate is 4% and the equity risk premium is 5%.
 - The effective tax is 30% and the marginal tax rate is 40%
 - a. Assuming that this project will be funded using the same mix of debt and equity as the company, estimate the cost of equity for the ‘snack food’ project. (2 points)
 - b. Estimate the cost of capital for this “snack food” project. (1 point)

2. You own a restaurant that generates \$ 500,000 in after-tax operating income on revenues of \$ 5 million. You are considering starting a service that will provide prepared meals to households and estimate that you will be able to generate annual revenues of \$ 1 million from the service. You have come up with the following additional information:
 - You plan on using the existing kitchen space, but you will need to invest \$500,000 in updating the facilities. This investment will be depreciated straight line over 5 years to a salvage value of \$ 100,000.
 - You will need to hire additional kitchen staff to meet the demand. You expect your annual costs to be \$200,000 for salary and related costs.
 - Your annual advertising costs will increase from \$ 80,000 to \$120,000, and your inventory, which is currently \$ 100,000, will increase to \$150,000 immediately.
 - You expect the cost of the food to be 50% of revenues and you plan to run the service for the next 5 years.
 - Your marginal tax rate is 40%.
 - a. Estimate the annual after-tax cash flows (to the firm) from this investment. (3 points)
 - b. If your cost of capital is 15%, estimate the net present value of this investment. (2 points)
 - c. How would your answer change if you were told that 20% of the revenues from the “prepared food” service represent loyal customers who would have otherwise come to the restaurant to eat? (You can assume that they would have spent an equivalent amount at the restaurant and that the cost of the food is the same) (2 points)

Quiz 2: Corporate Finance (Spring 2008)

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

3. You have inherited a house from your eccentric aunt (the one that Bill Silber uses in his examples). While you can sell the house for \$ 1 million today (tax free), you are considering renovating the house and renting it out for the next 5 years in the hope that the real estate market will improve. You estimate that it will cost you \$ 200,000 to renovate the house, that this entire investment can be depreciated straight line over the next 5 years and that your annual rental revenues will be \$ 100,000 a year for that period; your tax rate is 40%. In addition, maintenance costs and property taxes will be \$ 20,000 a year for the next 5 years and they are tax deductible.

a. Estimate the after-tax cash flows you will generate from the rental each year for the next 5 years. (1 point)

b. At the end of year 5, you hope to sell the house. Assuming your discount rate is 10%, what minimum price would you need to get for the house at year 5 to justify the renovation/rental option? (You can ignore taxes on the house sale price) (3 points)

4. Littwin Telecom is considering a major infrastructure investment, requiring \$ 100 million in up-front investment, and cash flows for 10 years. The analyst who worked through the analysis has concluded that the net present value of the investment is \$ 10 million. On reviewing his numbers, though, you note that he depreciated the initial investment (\$100 million) straight line over 5 years to a salvage value of zero. Based on your reading of the tax law, you believe that the investment should be depreciated straight line over 10 years to a salvage value of \$ 10 million. If your cost of capital is 8% and your tax rate is 40%, estimate the correct net present value with the changed depreciation. (3 points)

5. West Chester College is a tax-exempt community college with excess capacity on its computer servers now. Based on existing usage and growth in demand, it will have to invest \$ 3 million in additional server space at the end of year 5. It has been approached by a local business that is interested in leasing some of the excess server space for the next 5 years for a fixed, annual fee. This will, however, require the college to invest \$ 3 million in additional server space at the end of year 2. What is the minimum that West Chester College should charge the local business as an annual fee for the next 5 years, if the discount rate is 12%? (3 points)

Quiz 2: Corporate Finance (Spring 2009)

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. Ace Technologies, a computer software firm, is considering making an investment in business services. You have been asked to assess the cost of capital to use in analyzing this investment, and have been provided with the following information:

- Ace has 250 million shares outstanding, trading at \$ 10 a share. The firm has no conventional debt outstanding, but has lease commitments that are expected to be \$ 100 million each year for the next 8 years.
- A regression of Ace stock returns against the S&P 500 has generated a beta of 1.2 for the firm, but a separate analysis of publicly traded companies that operate in business services yields an unlevered beta of 0.80.
- Ace Software has a rating of A from S&P, and the default spread for the rating is 2%.
- The ten-year treasury bond rate is 3% and the equity risk premium is 6%.
- The effective tax rate last year was 25%, but the marginal tax rate is 40%

Estimate the cost of capital for the business services project. (4 points)

2. Nova Chemicals has provided you with the following estimates of operating income for a new investment, which is expected to have a three-year life and require an initial investment of \$250 million.

