Module 1: What is the Hospital Objective Function?

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Econ 771

Table of contents

1. Motivation

2. Not-for-profit Hospitals

3. For profit Hospitals

4. Cost-shifting

5. Physicians' Cooperative

Motivation

Ownership types

1. Private not-for-profit: About 60%
2. For-profit: About 20%
3. State and local gov't: About 20%

Source: AHA Fast Facts

Policy effects

Understanding how hospitals might respond to changes in policy or how they will strategically respond to each other requires that we know something about their objective function.

1. All for profit?

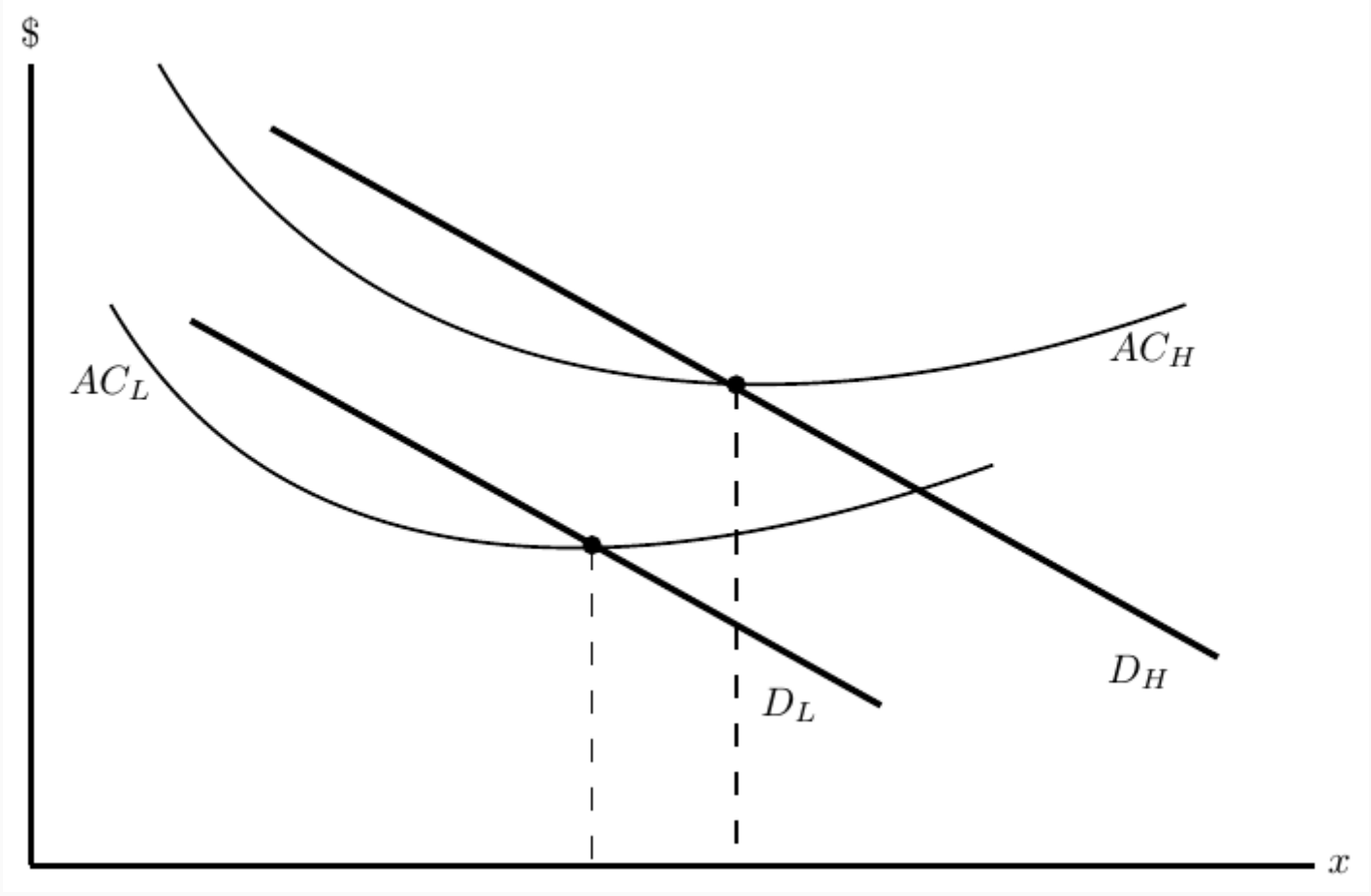
2. Profit motive with some charitable "mission"?

