Hospitals and patients

- Hospitals attract patients (revenues)
- Patients esteem
  - quality of medical care
  - quality of food
  - friendliness of the staff
  - proximity to patients and family
  - neatness and cleanliness
- Price matters only a little bit (if at all)
- Discussion: Competition - regulation - insurance
Hospital level

• Strategische Ziele
  Wettbewerb um „Marktanteile“
  Wettbewerb um medizinische Innovationen

• Ansatzpunkte
  Leistungssteigerung
  Qualitätssteigerung
  Effizienzsteigerung

• Indikatoren
  Strukturqualität
  Prozessqualität
  Ergebnisqualität
A simple model of equilibrium quality and price.

- Hospital has a simple utility function (it desires size $N$ and quality $S$): $U(N, S)$
- Patients’ willingness to pay for the hospital service is represented by the inverse demand curve:
  $$ P(N, S); \frac{\partial P}{\partial N} < 0; \frac{\partial P}{\partial S} > 0 $$
- Break-even constraint for a not-for-profit hospital:
  $$ P(N, S) \times N = C(N, S) $$
- Cost increase with quality and quantity: $\frac{\partial C}{\partial N} > 0; \frac{\partial C}{\partial S} > 0$

Market forces

How do various market forces (competition and insurance) alter the outcomes?
Demand and average cost curves depending on S
Equilibrium combinations of quantity and quality

- The demand curve for $S_1$ must intersect the corresponding average cost curve
  - at either two points,
  - at one point (tangent),
  - or never

- When two intersections occur – the one to the lower right is always the best (hospitals prefer to produce more care).
The optimum mix of N and S I

- EE line: the set of quantity-quality points that jointly satisfy the demand conditions facing a hospital and its zero profit constraint.
  - only the \textbf{downward sloping} portion of the curve matters!
- The EE curve is mapped into the hospitals possibility frontier FF
  - the best equilibrium point for the hospital is picked by using the indifference curve concept \((S^*, N^*)\)
The optimum mix of N and S II
Formal analysis of equilibrium I

Lagrange optimization

\[ L = U(N, S) + \lambda [P(N, S)N - C(N, S)] \]

F.o.c.

\[ U_N + \lambda [P(N, S)(1 + \frac{1}{\eta}) - C_N] = 0 \]
\[ U_S + \lambda (P_S N - C_S) = 0 \]
\[ P = \frac{C}{N} = AC \]

- Price elasticity of demand confronting the hospital. \( \ldots \eta \)
- Partial derivatives. \( \ldots U_N, U_S, C_N, C_S, P_S \)

\[ \frac{U_N}{[C_N - P(1 + \frac{1}{\eta})]} = \lambda \]
\[ \frac{U_S}{(C_S - P_S N)} = \lambda \]
Maximization requires the ratio of marginal utility to marginal cost to be equal for both N and S.

Net cost of N is marginal cost minus marginal revenue: \( C_N - P(1 + \frac{1}{\eta}) \).

In equilibrium MC exceeds MR which in turn requires expanding productions past the monopoly level (where MR = MC).

The hospital “spends” potential profit on the expansion of sales (see the utility function).
Competition between hospitals

- We have presumed so far that the hospital is a monopolist.
- However, in many cities, the market is shared by few hospitals.

If another hospital increases its quality:
- demand for higher quality (in the original hospital) will fall
- demand for lower quality (in the original hospital) will increase
- downward-sloping portions of EE flattens out
- FF flattens out as well
- the desired point is one with more N and smaller S
- Hospitals specialize in different styles of output.
Entry by new hospitals

- does the same thing to the incumbent hospital
- If the new entrant has precisely the same quality, all demand curves would shift similarly, and the entire EE and FF curves shift inward.
- Standard monopolistic competition as an ultimate equilibrium.
- Hospitals need to have demand curves crossing AC curves for at least one point.
- The limiting case occurs when each hospital in the market has its demand curves at all levels of quality just touching their AC curves at one point - just tangent to the AC curves.
- The excess-capacity story of monopolistic competition \(\rightarrow\) too many hospitals in the market.
Excursus: monopolistic competition in the short-run

$$\text{MC} = \text{MR}_{SR}$$

profit
$$(P_{SR} - AC^*)Q_{SR}$$
Excursus: monopolistic competition in the long-run

\[ MC = \text{MR}_{LR} \]

\[ (P_{LR} - AC)Q_{LR} = 0 \]
If every hospital has similar EE curves, the market is stable with no incentive for any hospital to enter or exit.
If patients suddenly became insured with “coinsurance-type” insurance:

- demand curve rotates clockwise
- EE curve shifts outward to the right
- FF expands outward (happens for all hospitals)

- quantity of care demanded and average quality, and hence average cost increase.