Module 2: Physician Agency and Treatment Decisions

Ian McCarthy | Emory University
Econ 771

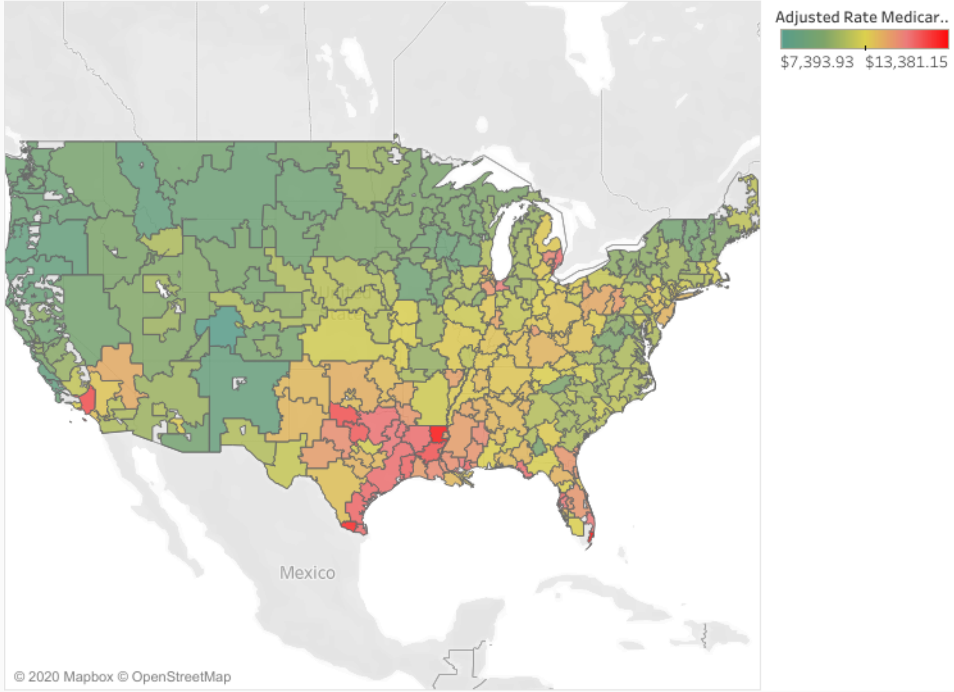
Table of contents


WE CAN PERFORM THE PROCEDURE
IN THE OFFICE TODAY.

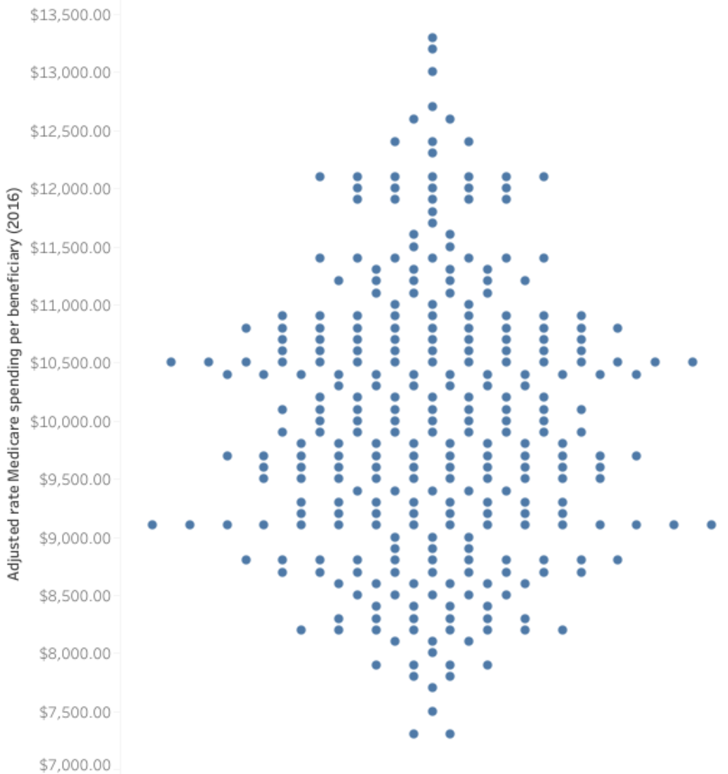
Motivation

Variation in care

Map: Price-Adjusted Total Medicare Reimbursements per Enrollee (Parts A and B), by HRR (2016)
(Price, Age, Sex, and Race adjusted)



