The Burden of Past Promises

Jin Li, Niko Matouschek, & Michael Powell

Kellogg School of Management

“A Good Relationship Takes Time”

- Common view: relationships are built on trust, and trust develops over time

  (Sobel, 1985; Datta, 1996; Ghosh and Ray, 1996; Kranton, 1996; Watson, 1999; Watson, 2002; Eeckout, 2006; Fujiwara-Greve and Ohuno-Fujiwara, 2009; Halac, Forthcoming)

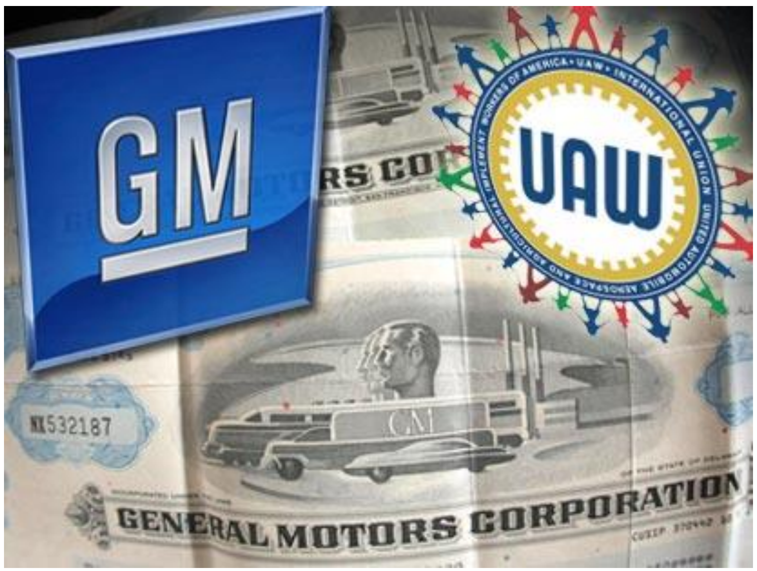
- Once trust is established, can motivate cooperation through promises regarding future actions

- Time is therefore the friend of a good relationship

The Burden of Past Promises

- ... but eventually, the future becomes the present
- Yesterday's promises become today's obligations
- Time can be the foe of a good relationship

The Jobs Bank



"The Jobs Bank is a legacy of the early 1980s, when then-Chairman Roger B. Smith was embarking on a strategy to automate GM's North American Factories."

The Wall Street Journal, January 7th, 2006

The Jobs Bank

*"In a recent interview, UAW President Ron Gettelfinger [...] said the **Jobs Bank originally was a company proposal, aimed at convincing UAW leaders not to oppose new technology.** `The idea was, "You help us get productive and we'll bring work in"' to occupy the displaced workers, Mr. Gettelfinger said."*

The Wall Street Journal, January 7th, 2006

The Jobs Bank

"In a recent interview, UAW President Ron Gettelfinger [...] said the ***Jobs Bank originally was a company proposal, aimed at convincing UAW leaders not to oppose new technology.*** *`The idea was, "You help us get productive and we'll bring work in"' to occupy the displaced workers, Mr. Gettelfinger said."*

*"**But that decision came back to haunt the company in later years** as it began to embrace Toyota's methods of car making [...]. But the Jobs Bank never got redefined. Instead,* ***after fighting a series of costly strikes with the UAW in the mid-1990s, GM management concluded it was better to build a harmonious relationship than provoke fights.****"*

The Wall Street Journal, January 7th, 2006

Purpose of the Paper

- Show that transition of promises into legacy costs is a natural feature of optimally managed relationships
- Examine implications for evolution of firms

Model Sketch

- Infinitely repeated delegation game a la Armstrong and Vickers

Limited Transfers in Organizations

"A striking characteristic of work life is that one cannot reward individuals in cash for some things, but can compensate them in other ways." (Prendergast and Stole, 1999)

"a significant number of [payments within firms] are in the form of policy commitments" (Cyert and March, 1963)

Model Sketch

- Infinitely repeated delegation game a la Armstrong and Vickers
- No transfers

Model Sketch

- Infinitely repeated delegation game a la Armstrong and Vickers
- No transfers
- Characterize the optimal relational contract: PPE that maximizes principal's expected payoff

Main Results

- Principal initially delegates with the understanding that Agent will choose Principal's preferred project if possible
- Agent rewarded and punished w/changes in continuation payoffs
- Two thresholds: if continuation payoff crosses upper threshold, entrenchment. If continuation payoff crosses lower threshold, permanent centralization or exit
- Rewards and punishments are permanent

Main Implication 1: Inertia and Decline

"One of the most consistent patterns in business is the failure of leading companies to stay at the top of their industries when technologies or markets change" (Bower and Christensen, 1996)

- Inertia of established firms is the result of commitments that allowed these firms to adapt when they were still young.

- Firm performance declines over time

Main Implication 2: PPDs

"Organizational policies/procedures tend to be derived from the early history of the organization (Stinchcombe, 1965; Hannan and Freeman, 1977" and to be derived (or at least crystallized out of) specific noteworthy events in the early history of the organization (Schein, 1983)" (Kreps, 1996, p. 577)

- Same starting point and multiple steady states: long-run performance is history-dependent

- Differences in performance linked to differences in organization

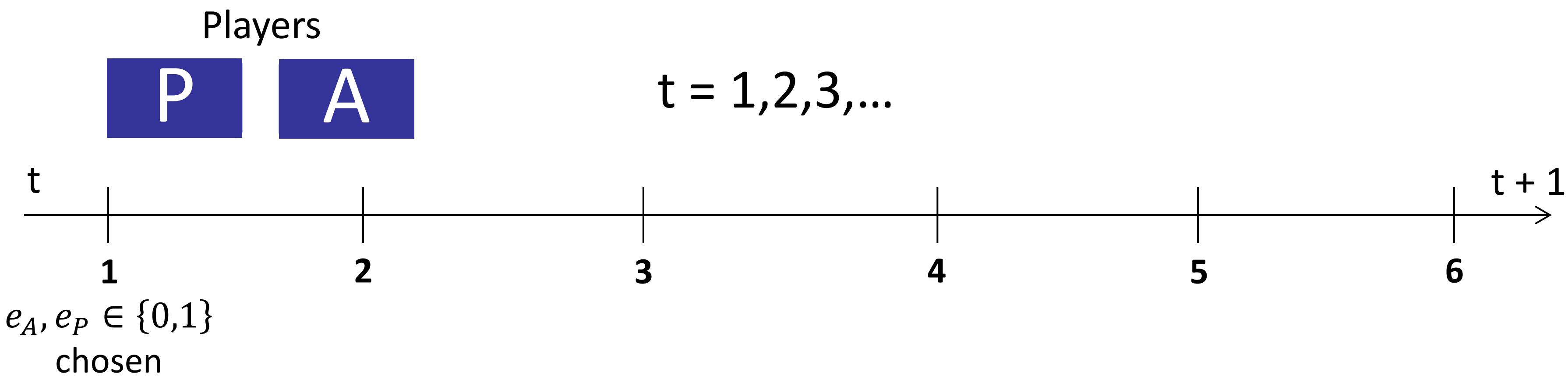
Agenda

- The Model
- The PPE Payoff Set
- The Optimal Relational Contract
- Public Information
- Conclusions

Model Sketch

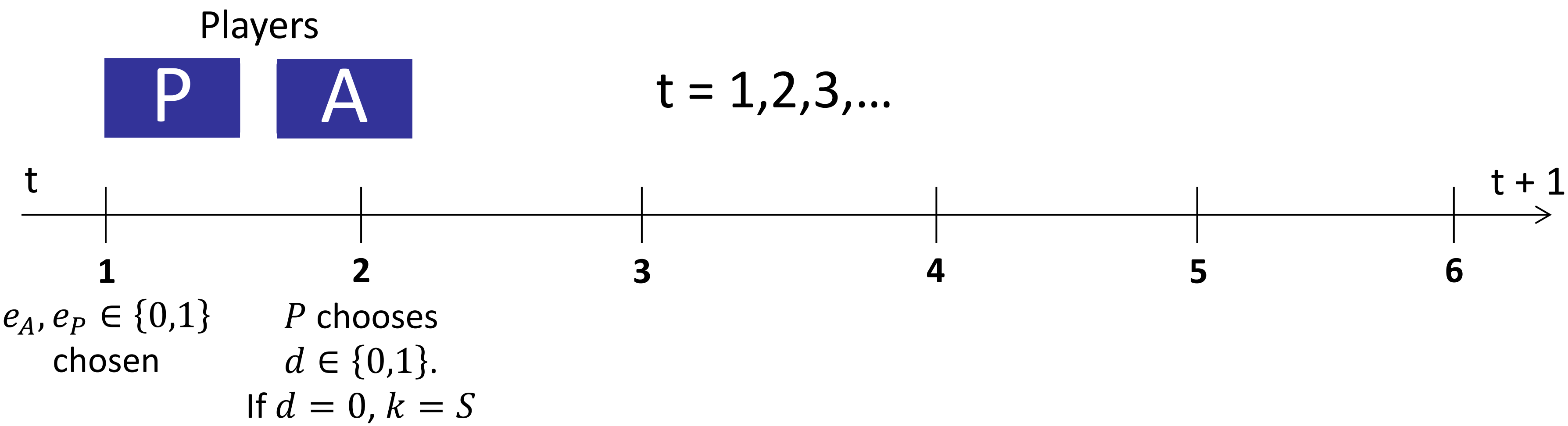
- One principal and one agent
- Risk-neutral
- No transfers
- Repeated trust game
- Only agent knows what projects are available
- Common discount factor δ

TIMING



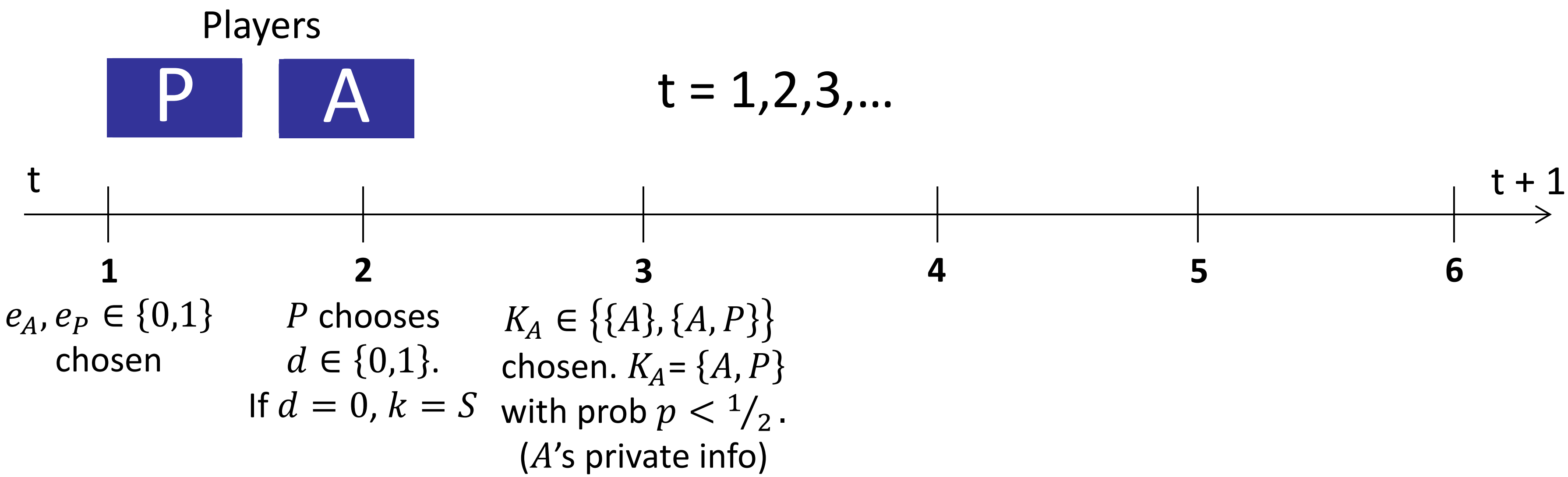
1: P and A simultaneously decide whether to enter the relationship. $e_j = 1$ if enter and $e_j = 0$ if not. $j = P, A$.

Timing



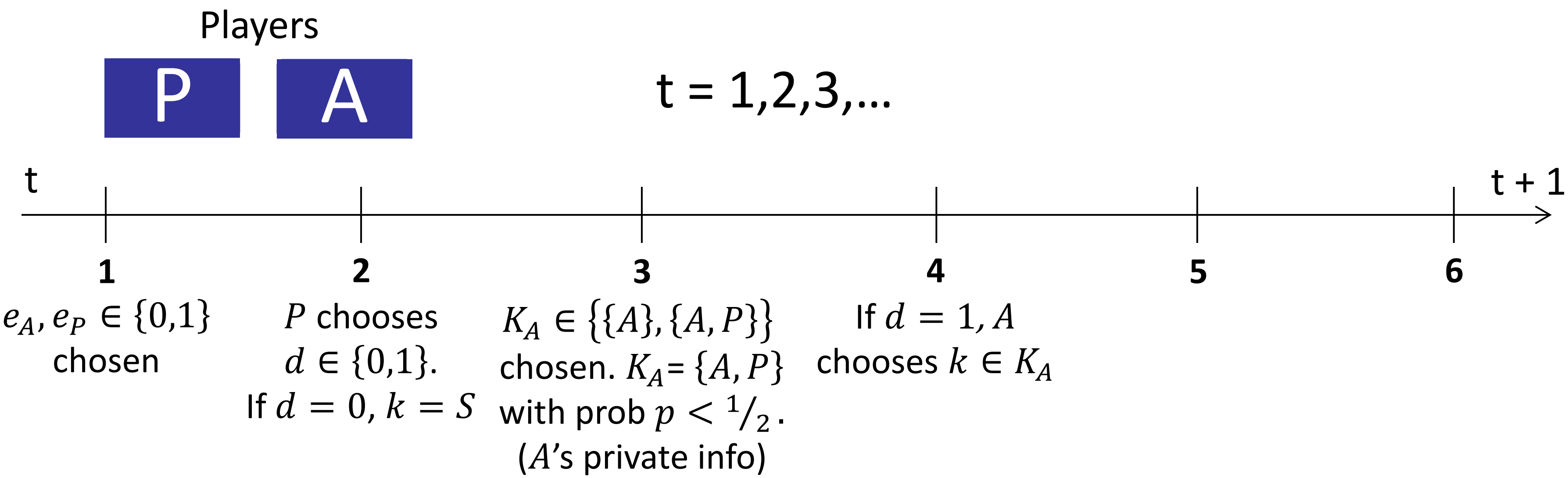
2: P decides whether to delegate decision making to A. If P does not delegate, then P chooses safe project, $k = S$.

Timing



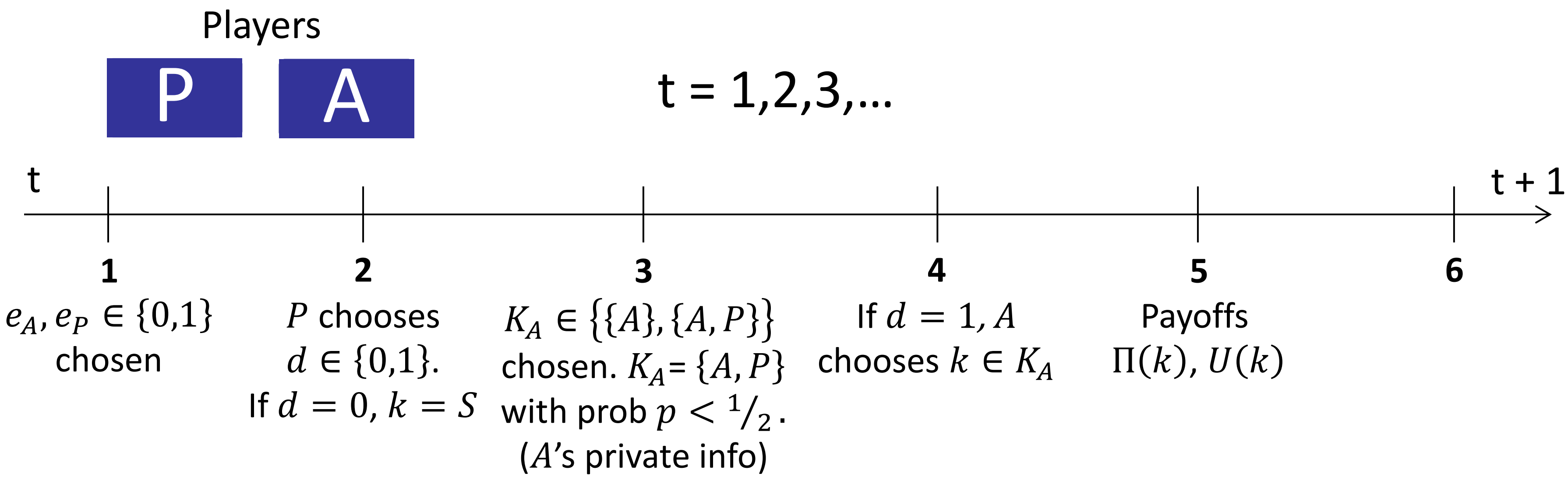
3: Nature determines which projects are available. A's project always available. P's project available with prob $p < 1/2$. Only A knows which projects are available.