Not-for-profit Hospitals

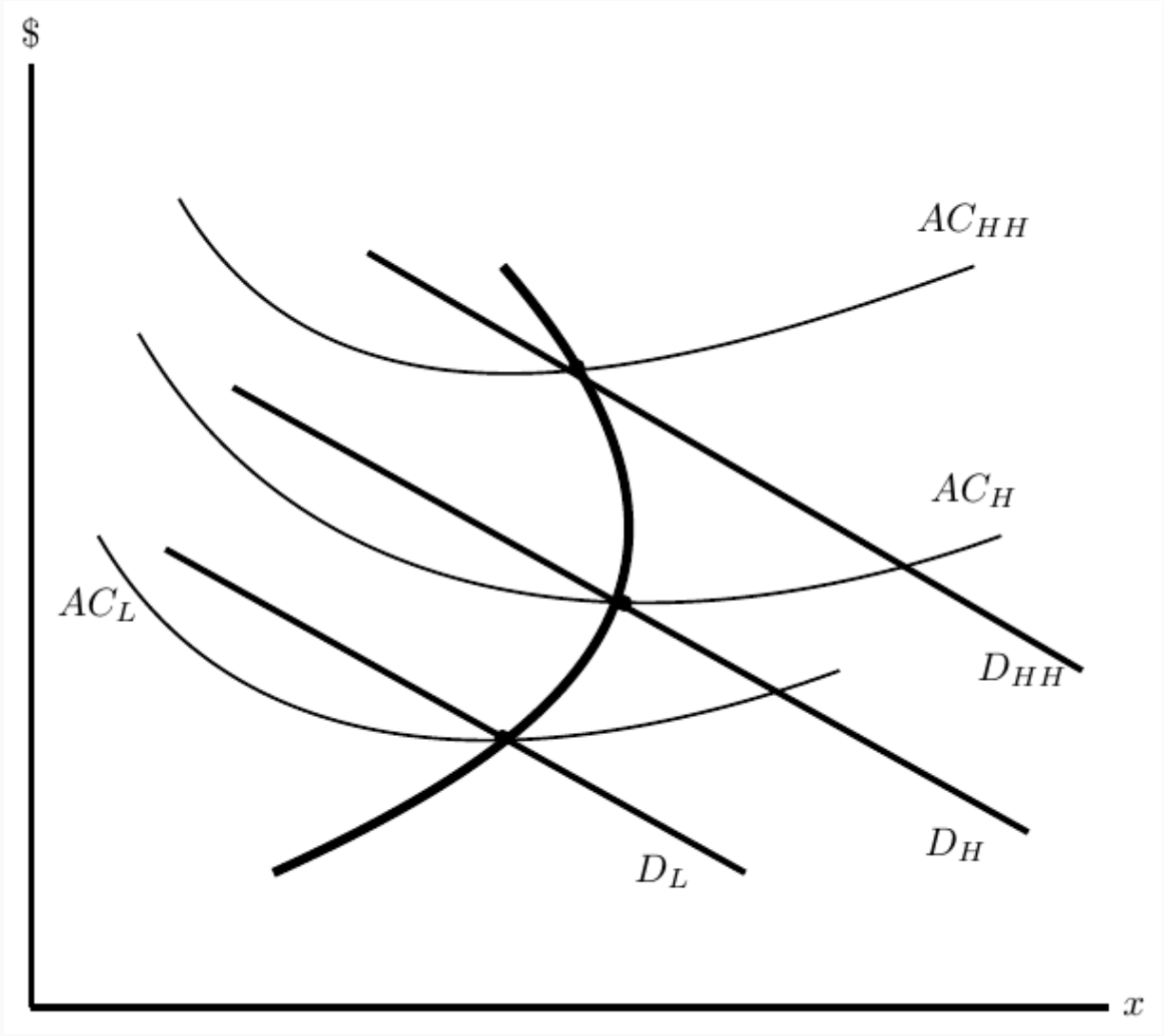
Non-profit hospitals in theory

- Hospital assumed to maximize some objective function, $u(q, z)$, subject to a production constraint
- q denotes quantity of care and z denotes quality of care
- Production is constrained by the break-even condition

