

Homework 20

Due April 3, 2018

Homework must be on the instructor's desk at K9 by 15:10. Papers turned in from 15:11 till 15:40 will be accepted at a penalty of 10 points. Submissions at any other time or manner will be ignored. Any paper which does not resemble a work by a student of a world-class institution (not clean, illegible, unnamed, unstapled, unlabelled tasks, final results not in boxes etc.) will be penalized with up to 50 points at the discretion of the grader. Copying in homework will be penalized with a 0 in that assignment plus 0 in the previous submitted assignment. Students who give their homework away for others to copy from will be penalized with 0s in the past 3 assignments*.

1. Consider the Main Street market with N consumers uniformly distributed on the one-mile long linear street. Assume there are two firms, A and B, which sell differentiated goods at zero operational costs. Each consumer buys at most one unit of the good either from A or from B and incurs a transportation cost tx^2 , where x is the distance travelled. At stage 1, firms choose their locations. At stage 2, firms choose prices.
 - (a) Find the equilibrium locations and prices if there are no network effects. [30p]
 - (b) Assume now that locations are fixed at the equilibrium level you derived at (a) and there exist network effects, so that consumer surplus depends on consumer's location x such that $CS_k = V + ms_k^e - tx_k^2 - p_k$, where s_k^e is the expected market share of consumers who purchase from firm $k \in \{A, B\}$. Find the new equilibrium prices. [20p]
 - (c) What is the impact of the network effect on the price competition? Explain. [10p]
 - (d) Explain why the sign of m has to be positive and not negative as it was shown in the lecture? [5p]
 - (e) Explain why $0 < m < t$? [5p]

2. Two firms are competing in their simultaneous choice of technologies. The payoff matrix for the game is given below.

Firm 1\Firm 2	Technology A	Technology B
Technology A	6, 7	3, 12
Technology B	3, 11	5, 8

- (a) What is/are the equilibrium/equilibria in the game and how have we called games of that type? Explain. [10p]
- (b) If firms make their choices consequently. Who should be given the right to move first in order to maximize total welfare? [10p]
- (c) How can firm 2 defend itself from undesirable actions of firm 1? [10p]

**The harsh penalty for the good students who offer their homework for copying is to give them a good excuse to say NO to those who use social peer pressure to make them give their work away. In case cheating happens again, I will request a reprimand for unethical behavior to be added to those students' permanent public records. If you care and want to help other students, sit with them and TEACH THEM how to solve the tasks, do not just throw the answers to their face.*

Estimated completion time: 100 min

Difficulty level (normalized to UoL standards): 1. 4/5 2. 4/5