ECO 610 Final Exam
July 2018

Name: KEY
4-digit number: 1234

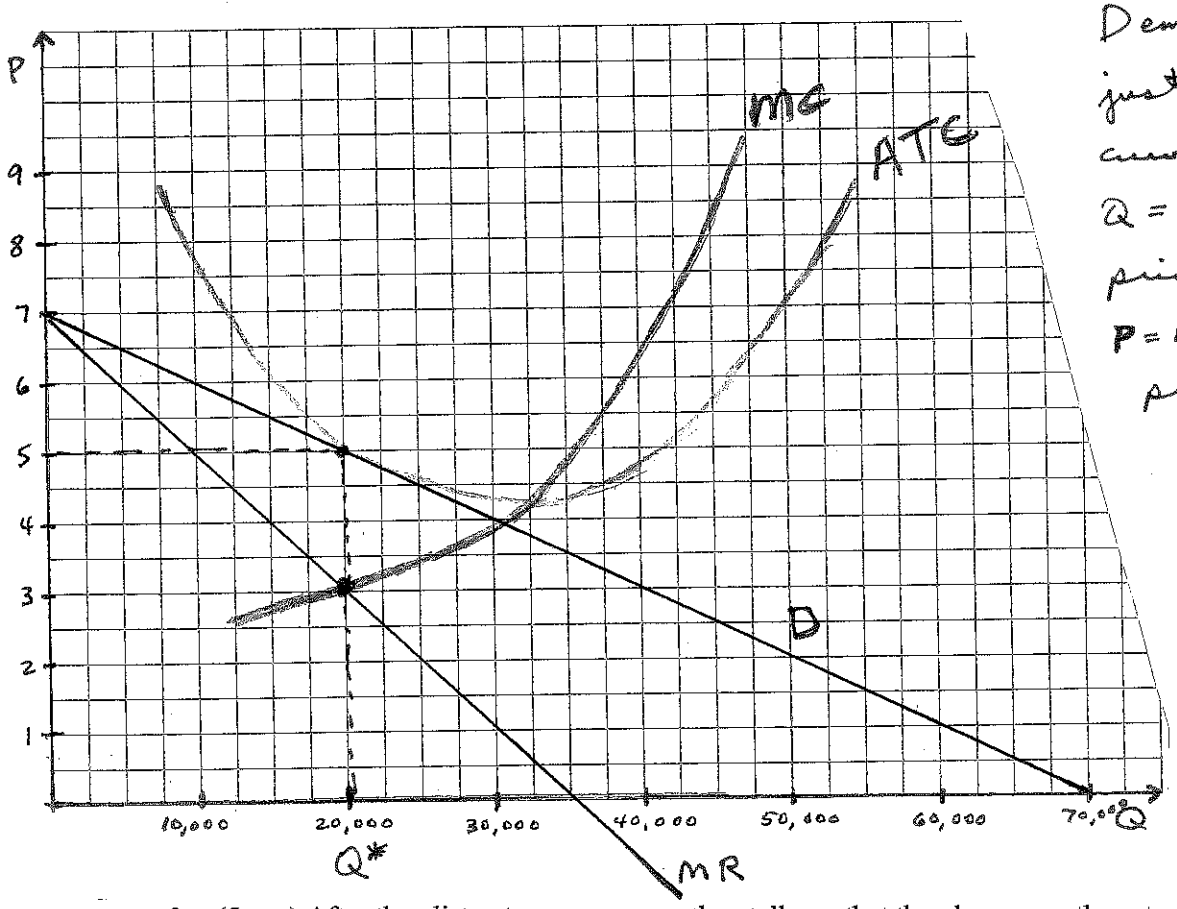
100 points total. Point values for each question are as indicated. Answer each question in the space provided. General advice: show your work, including any formulas or diagrams that you use in reasoning through your answers.

1. (10 pts.) We discussed five reasons why a firm might want to "make" instead of "buy" in its supply chain strategy. Pick any three of the five, briefly explain, and then give an example that illustrates the point.