	Year 1	Year 2	Year 3
Revenues	\$225	\$300	\$450
- Depreciation	\$75	\$50	\$25
- Other Operating Expenses	\$100	\$125	\$175
- Allocated G&A	\$25	\$25	\$25
Pre-tax Operating Income	\$25	\$100	\$225

You are also told that the all of the allocated G&A is fixed (and will continue even if this project is rejected). In addition, the project will require investments in accounts receivable and inventory that are expected to be 10% of revenues and be at the beginning of each year. The marginal tax rate is 40% and the cost of capital for the project is 10%.

Estimate the net present value of this project. (3 points)

3. You are an independent IT consultant and you bill by the hour (\$100/hour) and have the capacity to work 1500 hours in a year. As a result of the recession, you anticipate being able to work only 750 hours a year for the next two years; after year 2, you expect to be back working 1500 hours a year, at your regular rate. You have been approached by a company that wants to hire you as a long-term consultant, working 600 hours a year, for the next 5 years, at a reduced hourly rate of \$60/hour. Your regular hourly rates are expected to stay constant over the next 5 years and you cannot work more than 1500 hours a year. Assuming that you bill at the end of each year and that your cost of capital is 15%, will you take the long-term offer (you can ignore taxes)? (3 points)

Quiz 2: Corporate Finance (Spring 2010)

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. You have been asked to review the cost of capital computation for Lemur Inc., a small retail company. The company currently has 100 million shares trading at \$10 a share, no conventional debt and has estimated its cost of capital to be 10% (based upon a 100% equity ratio). However, the firm has lease commitments of \$ 50 million a year for the next 4 years and \$ 40 million a year for the following 3 years. If the pre-tax cost of debt for the firm is 5% and the marginal tax rate is 40%, estimate the correct cost of capital. (You can assume that the company's cost of equity will remain unchanged) (2 points)

2. Smallsville Courier is a small town newspaper, with revenues of \$ 200,000 and pre-tax operating income of \$40,000. It is considering starting an online edition that would be accessible at no cost to the general public and has collected the following information:
 - i. The initial cost of setting up the online edition is \$ 25,000. That expense will be capitalized and depreciated straight line over 5 years to a salvage value of zero.
 - ii. The annual operating cost of maintaining the online edition will be \$ 15,000.
 - iii. The newspaper plans to use its existing computer server, which has sufficient capacity for the existing business for the next 5 years. If the server is also used for the online edition, though, a new server will be needed at the end of year 2. The cost of a server is \$10,000 (and remain constant in nominal terms over time) and you plan to expense the amount, in the year in which you spend the money.
 - iv. The cost of capital is 15% and the tax rate is 40%.
 - a. What is the opportunity cost (in present value terms) of using up the server capacity early? (1 point)
 - b. Assuming a project life of 5 years and advertising revenues of \$ 30,000/year, is this venture a good one? (3 points)

3. You own the only upscale restaurant in a town and generated \$ 50,000 in operating income last year on revenues of \$500,000. You are considering initiating a new service, where you will prepare meals for entire families, which can be picked up at the restaurant. You have collected the following information:
 - You plan to use your existing kitchen, but you will have to invest \$50,000 up front to modify and expand the facilities. That investment will be depreciated straight line over the next 5 years down to a salvage value of \$10,000.
 - You expect to sell about 100 meals/month each month for the next 5 years at \$50/meal. The direct cost (food and packaging) for each meal will be \$20/meal.
 - While your current chef will be preparing the meals, you expect that preparation to take up 25% of her time. Consequently, you plan to increase her annual salary from \$60,000 to \$72,000 and to allocate 25% of the salary to this project.
 - You expect to lose some of your regular restaurant customers, as a result of the family meal plan. As a consequence, revenues at the restaurant will drop by about 5% and operating income by about 10%.
 - Your cost of capital is 12% and the tax rate is 40%.