Non-profit hospitals in theory, Newhouse (1970)



Non-profit hospitals in theory, Newhouse (1970)



Non-profit hospitals in practice

- Profits must be re-invested into the hospital
- Must show "community benefit" (no consensus definition...includes uncompensated care, services to Medicaid, and certain specialized services that are generally unprofitable)
- No taxes! and tax-free bonds

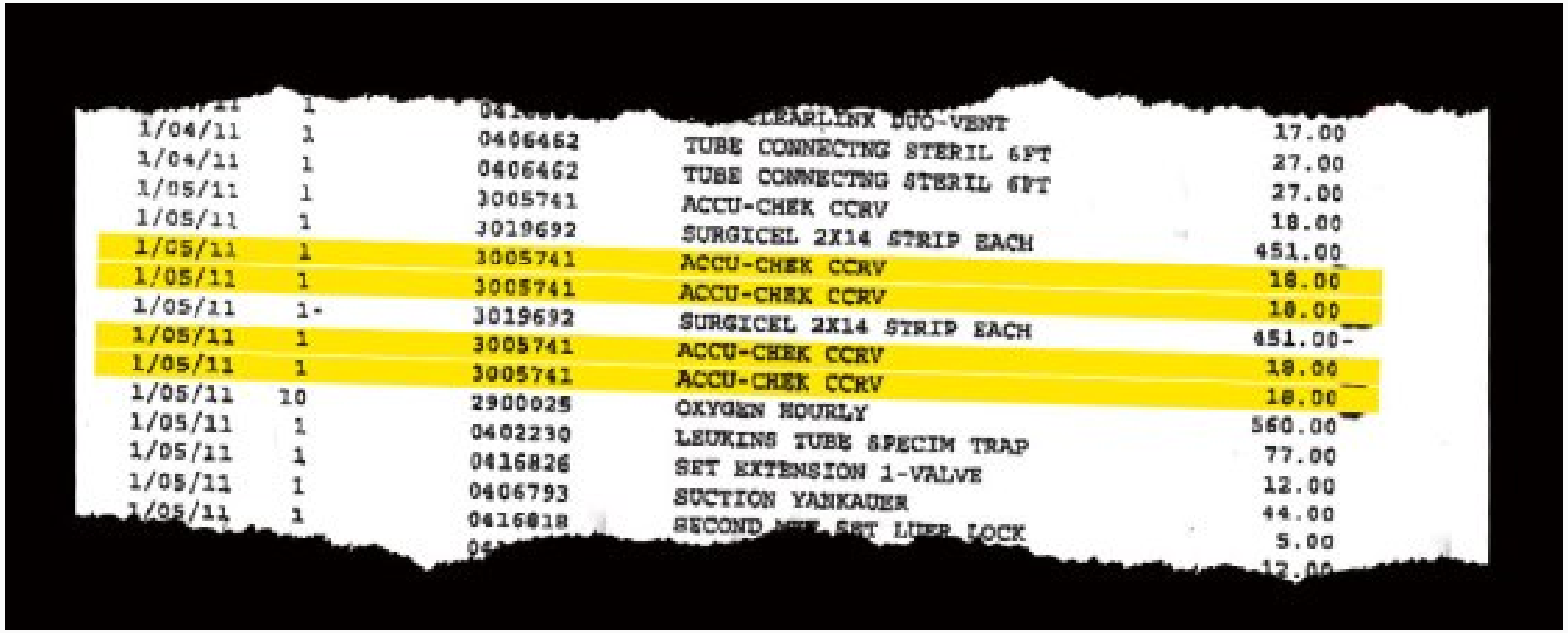
Non-profit hospitals and tax benefits

- $24.6 billion in tax exemptions in 2011
- $62.4 billion in "community benefits"
- Washington Post Article

What do you think? Are these community benefits measured appropriately?

