

# Midterm

AEC 504 - Summer 2007

Fundamentals of Economics

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## 1 Social Welfare and Free Trade (40 points)

Assume that the demand for sporting guns is described by  $Q^D = 100 - 2p$  and the supply is described by  $Q^S = -20 + p$  ( $Q^D$  and  $Q^S$  are in millions,  $p$  is in \$)

- i. (5 points) Compute the equilibrium price and quantity. Compute the total value created in the market for sporting guns.
- ii. (5 points) Suppose that the government views sporting guns as a luxury product and taxes the consumers \$5 for each sporting gun they buy, to redistribute the wealth to the poor. Effectively, it means that the demand for sporting guns is now  $Q^D = 100 - 2(p + 5)$ . What losses do consumers (of sporting guns) incur as a result of the tax? What losses, if any, do the producers of sporting guns incur? What is the total loss/benefit to the society? What is the optimal tax rate?

*Hint: Remember that the poor benefit from the tax, since they get all the revenue the government collects from the buyers of sporting guns.*

- iii. (Hard, 15 points) Assume (for this part only) that the owners of sporting guns destroy the wildlife and thus generate a negative effects on others. More precisely, the ownership of  $Q$  millions of guns creates costs of  $3Q^3/64$  to the society. Find the optimal tax rate in this case.
- iv. (5 points) Suppose now that the government is concerned about the dominance of the low-cost foreign producers in the sporting guns market, so it sets the lowest price at which a sporting gun can be sold – \$35. What is the total loss/benefit to the consumers, the producers, and the society as a whole?

- v. (10 points) A famous shooter Bill Tell invents an enhanced version of a sporting gun. Unlike Bill Gates, he is altruistic and commits to supplying the new guns at the fixed price (equal to the cost of production) of \$20. The demand function for the new guns is the same as the demand function for the old ones. However, Bill Tell's invention drastically affect the market for the old guns, the demand for which now becomes  $Q^D = 70 - 2p$ . What is the value of Bill Tell's invention to the society as a whole?

## 2 Apartment Glut (20 points)

In the aftermath of the dotcom crisis the market of rental apartments on the West Coast suffered a large decrease in the demand

- i. (5 points) The landlords were considering offering either rent cuts or free services of landlord's employees (e.g., picking up and dropping off dry cleaning) as means of attracting new clients. Which measure would be more efficient for landlords of high-quality apartments for the rich and which would be efficient in lending apartments to the poor?
- Hint: Think about opportunity costs.*
- ii. (5 points) Assume that the landlords went with the rent cuts. Compared to the situation before the price cuts (but after the decline in income associated with the crisis), do you think the decrease in rent induced the consumers to spend more on other goods (not apartments)?
- iii. (5 points) An article about the aftermath of the dotcom crisis claimed: "In many cities on the coasts, where new construction is more difficult and where an influx of highly educated people over the last two decades has driven up home prices, rents have held up better". Discuss this statement in terms of supply and demand interaction
- iv. (5 points) Assume that the apartment is a necessity good and the own house is a luxury good. Would you rather be a developer of houses or a developer of apartment buildings during the recession after the dotcom boom?

*Hint: Necessity goods have income elasticity less than 1, and luxury goods have income elasticity greater than one.*

### 3 Consumer Choice (30 points)

Consider a consumer with utility function  $U = (x + 1)(y + 1)$  and income of 8. The prices of  $x$  and  $y$  are 1.

- i. (5 points) Compute the demand functions for  $x$  and  $y$  and the optimal allocation.
- ii. (5 points) Are the goods normal or inferior? Are they substitutes or complements?
- iii. (5 points) Compute the own-price, cross-price, and income elasticities of the demand for  $x$  at the given prices and income.
- iv. (5 points) What is the maximum amount the consumer will pay for the right to consume  $x$  at the price of 1?

*Hint: Think of what happens if he is precluded from consuming  $x$  and how to translate this into an income decrease.*

- v. (10 points) Suppose the price of  $x$  jumps to 4. What is the new optimal allocation? What amount of money is needed to compensate the consumer for the price change? What are the income and the substitution effects for  $x$  and  $y$ ?