Distribution: Price-Adjusted Total Medicare Reimbursements per Enrollee (Parts A and B), by HRR (2016)
(Price, Age, Sex, and Race adjusted)



Source: Dartmouth Atlas of Health Care

Wasteful?

- Estimates are that more than 30% of health care expenditures are "wasteful": (The Atlantic, 2013)

- Some clear areas of waste:

    - Payment differentials by location of treatment (policy quirks)
    - Better imaging with little benefit
    - Proton treatment (for some conditions)
    - Heart stents
    - Arthroscopic knee surgery

Many estimates of "waste" are after-the-fact. It's actually very hard to identify waste before-hand. Report on End-of-life Spending

Physician Agency

Definition

Physicians are better informed about treatment decisions than patients, and so there exists some **agency** relationship between the two. For many conditions, patients can't treat themselves even if they wanted to.

Role of physicians:

- Gaynor, Propper, and Seiler (2016)
- Chernew, et al (2019)

Setup

- Denote quantity of physician services by x
- Denote benefit of services to patient by $B(x)$
- Patients pay (and physicians receive) a price of p for each unit of service x
- Physicians incur cost c for each unit of care
- Net benefit to patients is $NB(x) = B(x) - px$
- Physicians must choose quantity of care at least better than the patient's outside option, $NB(x) = B(x) - px \geq NB^0$.

Solving the model

Solve the model in two steps:

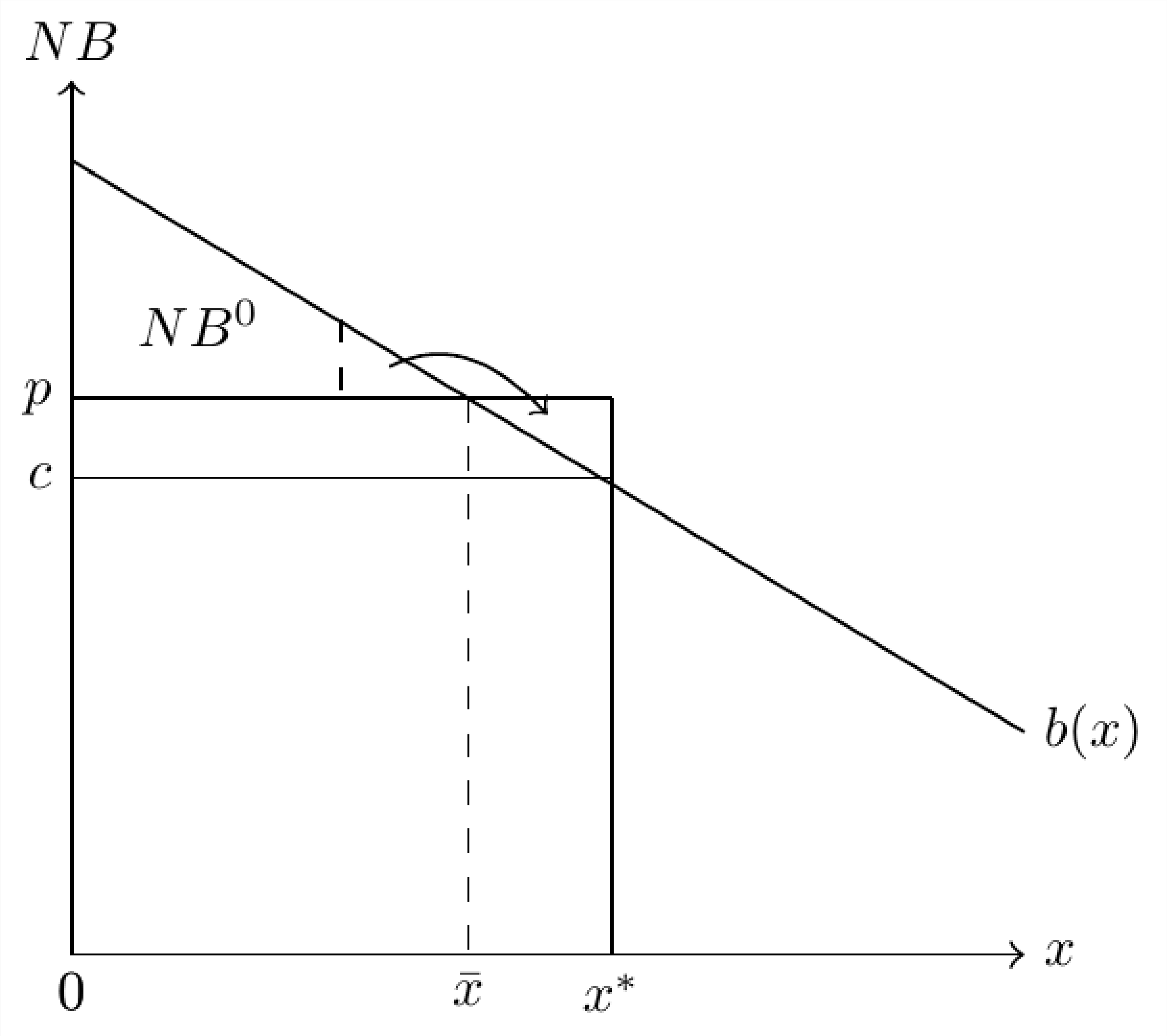
1. Physician will provide minimum surplus to keep the patient, $NB(x) = B(x) - px = NB^0$
2. Substitute into physician profit function,