Estimate the net present value of this investment over a 5-year life. (4 points)

Quiz 2: Corporate Finance (Spring 2011)

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. You work for a US multinational that is considering investing in an Indonesian project. You have estimated the cash flows for the project in Indonesian Rupiah for the three year life of the project:

	Time 0	Year 1	Year 2	Year 3
Cash flow (in rupiah)	-1000	350	450	500

The company has estimated a US \$ cost of capital, with Indonesian country risk incorporated in it, for this project of 10%. If the inflation rate in Rupiah is 9% and the inflation rate in US\$ is 2%, estimate the NPV for this project in Rupiah terms. (2 points)

2. You own a Laundromat in New York and are considering expanding. The business generated pre-tax operating income of \$60,000 in the most recent year. By investing \$ 50,000 in new washers and dryers (depreciable straight line over 5 years to a salvage value of zero) today, you believe that you can increase your operating income significantly each year. How much would your pre-tax operating income have to increase each year for the next 5 years (the remaining period on your lease), for the investment to make sense, if your cost of capital is 15%? (The tax rate is 40%) (2 points)
3. You are the agent for Albert Pujols, star first baseman for the St. Louis Cardinals and he is evaluating two offers:
- A 5-year offer from the St. Louis Cardinals, with a signing bonus of \$ 30 million (payable today) and \$ 20 million/year for 5 years.
 - A 7-year offer from the New York Yankees, with a signing bonus of \$ 15 million (payable today), \$30 million/year for the first 3 years and \$20 million/year for the remaining four years.

Both contracts are guaranteed, i.e., the only risk he faces is that the teams may default. The table below provides the costs of debt, equity and capital for the Yankees and the Cardinals.

	Cost of debt	Cost of equity	Cost of capital
St. Louis Cardinals	6%	10%	9%
NY Yankees	5%	10%	8%

Based purely on financial terms, which offer should Pujols take? (3 points)

4. You have just completed the investment analysis of a factory. The factory will cost \$ 100 million to build and is expected to have a 10-year life (with straight line depreciation down to a salvage value of zero at the end of year 10). You estimate a net present value of \$5 million for the factory, using a cost of capital of 9% and a marginal tax rate of 40%. The government has just announced a tax break for manufacturing firms like yours, where you will be allowed to expense the building cost of \$ 100 million immediately, rather than depreciating it over time. Estimate the new net present value, assuming that you take advantage of this tax break. (3 points)

Quiz 2: Corporate Finance (Spring 2012)

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. You are trying to estimate the cost of capital to use in assessing a new investment venture in the entertainment business, for TechSmith Inc, a publicly traded electronics company. You have been provided the following information:
 - The beta for TechSmith, based upon stock prices for the last 5 years, is 1.80 but the unlevered beta for entertainment companies is 1.20.
 - At the moment, TechSmith has one bank loan outstanding, with a principal payment due of \$250 million at the end of 10 years and interest payments of \$ 10 million every year for the next 10 years. TechSmith also has lease commitments of \$20 million a year, due at the end of each year for the next 8 years.
 - TechSmith has 60 million shares outstanding, with a stock price of \$20/share.
 - TechSmith has a bond rating of BB, with a default spread of 4.5% over the risk free rate. The marginal tax rate is 40% but TechSmith's effective tax rate is 25%.
 - The riskfree rate is 3% and the equity risk premium is 6%.
 - a. Estimate the market value of the interest bearing debt. (1 point)
 - b. Estimate the debt value of lease commitments. (1 point)
 - c. Estimate the cost of capital for this project, assuming that it will be funded using the same debt ratio that TechSmith uses to fund itself today. (2 points)

2. Supra Enterprises is considering changing its advertising policy from print advertising to social media advertising. To make this shift, Supra will have to incur an upfront cost of \$ 25 million, primarily in technology infrastructure. This cost will be capitalized and depreciated straight line over 5 years to a salvage value of zero. As a result of the shift, Supra expects to be able to reduce what it spends on advertising for the next 5 years. If Supra's cost of capital is 10% and its tax rate is 40%, how much would the annual pre-tax savings in advertising expenses have to be, each year for the next 5 years, for the shift to make sense? (3 points)

3. ESPN is considering opening a sporting complex in Bristol, Connecticut, offering sports programs and facilities for high school teams. You have the following information:
 - a. ESPN is planning to use vacant land it already owns in its Bristol broadcasting facilities. If it does so, it has to cancel an alternate plan to lease this land to a neighboring business and generate \$ 1 million a year in lease revenues for the very long term.
 - b. The cost of building the sports complex is expected to be \$ 80 million, depreciable straight line over 10 years to a salvage value of \$ 10 million.
 - c. The sporting facility is expected to generate revenues of \$ 30 million a year.
 - d. The direct operating expense associated with operating the facility is \$ 10 million. ESPN will also allocate \$ 10 million in SG&A costs to this facility, but \$ 8 million of these costs are fixed costs.

