P and A:
t=1: design. One can "allocate" control. action itself is not contractible.
t=2: implement (I) or not (S) (stop)
- decision that can only be taken by the principal P.
- not contractible

Design action: - C (cooperative)
- N (noncooperative)

Agent is "good" or "bad." (Principal believes Pr[bad] = μ)
- can we use the design stage to learn about the agent?

Payoffs

stage 2 actions

agent is good

stage 1 actions	I	S
C	G, g	0, 0
N	G-l, g	-l, 0

(G-l: principal)

- P gains G by implementing loses l if N chosen
- A gains g if P chooses I

agent is bad

	I	S
C	-L, b	0, 0
N	-L-l, B+b	-l, B

- P loses L by implementing (and l if N chosen)
- A gains b if P chooses I, B by choosing N

- $L > l > 0$
- $B > b > 0$

Suppose control is contractible: P can commit to giving control of stage 1 to the agent if some message has been sent
- optimal contract: (i) P keeps control in stage 1 if A announces "good," and P then chooses C then I
(ii) if A announces "bad," A receives control with prob $\frac{b}{B}$ then chooses N, and P chooses S. Otherwise, P chooses C, S.

P's payoff: $(1-\mu)G - \mu \frac{b}{B} d$

Transferable control: P can not commit to giving control of stage 1 to A if she does not find it in her interest.
- hence, only unconditional control works. cannot condition control on messages
- control will be transferred in stage 1 if $\mu < \frac{G}{G+d}$
  (iff $(1-\mu)G - \mu d > 0$
- you really learn about the agent by empowering the agent.
- giving control to the agent implies: (Aghion-Tirole interpretation)
  (i) transfer of formal authority
  (ii) (noncontractible) information needed for real authority.

Dessein:
- P is informed about the right course of action.
- A may be informed
- A is unsure about the congruence between him and P, while P knows it.
- Even if P has formal authority, A may be able, w/prob p, to "get his way."
- ∃ prob A knows what he prefers

If p sufficiently large, may want to transfer formal authority to A if congruence parameter is high enough, signalling to A that A might want to give P real authority.

Aghion-Tirole world: $N > 3$ potential projects, all very bad except for two: ◦ P's pet project (B for P, βb for A)

◦ A's pet project: αB for P, b for A

◦ $0 < \alpha, \beta < 1$

◦ assume P knows all payoffs
◦ A knows all payoffs w/prob $p < 1$,
◦ P can, at cost k, make a "recommendation."
at cost K, make an "order."

◦ contract is an allocation of formal authority
◦ for hard authority → P w/orders, principal gets $B - K$
agent gets βb

soft authority → P w/recommendation, principal gets $(1-p)B + p\alpha B - k$
agent gets $(1-p)\beta b + pb$

P sends nothing, P gets $p\beta B$
A gets pb

◦ p small, P can just recommend
◦ p larger, might want to do orders. (if congruence small)
◦ congruence large ⇒ full delegation

◦ P might want to choose hard authority with some probability to prevent agent from investing in P, so that he is a better follower, which is good for P, since P is informed.

Assume B is a monetary benefit. $Pr[\text{return}=1] = B$ (or $\propto B$).

Giving a share γ of this to the agent makes him readier to follow recommendations. Now gets

$$B\,b + \gamma B > b + \gamma \propto B$$

output incentives will backfire if there is disagreement
- should go for input incentives