Economics 121, spring 2006
Midterm 1: February 9, in class.
Answer all the questions explicitly and clearly.

Answer summary:

1. (20 points) Consider the following news release. Comment on Thierer and English's logic. What can we infer about monopoly power from the fact cited?

News Release

Media Monopolies Are a Myth
Thierer and English Cite Declining Market Capitalizations

WASHINGTON D.C. - If the stock market is any indication, the argument that just a few large media conglomerates control the market for what we see, hear and read, is completely without merit. So conclude Adam Thierer and Daniel English in the new Progress on Point, "**Testing 'Media Monopoly' Claims: A Look at What Markets Say**," released by the Progress & Freedom Foundation. In their paper, Thierer and English evaluate the market performance of five large media outlets and deduce that declining stock value -- market caps down 52% over the last four years -- is a clear indication that the corporations could not possibly be acting as monopolies.

There were lots of things you could say here. See the lecture on diagnosing monopoly. It was most important to state that the evidence presented by Thierer and English was not convincing support for the claim that the media are not acting as a monopoly. For instance, you might have talked about:
   - Profits are not a good indicator of monopoly status, even if you assume that stock value is an accurate reflection of the future stream of economic profits.
   - A decline in profits may be a reflection of something completely unrelated to a lessening of monopoly power (such as reduced demand, increased costs), let alone to there being *no* monopoly power now.
   - If nothing about the market structure has changed, a change in stock value says nothing about the *level* of competition in the industry (the *change* in stock value can only be explained by something that has *changed*).
   - Assessing the level of competition in the industry is a better way to think about the question – relative sizes of the firms in the industry, ease of entry/exit.

2. (T/F/U): 5 points for each part. For each of the following statements, indicate whether it is true (T), false (F), or uncertain (U); give a *brief* explanation of why.

(a) "In response to a small increase in its marginal costs, a monopoly passes through half of the increase as a price increase, and its profits fall by an amount roughly equal to the other half."

First half of this statement is uncertain (true for case of linear demand, constant marginal cost, but not generally); second half of this statement is false (not an easy adding-up condition as there is in the competitive case, monopoly loses Q*dc. Recall why, even though the monopoly can and will change its price, that doesn't significantly insulate it from the profit effect of cost changes: easiest to think of a small change in c.).

(b) "In a Cournot oligopoly, since each firm takes as given all other firms' quantity choices, each firm's residual demand curve has the same elasticity as the market demand curve."

False. While each firm's residual demand curve has the same *slope* as the market demand curve, because it is a shift to the left, the elasticity of the residual demand curve is *higher*. Recall the definitions of market and residual elasticity:

$$\varepsilon_{market} = -\frac{p}{Q}\frac{\partial Q}{\partial p};$$

$$\varepsilon_{residual} = -\frac{p}{q}\frac{\partial q}{\partial p}$$

Q = market output; q = firm output.

Since the slopes of the demand curves (and p) are equal but q<Q, you can see that residual elasticity is higher than market elasticity.

(c) "A contract between competitors in which they agree to keep prices high is unenforceable in court."

True (assuming you are talking about the U.S., or most developed nations). Cartels are illegal in the U.S. and therefore any agreement they might negotiate is unenforceable in court. To sustain collusion, cartels must create self-enforcing agreements.

3. (20 points) Suppose that the DRAM industry behaves as a Cournot oligopoly, with constant demand elasticity equal to 1. Initially there are 5 firms in the industry. Then a sixth firm enters. All the firms have the same marginal cost. Estimate the reduction in industry deadweight loss, as a proportion of industry revenue, giving your reasoning.

Recall the formula used to calculate the change in DWL:

$$\frac{\Delta DWL}{pQ} = \frac{\varepsilon}{2}(\ell_0^2 - \ell_1^2)$$

Recall also the Lerner equation for symmetric Cournot firms:

$$\ell = \frac{p-c}{p} = \frac{1}{N\varepsilon},$$ where N is the number of firms in the industry.

Plugging in what we know:

$$\frac{\Delta DWL}{pQ} = \frac{1}{2}(\frac{1}{25} - \frac{1}{36}) = 0.0061$$

So, the reduction in DWL is about 0.6% of industry revenues. We know from the Cournot model that adding entrants makes the industry more competitive and reduces deadweight loss. We also know that the reduction in deadweight loss decreases with the number of firms already in the market – by the time you add a sixth firm, the reduction in DWL is quite small.

4. (20 points)   Lexmark sells PC printers, whose marginal cost is c, at price p. For each printer it sells, it expects to sell an additional five toner cartridges, with a profit of m per cartridge. If the demand for printers is D(p), with elasticity e = - pD'(p)/D(p), does the standard Lerner equation (p – c)/p = 1/e hold when Lexmark chooses p to maximize its profits? If not, explain why not, and how would you modify the equation?

I am writing the below using the notation q=D(p) → D'(p)=dq/dp

Using this notation, the elasticity given in the problem can be rewritten: $\varepsilon = -\frac{p}{q}\frac{dq}{dp}$

You can use this notation, or work with the notation in the question – they're equivalent.

Recall that the Lerner equation is just another way to write MR=MC. So this question asks you to think about what MR=MC means if you consider that the purchase of the printer implies that there will be a future purchase of toner. Since the goods are complements, you might have noticed that the demand function for printers should be a function of the price of printers AND the price of toner. But moving on with the calculations…

Revenue = p*q + 5m*q
Cost = c*q

$$MR = q + p\frac{dq}{dp} + 5m\frac{dq}{dp} = c\frac{dq}{dp} = MC$$

$$q + \frac{dq}{dp}(p + 5m - c) = 0$$

$$p + 5m - c = -q\frac{dp}{dq}$$

$$\frac{p + 5m - c}{p} = -\frac{q}{p}\frac{dp}{dq} = \frac{1}{\varepsilon}$$

So the new Lerner rule is: $\frac{p + 5m - c}{p} = \frac{1}{\varepsilon}$.

The printer price that will satisfy the new equation is **lower** than if the toner sales were not taken into account, while the total margin is **higher**. (In fact, the profit-maximizing

price is the price that would result for an ordinary good with demand curve D(p) and marginal cost equal to c – 5m; why is that?)