Any three:

- Production efficiencies: in some production processes, there are physical production efficiencies that make cheek-to-jowl production (with accompanying joint ownership) more efficient. Secondary aluminum smelter owned and operated by aluminum casting plant or rolling mill.
- Extensive coordination: when a number of complex, interrelated processes are involved in producing a product, it is sometimes efficient to combine them and put them under the direction of one organization. Chicken processing plants and contract chicken farmers.
- Information asymmetry: If the upstream supplier of an input has more information about the quality of an input than the downstream buyer who uses the input in its production process, the buyer is susceptible to exploitation. The input supplier may exploit the buyer by supplying a lower quality product than the buyer was expecting. Vertical integration is one way to eliminate the incentive of the upstream seller to chisel on quality. Matsushita, a manufacturer of automobile air conditioning compressors owning and overseeing the operation of a casting line on Gready Foundry.
- Reputation externalities: Some products involve centralized development of a process, business format, or product, and development and maintenance of the associated brand-name capital. Production and delivery of the product to customers will be decentralized if customers are spread through geographic space. The value of the brand name will depend on customers' perception of the quality of their consumption experience. If customers who have a bad experience at one location associate bad quality with the entire chain, there are what we call reputation externalities. Any fast-food franchising chain.
- Specialized assets: refer to inputs that have significant productivity in a particular use, but little or no value outside of that use. The investment in that asset, once undertaken, is irreversible and so the cost is a sunk cost. The problem with specialized assets is that the owner of the specialized asset is subject to hold-up, and hence will be reluctant to make the investment in the first place. One solution is vertical integration. Krispy Kreme magic doughnut machine.

2. (10 pts.) At your tenth high school reunion, two of your good friends approach you with a business proposition. They have drifted from one job to another since graduating from high school, but both are now working at one of the dozen or more craft breweries in central Kentucky. They have a good understanding of how average and marginal costs vary with output, and sketch it for you in the diagram below. They think that they can earn an above-normal return in this industry if they start their own brewery. Having partnered as an MBA student with a company that produces craft beer, you know that monthly demand for a company like this is given by Q = 70,000 – 10,000*P, where Q is monthly quantity demanded in pints and P is the price per pint in dollars. Illustrate in the diagram what price and output will maximize profits for them, and show them what their expected long-run economic profits will be.



Demand curve just touches ATC curve at P = 5 and Q = 20,000. At that price and output, P = ATC and economic profit is zero.

3. (5 pts.) After they listen to your answer, they tell you that they have seen the externally reported financial records of their current employer, and it is making profits year in and year out just like all the other craft brewers. How do you respond?

Financial accounting statements reveal accounting profits, which will be positive if the firm is earning a normal return on equity. A normal return on equity is what we mean by zero economic profits—the firm is doing no better and no worse than its next best alternative. So your friends could invest their money in a low-load market-indexed mutual fund and expect to earn the same return as they would owning and operating their own craft brewery in this market.

4. (10 pts.) The clarity of your previous two answers causes your friends to re-think their futures. They have a falling out, and each of them decides independently to return to your and their hometown, East Liberty, and start a craft brewery there. East Liberty is a geographically isolated town in western Kentucky that currently has no craft breweries. One friend, Rick, shares the three business concepts he is contemplating for his brewery: R1 - warm dark frothy beers; R2 - lighter fruit-flavored ales; and R3 - Budweiser-inspired lagers. The other friend, Carol, tells you that she has four possible strategies in mind: C1 - cold dark frothy beer; C2 - lighter international ales; C3 - Coors-inspired lagers; and C4 - vegetable-based pale ales like her own creation, Pale Kale Ale. Since it is a small town and everyone knows what everyone else is up to, they both know the strategies their rival is considering and the resulting payoff matrix:

