

Suggested Solutions
MIDTERM EXAMINATION
Class #14

Instructions: You have 1 hour and 25 minutes to complete this exam. This exam is closed-book: no books or notes are allowed. In addition, you may *not* use a graphical calculator or one that stores words, user-specified functions, or spreadsheets. Answer *all* questions. Be sure to write your name and the name and number of the course on all pages that you hand in. Be as clear and legible as possible. The exam consists of 3 parts and 5 questions in total. Please note that ALL work must be shown to receive credit. The exam is out of 60 points.

Part I: Short Question and Answer Section. (Total points: 15) Please limit your response to NO LONGER than 3 or 4 sentences (take into account that each question is only worth 5 points).

1. If the benefit deregulating the airline industry in Mexico involves a one off cost \$1 bn now and an annual gain of \$100m starting in a year's time. How high would the discount rate have to be for this not to be a worthwhile investment for society? If the cost of deregulation were incurred by the government (for the whom the social value of \$1 is \$1) and the gains went to rich consumers (for whom the social value of \$1 is \$0.5), how would this change the answer?

NPV of investment in deregulation equals:

$100/(1+r) + 100/(1+r)^2 + 100/(1+r)^3 + \dots - 1000 = (100/r) - 1000$; setting this equal to zero and solving for the interest rate we get: $r = 0.1$. Thus if $r \leq 10\%$ go ahead with deregulation. Introducing social weights means that benefits effectively go down to \$50m per year. Thus $r = 0.05$, thus if $r \leq 5\%$ go ahead. This implies that changing the weights means a tougher interest rate hurdle before going ahead.

2. A certain government decides to auction radio spectrum for use by 3G mobile phone companies. Does it matter for the final price of mobile phones what the government receives from the companies as a result of the auction? Justify your answer.

Auction fees are fixed costs to the companies that pay them. Prices are determined for all firms in any market by $MC = MR$. Fixed costs therefore do not effect price of the product. The maximum amount that any company would pay is the supernormal profit that it would gain from being in the 3G mobile phone market.

3. Price and entry/exit regulation usually go together in all regulated industries. It is rare to see one type of regulation and not the other. Explain why this was the case in railroads.

If there was regulation of price and no entry/exit regulation, then inefficient rail companies would enter on the profitable routes and cream skim, railroads would exit unprofitable lines. If there was entry and exit regulation but no price regulation railroads would have charged high prices to customers with elastic demand and no alternative suppliers and predatory

priced in markets which were competitive with alternative transport modes (such as trucking). These outcomes are politically undesirable.

Part II: Numeric Problem. (Total points: 25). Be sure to show all of your work.

4. A natural monopolist has total costs $C(Q)=300+15Q$ and faces market demand $Q=200-2P$. Solve for the monopolist's profits, output, and consumer surplus when:
- (a) Price is set equal to marginal cost.
 - (b) Price is set equal to average cost.
 - (c) There is two-part pricing, the monopolist sets them to maximize profits.
 - (d) There is two-part pricing, the regulator sets them to maximize consumer surplus, subject to the monopolist breaking even.
- For parts (c) and (d), you can assume that there are 10 identical consumers.

(a) (7 points) $P=15, Q=170, \pi=-300, CS=0.5*85*85=7225$.

(b) (6 points) $300/Q + 15 = 100-0.5Q: AC=P$

$300+15Q=100Q-0.5Q^2; Q^2-170Q+600=0; Q=166.4, P=16.8, CS=0.5*83.2*166.4=6922, \pi=0$.

(c) (6 points) The per unit price will be 15 (MC). The participation fee would be equal to CS in (a) divided by 10 = 722.5, $Q=170, \pi=6925, CS=0$.

(d) (6 points) The per unit price will be 15. The participation fee would be the fixed cost (300) divided by 10=30, $\pi=0, CS=6925, Q=170$.

Part III: Short Essay (Total points: 20).

5. Government ownership is an alternative way of regulating production that might otherwise be undertaken by a regulated private monopoly. In the US it is still the case that the government ownership is significant in for example the rail, electricity and water sectors. Discuss the rationale for government ownership of this type in terms of (1) the motivation for government ownership as a form of regulation (2) how it is supposed to work (3) any theoretical and practical weaknesses of government ownership. Try to use specific examples and evidence drawn from the class to support your views.

Government ownership can take different forms (e.g. municipal, state and national ownership). Municipal ownership is potentially very politically popular while national ownership has recently become very unfashionable and subject to mass privatisation. In Boston public transit is, perhaps, the most noticeable example of government ownership.

The motivation for government ownership is that it allows the government to set a very low price and to subsidise losses out of general taxation. These makes marginal cost pricing for a natural monopoly very possible. Many government enterprises are natural monopolies. Other motivations are a desire to manage employment and investment in the economy. In the American city a lot of public ownership can be traced to the early problems with private operation of utilities in the early days following the introduction of a new service. Glaeser has highlighted the corruption potential if private monopolies are allowed to operate important local services (such as public transport). Government owned enterprises may be more sensitive to public concerns about safety.

It is supposed to work by reducing the cost enforcing the achievement of social optimal quantities and quality of output ($P=MC$ or $P=AC$ if no subsidies are allowed). It is possible to have a private monopoly but this involves expensive regulation of prices and monitoring quality. This can be done with contracts, however, often the private regulated company faces perverse incentives. For instance under rate of return regulation we have the Averch-Johnson Effect which leads to over-capitalisation and no incentive to minimise operating costs.

One major weakness of government ownership is the incentive mechanism facing the managers and employees in the public enterprise. In the absence of profits it is difficult to write incentive based pay contracts and pay is often tied to civil service pay scales. This means that public companies may be inefficient. It is also the case that because prices may not reward quality then public companies supply low quality output (worsened by a shortage of public investment). These problems can be mitigated by municipal ownership where local politicians keep a close eye on enterprise performance. However for nationally owned firms political monitoring is often weak (because national governments have more important things to do), hence the push to privatisation after decades of underperformance in the UK for instance. Public enterprises are also likely to exhibit less efficient price discrimination and are subject to political pressure to have rate structures which favor politically powerful interest groups (e.g. large customers who make campaign donations).