

***** WRITE YOUR NAME AND COHORT ONLY ON THE LAST PAGE *****

UNIVERSITY OF CALIFORNIA BERKELEY
Hass School of Business

MBA 201A—Economic Analysis for Business Decisions—Fall 2009
Professors Catherine Wolfram and Steve Tadelis

MIDTERM EXAM

Instructions: The number in brackets (e.g., [5]) indicates the points for each question. Total: 120 points. Note that you have 120 minutes to do the exam, so you should spend no more than 1 minute per point.

Please Write Legibly. Briefly explain your answers (that is, don't just write "yes" or "no" and don't just write down a numerical answer without showing how you derived it). Write only on this exam and not on other sheets of paper.

Please sign the honor code oath at the bottom of the back page.

Short answer questions

The following three questions require only short answers (1-3 sentences). Use any graphs that will help your explanation. Be sure to label graphs clearly.

1. [10] List three factors that you think will shift the demand for slots in the Berkeley-Haas MBA program over the next several years. For each factor, discuss whether you think it will cause demand to shift in or out.

Answer: Full credit will be given for answers that discuss factors that affect potential students' income (e.g., continuing recession may mean fewer potential students can afford the tuition, causing demand to shift in), tastes (e.g., if Haas' ranking increases, causing demand to shift out), demographics (e.g., baby bust hitting the age of a typical student, causing demand to shift in) or price and availability of substitute products (e.g., MIT-Sloan and NYU-Stern lower their tuition by 50%).

Points will most likely be taken off for factors related to the supply (e.g. the availability of slots) or for discussions of the Berkeley-Haas price, since this affects the quantity demanded and not the demand.

2. [10] A firm operates in a perfectly-competitive market where the world price is \$1000. (The firm's output has no effect on the world price, over the relevant range.) It operates one plant with capacity of 600 and has a total cost function of $TC(Q) = 50,000 + 500Q$ up to $Q=600$. How much should the firm produce? What are its profits?

Answer: For this firm, $MC < P$ for all Q , so the firm should produce up to the capacity of its plant. Profits are $TR - TC = \$1000 \times 600 - (\$50,000 + \$500 \times 600) = \$250,000$.

3. [10] Club Ed surf school has a proprietary license to offer surf lessons at Manresa State Beach. Before the economic downturn, Ed was charging \$85 per person for a group lesson and served about 100 people per week. Following the downturn, Ed realized that at this price he was only serving about 70 people a week. Given the circumstances, Ed lowered the price to \$70 a person, and while he got more customers (about 80 people per week), his total revenue fell. He's quite sure nothing caused his demand to shift when he lowered the price. Explain why this might have been the case.

Answer: A quick calculation shows that the elasticity from $p = 85$; $q = 70$ to $p = 70$; $q = 80$ is less than -1 which means that Ed is on the inelastic part of the demand, hence lowering his price causes revenue to fall.

Question 4 [20]

Due to the recession, United Airlines has experienced a decrease in demand on their flights from San Francisco International Airport (SFO) to Bakersfield (BFL), Fresno (FAT) and Santa Ana (SNA). They are debating changing their service and only offering flights to FAT and SNA, and have called you in to advise them. They show you the following table:

Monthly Accounts: United Airlines from SFO to BFL, FAT and SNA, August 2009.				
(Numbers in parentheses represent negative amounts)				
	SFO – BFL	SFO – FAT	SFO – SNA	Total
No. of passengers	2,160	2,700	5,760	10,620
No. of flights per day	4	6	8	18
Revenue	\$404,000	\$675,000	\$1,440,000	\$2,519,000
Fuel Costs	\$27,000	\$135,000	\$360,000	\$522,000
Other Direct Costs*	\$216,000	\$324,000	\$432,000	\$972,000
Overhead**	\$204,000	\$204,000	\$204,000	\$612,000
Profit	(\$43,000)	\$12,000	\$444,000	\$413,000

* Other direct costs include the wages of the flight staff and maintenance crew as well as costs for maintenance parts. These are calculated on a one-way route and are identical for all flights to the three destinations. There are two round trip flights a day from SFO to BFL, three from SFO to FAT and four from SFO to SNA.