		Carol's strategies			
		C1	**C2**	**C3**	**C4**
Rick's strategies	**R1**	8, 8	11, 7	12, 6	13, 5
	R2	7, 11	10, 10	13, 9	14, 7
	R3	6, 12	9, 13	12, 12	12, 10

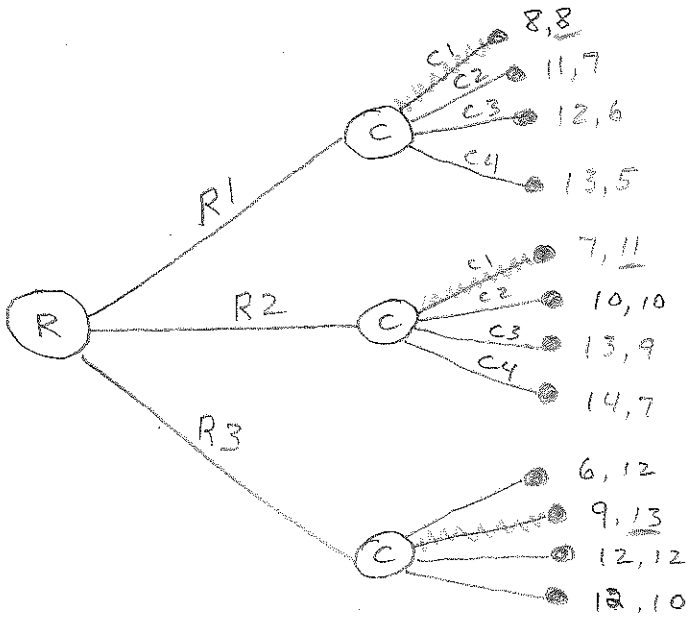
If they both choose their business strategies simultaneously, solve this game using the solution strategies we discussed in class and explain how you arrive at your answer. When you return to East Liberty, what kind of beer do you expect to be able to drink at each craft brewery brew-pub?

Both C3 and C4 are dominated by C2 for Carol, so they can be eliminated from consideration. R3 is dominated by R2 for Rick, so it can be eliminated from consideration. We are thus left with:

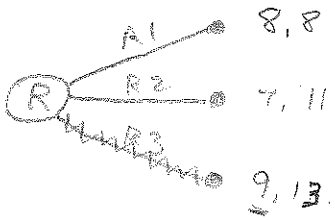
	C1	**C2**
R1	8, 8	11, 7
R2	7, 11	10, 10

Determining Rick's best responses to Carol's strategy possibilities, we see that R1 is a dominant strategy for Rick. Determining Carol's best responses to Rick's strategy possibilities, we see that C1 is a dominant strategy for Carol. When we return to West Liberty we expect to only be able to drink dark frothy beer, served at room temperature at Rick's brew-pub and served cold at Carol's brew pub.

5. (10 pts.) Suppose Carol is contemplating taking a world cruise prior to returning to East Liberty to start her craft beer business. That would give Rick a head start and enable him to choose his business strategy first. Carol would be left to choose her strategy second, after seeing what move Rick had already made. Would you advise Carol to go ahead with her travel plans or to postpone her trip and move back home so she can get started at the same time Rick does? Carefully draw the game tree and explain the basis for your advice to her.



If Rick moves first and chooses from his three possible strategies R1, R2, and R3, and then Carol moves second and chooses from among her four possible strategies C1, C2, C3, and C4, then the game tree will be as illustrated above. We break the game down into its smallest sub-games, and solve sequentially backward. Carol will play C1 if Rick first plays R1. She will play C1 if Rick first plays R2. She will play C2 if Rick first plays R3. The implied payoffs for Rick from each of his strategy options are thus illustrated in this sub-game tree:



Rick will thus choose to play R3, since his payoff is higher than if he chooses R1 or R2. Carol will then choose C2, resulting in payoffs of 9 for Rick and 13 for Carol. Compared with her payoff of 8 when they choose their strategies simultaneously, Carol is definitely better playing the game sequentially if Rick goes first. She should take the trip. Rick, since he gets 9 instead of 8 if he gets to go first instead of moving simultaneously, should happily drive her to the airport.