- e. The cost of capital for ESPN is 10% but the cost of capital for companies that operate sports and entertainment complexes is 8%. The tax rate is 40%. Assuming that ESPN plans to operate this sporting complex in perpetuity, with constant (no growth) cash flows, estimate the NPV of this investment. (3 points)

Quiz 2: Corporate Finance (Spring 2013)

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. In an attempt to globalize and diversify its businesses, Heinz is considering opening restaurants in India. You have been asked to estimate a cost of capital to use in assessing these investments and have collected the following information:
- The beta for Heinz, as a company, is 0.85. The company has a market capitalization of \$20 billion and debt outstanding (in market value terms) of \$ 5 billion. Heinz's debt is rated A1 by Moody's and the default spread for A1 rated bonds is 1%. The marginal tax rate for the company is 35%.
 - The average unlevered beta for restaurant companies in emerging markets is 1.10.
 - The US treasury bond rate is 3%, the equity risk premium for mature markets is 6% and the additional country risk premium for India is 2.5%.
 - The inflation rate for US dollars is 2% and the inflation rate in Rupees is 6%.

Assuming that Heinz will be funding this project using its current debt ratio, estimate the cost of capital for the Indian restaurant venture in Indian rupees. (3 points)

2. Desdemona Media is a movie company that is considering entering the toy business in a short-term (3-year) venture. The venture will have an initial capital investment of \$45 million and you have been provided with the following projections on the venture (in millions):

	1	2	3
Revenues	\$50	\$65	\$70
- Depreciation	\$15	\$12	\$8
- Allocated G&A	\$10	\$10	\$10
- Other Operating Expenses	\$20	\$22	\$26
Operating Income	\$5	\$21	\$26

- You have been told that 75% of the G&A expenses are fixed (i.e., they have nothing to do with this project) and non-cash working capital is expected to be 10% of revenues, with the investment being made at the end of each year.
 - At the end of year 3, you can expect to sell all of the project's remaining assets at book value. The cost of capital for the toy project is 9% and the cost of capital for the movie business is 12%. The marginal tax rate is 40%.
- a. Estimate the incremental after-tax operating cash flows each year for the life of the project. (2 points)
- b. What is the NPV of this investment? (1 point)
- c. Assume that the toy business will generate side benefits for the movie business, increasing after-tax cash flows from that business by \$7.5 million/year, each year for the next 3 years. What effect does this have on your NPV? (1 point)
3. Assume that you have just started business as a technology consultant (your expertise is writing apps for social media site) and are faced with two choices in terms of long term, full-time contracts. (If you take one, you cannot take the other).

- a. The US government has offered you a 3-year fixed contract, where you will receive \$60,000 next year, \$70,000 the year after and \$75,000 in the third year.
- b. You can work with a software company and write apps that they will then package with their existing products. The contract will last 5 years and you will get 20% of the after-tax net profits on sales. The net profits are expected to be \$200,000 next year and grow \$50,000 each year for the following four years.

The US Treasury Bond rate is 3%, the beta for software companies is 1.20 and equity risk premium is 5%. Which contract would you take? (3 points)

Quiz 2: Corporate Finance (Spring 2014)

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. Tabor Inc. is a German manufacturing company that makes auto parts and derives its revenues entirely in Germany. It is considering investing in a joint venture in Poland to manufacture steel and has asked you to compute a cost of capital for the venture. You have been given the following information:
- The joint venture expects to derive 60% of its revenues in Poland and 40% in Germany. The equity risk premium for Poland is 7.5% and the equity risk premium for Germany is 5%.
 - The unlevered beta for the auto parts business is 1.20 and the unlevered beta for steel is 0.90.
 - Tabor is all equity funded but the joint venture will be funded with 80% equity and 20% debt.
 - The joint venture is expected to be able to borrow money at a default spread of 1.5% above the risk free rate.
 - The risk free rate in Zlotys is 4% and the risk free rate in Euros is 2%. The tax rate in Poland is 20%.

What is the cost of capital, in Euros, for Tabor on this Polish joint venture?

