



# Module 3: Hospital Pricing and Competition

## Part 1: Single and Two-price Market

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Econ 372

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# Unilateral Pricing (depends on the objective)

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# Pricing for NFP hospitals

Objective is to maximize some function of profits and quantity of care provided, denoted by

$$U(\pi_j = \pi_{i,j} + \pi_{g,j}, D_{i,j}, D_{g,j})$$

where  $\pi_j$  denotes total profits for hospital  $j$  and  $D_{i,j}$  denotes hospital demand from insurer  $i$ . We assume that  $p_j$  is exogenous and determined by a public payer, so the hospital need only set its price for private insurance customers,  $p_i$ .

# Solution for NFP hospital

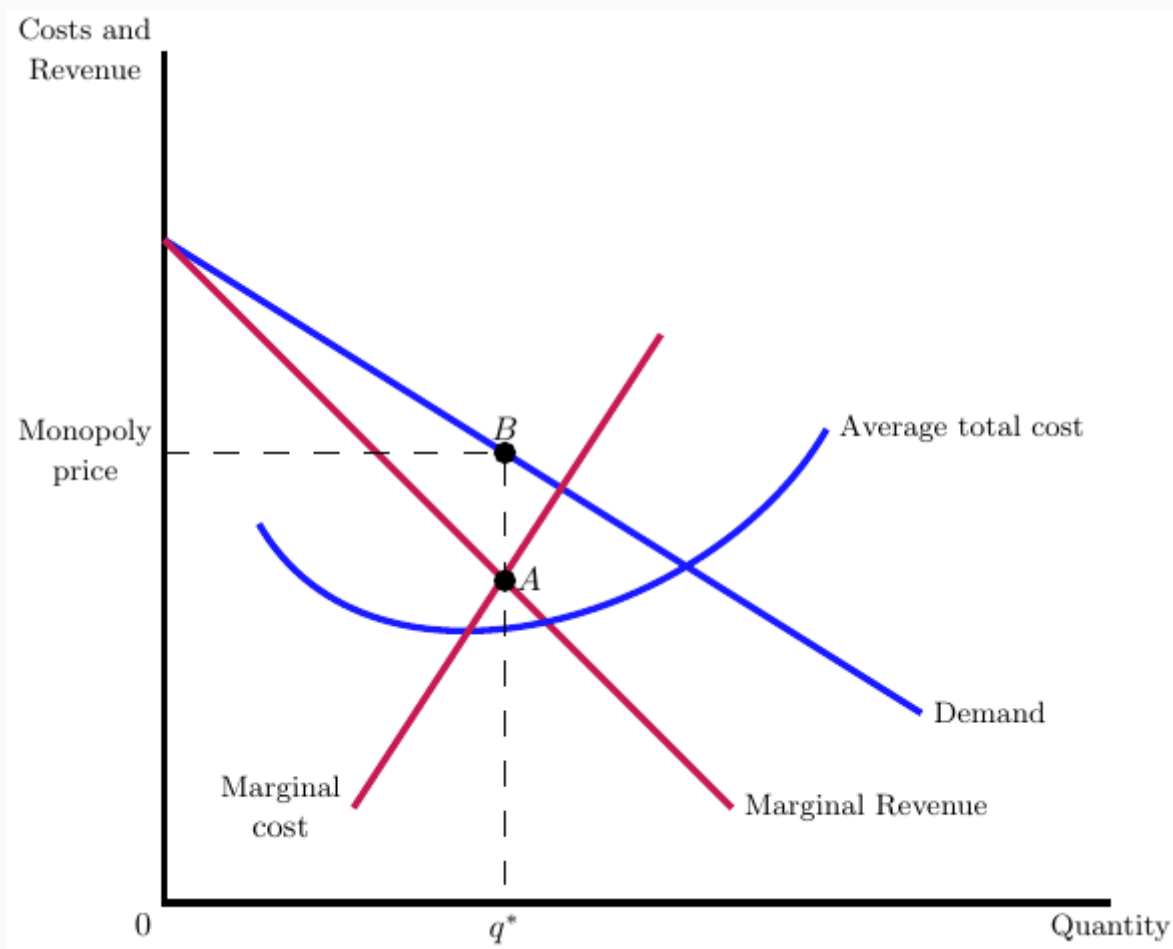
The hospital chooses  $p_i$  such that

$$\frac{dU}{dp_i} = U_1 \pi_1^i + U_2 \frac{dD_i}{dp_i} = 0,$$

where  $U_1$  denotes the derivative of  $U(\cdot)$  with respect to its first argument and similarly for  $U_2$ .

In general, we can't solve this directly without knowing the hospital's utility function.

# Assuming pure profit maximization



# Example

Consider the firm's demand curve,  $d = 16 - q$ , and cost curve,  $c(q) = 5 + q^2$ . Where will the firm produce and at what price? What is the firm's markup over marginal cost? The profit function is,  $\pi = (16 - q)q - 5 - q^2$ . Differentiating with respect to quantity yields  $-q + 16 - q - 2q = 16 - 4q = 0$ , or  $q = 4$ . At this quantity, the price is  $p = 12$ , which is a markup of 4 over the marginal cost (or 50% markup).

