

考 試 科 目	個體經濟學	所 別	政大 經濟學系	考 試 時 間	2 月 25 日(星期六) 第二節
---------	-------	-----	------------	---------	-------------------

1. (25 points)

Set up a model of two producers (each producing a single commodity) and one final consumer to discuss the economic incidence of a sales tax of 5% ad valorem partially on one of the two commodities in the general equilibrium framework, in which markets are interlinked and supply and demand interact to determine a market-clearing price in each market.

Note: You will have to state first the assumptions underpinning the model, including: technology of production, behavior of factor suppliers, market structure, total factor supplies, consumer preferences.

2. (25 points in total, from 5 sub-questions)

Suppose that two swine farms are located along a river. The upstream swine farm (x) has a production function of the form:

$$X = 2000(L_X)^{0.5},$$

where L_X denotes labor employed per day by farm x, and X denotes output level of the upstream swine farm x in kilograms. The downstream swine farm (y) has a similar production technology, but its output may be affected by the effluents farm x discharges into the river. The production technology of farm y can be described as follows:

$$Y = \begin{cases} 2000(L_Y)^{0.5}(X - X_0)^a, & \text{for } X > X_0, \\ 2000(L_Y)^{0.5}, & \text{for } X \leq X_0, \end{cases}$$

where L_Y denotes labor employed per day by farm y, and Y denotes output level of the downstream swine farm y in kilograms; X_0 is the river's natural capacity for neutralizing waterborne pollutants—let's assume X_0 amounts to 38000 in this case.

Production process of farm x would have no effect on farm y if parameter a equals zero. However, if a is less than zero, an increase in the output of farm x above X_0 would drive down farm y's output.

Assuming pork sells for one dollar per kilo and the prevailing daily wage is fifty dollars.

(a) (5 points)

Discuss the optimal output and labor employment decisions of farms x and y under the scenario where there are no externalities.

(b) (5 points)

Discuss the optimal output and labor employment decisions of farms x and y under the scenario where there are negative externalities, say, $a = -0.1$.

(c) (5 points)

Discuss the inefficiency under the decentralized profit maximization as in sub-question (b), by contrasting with the decisions of output and labor employment of both farms under a merger.

(d) (5 points)

Discuss the social marginal productivity of labor input into the negative externality generating farm x

考 試 科 目	個體經濟學	所 別	2161 經濟學系	考 試 時 間	2 月 25 日(星期六) 第二節
---------	-------	-----	--------------	---------	-------------------

once the two farms are merged, and contrast it with the case of decentralized profit maximization.

(e) (5 points)

An alternative proposal to remedy the externality problem of the aforementioned case could be to tax on the upstream farm x so that its output would reduce to a level at which the externality vanishes. What rate of such a Pigovian tax would you suggest to the Minister of Agriculture and Environment? And also brief the Minister on the consequence of output and labor employment of the two farms.

3. (五十分，每小題五分) 本大題請使用英文作答。

請解釋並說明下列專有名詞，並指出其在經濟學上的重要性為何。未使用英文作答、或是未說明重要性者，該小題以零分計算。

- Convex preferences
- von Neumann–Morgenstern utility functions
- Second welfare theorem
- Substitution effects
- Production function
- Elasticity of substitution
- Nash equilibrium
- Conditional factor demand functions
- Weak axiom of revealed preferences
- Compensated demand functions