2. Fryer's Hardware is a hardware store, selling both large equipment (lawnmowers, snow blowers etc.) and conventional hardware. The store generated \$500,000 in after-tax operating income from revenues of \$ 5 million last year; large equipment accounted for 40% of the revenues and 60% of after-tax operating income. Fryer's is considering opening a equipment servicing center on site and has the following information:
- The initial investment in the service center is expected to be \$1.00 million, depreciable straight line over five years to a salvage value of zero.
 - The service center is expected to generate \$400,000 in revenues each year for the next 5 years and the costs of personnel and material is expected to be \$150,000 each year.
 - The marginal tax rate is 40%, the cost of capital is 12% for equipment sales and 10% for equipment servicing.
- Estimate the NPV of the equipment service center. (2.5 points)
 - The service center is expected to increase large equipment sales at the store by 20% over the current level. Assuming that revenues from equipment sales would have been flat (unchanged) for the next five years and that the after-tax operating margin on these sales would remain at the existing level for that period, estimate the effect of this "synergy" on the NPV of the project. (1.5 points)
3. Biozyte Inc. is a small, biotechnology firm that has just received approval from the FDA for its first drug and is considering one of two options to commercialize it:
- It can license the drug to Amgen and receive an upfront payment of \$200 million and a guaranteed (by Amgen) licensing fee of \$150 million (pre-tax) a

year for the next 15 years. At the end of year 15, Amgen will get full rights to the drug.

- b. It can manufacture the drug itself. To do so, it has to invest \$ 1.5 billion in infrastructure, depreciable straight line to a salvage value of zero, over 15 years, to generate an EBITDA of \$550 million a year for that period. After 15 years, the sales will drop to zero.

Biozyme's tax rate is 30%, its pre-tax cost of debt is 8% and its cost of capital is 12%. Amgen's tax rate is 40%, its pre-tax cost of debt is 4% and its cost of capital is 8%. Considering risk and the time value of money, which option is the better one for Biozyme? (3 points)

Quiz 2: Corporate Finance (Spring 2015)

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. You are checking over an analyst's calculation of NPV and notice that she has estimated a NPV of -\$200 million for the 5-year project. You notice three problems with the NPV:
 - a. The analyst has computed the cash flows after allocating \$50 million in G&A costs to it each year for the next 5 years. You believe that none of these costs are incremental.
 - b. The analyst also ignored depreciation on the initial investment, which is expected to amount to \$100 million a year for the next 5 years, when computing the earnings and cash flows.
 - c. The analyst overlooked working capital requirements in computing cash flows. The project will require an immediate investment of \$100 million in working capital, which will be salvaged after 5 years.Estimate the corrected NPV for this project assuming that the cost of capital for the project is 10% and that the marginal tax rate is 40%. (3 points)
2. You own and run a tennis club, with a dozen tennis courts. Last year, you had 500 members, each of whom paid \$1000 in annual dues, and generated operating income of \$100,000. You are considering offering tennis lessons to members and have collected the following information:
 - You have ten years left on your lease of the club grounds and it is unlikely that you will be able to renew the lease.
 - You will have to spend \$200,000 in new equipment (ball machines and simulation equipment) today, that you will have to treat as capital expenditures and depreciate over ten years to a salvage value of zero.
 - You will have to pay a tennis pro a salary of \$50,000 each year for the next ten years. You expect to generate \$200,000 from tennis lessons each year, and will get to keep 60% of these revenues; the tennis pro gets the remaining 40%.
 - The cost of capital of sports facilities is 9% and the marginal tax rate is 40%.
 - a. Estimate the NPV of adding tennis lessons. (3 points)
 - b. Now assume that the added wear and tear on the courts will result in you having to resurface the courts twice over the next 10 years (once at the end of year 3 and once at the end of year 7), at a cost of \$50,000/resurfacing. If you had not offered lessons, you would have to resurface the courts only once (at the end of year 5) at a cost of \$50,000. How much will your NPV (from part a) change as a consequence? (You can assume that the resurfacing can be expensed.) (1 point)
 - c. Finally, assume that the lessons will also increase your sales of tennis equipment at your club store by \$25,000 a year and that you generate an after-tax operating margin of 40% on these sales. If the cost of capital for sporting equipment retailers is 12%, estimate the value of this synergy? (1 point)

3. Canterra Construction Supplies Inc. is considering what to do with its logistics arm which has been a financial disappointment, in spite of the large investment (with \$500 million in book value of assets today) the company has made in it. The logistics division is in stable growth, with cash flows growing 2% a year in perpetuity. Canterra can sell the business to Donnelly Trucking, a potential buyer, for \$ 200 million and claim the loss on its assets as tax deduction (entitling it to a 25% tax savings). Canterra's cost of capital as a company is 8% but the cost of capital of logistics companies is 10%. How high would the expected cash flows from the logistics division have to be next year for Canterra not to divest? (2 points)