Timing



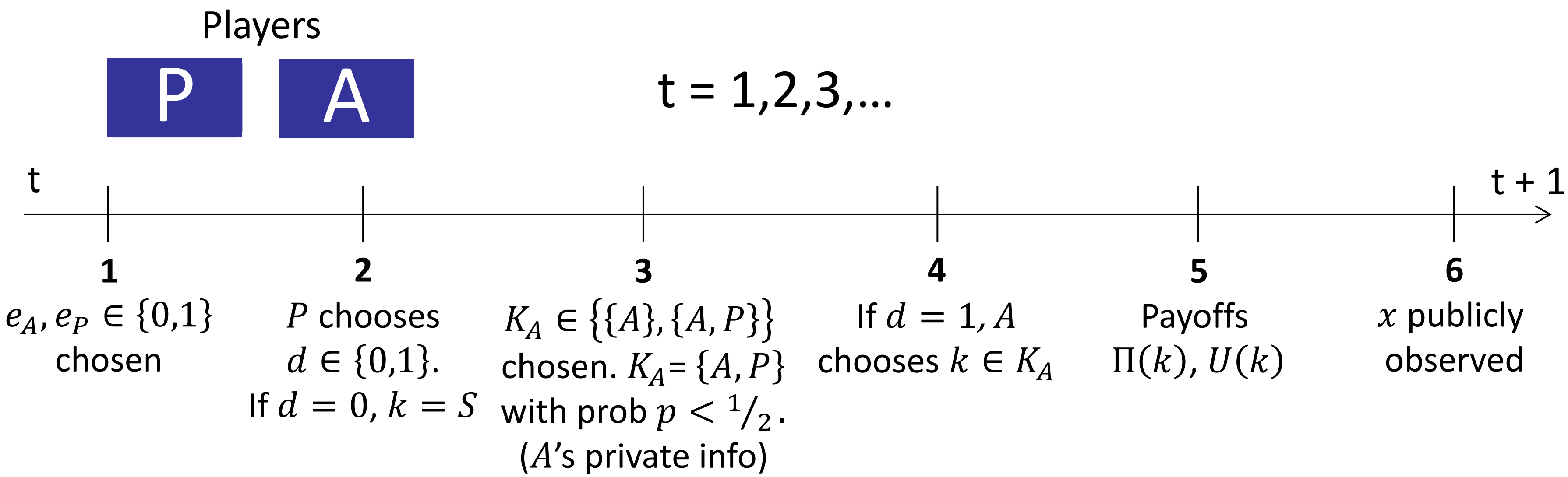
4: If P has delegated, A chooses an available project.

Timing



5: Stage payoffs are realized

Timing



6: The outcome, x, of a public randomization device is commonly observed.

Stage-Game Payoffs

Players

P A

t = 1,2,3,…

t

t + 1

1
$e_A, e_P \in \{0,1\}$ chosen

2
P chooses $d \in \{0,1\}$.
If $d = 0$, $k = S$

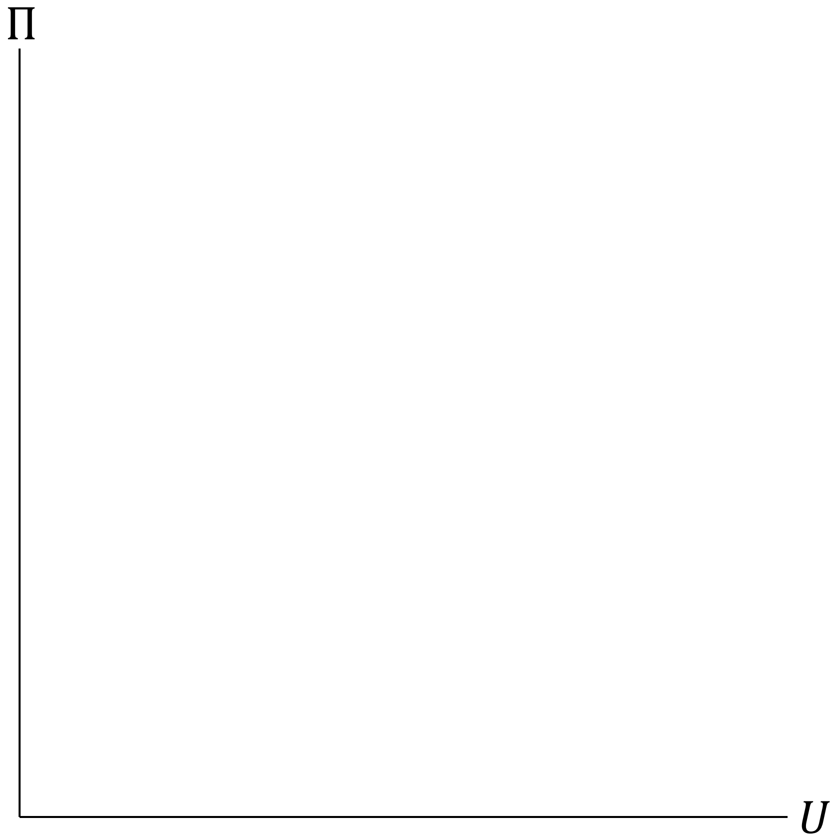
3
$K_A \in \{\{A\}, \{A, P\}\}$ chosen. $K_A = \{A, P\}$ with prob $p < 1/2$.
(A's private info)

4
If $d = 1$, A chooses $k \in K_A$

5
Payoffs
$\Pi(k)$, $U(k)$

6
x publicly observed

Stage-Game Payoffs

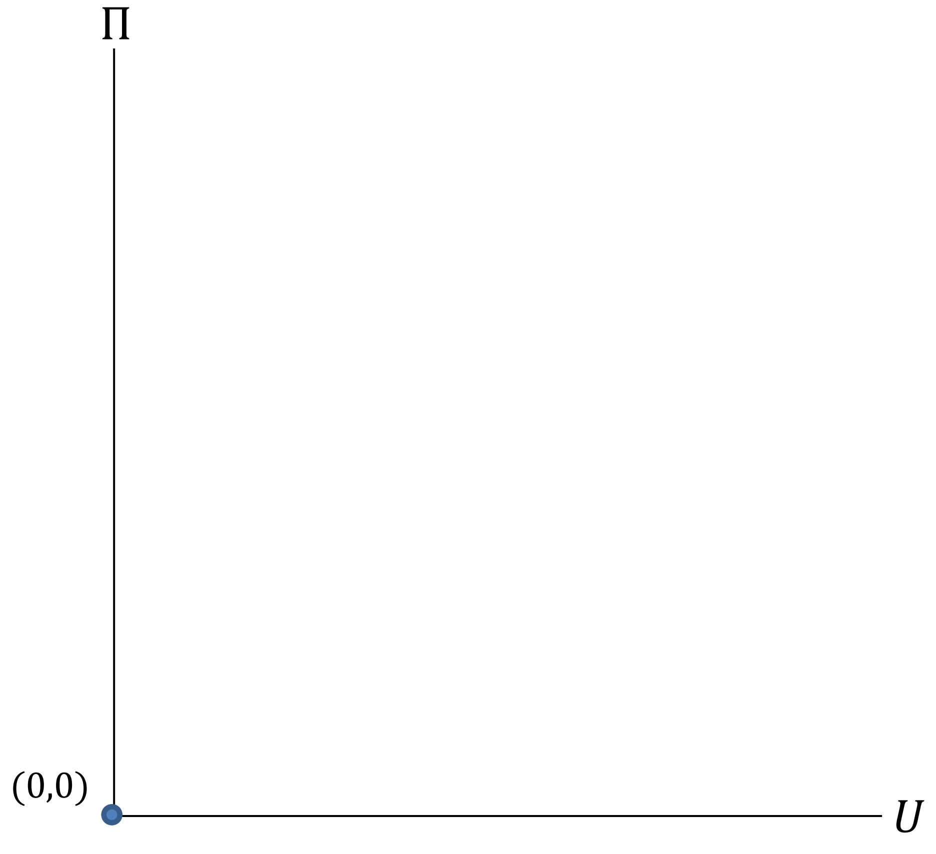


Stage-Game Payoffs

Exit:

$\Pi(E) = 0$

$U(E) = 0$



Stage-Game Payoffs

Exit:

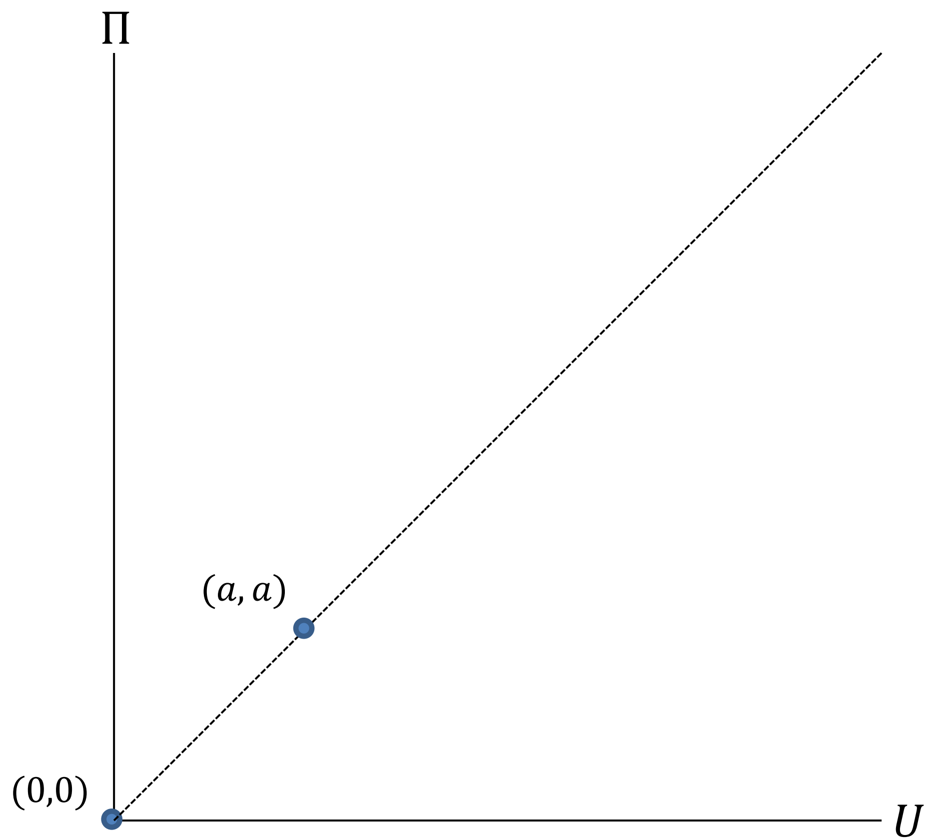
$\Pi(E) = 0$

$U(E) = 0$

No Delegation/Safe Project:

$\Pi(S) = a$

$U(S) = a$



Stage-Game Payoffs

Exit:

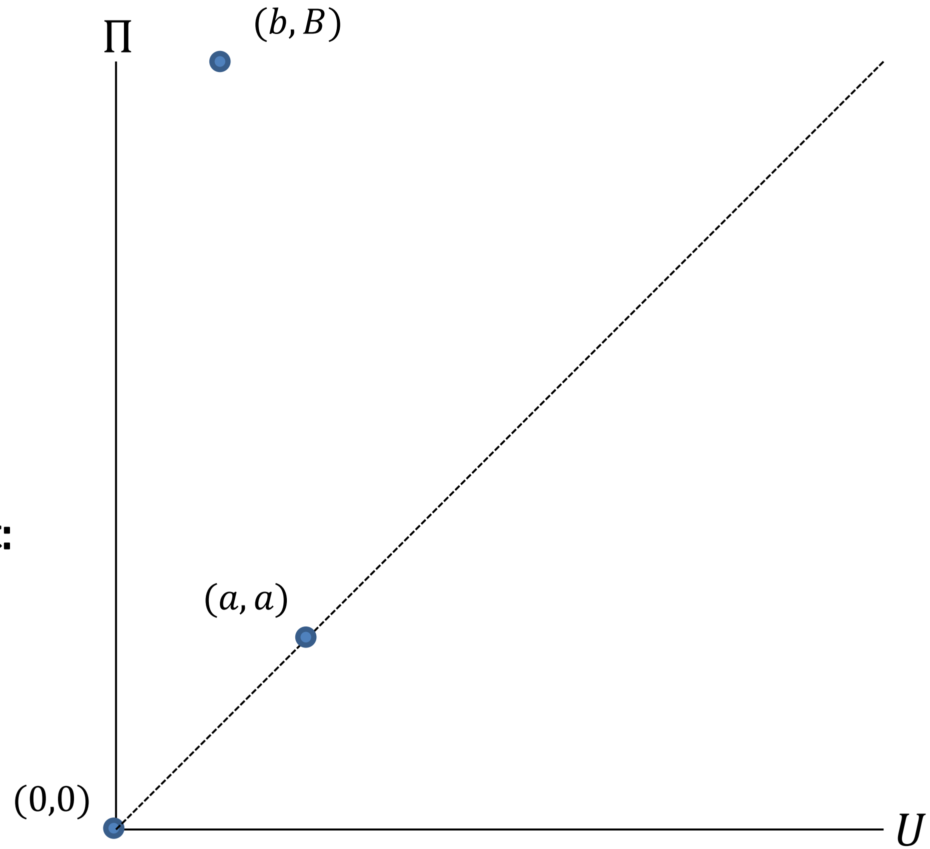
$\Pi(E) = 0$
$U(E) = 0$

No Delegation/Safe Project:

$\Pi(S) = a$
$U(S) = a$

Principal's Preferred Project:

$\Pi(P) = B$
$U(P) = b$



Parameter Restrictions:

1. $B > a > b$

Stage-Game Payoffs

Exit:

$\Pi(E) = 0$

$U(E) = 0$

No Delegation/Safe Project:

$\Pi(S) = a$

$U(S) = a$

Principal's Preferred Project:

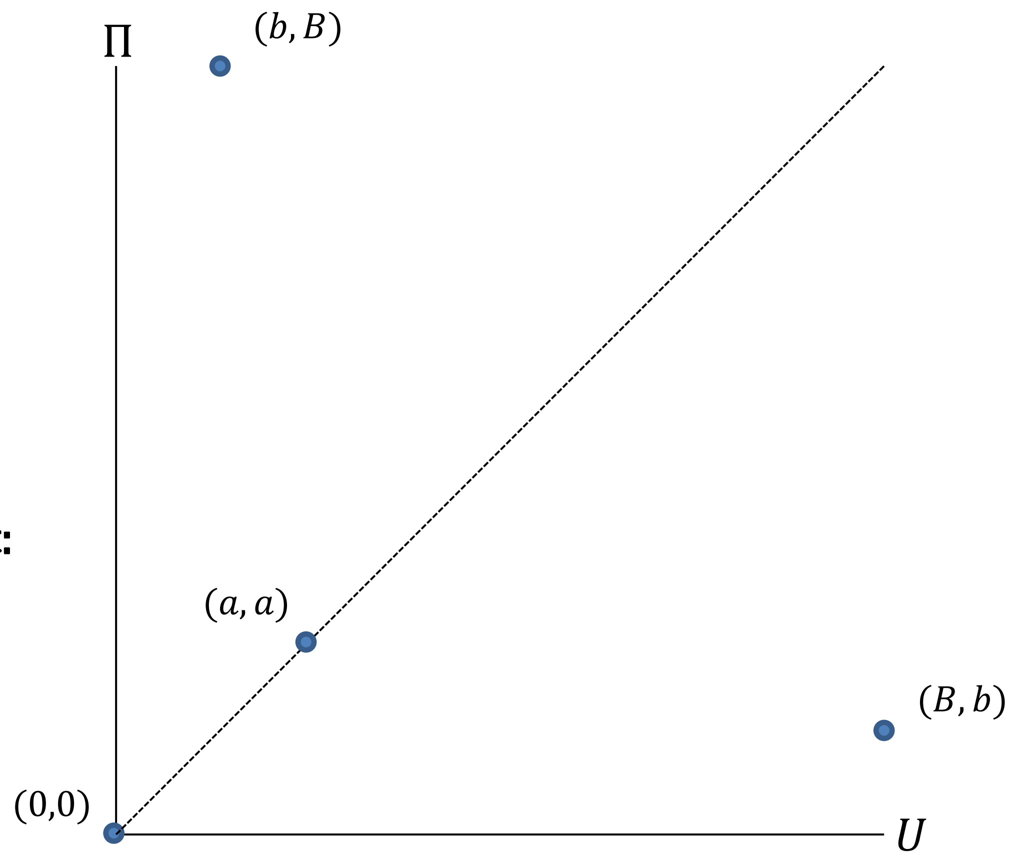
$\Pi(P) = B$

$U(P) = b$

Agent's Preferred Project:

$\Pi(A) = b$

$U(A) = B$



Parameter Restrictions:

1. $B > a > b$

Stage-Game Payoffs

Exit:

$\Pi(E) = 0$
$U(E) = 0$

No Delegation/Safe Project:

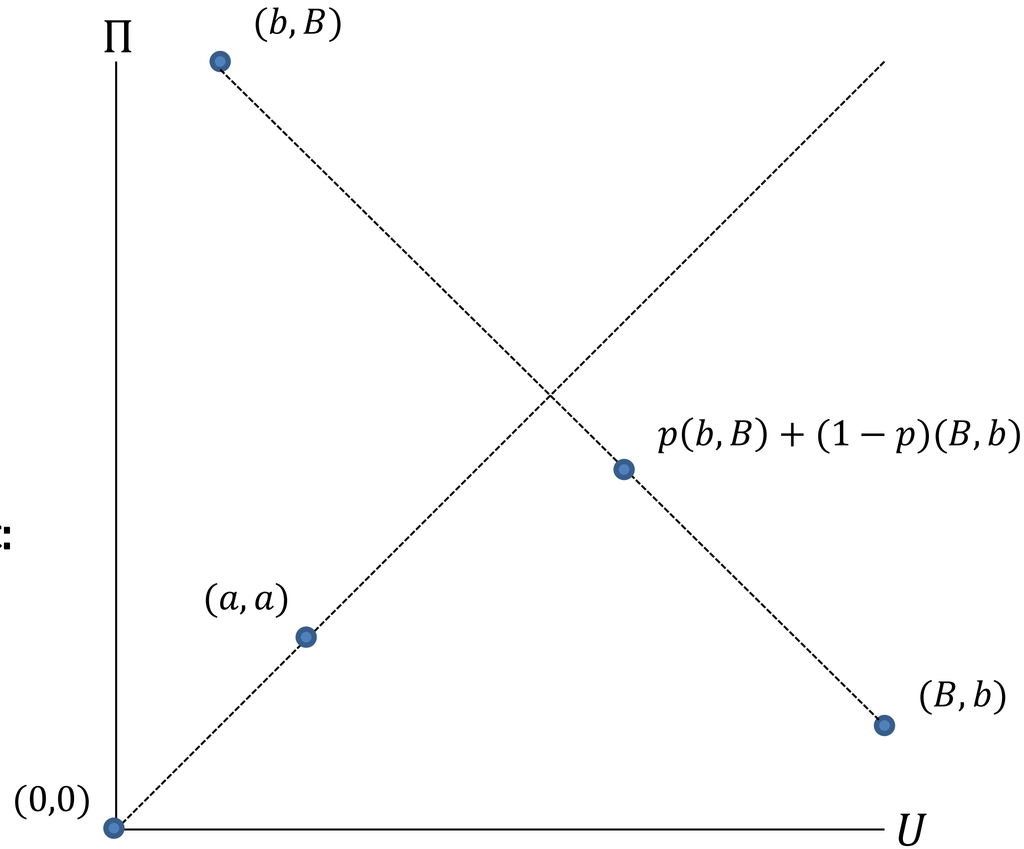
$\Pi(S) = a$
$U(S) = a$

Principal's Preferred Project:

$\Pi(P) = B$
$U(P) = b$

Agent's Preferred Project:

$\Pi(A) = b$
$U(A) = B$



Parameter Restrictions:

1. $B > a > b$
2. $pB + (1 - p)b > a$

Stage-Game Payoffs

Players

P A

t = 1,2,3,…

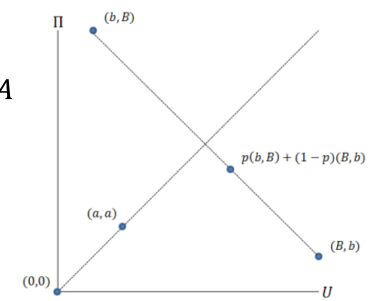
t — t + 1

1
$e_A, e_P \in \{0,1\}$ chosen

2
P chooses $d \in \{0,1\}$.
If $d = 0$, $k = S$

3
$K_A \in \{\{A\},\{A,P\}\}$ chosen. $K_A = \{A,P\}$ with prob $p < {}^1\!/_2$.
(A's private info)

4
If $d = 1$, A chooses $k \in K_A$

5


$B > a > b$

$pB + (1-p)b > a$

6
x publicly observed

Repeated Game

Players

P A

t = 1,2,3,...

t — t + 1

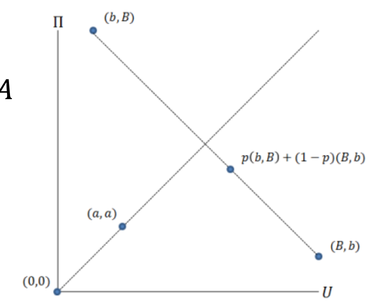
1
$e_A, e_P \in \{0,1\}$ chosen

2
P chooses $d \in \{0,1\}$.
If $d = 0$, $k = S$

3
$K_A \in \{\{A\}, \{A, P\}\}$ chosen. $K_A = \{A, P\}$ with prob $p < {}^1/_2$.
(A's private info)

4
If $d = 1$, A chooses $k \in K_A$

5



$$B > a > b$$
$$pB + (1-p)b > a$$

6
x publicly observed

$$\pi_t = (1-\delta)E_t\left[\sum_{\tau=t}^{\infty} \delta^{t-\tau}\, e_{P,t}e_{A,t}\Pi(k_t)\right]$$

$$u_t = (1-\delta)E_t\left[\sum_{\tau=t}^{\infty} \delta^{t-\tau}\, e_{P,t}e_{A,t}U(k_t)\right]$$

Solution Concept

- (Pure Strategy) Perfect Public Equilibrium
- **Optimal relational contract:** PPE that maximizes P's average payoff
- Goal: characterize the dynamics of the optimal relational contract

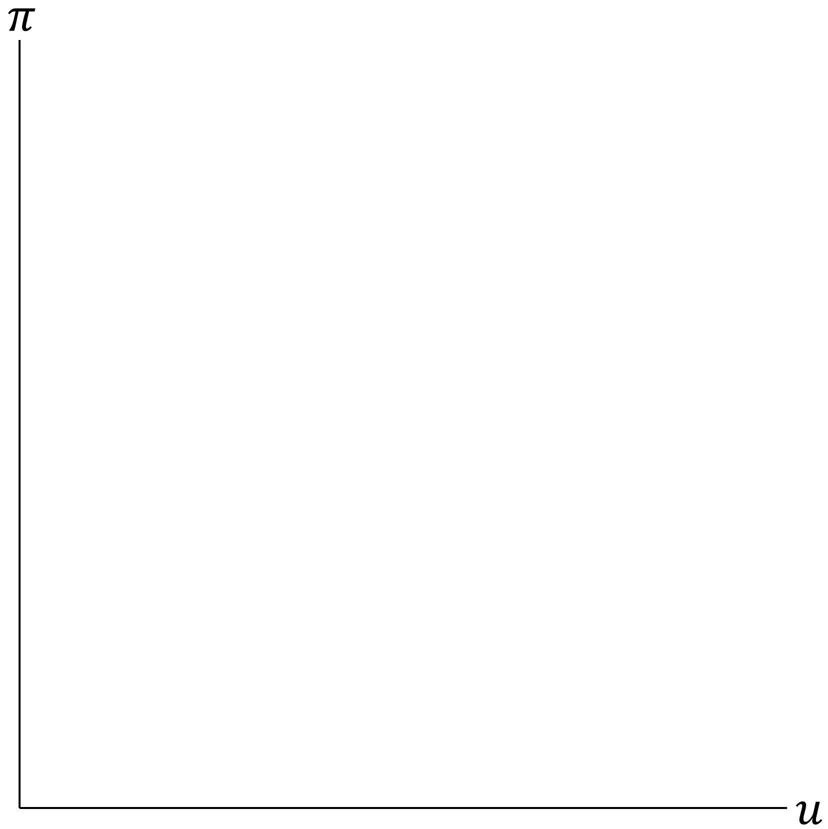
Agenda

- The Model
- The PPE Payoff Set
- The Optimal Relational Contract
- Public Information
- Conclusions

PPE Payoff Set

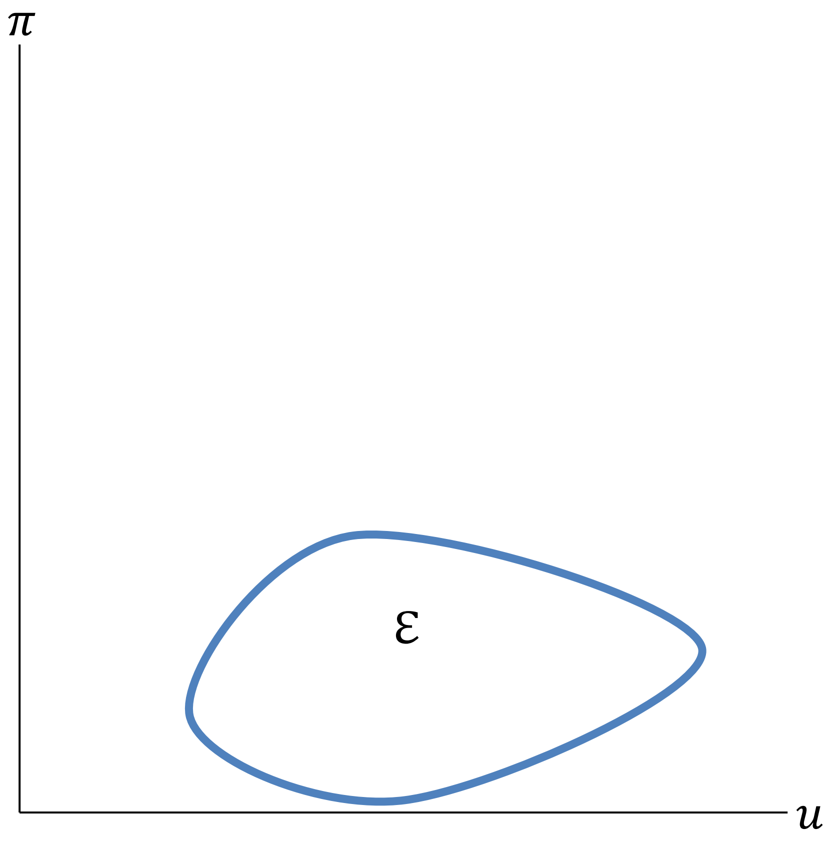
- Abreu-Pearce-Stacchetti: characterizes PPE *payoff set*

PPE Payoff Set



PPE Payoff Set

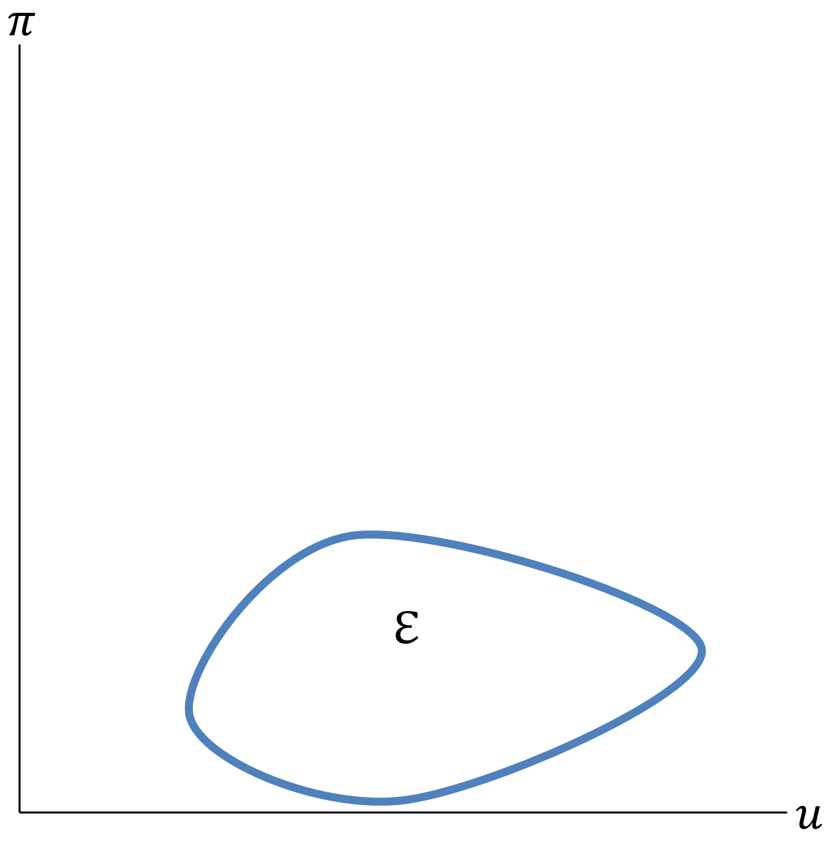
1. PPE set $\mathcal{E}$ is convex and compact