6. (5 pts.) Suppose that Rick and/or Carol ask you whether you think their prospects for earning an above-normal return in a smaller market like East Liberty are better than earning an above-normal return in a larger market like central Kentucky? What do you think? Recall our discussion of barriers to entry.

The central Kentucky market is clearly large enough to support multiple efficient-sized craft brewers, and so the expected long-run economic profits are zero. Market demand in East Liberty, however, may only be sufficient to support one or two MES brewers, creating a natural monopoly or duopoly market. So the fact that economies of scale are large relative to market demand in East Liberty increases the likelihood that incumbent firms can earn above-normal returns without attracting new entrants.

7. (10 pts.) Knowing what you do based on assigned readings and lecture material, conduct a Porter's five-forces analysis of the market for passenger jets.

Porter's five-forces analysis of passenger jet manufacturing:

Upstream supplier power: Boeing and Airbus have the ability to vertically integrate upstream and make rather than buy many of the component parts of a passenger jet plane. One item for which this is not feasible is jet engines. GE, Rolls Royce, and Pratt & Whitney are the major manufacturers of jet engines, and have some market power of their own. So this is a threat to Boeing and Airbus profitability.

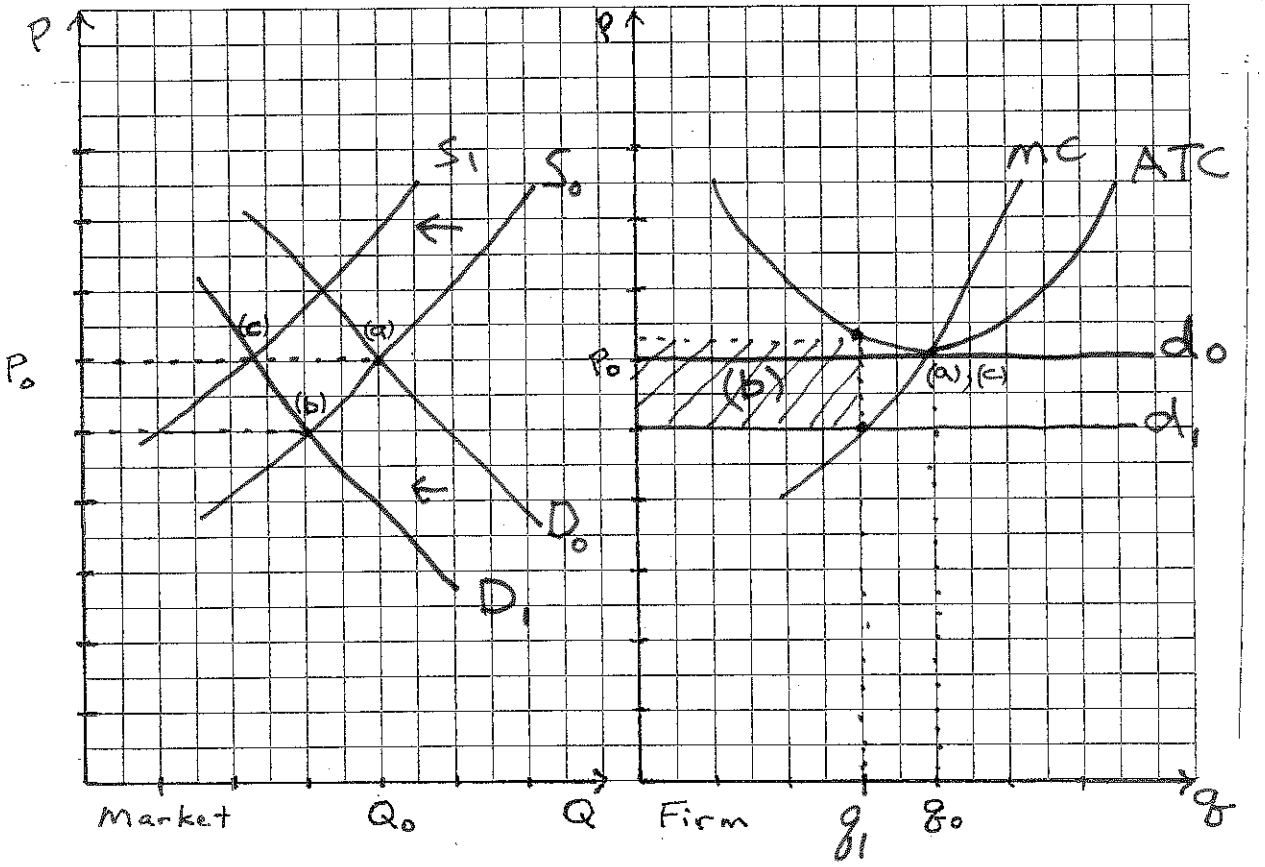
Downstream buyer power: Airlines around the world are the major buyers of passenger jets. While many of these are large and sophisticated customers, no one of them has significant buyer power. So the threat of buyer power on Boeing and Airbus profitability is not particularly significant.

