Problem Set 4
Global Poverty and Economic Development

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NB: This problem set is due on the 20th of December by 5.00pm. Please submit your work on OLAT in the section "Problem Set 4" with your name on the first page. Please also indicate the name of the other person with whom you worked.

1 Theory - Repeated Games

The economy consists of 2 agents: a buyer and a seller. The seller can offer a high- or low-quality product; a high-quality product implies that the product works, a low-quality one does not. A seller can achieve a high-quality product by putting in effort $c > 0$. The buyer is willing to pay $p_H = 3$ (the expected value of the high quality good for the buyer) if the product works, $p_L = 1$ otherwise. However, the buyer will not be able to observe the quality of the product until *after* the purchase.

1. Say that the buyer and seller engage in a single period (one-period) game with no repetition. What would be the equilibrium outcome when $c < 3$?

2. Describe in a few lines what the folk theorem is.

Now assume that the buyer and the seller engage in an infinitely-repeated game. Assume there is a discount rate δ, and that at the beginning of the game the buyer and seller start in a trust setting; this implies that they trust one another, i.e. seller offers a high-quality product ($c > 0$) and the buyer pays $p_H = 3$. If however at any point a product breaks down, a punishment is triggered, whereby the buyer pays $p_L = 1$ for all future periods.

3. Set-up the condition that ensures that the seller doesn't deviate from the trust equilibrium.

4. What does this condition imply for the δ versus c? Explain.

Assume now that there exists a probability β with which high-quality products breaks down (you can assume that the low-quality product always breaks down). As before, the seller puts in effort $c > 0$ for a high-quality good.

5. What is the maximum price a buyer will be willing to pay for a high-quality good? Call this price p_{max}

Under this scenario, a strategy where the buyer never buys from a seller when the product breaks down may be too harsh of a punishment. Consider a strategy where the buyer only punishes the buyer for T periods after experiencing a product breakdown.

Take V^+ to be the value to the seller of being in a trust setting, and V^- as the continuation value to the seller in punishment period.

$$V^+ = p_{max} - c + (1 - \beta)\delta V^+ + \beta\delta V^-$$

$$V^- = \delta^T V^+$$

where p_{max} is the price defined in point 5.

6. What would be the no-deviation condition in this setting?

7. Find the minimum level of T to satisfy the no-deviation constraint. You are asked to provide an implicit solution for T of the following form: $f(\delta, T) > g(c, \beta)$, where you need to find $f(\cdot)$ and $g(\cdot)$

2 Evaluation Design

To increase education levels in the country, the government implements a large-scale schooling program which aims to build primary schools in regions of the country with very low enrollment rates. The government would like to understand the long-term impacts of such a program. Help them to design and implement the program, and discuss how you would evaluate the impact of this program at the aggregate level. Things you should consider: the structure of the program, the evaluation design, the empirical strategy, and the general equilibrium concerns (max 1000 words).