PPE Payoff Set

1. PPE set $\mathcal{E}$ is convex and compact
2. $\mathcal{E}$ is convex hull of its frontier:

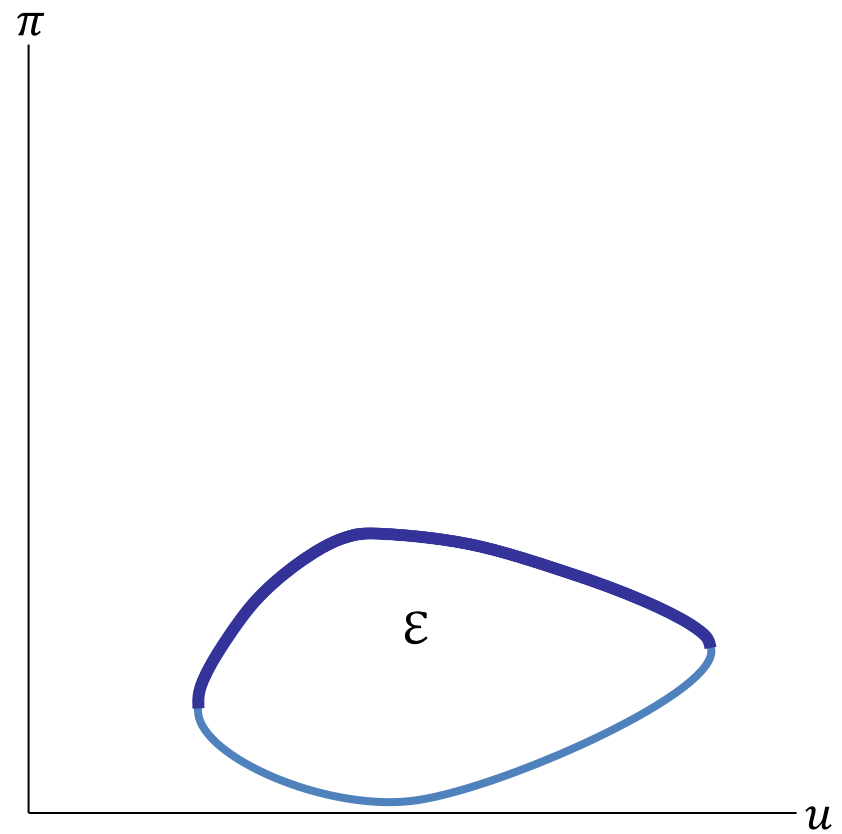
$$\pi(u) = max\{\pi|(u,\pi) \in \mathcal{E}\}$$



PPE Payoff Set

1. PPE set $\mathcal{E}$ is convex and compact
2. $\mathcal{E}$ is convex hull of its frontier:

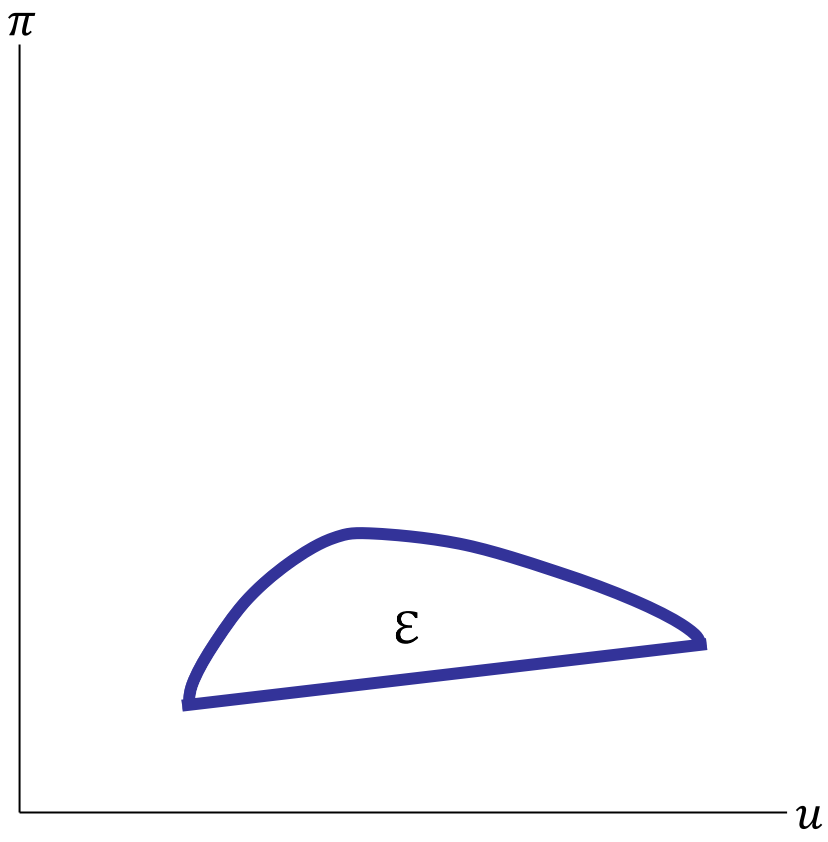
$$\pi(u) = max\{\pi | (u, \pi) \in \mathcal{E}\}$$



PPE Payoff Set

1. PPE set $\mathcal{E}$ is convex and compact
2. $\mathcal{E}$ is convex hull of its frontier:

$$\pi(u) = max\{\pi | (u, \pi) \in \mathcal{E}\}$$

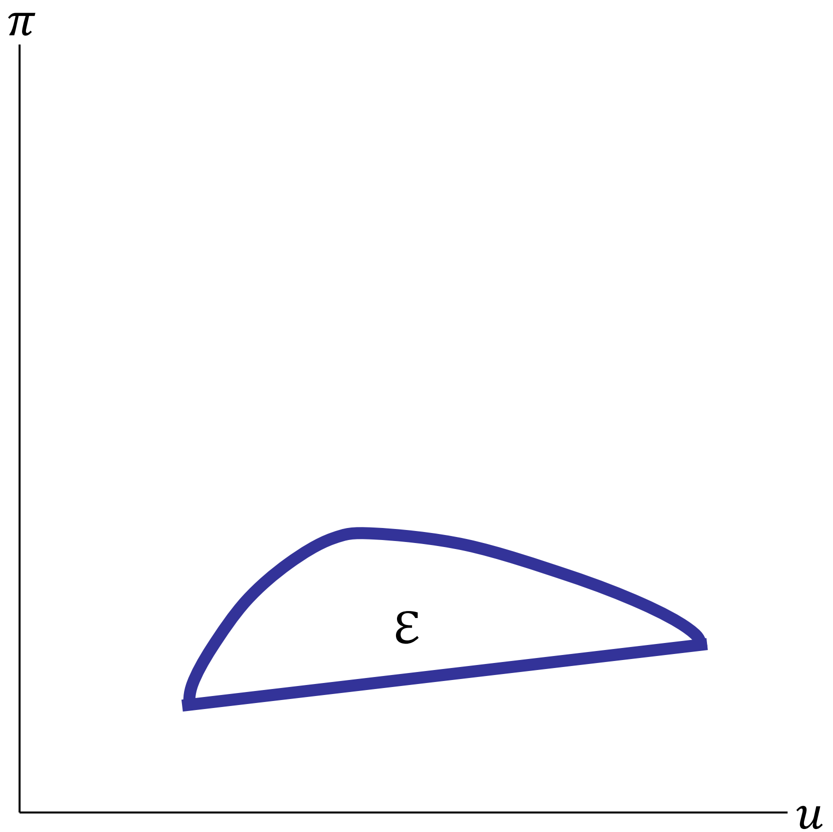


PPE Payoff Set

1. PPE set $\mathcal{E}$ is convex and compact
2. $\mathcal{E}$ is convex hull of its frontier:

$$\pi(u) = max\{\pi | (u, \pi) \in \mathcal{E}\}$$

3. $\pi(\cdot)$ is self-generating



PPE Payoff Set

- Abreu-Pearce-Stacchetti: characterizes PPE *payoff set*
- Can focus exclusively on frontier

Actions?

- Abreu-Pearce-Stacchetti: characterizes PPE *payoff set*
- Can focus exclusively on frontier
- Also want to characterize *actions* taken at each point on the frontier
- Any eqbm payoff pair on frontier either generated by pure actions or by randomization b/t two eqbm payoff pairs generated by pure actions

Four Classes of Actions in Equilibrium

- Centralization (C)

  both enter, P does not delegate

- Cooperative Delegation (D_C)

  both enter, P delegates,

  A chooses $k = P$ whenever possible

- Uncooperative Delegation (D_U)

  both enter, P delegates,

  A always chooses $k = A$

- Exit (E)

  neither enter

Four Classes of Actions in Equilibrium

If supported at $\big(u, \pi(u)\big)$, then:

- Centralization (C)

  both enter, P does not delegate

Four Classes of Actions in Equilibrium

- Centralization (C)
  both enter, P does not delegate

If supported at $\big(u, \pi(u)\big)$, then:

$$u = (1-\delta)a + \delta u_C$$

Four Classes of Actions in Equilibrium

If supported at $(u, \pi(u))$, then:

$$u_C(u) = \frac{u - (1 - \delta)a}{\delta}$$

- Centralization (C)

  both enter, P does not delegate

Four Classes of Actions in Equilibrium

- Centralization (C)
  both enter, P does not delegate

- Cooperative Delegation (D_C)
  both enter, P delegates,
  A chooses $k = P$ whenever possible

If supported at $\big(u, \pi(u)\big)$, then:

$$u_C(u) = \frac{u - (1-\delta)a}{\delta}$$

Four Classes of Actions in Equilibrium

If supported at $(u, \pi(u))$, then:

$$u_C(u) = \frac{u - (1-\delta)a}{\delta}$$

- Centralization (C)

  both enter, P does not delegate

- Cooperative Delegation (D_C)

  both enter, P delegates,

  A chooses $k = P$ whenever possible

There must be two continuation values, u_l and u_h satisfying:

$$(1-\delta)b + \delta u_h \geq (1-\delta)B + \delta u_l$$

and

$$u = p[(1-\delta)b + \delta u_h] + (1-p)[(1-\delta)B + \delta u_l]$$

Four Classes of Actions in Equilibrium

- Centralization (C)
  both enter, P does not delegate

If supported at $\big(u, \pi(u)\big)$, then:

$$u_C(u) = \frac{u - (1-\delta)a}{\delta}$$

- Cooperative Delegation (D_C)
  both enter, P delegates,
  A chooses $k = P$ whenever possible

There must be two continuation values, u_l and u_h satisfying:

$$(1-\delta)b + \delta u_h = (1-\delta)B + \delta u_l$$

and

$$u = p[(1-\delta)b + \delta u_h] + (1-p)[(1-\delta)B + \delta u_l]$$

Four Classes of Actions in Equilibrium

If supported at $\big(u, \pi(u)\big)$, then:

$$u_C(u) = \frac{u - (1-\delta)a}{\delta}$$

- Centralization (C)
  both enter, P does not delegate

- Cooperative Delegation (D_C)
  both enter, P delegates,
  A chooses $k = P$ whenever possible

There must be two continuation values, u_l and u_h satisfying:

$$(1-\delta)b + \delta u_h = (1-\delta)B + \delta u_l$$

and

$$u_h(u) = \frac{u - (1-\delta)b}{\delta} \qquad u_l(u) = \frac{u - (1-\delta)B}{\delta}$$

Four Classes of Actions in Equilibrium

- Centralization (C)

  both enter, P does not delegate

- Cooperative Delegation (D_C)

  both enter, P delegates,

  A chooses $k = P$ whenever possible

If supported at $\big(u, \pi(u)\big)$, then:

$$u_C(u) = \frac{u - (1-\delta)a}{\delta}$$

$$u_h(u) = \frac{u - (1-\delta)b}{\delta}$$

$$u_l(u) = \frac{u - (1-\delta)B}{\delta}$$

Four Classes of Actions in Equilibrium

If supported at $\big(u, \pi(u)\big)$, then:

- Centralization (C)

  both enter, P does not delegate

$$u_C(u) = \frac{u - (1-\delta)a}{\delta}$$

- Cooperative Delegation (D_C)

  both enter, P delegates,

  A chooses $k = P$ whenever possible

$$u_h(u) = \frac{u - (1-\delta)b}{\delta}$$

$$u_l(u) = \frac{u - (1-\delta)B}{\delta}$$

- Uncooperative Delegation (D_U)

  both enter, P delegates,

  A always chooses $k = A$

$$u_{D_U}(u) = \frac{u - (1-\delta)B}{\delta}$$

- Exit (E)

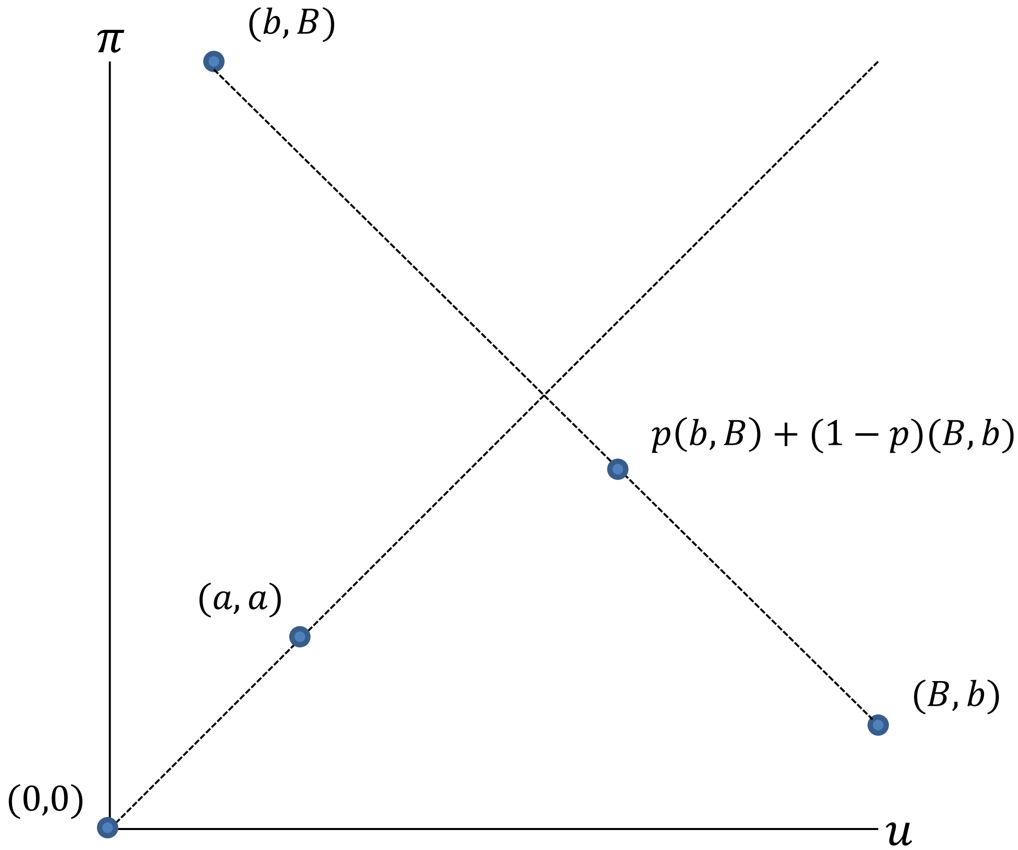
  neither enter

$$u_E(u) = \frac{u}{\delta}$$

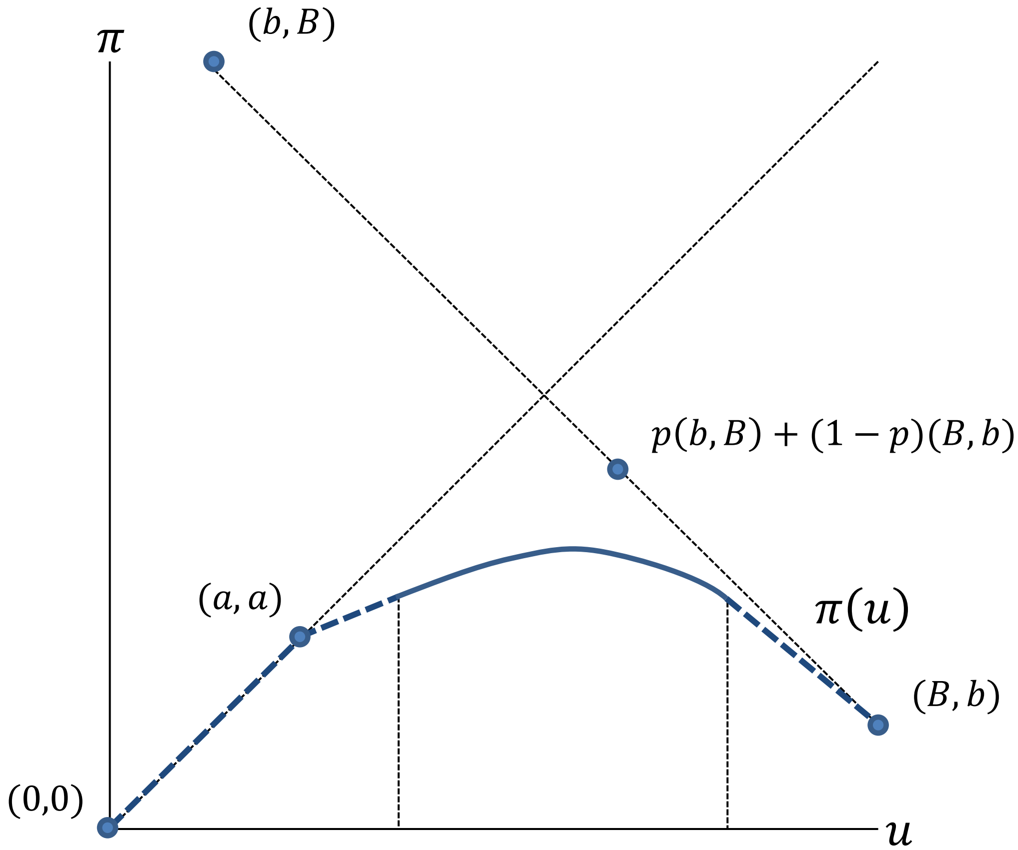
Agenda

- The Model
- The PPE Payoff Set
- The Optimal Relational Contract
- Public Information
- Conclusions