** Overhead includes: (a) \$612,000 in landing slot payments, paid to the airport for every takeoff and landing (the payment per takeoff and landing is equal for all three routes); (b) the route manager's salary of \$9,000 a month and (c) the route manager's office lease of \$1,000 a month. The route manager manages these three destinations together with flights from SFO to Chico (CMA) and SFO to Eureka (ACV), and the expenses of his salary and office space is equally divided between these five routes.

Should United stop offering flights to BFL? If they do, by how much would their profits change? (Explain your answer with respect to all the costs United Airlines faces.)

Answer: *The fuel costs and direct costs are indeed direct costs related to each flight. The landing slot payments are also directly related to the flights, and hence they are not overhead. There are a total of $18 \times 30 = 540$ flights per month and the slot payments are \$612,000, so for each flight the costs are \$1,333 per flight or \$34,000 per month for each flight. Hence, for BFL the slot costs are \$136,000 ($\$34,000 \times 4$) and not \$204,000 as listed. As a consequence the actual profit from the BFL flights is \$25,000 and not a loss of (\$43,000). The conclusion is that United should not discontinue these flights because if they do, then profits will drop by \$25,000.*

MULTI-PART QUESTIONSQuestion 5

You manage inventory for Coach Handbags, a chain selling fashionable purses and accessories. At the end of your summer 2009 season, you are left with a large inventory of apple green cloth purses. You now have two options to get rid of the purses:

- (1) You can sell them to the east coast outlet store Filene's Basement, which specializes in selling brand-name items at reduced prices. Filene's is willing to accept your entire inventory, and they will pay you \$20 per purse.
- (2) You can try to sell them at the Coach stores by putting them on sale at a discount off the original price. At the beginning of the summer 2009 season, you were selling the purses for \$80. Since it's the end of the season, your demand will have declined from the original level, and you know that the demand curve you face will be $Q = 52,000 - 800P$ where Q is the number of purses and P is measured in dollars per purse. Since it will take some time for Filene's to put your purses on their floor, the number of purses you sell to Filene's does not affect this demand curve.

You have 30,000 purses to get rid of and these two options are in no way mutually exclusive. In other words, you could sell some fraction of the purses to Filene's Basement and some at your own store, all at your own store, or all to Filene's Basement.

Assume that your original acquisition cost for the purses was \$40 apiece. Under no circumstances will you hold the purses for summer 2010. Storing them would degrade their quality and trying to sell them again next season would destroy Coach's reputation as a trendsetter.

a. [15] Your boss, also an MBA, tells you that he thinks the acquisition costs for the purses is sunk and asserts that Coach will be able to sell them for much more than the \$20 Filene's is offering. He claims that the best you can do is to **maximize revenues** from a sale at Coach stores. What price maximizes these revenues? Assume that any purses remaining after the sale are sold to Filene's. How many purses are sold to Filene's? What are the total revenues from both channels?

Answer: *To maximize revenues from the sale at Coach stores, we should set marginal revenue equal to zero:*

$$Q^{Coach} = 52,000 - 800P \rightarrow P = 65 - Q^{Coach}/800 \rightarrow MR = 65 - Q^{Coach}/400$$

$$MR = 0 \rightarrow 65 = Q^{Coach}/400 \rightarrow Q^{Coach} = 26,000 \rightarrow P = \$32.50$$

The remaining 4,000 purses are sold at Filene's for \$20.

$$Total\ revenues\ are\ \$32.5 \times 26,000 + \$20 \times 4,000 = \$925,000.$$

b. [20] Is your boss right? What is the profit-maximizing strategy for selling the purses? How many purses are sold through the sale and how many through Filene's? What are the total revenues from both channels?

