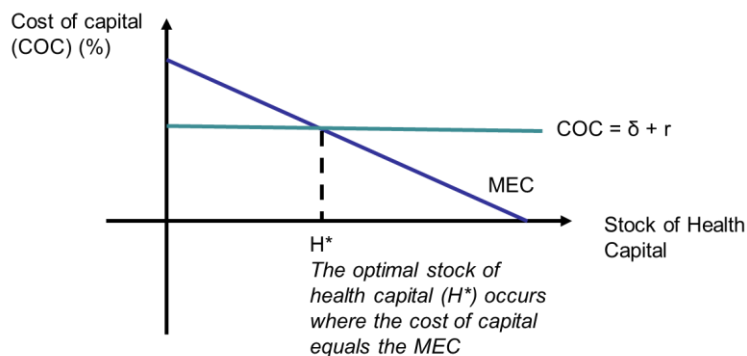


Question 1: (50%)

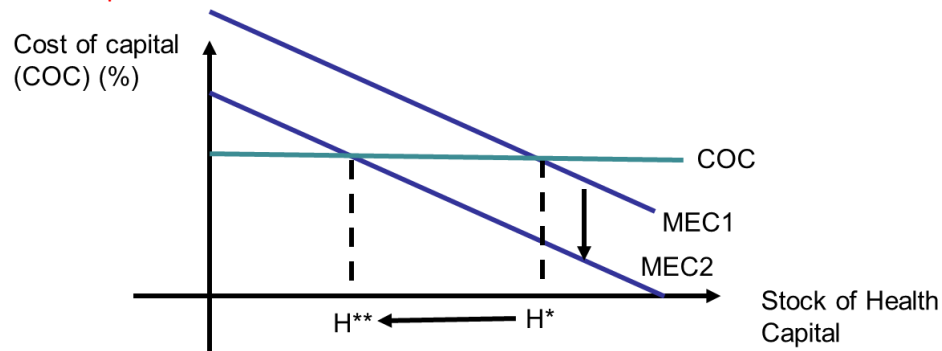
Michael Grossman was the first to view health as a choice variable, and view demand for health care as a result of the demand for “good health”. He developed the economic model referred to as “the Grossman model”

- a) Within this modelling framework, what are the three main motives for why individuals demand health? Explain each of the motives briefly.
1. Consumption motive: $U(H,...)$ Individuals derive direct utility from being in good health.
 2. Investment motive: $U(...,C)$ Better health yields more healthy days, thus more time to work, which in turn gives a higher income, allowing more consumption.
 3. Longevity motive: $U(H,C)$ Better health yields utility from health itself and consumption in more periods
- b) Explain what is meant by cost of capital (COC) and marginal efficiency of capital (MEC). Mention two factors that influence COC and two factors that influence MEC.
- a. COC is the cost of holding capital, defined as the sum of depreciation, interest and appreciation. In the Grossman model, COC is defined as depreciation (δ) plus the interest rate (r). Thus, both depreciation and the interest rate are factors that influence COC. Some factors may influence COC indirectly; for example, age may impact COC via the depreciation rate.
 - b. MEC reflects the percentage increase in output made possible by adding another unit of capital (expressed as value terms). Example of factors that influence MEC are the price of medical care, wage rate, education level, and the marginal productivity of health.
- c) How can individuals identify the optimal stock of health capital (H^*) given COC and MEC? Explain with words and illustrate with a graph showing the optimal stock of health capital (H^*) and the COC and MEC curves.
- a. In the Grossman model, individuals identify H^* at the point where $COC = MEC$. The MEC curve slopes downward, because the marginal product of health capital diminishes as the stock increases. The user cost of capital is independent of the stock of health, and therefore is a horizontal line in the diagram. To the right of H^* , the COC is higher than MEC – meaning that the cost of holding health stock is higher than returns you get from it.



d) Assume that the price of medical care increase. How does this impact the stock of optimal health capital (H^*)? Explain with words and draw a new graph showing movement from initial H^* to the new optimal stock of health capital H^{**} .

- a. An increase in the price of medical care increases the unit cost of health investments and thus reduces MEC such that the MEC curve shifts to the left. Holding everything else constant, an increased price of medical care thus reduces the optimal stock of health capital from H^* to H^{**} .



Question 2: (25%)

a) Explain the following concepts related to financing of health care services:

- Global budgets

Prospective reimbursement (i.e. set in advance) that are independent of current activity. The budget level is typically set based on historical costs (or last year's budget). If providers are given a global budget, s/he holds the financial risk both for activity and cost.

- Activity-based financing

The payment to the provider depends on the activity level. In hospitals, the payment is often related to discharges of patients, and the payment typically are determined by the patient's Diagnosis Related Group (DRG).

- Retrospective financing system

The payment to the provider is based on the realized cost of the provider. I.e., the providers are paid for costs after the treatment is provided, and the costs are realized. In a retrospective payment system, the payer holds all financial risk, i.e. both the risk that the treatment turned out to be more costly than expected, and that more patients than expected are treated.

- Prospective financing system

A fixed price is paid. In hospitals, the fixed price is often paid according to the DRG, but prospective payments can also be related to global budgets and capitation, that is, fixed price per individual. If the prospective payment is related to activity, as in the hospital case, the provider covers the risk of treatment costs, while the payer covers the risk of the activity level.

- b) How does the reimbursement systems mentioned in a) allocate financial risk between the payer and provider of health care services?

See answers given in a)

- c) Explain why high-cost patients risk delayed treatments if the payment system is prospective

If the payment system is prospective, prices are set ex ante. If the expected cost of a patient's treatment is higher than the price, the provider's expected profit is negative. If the provider cares (to some extent) about profit, s/he might decide to delay treatment or to provide cheaper services (skimping).

Question 3: (25%)

- a) Why is not-for-profit hospitals a response to for-profit hospitals' missing incentive to provide high-quality care in the market?

(Clinical) quality is difficult to observe ex. ante in such a way that a third party can verify if a certain quality level is provided, and high quality care is costly to produce. We thus say that (clinical) quality is non-contractible.

For-profit hospitals are confronted with an incentive to underinvest in quality (stinting) - why? Not-for-profit hospitals a response to stinting. Also, the non-profit can (more) credible claim it will provide high quality since it does not pay dividends to its owner.

- b) The following figure relates to a not-for-profit organization. Explain the different parts in the figure, and how it determines the not-for profit organization's optimal choice of optimal quality and quantity.

The curve connecting the quality-quantity-axes shows different combinations of quality and quantity that satisfy the non-for-profit's zero-profit-constraint. Its called the organization's quantity-quality frontier, and is the combinations of points where the demand curve (average revenue) equals the average cost curves. Its backward bending since at low level of quality, a given increase in quality is highly valued by patients, resulting in relatively large outward shifts in demand relative to a smaller shift in average cost. When quality is high, further quality improvements do not longer strongly attract customers, but quality is increasingly costly. Hence the shift in average costs dominates.

The other curve is the indifferent curve of the hospital. I.e., it shows different combination of quality and quantity that makes the hospital equally well off. It has the standard form of an indifferent curve due to decreasing marginal utility of quantity and quality.

The hospital's optimal quality-quantity combination is determined when the indifference curve and the quantity-quality frontier are tangent.

Extra points to the students who mention that if the utility functions vary among hospitals (some put more weight on quality relative to quantity) we would observe different quality being provided in the market