$$\pi = (p - c)x = B(x) - NB^0 - cx,$$

and solve for x[1]

[1]This approach applies when prices and quantity of care are variable. If the physician cannot set price, then we just work off of the constraint, $B(x) - \bar{p}x = NB^0$.

Physician agency in a graph



Example with fixed price

An increase in the administratively set price leads to a **decrease** in quantity of services provided. And vice versa, a reduction in price leads to an **increase** in quantity provided. Why?

$$
\begin{aligned}
b(x)\frac{\mathrm{d}x}{\mathrm{d}p} - x - p\frac{\mathrm{d}x}{\mathrm{d}p} &= 0 \\
\frac{\mathrm{d}x}{\mathrm{d}p} &= \frac{-x}{p - b(x)} < 0.
\end{aligned}
$$

Agency with capitated payments

- Physician receives fixed ("capitated") amount for each patient, R, along with some price per unit of service, p_s

- Physician therefore paid $R + (p_s - c)x$ for each patient

- Number of patients for each physician expressed as a positive function of the net benefit offered, $n(NB)$, where $NB = B(x) - p_d x$. Here, we assume that the insurer sets p_d and p_s separately (the demand and supply price, respectively).

- Physician again aims to maximize profits, $\pi = n(NB)\left[R + (p_s - c)x\right]$.

Solution with capitated payments

Maximizing the profit function yields:

$$n'(NB)(B'(x) - p_d)\left[R + (p_s - c)x\right] + n(NB)(p_s - c) = 0.$$

Rearranging terms and multiplying both sides by $\frac{1}{NB}$, we get:

$$\frac{B'(x)-p_d}{NB}\frac{R+(p_s-c)x}{p_s-c} = -\frac{1}{\varepsilon_{n,NB}}$$

1. What happens for $R = 0$?
2. What about $R > 0$, assuming $p_s < c$?

Policy Issues

Current policy

1. Value-based Purchasing
2. Bundled Payments
3. Accountable Care Organizations
4. Information and Consumer Choice: Examples include Hospital Compare and Penalty Information