Answer: Your boss is not right. He has recognized that the \$40 acquisition cost was sunk, but he has not accounted for the opportunity cost of selling to Filene's. Since every unit not sold to Filene's is like giving up \$20). To maximize profits, we should set marginal revenue from the sale at Coach equal to the price Filenes is willing to accept. That is, $MC=20$.

$MR=MC \rightarrow 65 - Q^{Coach}/400=20 \rightarrow Q^{Coach} = 18,000$ (consistent with our assumption).

$Q^{Coach} = 18,000 \rightarrow P = \42.50

The remaining 12,000 purses are sold at Filene's for \$20.

Total revenues are $\$42.50 \times 18,000 + \$20 \times 12,000 = \$1,005,000$, more than in part a.

Question 6

This past week at the 2009 Frankfurt Motor Show, the founder and CEO of Better Place, Shai Agassi, announced a newly expanded agreement with Renault that commits both companies to a volume of at least 100,000 electric cars in Israel and Denmark by 2016. In May 2011, after his commencement speech at the Berkeley-Haas MBA graduation event, Agassi offered you the job of running the franchise to distribute the needed lithium-ion batteries in Denmark for the next five years (January 2012 through December 2016).

You are now in the market to lease a warehouse outside of Copenhagen.

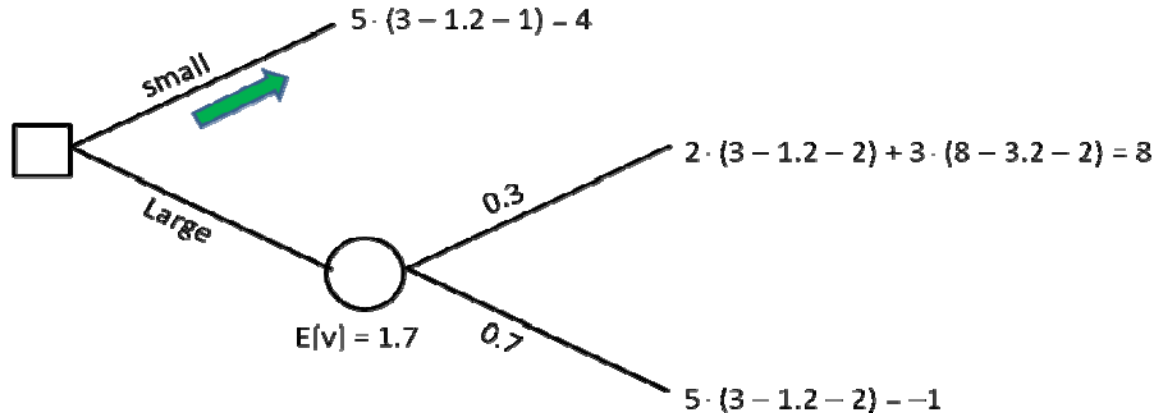
A small warehouse costs \$1 million per year and a large warehouse costs \$2 million per year. Current contracts show that your sales will be low in the first two years and that you will only need a small warehouse for these years. Reliable estimates show that there is a 0.3 probability that your sales will take off and that you will have high demand, in which case you will need a large space in years 3 through 5 (and a 0.7 probability that demand stays low and you will only need a small space in all years). If your sales take off and you face high demand, you could increase sales in year 3, but **only** if you have leased the large warehouse. Data from Better Place includes the following table (which applies to all years):

		Total Annual Revenues	Annual Variable Costs
Small Warehouse	Low Demand	3,000,000	1,200,000
	High Demand	3,000,000	1,200,000
Large Warehouse	Low Demand	3,000,000	1,200,000
	High Demand	8,000,000	3,200,000

NOTE: Variable Costs include all costs *except* the warehouse lease cost. Profit is equal to Total Revenue – Variable Costs – Costs of the Lease. **Assume that the interest rate is 0%, so no discounting applies.**

a) [10] Draw a decision tree to help you decide whether to lease a large or small warehouse. (Note that you **cannot** change warehouses, so whatever warehouse you choose you will have in all five years.)