An aside on hospital pricing

What is a hospital price? A defining characteristic of hospital services is, *it's complicated!*



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				12.00

Brill, Steven. 2013. "Bitter Pill: Why Medical Bills are Killing Us." *Time Magazine*.

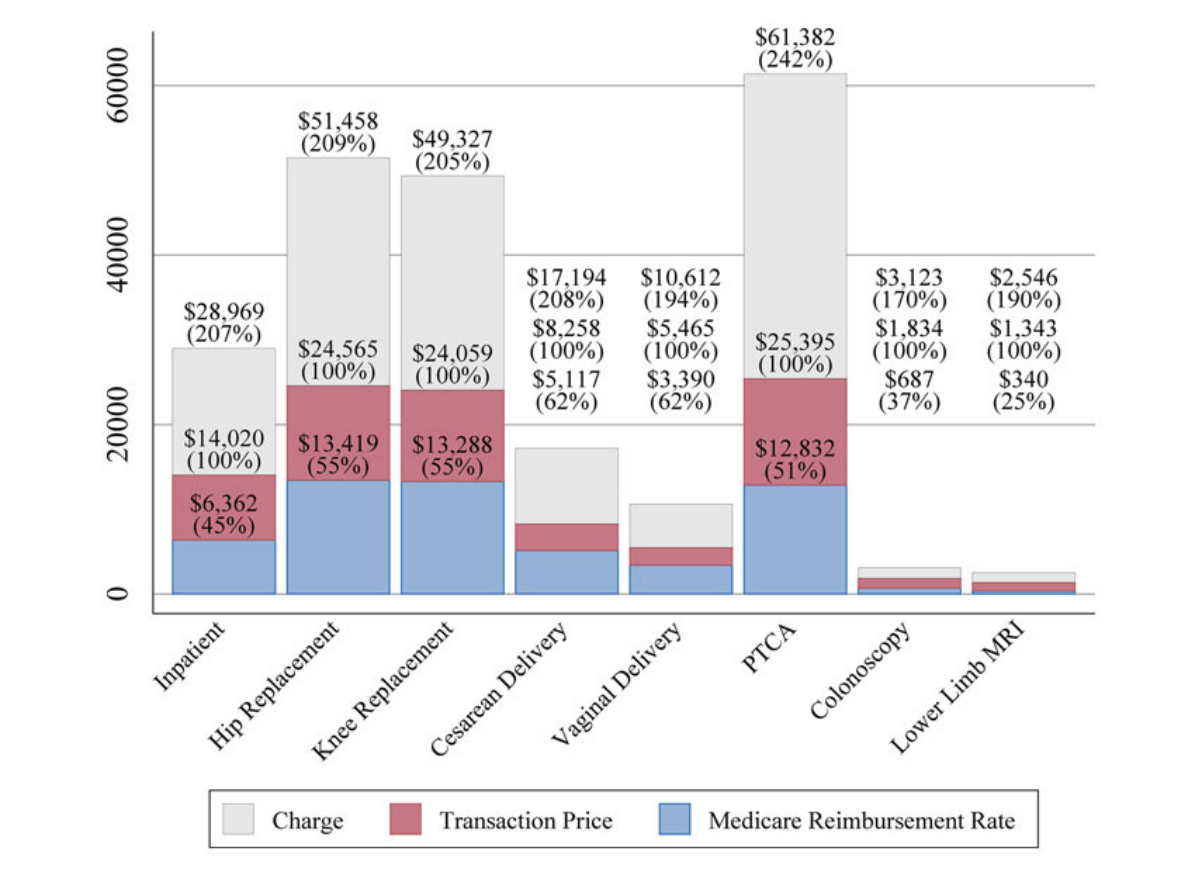
An aside on hospital pricing

Lots of different payers paying lots of different prices:

- Medicare fee-for-service prices
- Medicaid payments
- Private insurance negotiations (including Medicare Advantage)
- But what about the price to patients?

$$\text{Price} \neq \text{charge} \neq \text{cost} \neq \text{patient out-of-pocket spending}$$

An aside on hospital pricing



Source: Health Care Pricing Project

What is a hospital price?