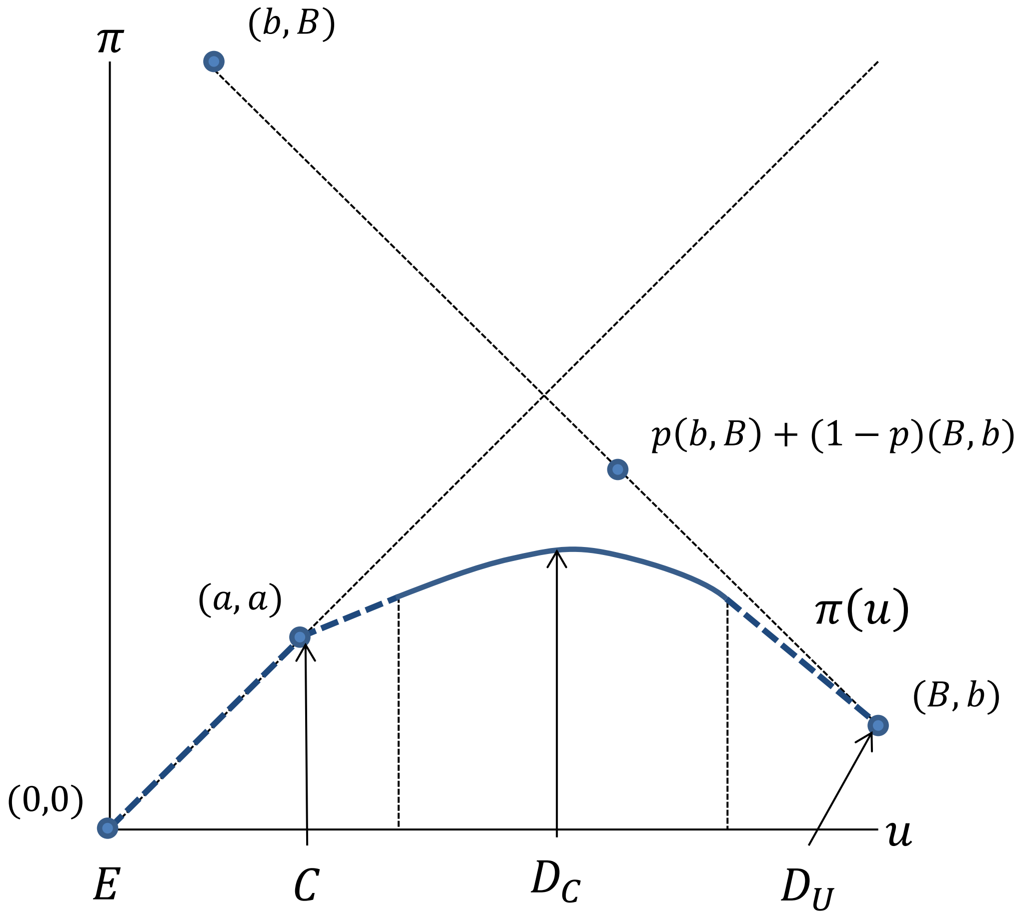
The PPE Payoff Frontier



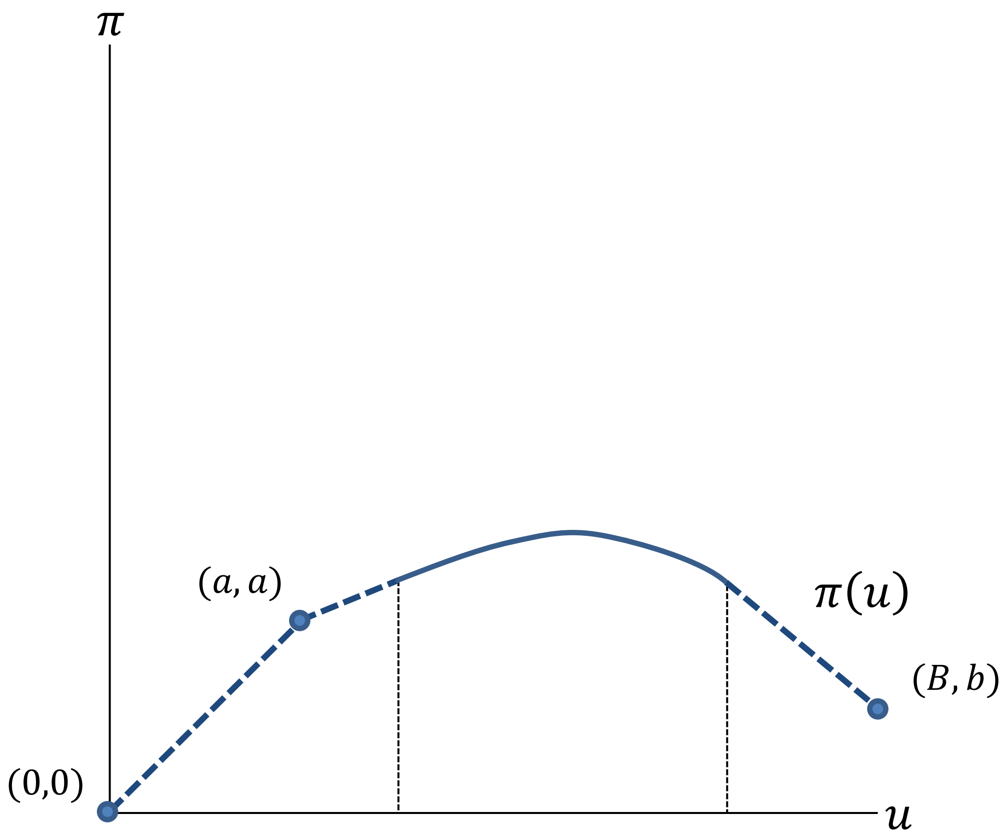
The PPE Payoff Frontier



Actions Supporting the Frontier

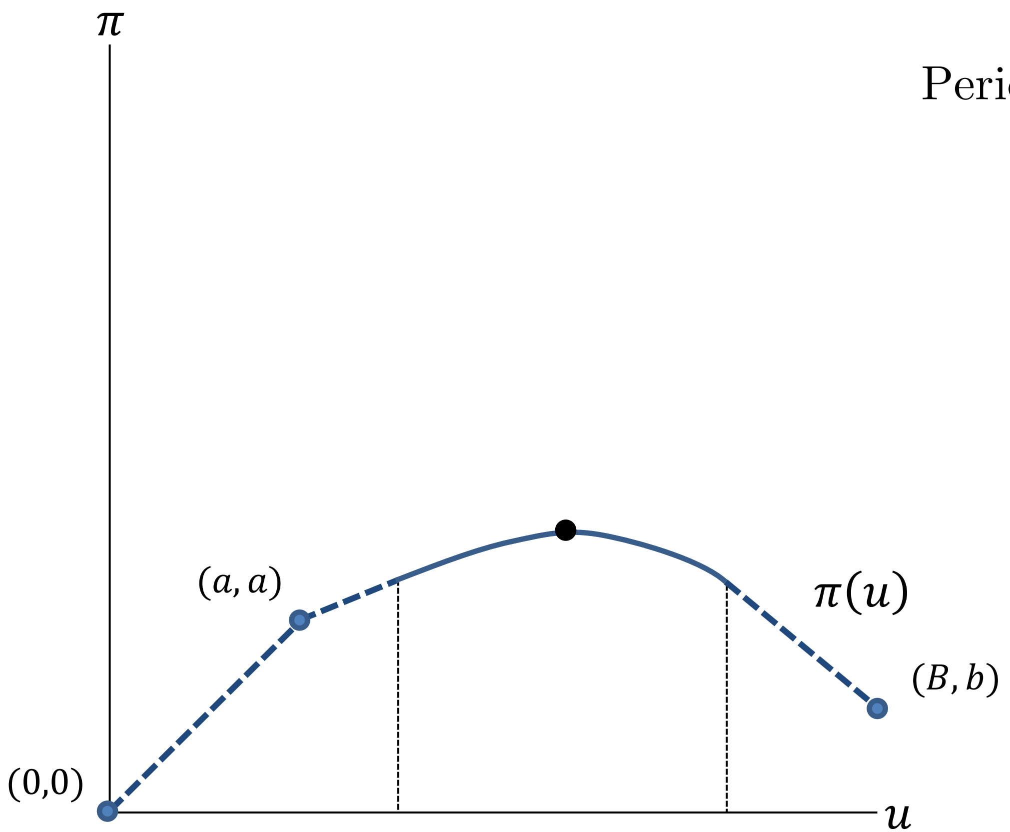


Optimal Relational Contract

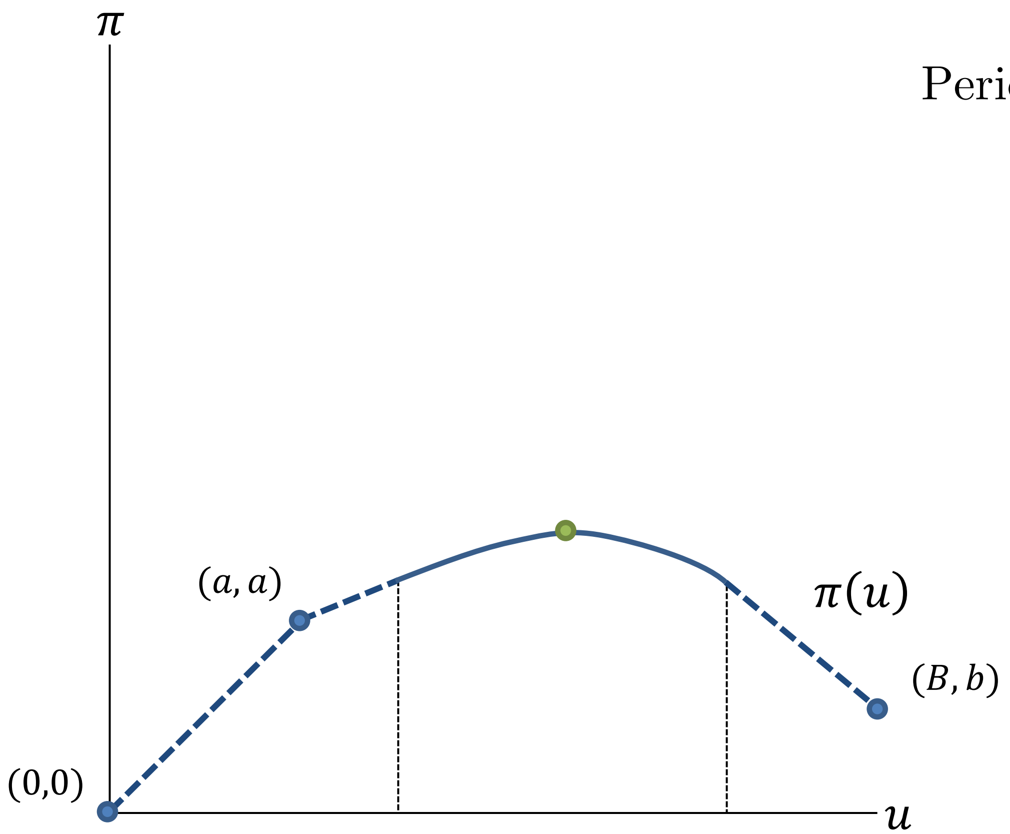


Optimal Relational Contract

Period 1: D_C

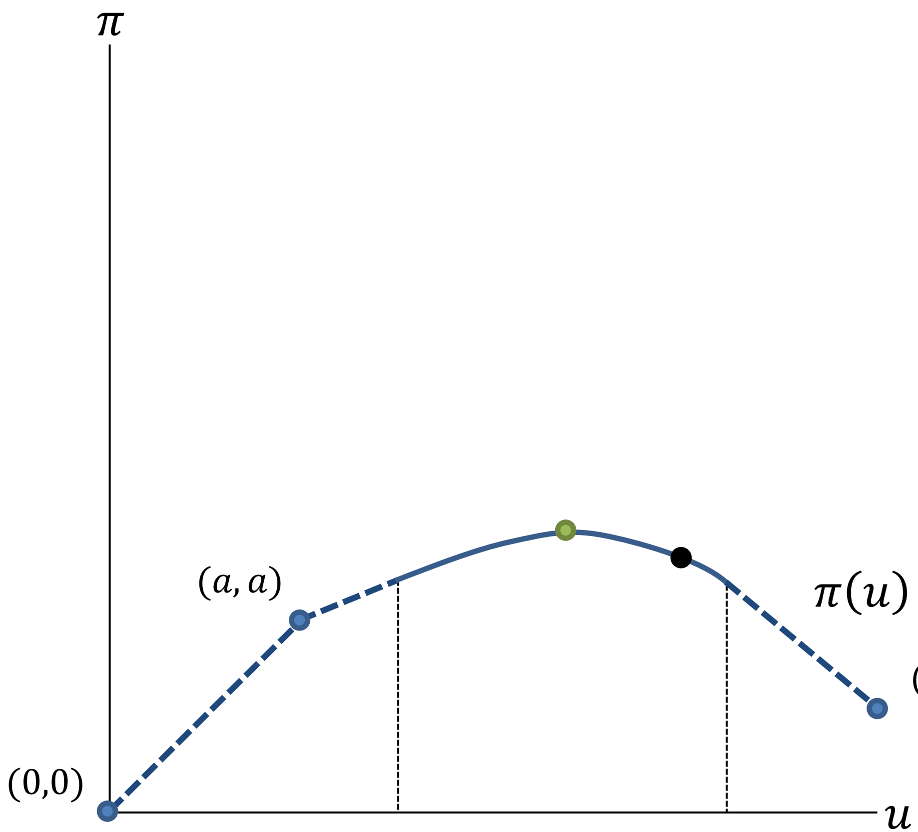


Optimal Relational Contract



Period 1: D_C, P chosen

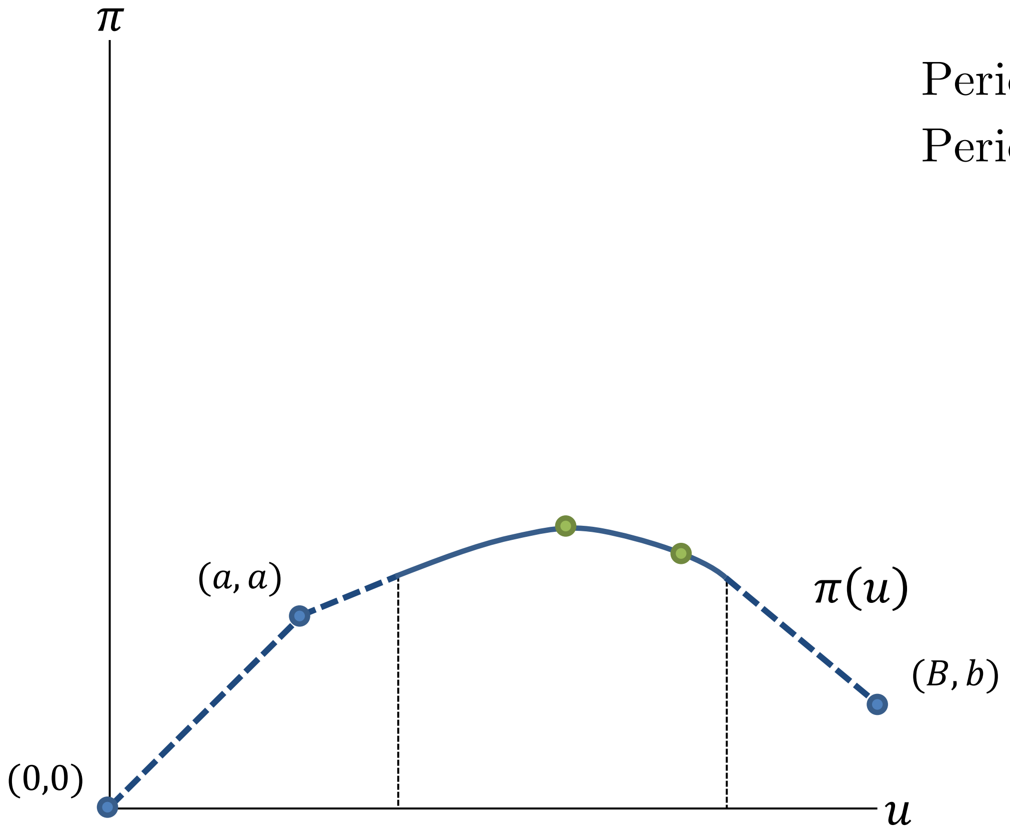
Optimal Relational Contract



Period 1: D_C, P chosen

Period 2: D_C

Optimal Relational Contract



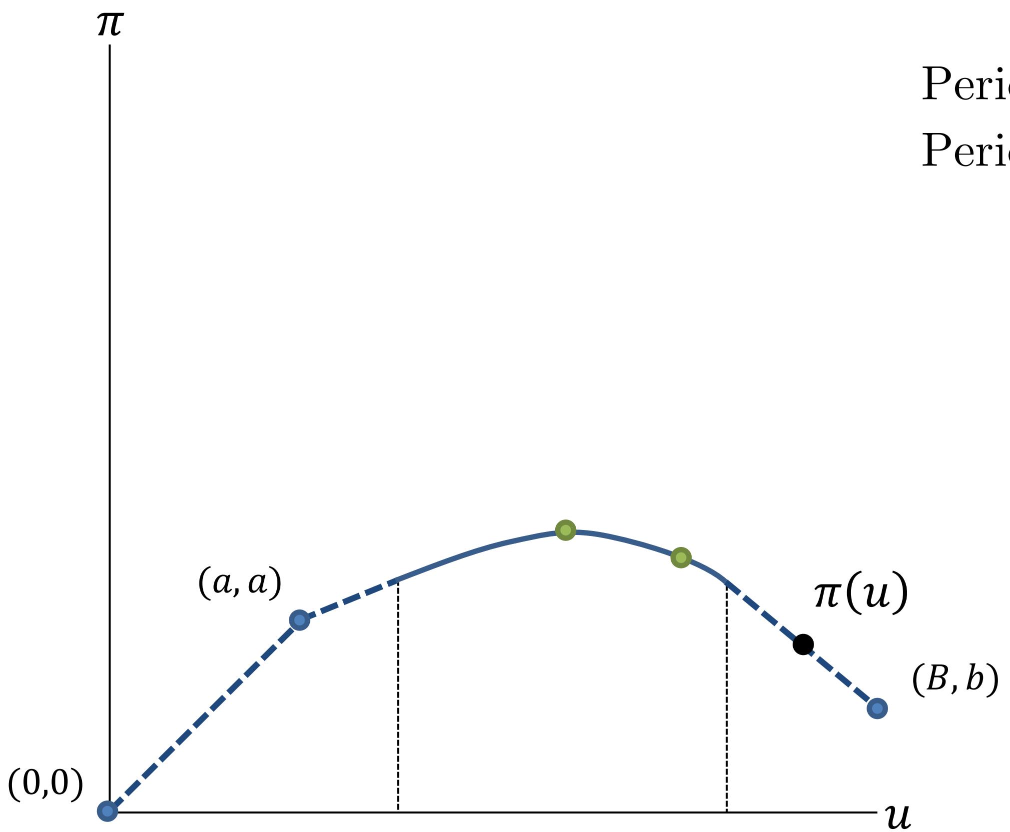
Period 1: D_C, P chosen

Period 2: D_C, P chosen

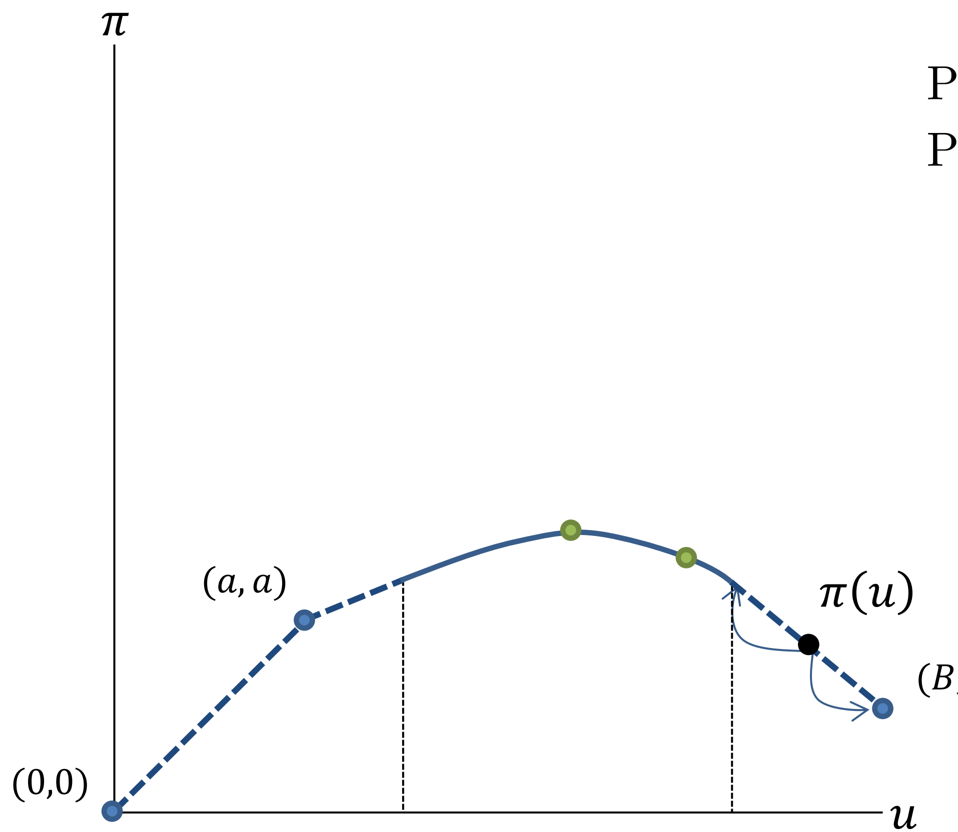
