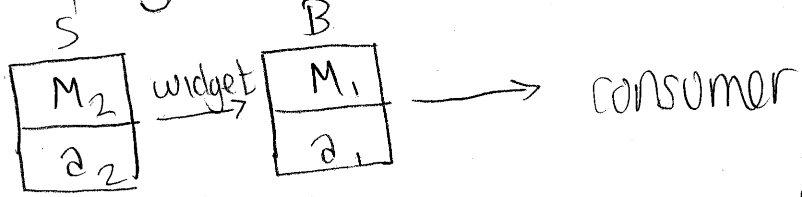
New notes posted on the course website.

Hart ('95): Clarendon Lecture (book)
- easiest way to understand this material

- Two players S, B

M_i - manager i
a_i - asset i



- We will discuss asset structure (ie which managers own which assets?)

- No discounting
- wealthy, risk neutral parties
- 3 organizational forms (why not partial ownership?)
  1. Non integration
     - M_1 owns a_1
     - M_2 owns a_2
  2. Type one integration
     - M_1 owns a_1 and a_2
  3. Type two integration
     - M_2 owns a_1 and a_2

- Payoffs:
  - M_1 invests i at cost i
  - gets $R(i) - p - i$ if get widget from M_2 at cost p. $R' > 0$, $R'' < 0$
  - outside option: can get generic widget

from a competitive market
- In this case, payoff is $r(i, A) - \bar{p} - i$
  - A is the asset set owned by M_1
  - $\bar{p}$ is competitive price
    - under no integration, $A = \{a_1\}$
    - under type I integration, $A = \{a_1, a_2\}$
    - under type II integration, $A = \emptyset$
- M_2 invests e at cost e
  - Production cost is $C(e)$ with $C'(\cdot) < 0$, $C''(\cdot) > 0$
  - If not trade with M_1, can supply widget to competitive market and get $\bar{p} - \underset{\text{little c}}{c}(e, B) - e$, where:
    - no integration, $B = \{a_2\}$
    - type I integration, $B = \emptyset$
    - type II integration, $B = \{a_1, a_2\}$

Assumptions:

$\boxed{A1}$ $R(i) - C(e) > r(i, A) - c(e, B) \quad \forall i, e, A, B$
- obviously, $A \cup B = \{a_1, a_2\}$ and $A \cap B = \emptyset$
- There are always ex post gains from trade

$\boxed{A2}$ $R'(i) > r'(i, \{a_1, a_2\}) \geq r'(i, \{a_1\}) \geq r'(i, \emptyset)$ for all $i \in (0, +\infty)$

$\boxed{A3}$ $|C'(e)| > |c'(e, \{a_1, a_2\})| \geq |c'(e, \{a_2\})| \geq |c'(e, \emptyset)|$ $\forall e \in (0, +\infty)$
- cost savings are bigger in the relationship

$\boxed{A4}$ R, r, C, c, i, e observable but not verifiable

First best: $\max\{R(i)-C(e)-i-e\}$

(i): $R'(i^*)=1$

(e): $-C'(e^*)=1 \Rightarrow |C'(e^*)|=1$

Expost gains from trade: $(R-C)-(r-c)$

Payoffs:

- $\pi_1 = r-\bar{p} + \frac{1}{2}[(R-C)-(r-c)]$
- $\pi_2 = \bar{p}-c + \frac{1}{2}[(R-C)-(r-c)]$
- The price generating this is

$$p=\bar{p}+\tfrac{1}{2}(R-r)-\tfrac{1}{2}(c-C)$$

Thus, M_1 solves:

$$\max_i \pi_1 - i$$

$$=\max_i \left\{\tfrac{1}{2}R(i)+\tfrac{1}{2}r(i,A)-\tfrac{1}{2}C(e)+\tfrac{1}{2}c(e,B)-i-\bar{p}\right\}$$

The FOC is:

(i): $\frac{1}{2}R'(i)+\frac{1}{2}\frac{\partial r(i,A)}{\partial i}=1$

and M_2 solves:

$$\max_c \left\{\bar{p}-\tfrac{1}{2}C(e)-\tfrac{1}{2}c(e,B)+\tfrac{1}{2}R(i)-\tfrac{1}{2}r(i,A)-e\right\}$$

FOC:

(e): $\frac{1}{2}|C'(e)|+\frac{1}{2}\left|\frac{\partial c(i,B)}{\partial e}\right|=1$

- No matter what the ownership structure is, will have underinvestment.

- Thus $i^{T2} \le i^{NI} \le i^{T1} < i^*$
- and $e^{T1} \le e^{NI} \le e^{T2} < e^*$
  - ie asset ownership matters

<u>T1</u>: $A = \{a_1, a_2\}$, $B = \emptyset$

<u>T2</u>: $A = \emptyset$, $B = \{a_1, a_2\}$

<u>NI</u>: $A = \{a_1\}$, $B = \{a_2\}$

- Let $s = R(i) - C(e) - i - e$ be the surplus
  - can compute this for each type of ownership structure

<u>Defn</u>: We say that assets a_1 and a_2 are <u>independent</u> if $\frac{\partial r}{\partial i}(i, \{a_1, a_2\}) = \frac{\partial r}{\partial i}(i, \{a_1\})$ and

$$\frac{\partial c}{\partial e}(e, \{a_1, a_2\}) = \frac{\partial c}{\partial e}(e, \{a_2\})$$

<u>Defn</u>: a_1 and a_2 are <u>strictly complementary</u> if either $\frac{\partial r}{\partial i}(i, \{a_1\}) = \frac{\partial r}{\partial i}(i, \emptyset)$ or $\frac{\partial c}{\partial e}(e, \{a_2\}) = \frac{\partial c}{\partial e}(e, \emptyset)$.

<u>Defn</u>: M_1's human capital (respectively M_2's) is said to be <u>essential</u> if $\frac{\partial c}{\partial e}(e, \{a_1, a_2\}) = \frac{\partial c}{\partial e}(e, \emptyset)$

(resp $\frac{\partial r}{\partial i}(i, \{a_1, a_2\}) = \frac{\partial r}{\partial i}(i, \emptyset)$)

Result 1: Type I integration is optimal if M1's investment is "important." Type II integration is optimal if M2's investment is "important." No integration is optimal if both are equally "important."

Result 2: ◦ If a_1, a_2 are independent, then NI is optimal.

◦ If a_1, a_2 are strictly complementary, then some integration is optimal

◦ If M_1's HC is essential then T I integration is optimal

◦ If M_2's HC is essential then T II integration is optimal

◦ If M_1 and M_2's HC are both essential, then all are pretty much the same

◦ Joint ownership (both can exclude each other) is bad, because it creates bilateral monopoly

Hart-Moore (JPE '90) - many assets, many individuals

Rajan-Zingales - one asset, one investment, two people
◦ worth looking at.

de Meezer-Lockwood - explore effects of different types of bargaining

Elfenbein-Lerner (RAND, 2003) - empirical
- Does allocation of asset ownership depend on level of asset specificity.
  - more asset specificity ⇒ less investment

Aghion - Tirole (QJE '94)
- asset ownership with wealth constraints
  - what if the people who should own an asset cannot afford it?

Woodruff (IJIO)
- Mexican shoes
- When style changes occur frequently, les investment

Mullainathan, Scharfstein (AER PP '01) - more empirical evidence

Baker-Hubbard
- ownership structure matters for truck ownership.