Not clear what exactly is negotiated...

Fee-for-service

- price per procedure
- percentage of charges
- markup over Medicare rates

Capitation

- payment per patient
- pay-for-performance
- shared savings

An aside on hospital pricing

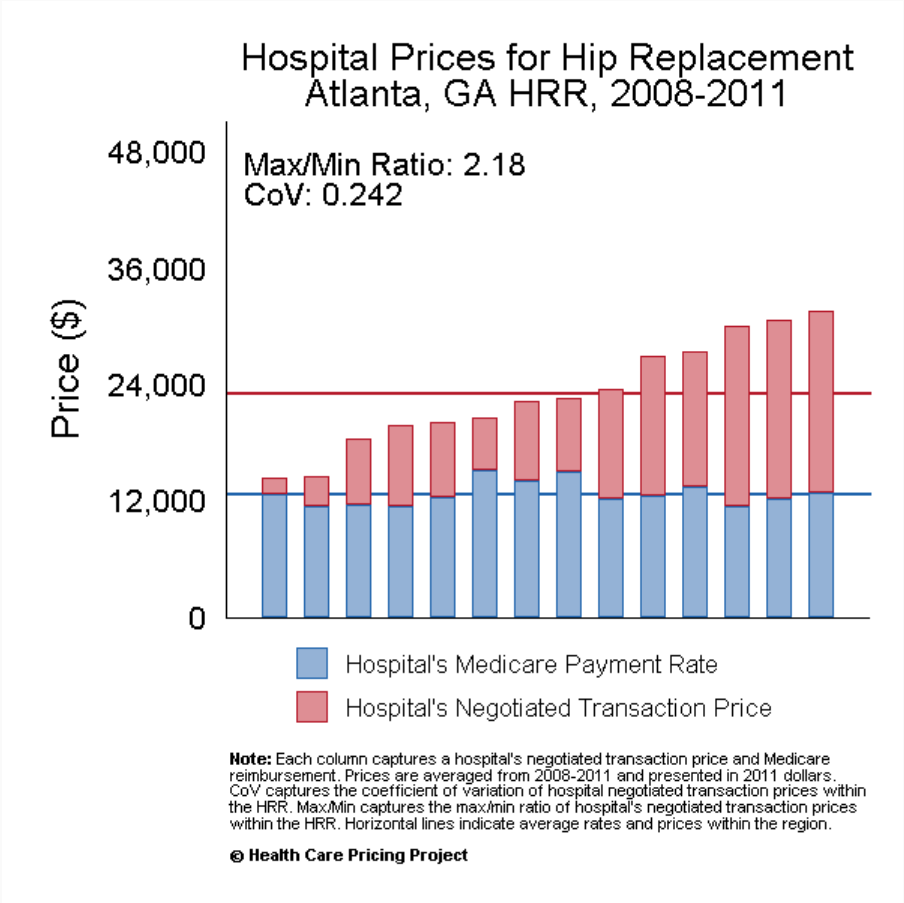
A few stylized facts:

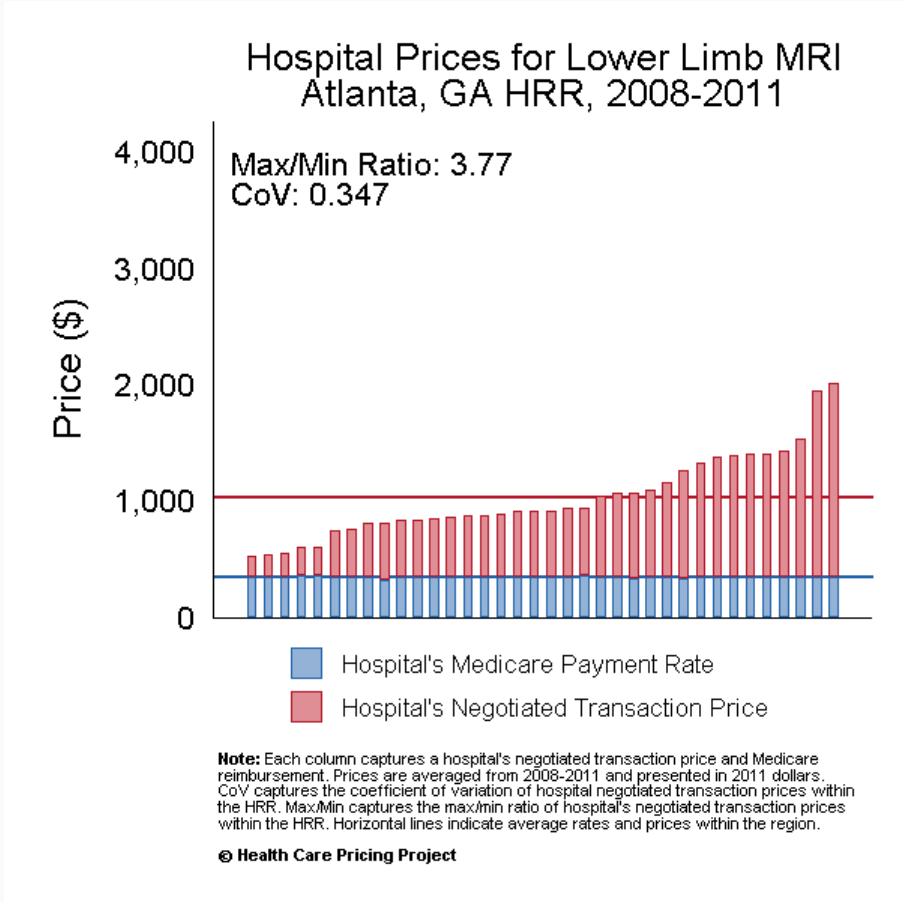
1. Hospital services are expensive

2. Prices vary dramatically across different areas

3. Lack of competition is a major reason for high prices

An aside on hospital pricing





What is a non-profit hospital?

The real question is...what is the hospital's objective function?

- For-profit in disguise
- Output maximizers
- Tax-benefit maximizers
- Social welfare maximizers

Most empirical evidence doesn't find much of a difference between FP and NFP hospitals, except FPs have higher prices. Why is that?

For Profit Hospitals

For-profit hospitals

These are easier to study theoretically...just a standard profit maximizing firm.

- $\pi = P(q)q - C(q)$, where q denotes quantity of care
- Firm has some market power and so faces a downward sloping demand curve

Cost Shifting

What is cost-shifting?

The process by which hospitals increase prices for private insurance patients in response to lower reimbursements from other patients

Theory of cost-shifting, Dranove (1988)

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

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

where π_j denotes total profits for hospital j and $D_{i,j}$ denotes hospital demand from insurer i.

- p_j is exogenous and determined by a public payer
- hospital sets price for private insurance customers, p_i

Theory of cost-shifting, Dranove (1988)

The hospital chooses p_i such that

$$\frac{\partial U}{\partial p_i} = U_1 \pi_1^i + U_2 \frac{\partial D_i}{\partial p_i} = 0,$$

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

Theory of cost-shifting, Dranove (1988)

How does the choice of p_i change with p_j?

$$\frac{\mathrm{d}p_i}{\mathrm{d}p_j} = -\frac{U_{11}\pi_1^i\pi_1^j + \frac{\partial D_i}{\partial p_i}U_{12}\pi_1^j}{\frac{\partial^2 U}{\partial p_i^2}}$$

Cost-shifting in practice

- Can it happen? Not theoretically supported if hospitals are for-profit. Supported if something other than profits actually drives a hospital's decisions
- Does it happen? Empirically, some evidence of cost-shifting but likely small with heterogeneous effects
- Some people **really** don't think cost-shifting happens, incidental economist blog.