Optimal Relational Contract

Period 1: D_C, P chosen

Period 2: D_C, P chosen



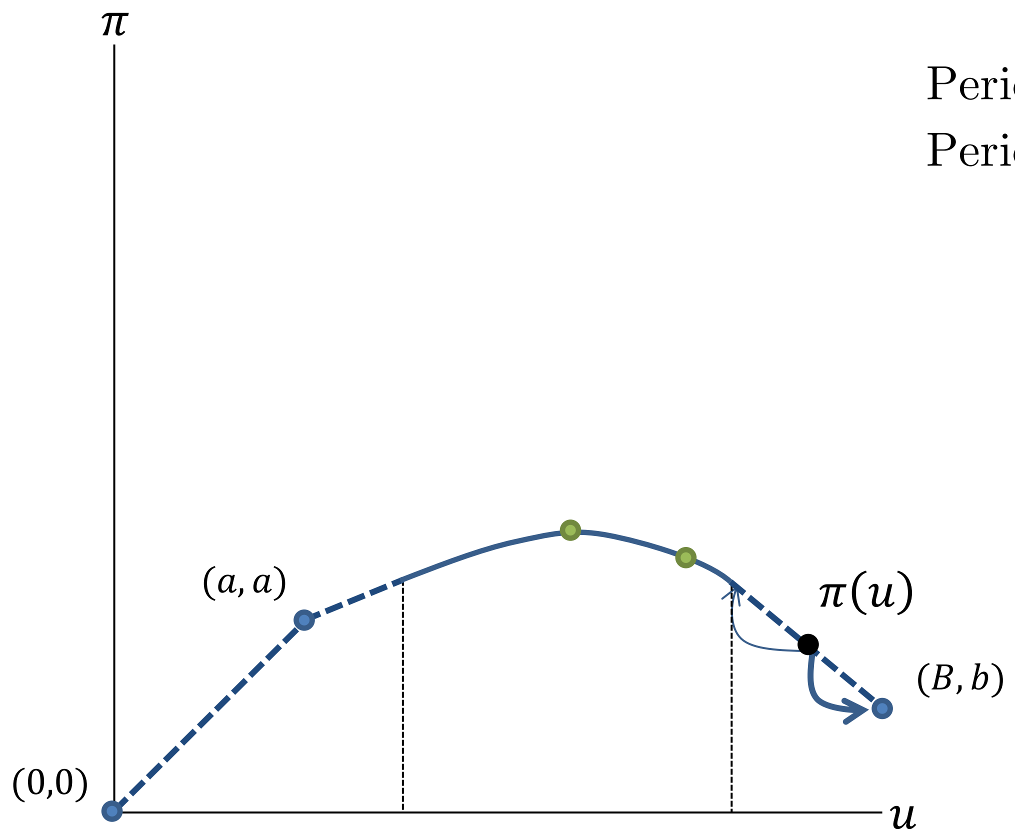
Optimal Relational Contract



Period 1: D_C, P chosen

Period 2: D_C, P chosen
Randomization

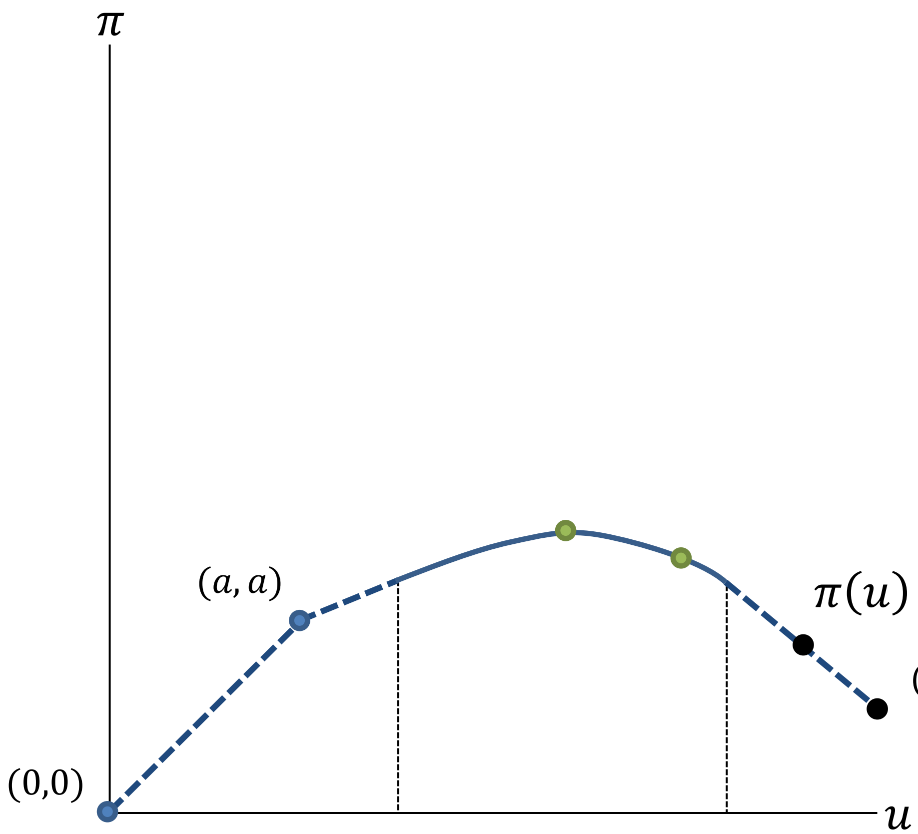
Optimal Relational Contract



Period 1: D_C, P chosen

Period 2: D_C, P chosen
Randomization

Optimal Relational Contract

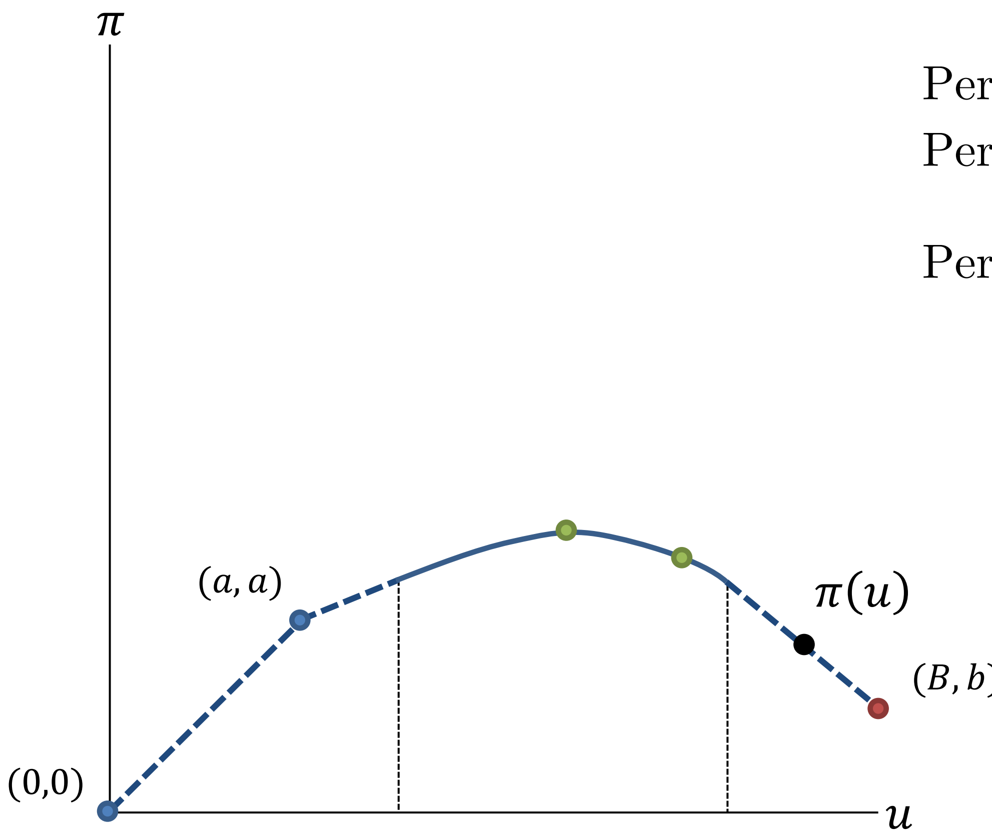


Period 1: D_C, P chosen

Period 2: D_C, P chosen
Randomization

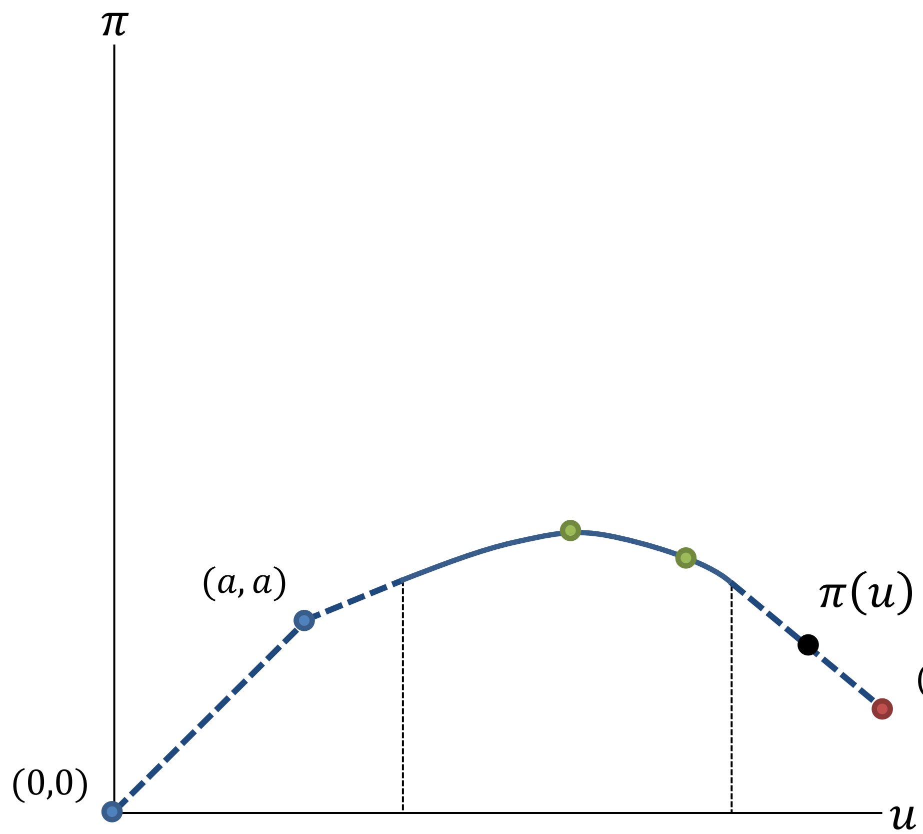
Period 3: D_U

Optimal Relational Contract



Period 1: D_C, P chosen
Period 2: D_C, P chosen
Randomization
Period 3: D_U, A chosen

