

Whitman College  
 Econ 358  
 Exam 2  
 March 12, 2010

Write all answers in your blue book. **Show all of your work.** The exam ends at 10:50.

1. Suppose Claire owes \$4263 on her credit card, and she pays the average interest rate that Americans pay on their credit cards, which is 14%.

(a) (5pts) If she makes regular annual payments of \$600, starting next year, and does not charge any more on her card, how long would it be until she paid off her balance?

Legislation that took effect February 22, 2010 requires credit card companies to tell customers how long it would take to pay off the balance if they only make the minimum monthly payment. The minimum monthly payment is usually about two percent of the balance, which in Claire's case would be about a \$1200 annual payment.

(b) (5pts) How long would it take Claire to pay off her credit card balance if she made regular \$1200 annual payments starting next year and did not charge any more on her card?

2. A firm is considering two **mutually exclusive** projects with the costs and benefits shown below.

(a) (5pts) At what market interest rate would the firm be indifferent between accepting Project I or Project II?

(b) (20pts) The firm would undertake Project I if the market interest rate lies within what range? Draw a Net Present Value graph to support your reasoning.

Project I		
Period	Benefits	Costs
0	\$40	\$0
1	0	0
2	0	45

Project II		
Period	Benefits	Costs
0	\$400	0
1	0	0
2	0	480

3. (15pts) Suppose your boss has just finished analyzing a potential investment project and is now asking for your opinion on his results. The project under consideration imposes costs of \$2000 today, and provides real benefits of \$2600 four periods from now. Your firm can borrow or lend at a nominal interest rate of 9.5%. The inflation rate will be 3.2% per year over the next four years. Using the nominal interest rate to discount the real benefits in period 4, your boss calculates that the net present value of the project is negative. He therefore concludes that the project should be rejected. Write a memo to your boss in which you explain your opinion on his results. If you disagree with your boss's results, then explain in detail what the results should be and why.

4. (20pts) Suppose a company has designed a new way to play video games. They have spent the past year and \$28 million designing a new controller that they could start producing next year. The Board of Directors has decided to use sensitivity analysis to determine whether or not to produce the controller. Their best guess is that they would earn revenues of \$7.0 million in the first year of production and \$2.5 million in each of the 6 years after that, and have production costs of \$1.5 million per year for the 7 years of production. Their optimistic guess is that they would earn revenues of \$12.0 million in the first year of production and \$3.0 million in each of the 8 years after that, and have production costs of \$0.5 million per year for the 9 years of production. Their pessimistic guess is that they would earn revenues of \$2.5 million in the first year of production and \$1.0 million in each of the 3 years after that, and have production costs of \$1.5 million per year for the 4 years of production. You are the chief executive officer of the this company and have final say on whether to undertake production of the controller. Using sensitivity analysis, show how you would find your answer. Assume that you can borrow or lend at a market interest rate of 5%.

5. Alpha Inc. is a corporation that pays out all of its after-tax profits as dividends. Alpha has 10,000 shares of stock outstanding and it earns with certainty \$100,000 per year in after-tax profits. The market interest rate is 10%. Alpha has no opportunities to undertake investment projects.

(a) (5pts) What is the equilibrium price for a share of Alpha stock?

Beta, Inc. is a firm that is identical to Alpha except that it has the opportunity to undertake an investment project. The project requires an expenditure in Period 3 of all of its after-tax profits and provides with certainty an increase in revenue of \$18,000 per year starting in Period 6 and continuing forever.

(b) (10pts) What is the equilibrium price for a share of Beta stock?

(c) (5pts) Calculate the price-to-earnings ratios for Alpha and Beta stock.

(d) (10pts) Which stock, Alpha or Beta, is the better deal? Explain.