Quiz 2: Corporate Finance (Spring 2016)

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. DollarTrade Inc. is a US-based retail company that is considering entering the retail business in India.
- DollarTrade currently does all its business in the US and has a levered beta of 1.20; the risk free rate in US \$ is 2%, the equity risk premium for the US is 5% and the expected inflation rate in US \$ is 1.5%.
 - DollarTrade has a market capitalization (equity) of \$1 billion, no interest-bearing debt and \$150 million in lease commitments each year for the next 5 years. The company has a BBB rating and the default spread for that rating is 2.5%.
 - The equity risk premium in India is 9% and inflation rate in Indian Rupees is 6%. You can assume that the marginal tax rate is 40%.

Estimate the Indian rupee cost of capital that DollarTrade should use for its Indian retail expansion, if it plans to fund that business entirely with equity. (3 points)

2. You are the owner of Café on the Green, a well-regarded but run-down restaurant, and have ten years left on your lease. You are considering a major renovation that will cost \$5 million, depreciable straight line over the next ten years to a salvage value of zero, which will perk up your revenues for the next ten years, while also improving your profitability. The table below gives you the expected annual values (for the next 10 years) for key items with and without the renovation for the entire café.

	Without Renovation	With Renovation
Revenues (in millions)	\$4.0	\$6.0
EBITDA Margin (EBITDA as % of Sales)	20%	30%
Non-cash Working capital as % of Sales	4%	5%

The tax rate for the company is 40% and the cost of capital is 12%,

- Estimate the annual after-tax cash flows for the investment for the next 10 years. (2 points)
 - Estimate the NPV on the investment, with a 10-year life. (1 point)
 - Now assume that you will be expense the entire renovation expense immediately instead of capitalizing and depreciating it. How much will your NPV change as a consequence? (1.5 points)
3. You are an inventor who has come up with a new organic detergent and have an offer from P&G for exclusive rights to the product. P&G has offered you \$2 million a year in guaranteed fees for the next five years and 10% of the after-tax operating profits each year on the product in perpetuity; the total after-tax operating income on the product is expected to be \$10 million next year, growing 3% a year forever thereafter. P&G's cost of debt is 4%, its cost of capital is 8% and its cost of equity is 10%.
- What is the value of the guaranteed payments for the next five years? (1 point)
 - What is the value of profit-sharing part of the agreement? (1.5 points)

Quiz 2: Corporate Finance (Spring 2017)

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. Supra Inc, a US company in the travel services and hotel businesses, has asked you to compute a cost of capital to use in assessing a joint venture to build new hotels along the US-Mexico border, with 20% of the revenues coming from the US and 80% from Mexico. You are given the following additional information:

- a. The beta for Supra is given below, with a business breakdown:

	D/E Ratio	Levered Beta
Supra Travel Services	20%	1.008
Supra Hotels	50%	1.430
<i>Supra Overall</i>	<i>30%</i>	<i>1.062</i>

- b. The equity risk premium for the US is 6% and the equity risk premium for Mexico is 9%.
- c. The US treasury bond rate is 2.5% and the inflation rate in US \$ is 2%. The expected inflation rate in Mexico (in pesos) is 4.5%.
- d. Supra's pre-tax cost of debt is 4% (in US\$) and the tax rate is 40%.
If Supra plans to fund this joint venture entirely with equity, and wants to do the analysis in Mexican pesos, estimate the cost of capital for the project. (3 points)

2. You run a restaurant that is expected to generate \$100,000 in EBITDA each year for the next five years (after which your lease terminates). If you invest \$250,000 in renovating the restaurant today (depreciable straight line over five years to a salvage value of zero), you expect to increase your EBITDA to \$175,000 a year for the next five years. If you face a tax rate of 40% and a cost of capital of 12%, would you invest in the renovation? (3 points)

3. You own a movie theater and have to replace all the seats in the theater. You have two choices.
- a. Option 1: You can spend \$250,000 on cheaper seats that will cost \$10,000 to clean each year and last four years.
- b. Option 2: You can spend \$400,000 on better quality seats that will cost only \$5000 to clean each year and last seven years.

Ignoring taxes and depreciation, which option would you pick, if your cost of capital is 8%?
(2 points)

4. You are planning to make an investment of \$10 million in new servers for your business and expect to be able to depreciate that investment, straight line over five years down to a salvage value of zero. If your tax rate is 40% and you were able to expense the investment today instead, what effect will that have on your NPV (assuming a cost of capital of 12%)?
(2 points)