Physicians' Cooperative

Hospitals as a physicians' cooperative

- Physicians as the owners of the hospital
- Divide operational profits among themselves
- In practice: physician owned hospital or simply medical staff of the hospital with some control over physician admitting privileges

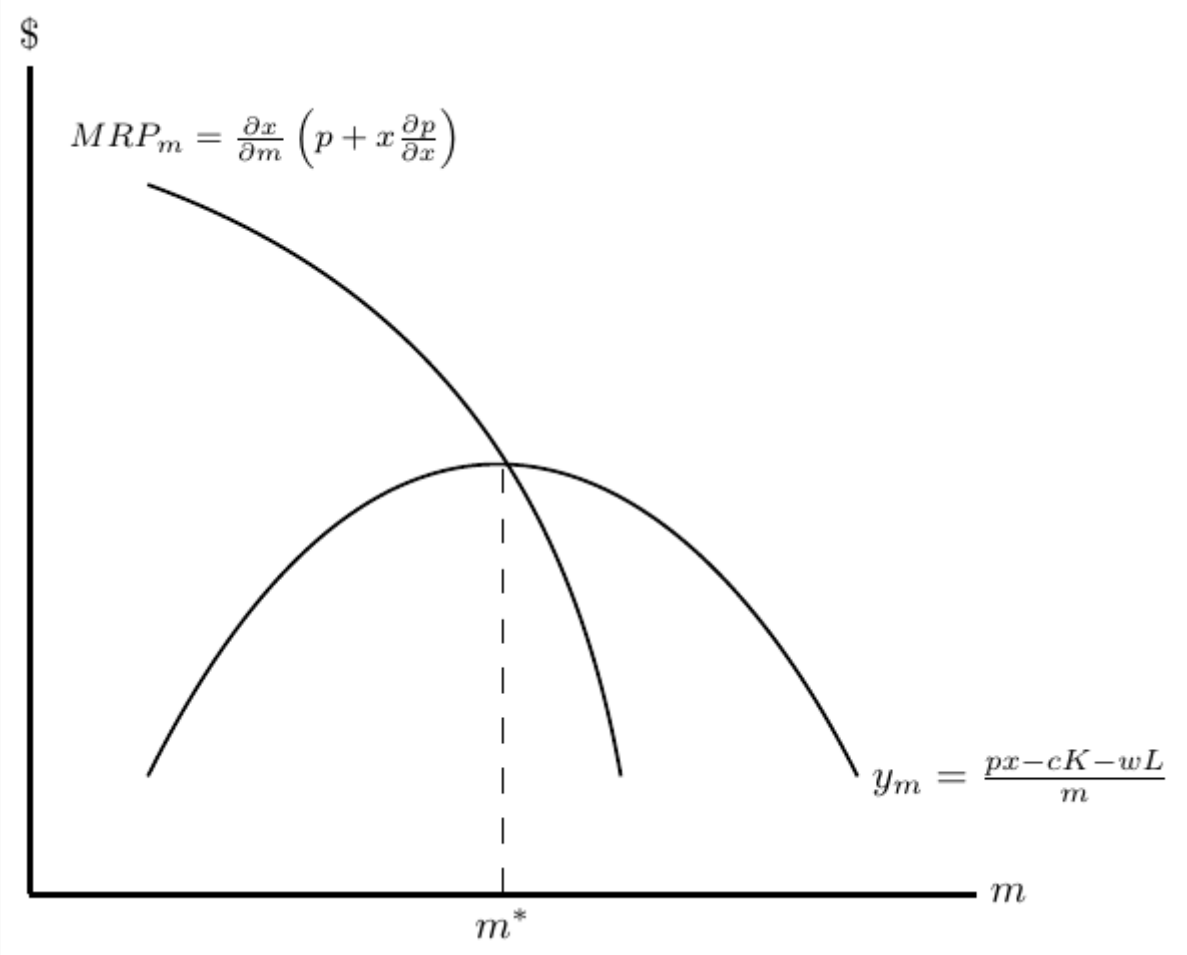
Physicians' cooperative objective function