Optimal Relational Contract



Period 1: D_C, P chosen

Period 2: D_C, P chosen
Randomization

Period 3: D_U, A chosen

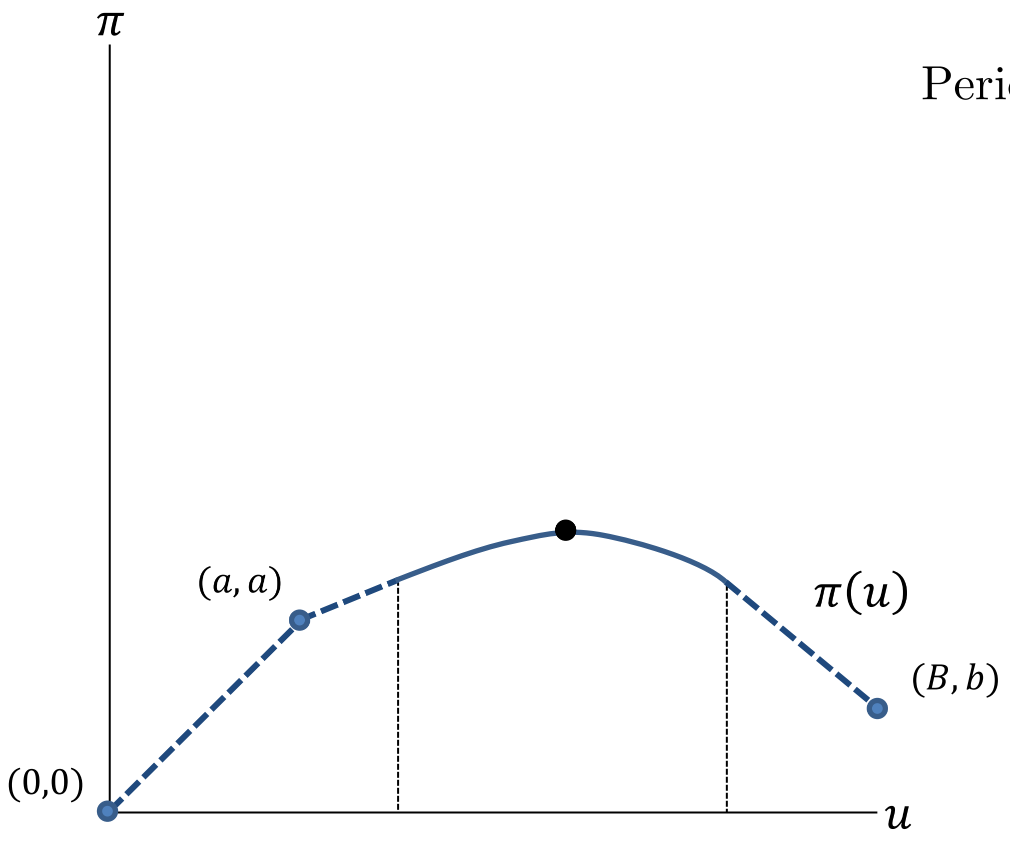
Period 4: D_U, A chosen

⋮

Entrenchment

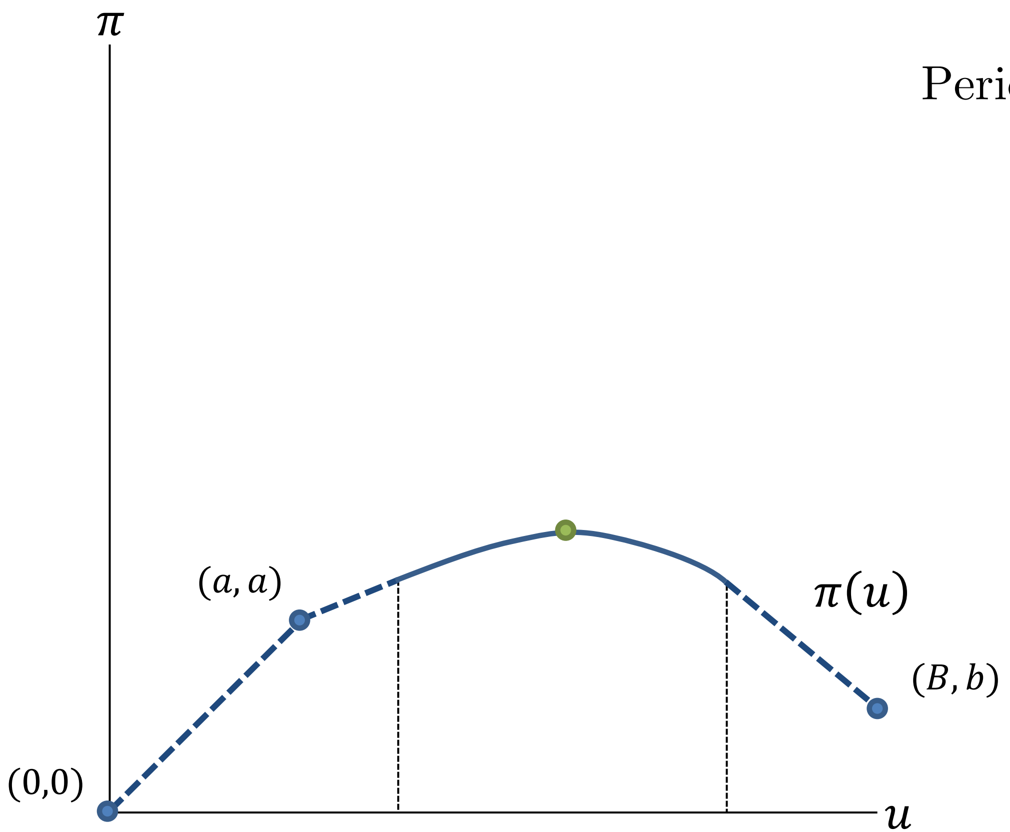
Optimal Relational Contract

Period 1: D_C

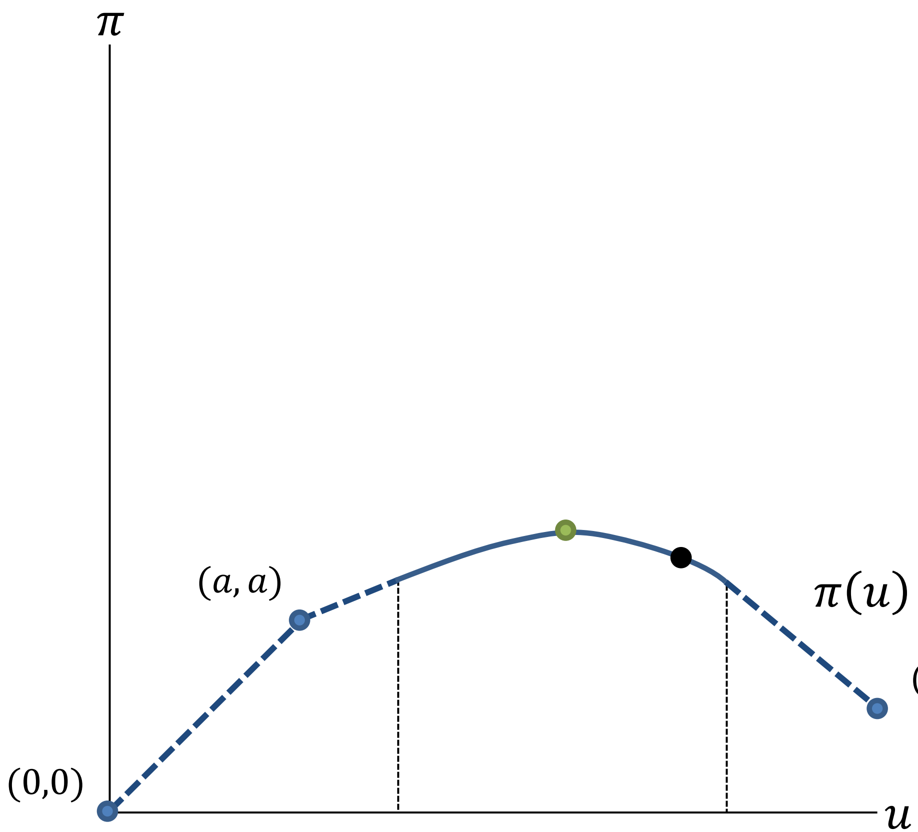


Optimal Relational Contract

Period 1: D_C, P chosen



Optimal Relational Contract



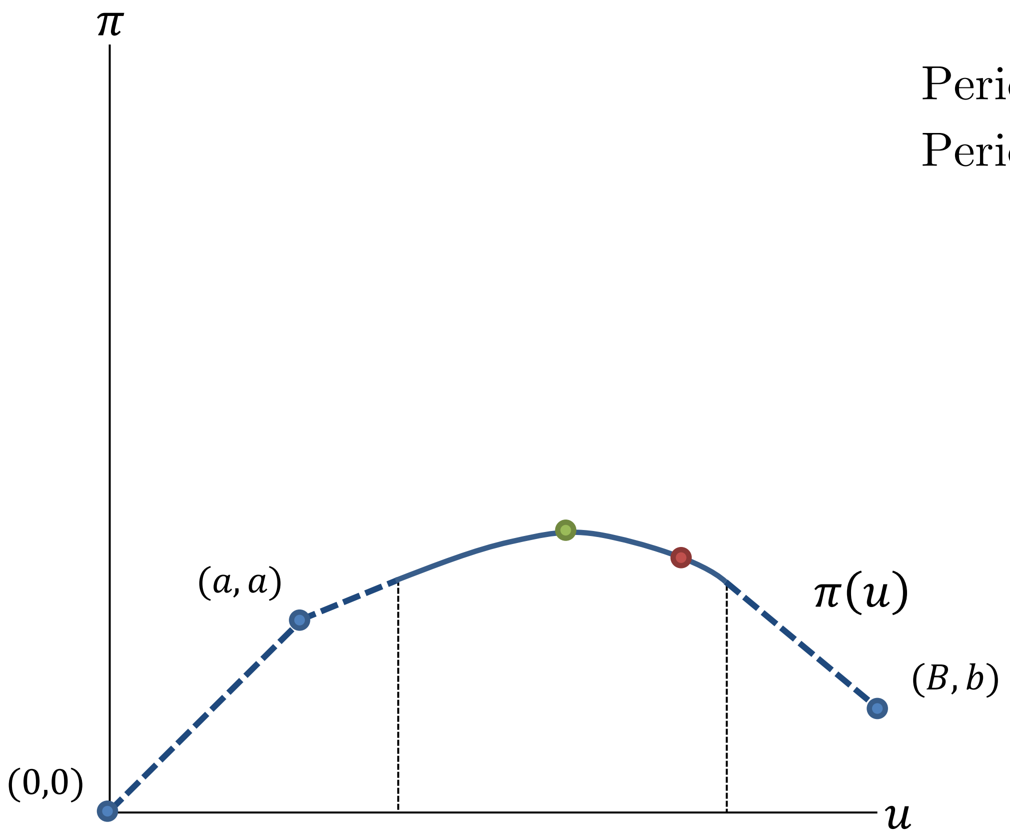
Period 1: D_C, P chosen

Period 2: D_C

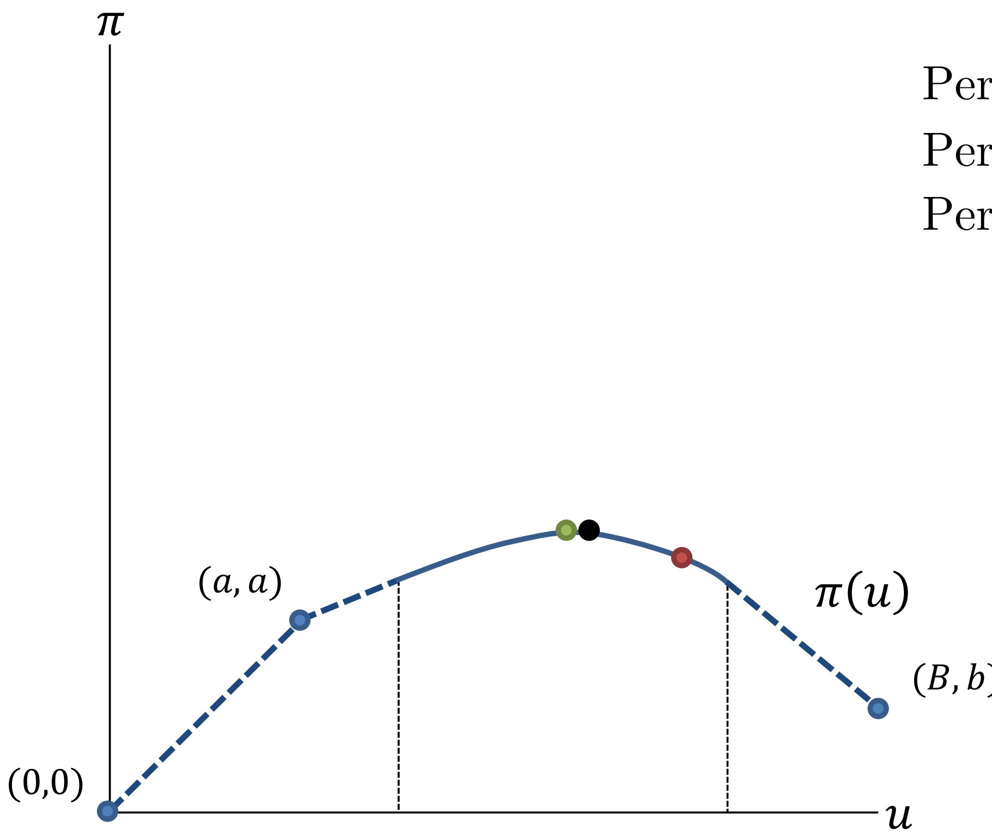
Optimal Relational Contract

Period 1: D_C, P chosen

Period 2: D_C, A chosen



Optimal Relational Contract

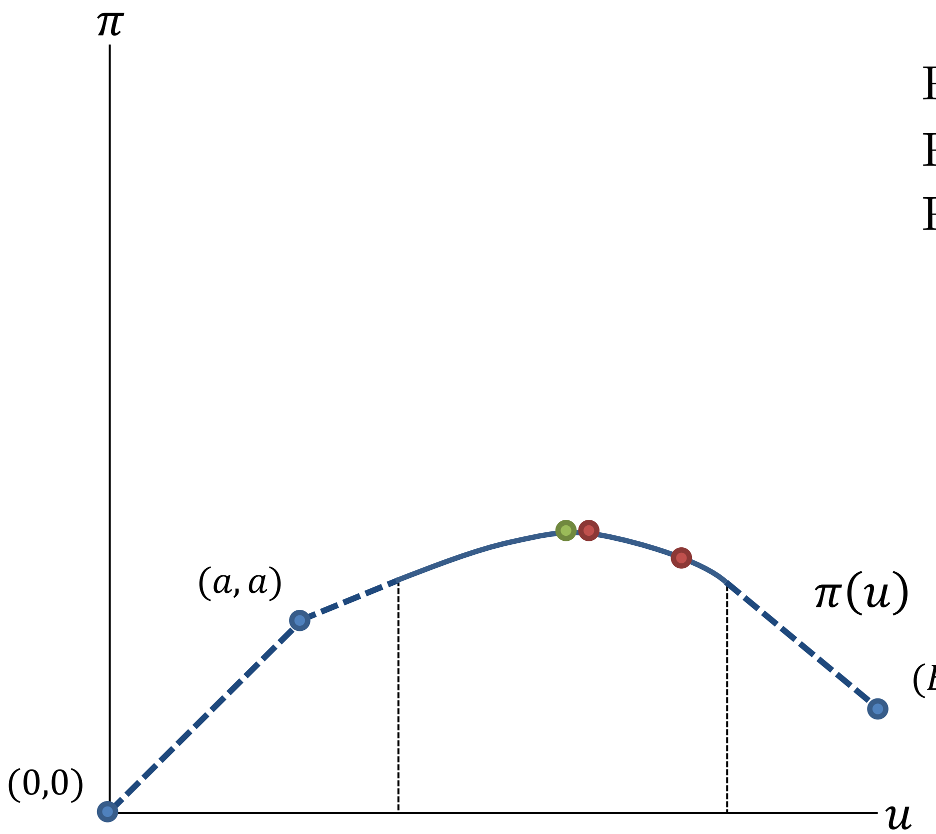


Period 1: D_C, P chosen

Period 2: D_C, A chosen

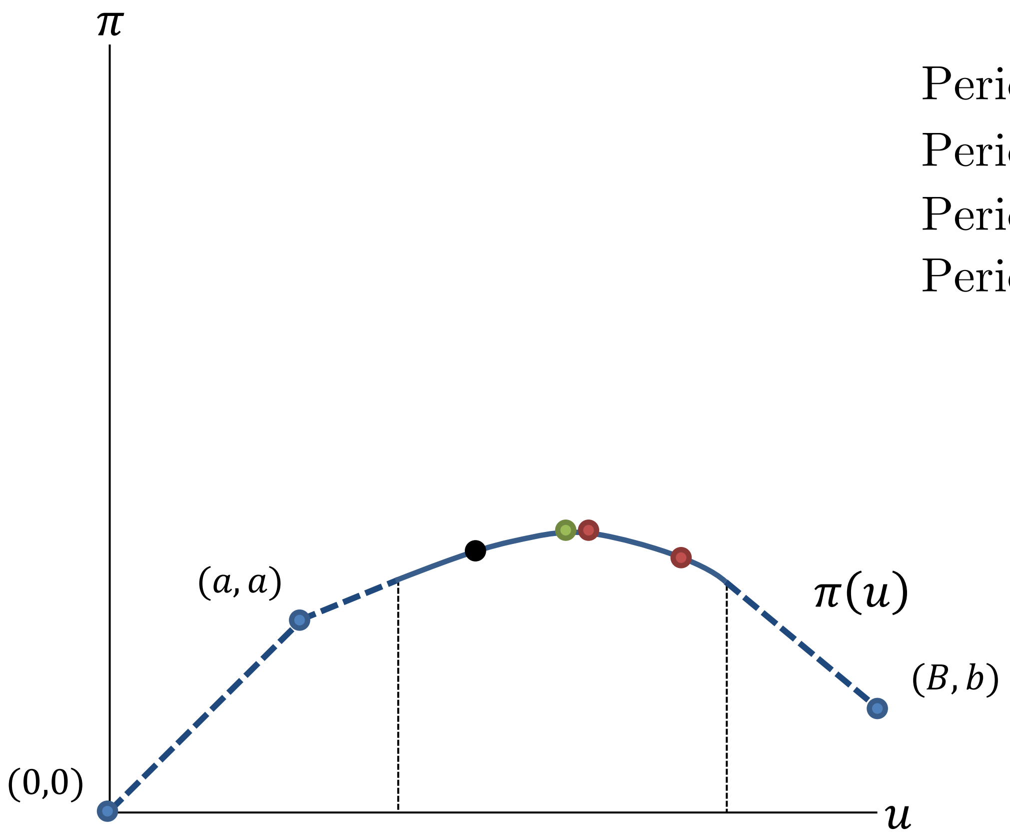
Period 3: D_C