# In-class problem (unilateral pricing)

Consider the firm's demand curve,  $d = 40 - 2q$ , and cost curve,  $c(q) = 5q + \frac{1}{2}q^2$ .

1. What is the firm's profit maximizing choice of quantity and price?
2. What is the markup over marginal cost?



# Two-price Market

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# Relationship between prices

In health care, providers usually face two prices:

1. A price fixed by Medicare and Medicaid,  $p_m$ .
2. A price that is negotiated with insurers,  $p_n$ .

How does  $p_m$  affect  $p_n$ ?

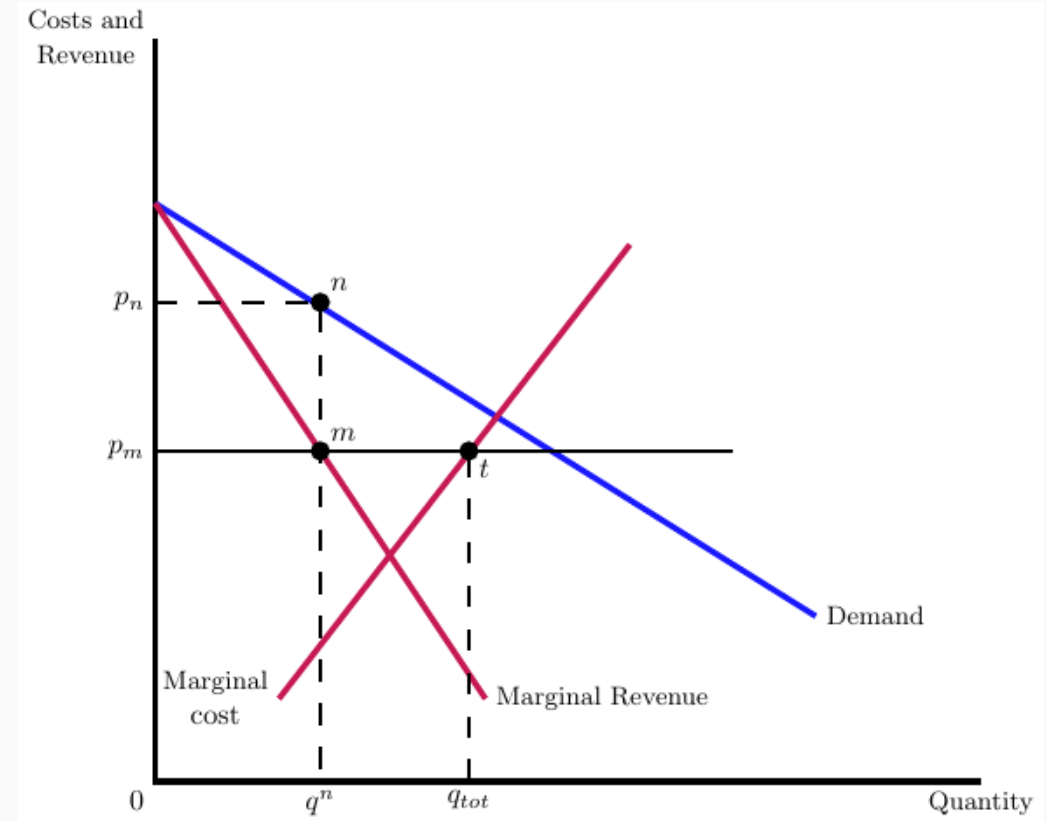
# Two price market and NFP

Although we don't know the general solution for the private price, we can find how it varies with the public price...

$$\frac{dp_i}{dp_j} = - \frac{U_{11}\pi_1^i\pi_1^j + \frac{dD_i}{dp_i}U_{12}\pi_1^j}{\frac{d^2U}{dp_i^2}}$$

# Two price market and FP

- Sell to "private" market as long as marginal revenue exceeds the public price
- Switch to "public" market otherwise, and sell to the point where price equals marginal cost



# In-class problem (two-price market)

Consider the firm's demand curve in the private insurance market,  $d = 16 - q$ , and costs,  $c(q) = 5 + q^2$ . Assume that there exists a public insurer that pays a fixed price of  $\bar{p} = 10$ .

1. How many private patients will the provider serve?
2. How many public patients?
3. What if  $\bar{p}$  drops to \$9.

# Cost-shifting

- Relationship between public and private price is important
- Speaks to anticipated effects of a change in Medicaid or Medicare rates
- Do hospitals "make up" the difference?

The idea that hospitals will increase private prices following a decrease in the public price is called **cost shifting**.

# Cost-shifting

But how could it happen?

Assumes that hospitals could have increased private prices earlier but chose not too. This is technically possible if, for example:

- Hospital has very low margins (maybe negative with a lower public price)
- Insurer wants to prop up the hospital for competitive reasons
- Hospital has diminishing returns to profits

but economists usually see this as a smaller effect than most policy makers.