Threat of substitutes: For long-distance travel, trains, boats, and cars are not very good substitutes for air travel. So not really a factor in this industry.

Threat of entry: Already competing on the fringes of Boeing's and Airbus's product offerings are Embraer and Bombardier, with their smaller, regional jet airplanes. And looming on the horizon are Chinese and Russian jet manufacturers, who may pose the bigger threat in the long run to the tight duopoly that Boeing and Airbus have.

Internal rivalry: Boeing and Airbus compete in many different ways, in terms of size and style of different models of their jets. They compete in the financing of the purchase or lease deals they offer different customers. But in the "sweet spot" market of medium-sized single-aisle jets (737's and A320's), they apparently make above-normal returns and have long waiting lists for delivery.

8. (20 pts.) Hog farmers are experiencing sharp declines in pork prices. Recently imposed tariffs on U.S. meat products by foreign governments have reduced demand for U.S. pork, beef, and chicken, sending prices downward. Pork prices have dropped 16.7%. Assume that the market had been in long-run equilibrium at price P_0 and output Q_0 and that a typical hog farmer produced output q_0 at that price.
   (a) Illustrate this long-run equilibrium in the diagram below, showing how market price and output are determined. Then draw the firm's demand and cost curves and show its optimal output and profits.
   (b) Now show the short-run impact of a decrease in market demand on market price and output. Then show the typical farmer's optimal output, and the farmer's economic profitability.
   (c) If the trade war turns out to be long-lived and the decline in demand is permanent, explain the long-run adjustments that will occur in this market.