Answer:



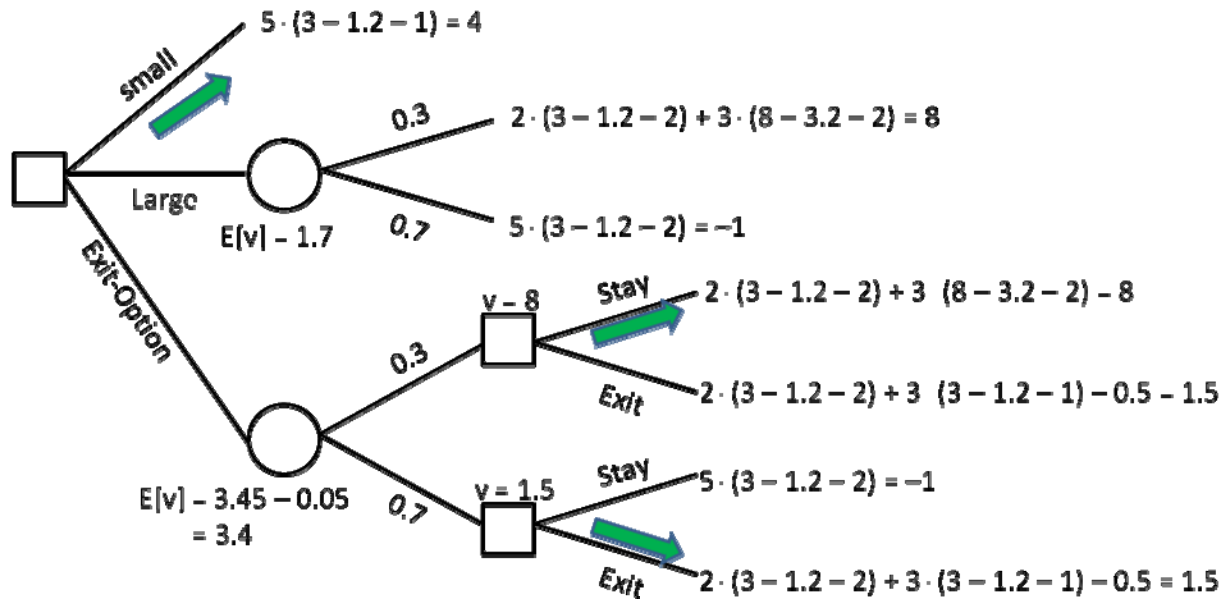
b) [5] Assuming you are a risk-neutral expected-profit maximizing decision maker, should you lease a large warehouse or a small warehouse?

Answer: Choose small warehouse which gives \$4M for sure because the expected value of choosing the large warehouse is only \$1.7M.

c) [5] Might your answer to part a) change if you were risk averse?

Answer: No, you prefer the safe option already, and risk aversion makes it even more desirable.

d) [15] A real estate company offers you an “exit-option lease.” This is a lease for a **large** warehouse in the first two years, but it would allow, though not require you to downsize your operation to a **small** warehouse (less space in the original one) at the end of year 2, **after you had learned** whether demand would be high or low in years 3 through 5. Each year in the large warehouse would still have an annual cost of \$2 million and each year in a small warehouse would still have an annual cost of \$1 million. The exit-option lease, however, has two twists. First, it includes a **signing fee** of \$50,000 **upfront** above and beyond the annual fees. Second, it includes an **exercise fee** of \$500,000, which must be paid at the end of year 2 **only if you decide** to downsize the warehouse. Assume again that you are risk neutral. Should you sign this exit-option lease instead of the one you chose in part b)?



Answer: If you choose the exit-option lease then it offers a higher expected revenue (\$3.4M) than committing to the large warehouse (\$1.7M), but it is still less than just taking the small warehouse (\$4M).