

## Real vs Formal Authority

aghion - Tirole (JPE '97)

• How do we allocate authority within the firm?

Two parties: Principal, Agent

• Formal authority: decisionmaking in situations which are contractible.

• Real authority

• Each player invests in having an idea

• P chooses probability  $E$  of having an idea at a cost  $g_P(E)$ ,  $E \in [0, 1]$

• A chooses probability  $e$  of having an idea at cost  $g_A(e)$ ,  $e \in [0, 1]$

• Assume  $\forall i$ ,  $g_i(0) = 0$ ,  $g_i'(0) = 0$ ,  $g_i' > 0$  elsewhere,  $g_i'' > 0$ ,  $g_i'(1) = +\infty$  (I made conditions for an interior solution.)

• If P's idea is implemented, then P gets  $B$  and A get  $\alpha b$  with  $\alpha \in [0, 1]$ ,  $\alpha$  is the congruence parameter

• If A's idea is implemented, then A gets  $b$  and P get  $\alpha B$ .

Case I: P has formal authority (if both have an idea,

P's is implemented)

•  $U_P = EB + (1-E)\alpha b - g_P(E)$

•  $U_A = E\alpha b + (1-E)b - g_A(e)$

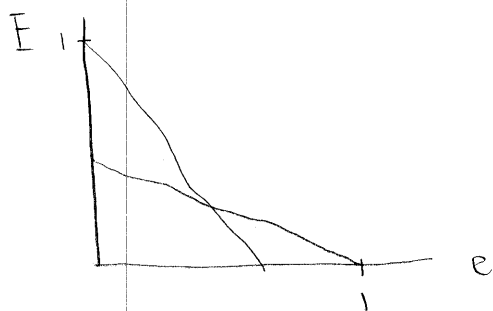
The first order conditions are:

$$(E): B - e\alpha B - g'_P(E) = 0$$

$$\Rightarrow B(1 - e\alpha) = g'_P(E) \Rightarrow -\alpha B = g''_P(E) \frac{dE}{de} \Rightarrow \frac{dE}{de} = \frac{-\alpha B}{g''_P(E)} < 0$$

$$(e): b(1 - E) = g'_A(e) \Rightarrow -b = g''_A(e) \frac{de}{dE} \Rightarrow \frac{de}{dE} = -\frac{b}{g''_A(e)} < 0$$

These FOCs implicitly define reaction functions  
 •  $E$  and  $e$  are strategic substitutes, since  $i$ 's efforts crowd out  $j$ 's effort.



Case II: A has formal authority (eg the principal delegates the authority to A.)

$$P \text{ solves: } \max_E \{ e\alpha B + (1-e)EB - g_P(E) \}$$

$$A \text{ solves: } \max_e \{ eb + (1-e)E\alpha b - g_A(e) \}$$

$$\text{FOCs: } (E): (1-e)B = g'_P(E)$$

$$(e): b - E\alpha b = g'_A(e) \Rightarrow b(1 - \alpha E) = g'_A(e)$$

Compare the FOCs for A in these two setups:

$$\text{Case I: } g'_A(e^I) = b(1-E)$$

$$\text{Case II: } g'_A(e^II) = b(1-\alpha E)$$

$$\text{Since } \alpha \leq 1, b(1-\alpha E) \geq b(1-E)$$

$$\Rightarrow g'_A(e^I) \leq g'_A(e^II) \Rightarrow e^II \geq e^I \text{ by convexity.}$$

That is, if you delegate authority, the agent will have more incentive to invest in ideas.

Remarks:

1] Renegotiation. If  $B=b$ , then this can go away.

2] If you can observe  $\alpha$ , then it might make sense to restructure who works with who.

2 Theory of Yes-Men: Candice Prendergrast (AER '91)

Qian (Re Stud) - optimal hierarchies. (Not in an incomplete contracting framework.)

Financial Contracting

e.g. corporate debt contracts, mortgages, equity contract  
 • debt that can be converted into stock and vice versa.

We are sort of "financial anthropologists" seeking a positive explanation for the existence of certain types of contracts.

Control is a major issue. Covenants are important

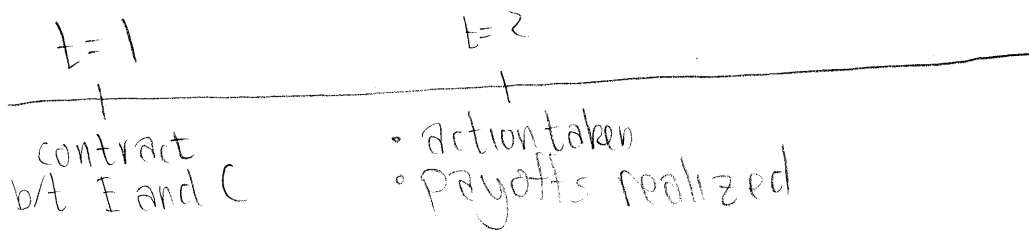
Modigliani-Miller - Debt and equity are perfect substitutes

This theorem really paved the road for studying corporate finance.

Aghion-Bolton (Restud '92) - Why finance with debt?

- Entrepreneur (E) - has an idea but no wealth
- Capitalist (C) - has wealth but no idea
- Project costs  $k$
- Private benefits (accrues to one party - not contractible)

◦ Timeline:



- $a \in A$
- leads to  $y(a)$  monetary benefit (contractible)
- leads to private (non-pecuniary benefits)  $b(a)$  to the entrepreneur.
- options:
  - i) divide up  $y(a)$
  - ii) decide who has control

First-best:

$$\max_a \{y(a) + b(a)\} \Rightarrow a^*$$

Second-best: Two cases:

Case I: E controls the project, C owns the project (ie C gets all of  $y(a)$ ).

$$\max_a \{b(a)\} \Rightarrow a_E$$

◦ assume E has all the ex-post bargaining power.

◦ E says to C "I'll take  $a^*$ , but you have to bribe me."

◦ E will demand  $y(a^*) - y(a_E)$

◦ E gets  $y(a^*) - y(a_E) + b(a^*) \geq b(a_E)$

◦ C gets  $y(a_E)$

Case II: C has control:

$$\max_a \{y(a)\} \Rightarrow a_C$$

◦ due to wealth constraint of E, we get stuck with  $a_C$ . (Coase thm fails)

Next time: What is the optimal contract? Are there nice substitutes?