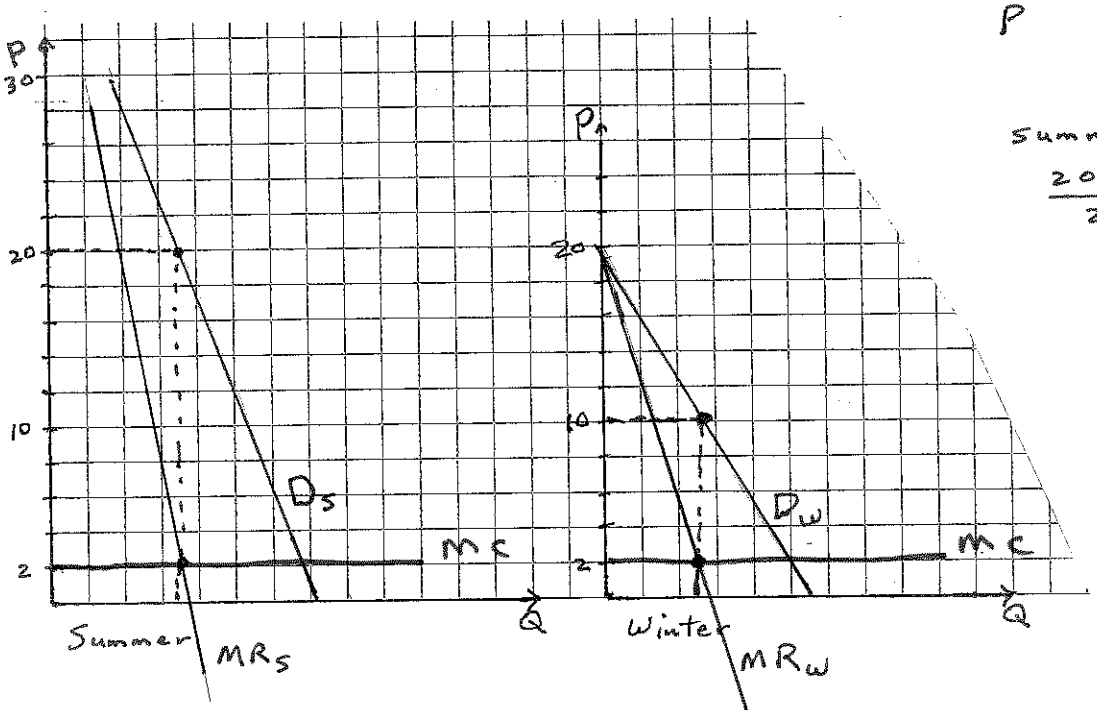
(a) Market price (P_0) and output (Q_0) are determined by market demand (D_0) and supply (S_0). At that price the firm's demand curve is perfectly elastic. A representative firm will produce q_0 where P_0=MC, and since P=ATC, will earn zero economic profit.

(b) A decrease in market demand to D_1 will cause both equilibrium price and quantity to fall. The firm's demand curve shifts downward to d_1. The firm will reduce its output and suffer economic losses equal to the shaded area in the diagram.

(c) If firms perceive the drop in market demand to be permanent, some of them will decide to go out of business, exiting from the market. That shifts the market supply curve to the left, causing price to rise. When enough firms have left the market such that market supply shifts to S_1, price will return to P_0 and those firms who stuck it out will earn zero economic profits once again.

9. (10 pts.) The Greek government charges 20 euros for admission to the Acropolis during the summer and 10 euros during the winter. If they are charging the profit-maximizing prices in summer and winter, illustrate the Demand, Marginal Revenue, and Marginal Cost curves consistent with such behavior. Assume for simplicity that marginal cost is constant at 2 euros per customer. After you illustrate this outcome, calculate own-price elasticity of demand for summer and winter visitors, showing how you arrive at your answer.

$$\frac{P - MC}{P} = \frac{1}{\varepsilon_{x,P_x}}$$



Summer:

$$\frac{20-2}{20} = \frac{1}{\varepsilon_s}$$

$$\varepsilon_s = \frac{20}{18} = 1.11$$

Winter:

$$\frac{10-2}{10} = \frac{1}{\varepsilon_w}$$

$$\varepsilon_w = \frac{10}{8} = 1.25$$

10. (5 pts.) The University of Kentucky price discriminates between in-state and out-of-state students, charging the latter group a significantly higher price for tuition than the former group. Why doesn't the UK bookstore likewise charge higher prices for textbooks to out-of-state students than in-state students?

UK can prevent resale of degrees. UK Bookstore can't prevent resale of books. If it attempted to charge a higher price for textbooks to out-of-state students, the bookstore would soon find that only in-state students were buying textbooks, often purchasing several copies of the same book at a time.

11. (5 pts.) True or false and briefly explain: If the market price of strawberries is so low that strawberry farmers cannot cover their fixed costs in the short run, they should shut down, i.e. not harvest the strawberries.

False. Fixed costs are those costs that don't go away if output drops to zero, so they are irrelevant to the short-run production decision. It is variable costs that matter. If TR < TVC, then the firm should shut down in the short run.