Physicians maximize income,

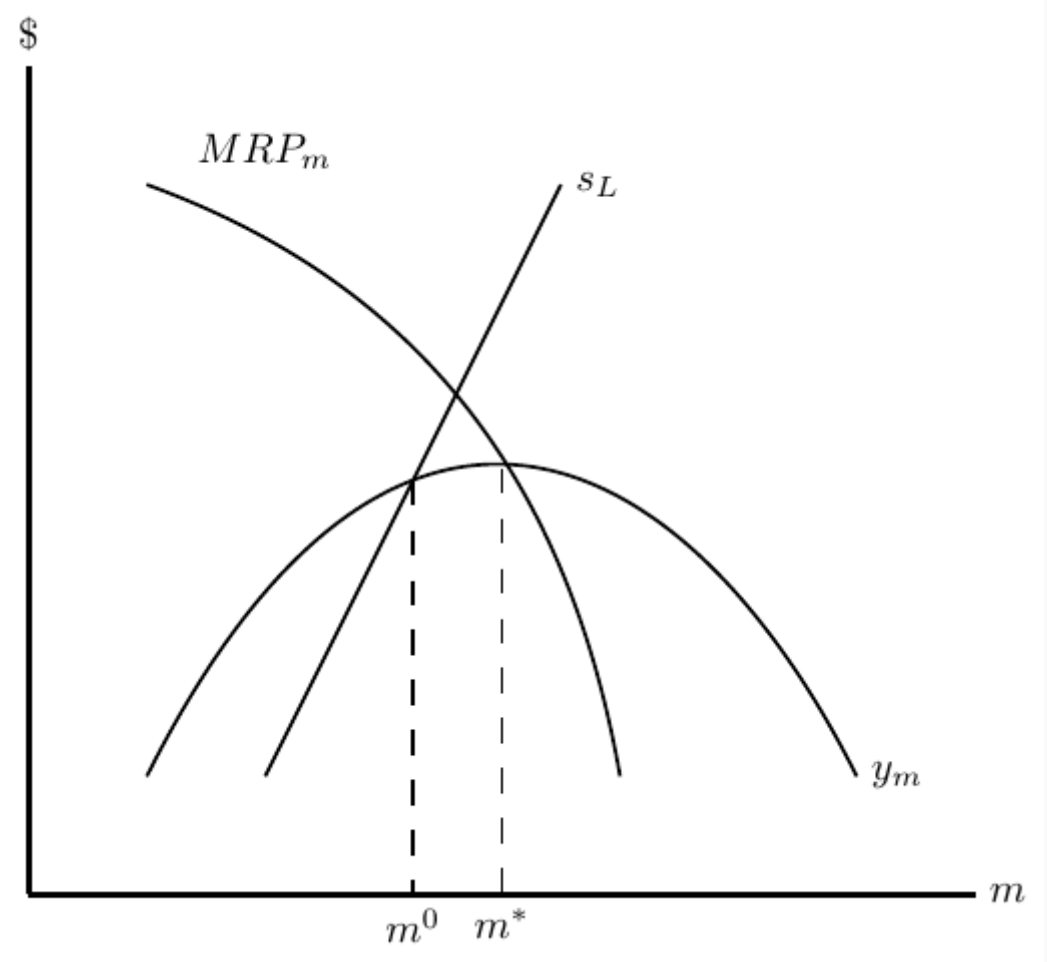
$$y_m = \frac{1}{m}(px - wL - cK)\,,$$

where L is the amount of non-physician labor, w is the wage of those employees, K is the capital purchased for price c, and px reflects the total revenue (to both the hospital and physician) based on a quantity of x and price of p

Physicians' cooperative graphically



Physicians' cooperative with physician supply



Takeaways

Different predictions

- Not-for-profit hospitals will respond differently to price changes and changes in competition
- In practice, hospitals may have a blend of different objectives...very hard to predict behavior theoretically

Why does this matter?

A few reaons for going through this stuff:

1. Understand the basic models in the literature
2. Cost-shifting is an important policy question and a good story of bias in the literature
3. Ultimately, identifying the "true" objective function is an empirical question (and maybe impossible)