Module 2: Physician Agency and Treatment Decisions

Part 1: Physician Agency

Ian McCarthy | Emory University
Econ 372

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.

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

With this framework, how much care will be provided? (i.e., what is the optimal value of x)

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

Solving the model

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

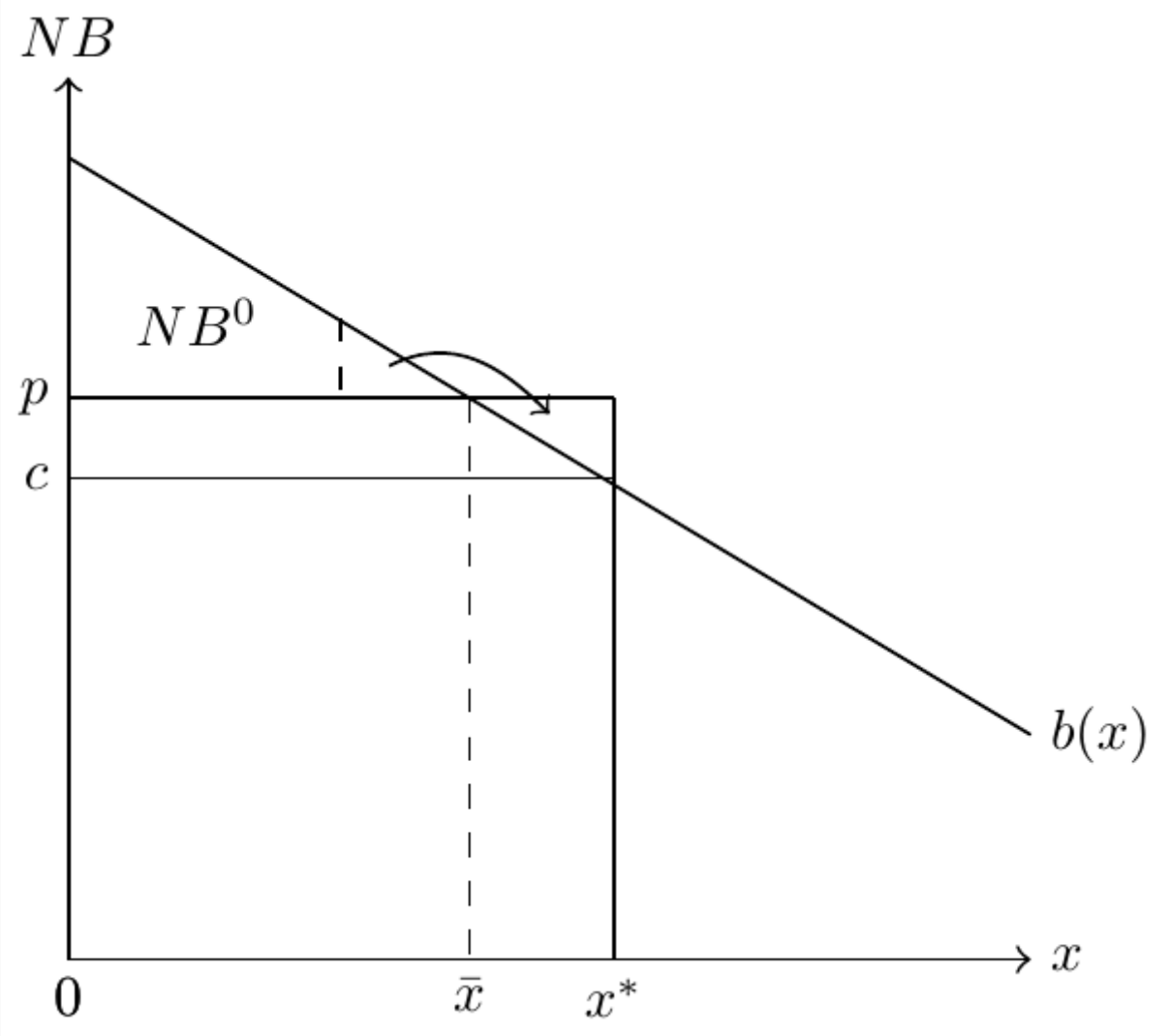
Why? This is a corner solution...can't just take a derivative.

In-class Problem: Physician agency

Denote the quantity of care consumed by x, and denote by $B(x)$ the function that determines the benefit of care to the patient. Assume that the patient must pay the full price of care, px, so that their net benefit is $NB = B(x) - px$. Further assume that the physician can choose both x and p.

1. Find the patient's optimal x.
2. Draw the marginal benefit function on a graph and note the price and patient's optimal quantity. Assume that $B'(x) > 0$ and $B''(x) < 0$ (i.e., the marginal benefit function is positive and downward sloping).
3. Find the physician's optimal x assuming $NB^0 = 0$.
4. Add the physician's optimal x to your graph and interpret the difference.

Physician agency in a graph



Example

Assume $B(x) = 8x^{1/2}$, $NB^0 = 2$, and $c = 1$:

1. Find the physician's optimal level of x and p.
2. Find the patient's optimal level of x.
3. Draw this graphically.

Answer

First let's re-write the constraint such that $px = 8x^{1/2}$ and $\pi = 8x^{1/2} - 2 - x$. The first order condition for x is then $4x^{-1/2} - 1 = 0$, which is satisfied at $x^* = 16$. Substituting this into the constraint, $8x^{1/2} - px = 2$ yields $p = \frac{15}{8}$.

But if they could choose on their own, the patient would prefer to maximize their net benefit. This would occur at $4x^{-1/2} = p$, which yields $x = (32/15)^2 \approx 4.5$ at $p = 15/8$.