Optimal Relational Contract



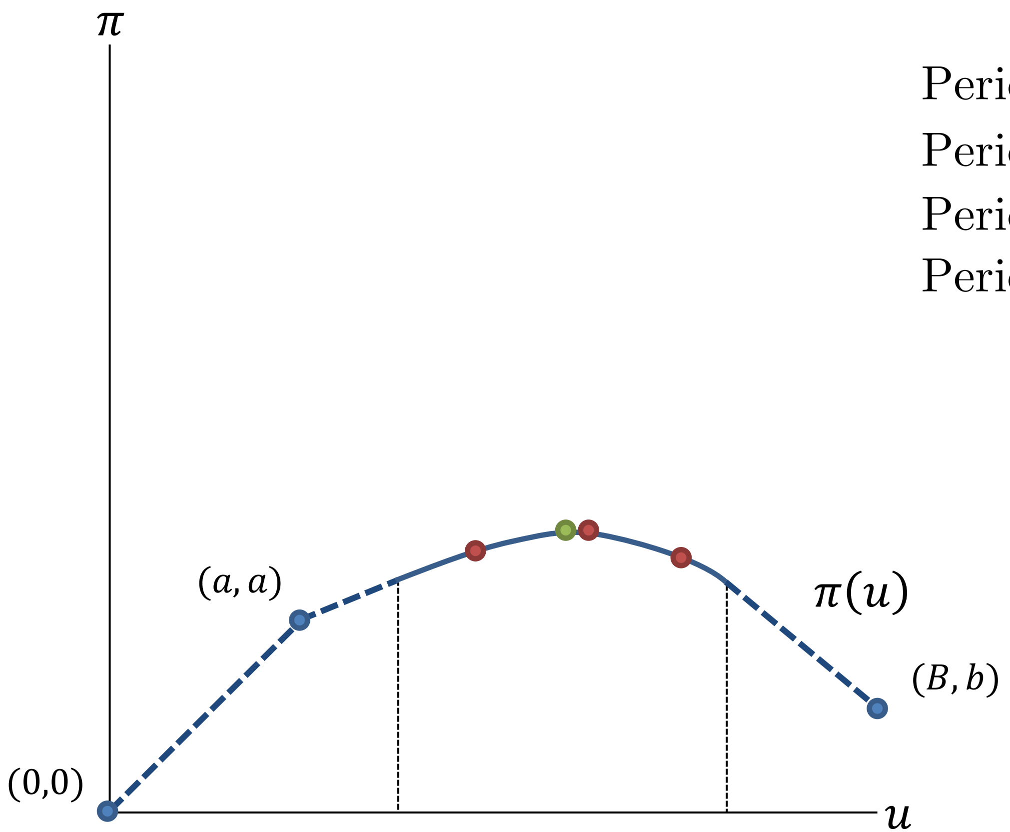
Period 1: D_C, P chosen
Period 2: D_C, A chosen
Period 3: D_C, A chosen

Optimal Relational Contract



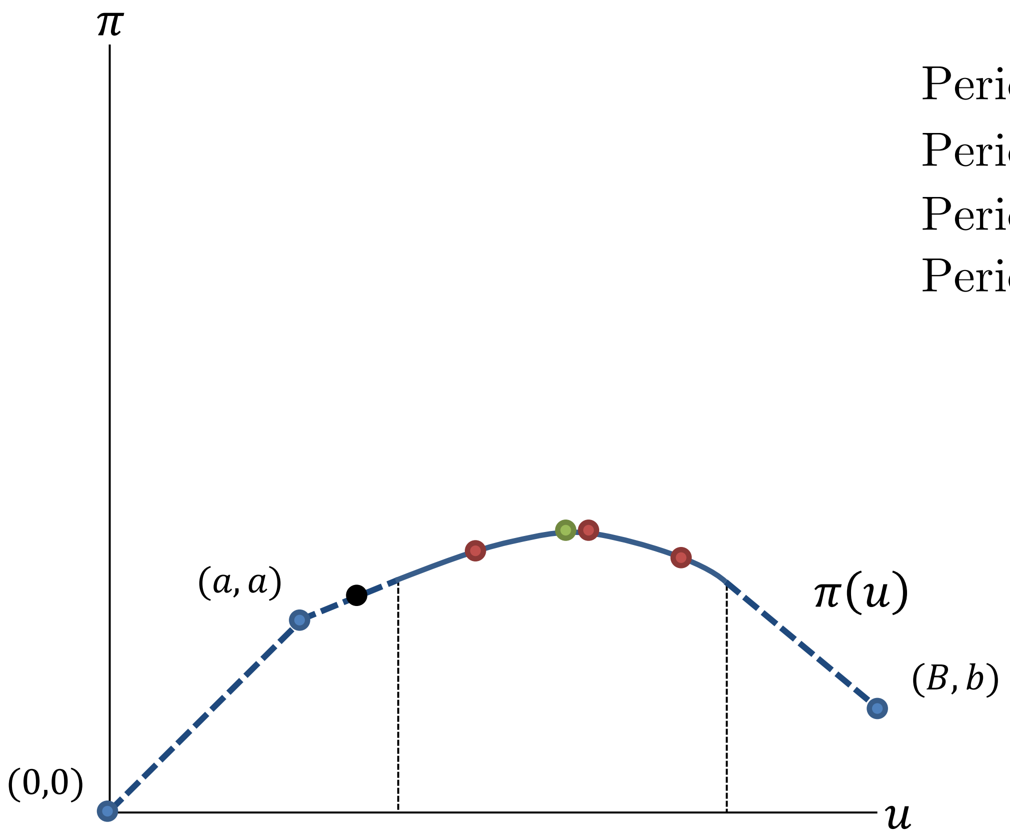
Period 1: D_C, P chosen
Period 2: D_C, A chosen
Period 3: D_C, A chosen
Period 4: D_C

Optimal Relational Contract



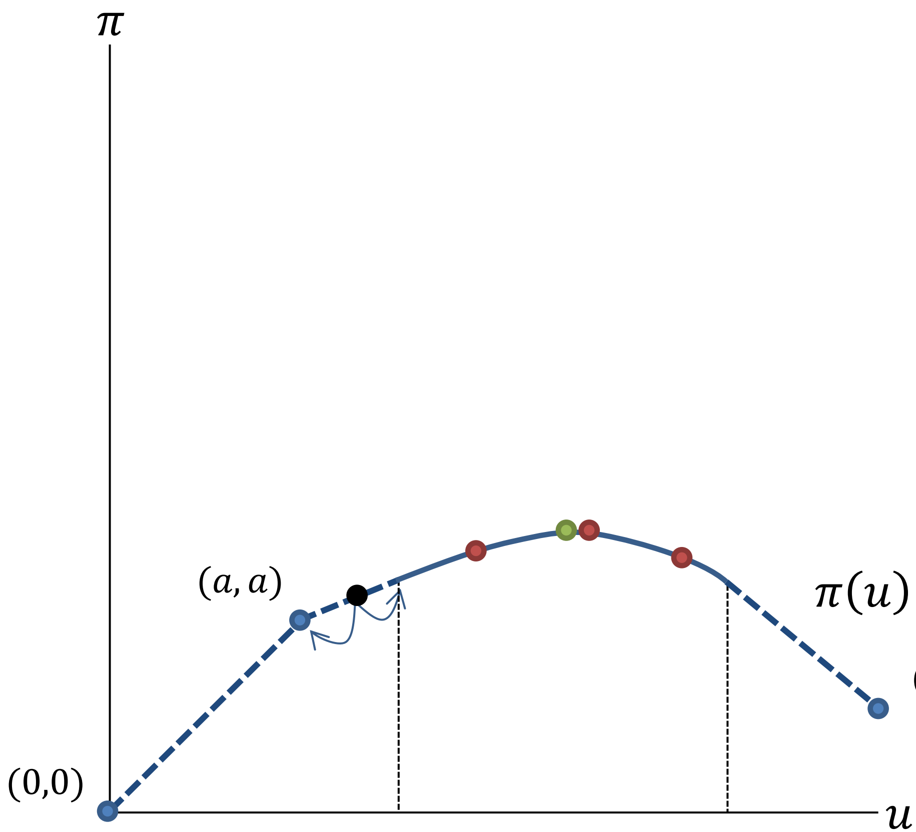
Period 1: D_C, P chosen
Period 2: D_C, A chosen
Period 3: D_C, A chosen
Period 4: D_C, A chosen

Optimal Relational Contract



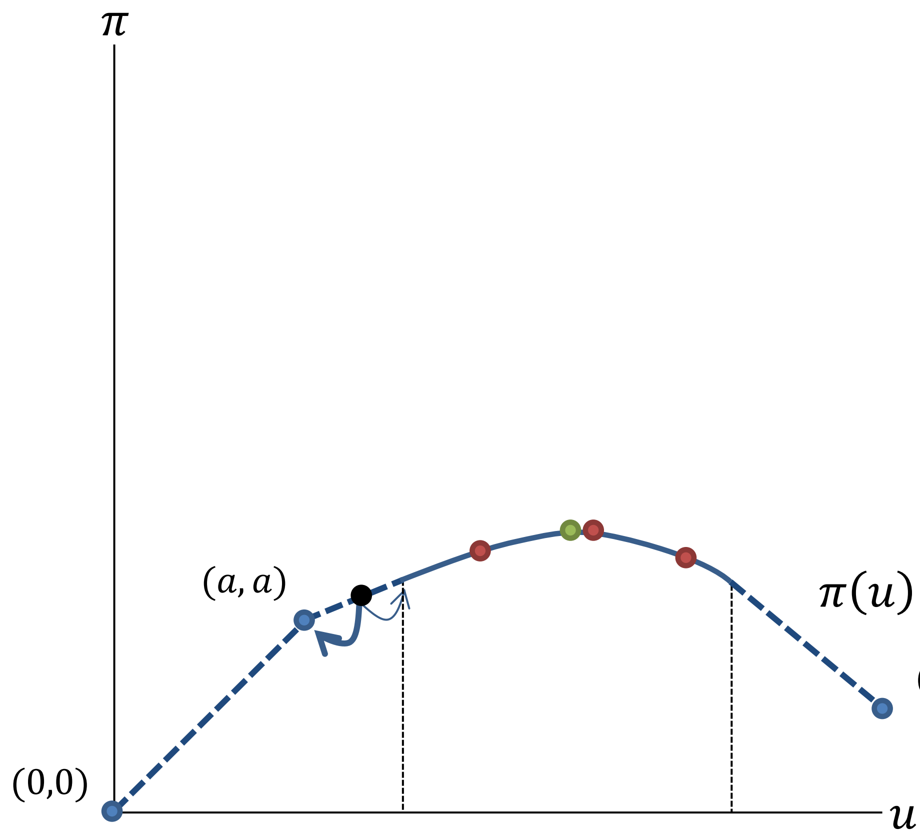
Period 1: D_C, P chosen
Period 2: D_C, A chosen
Period 3: D_C, A chosen
Period 4: D_C, A chosen

Optimal Relational Contract



Period 1: D_C, P chosen
Period 2: D_C, A chosen
Period 3: D_C, A chosen
Period 4: D_C, A chosen
Randomization

Optimal Relational Contract



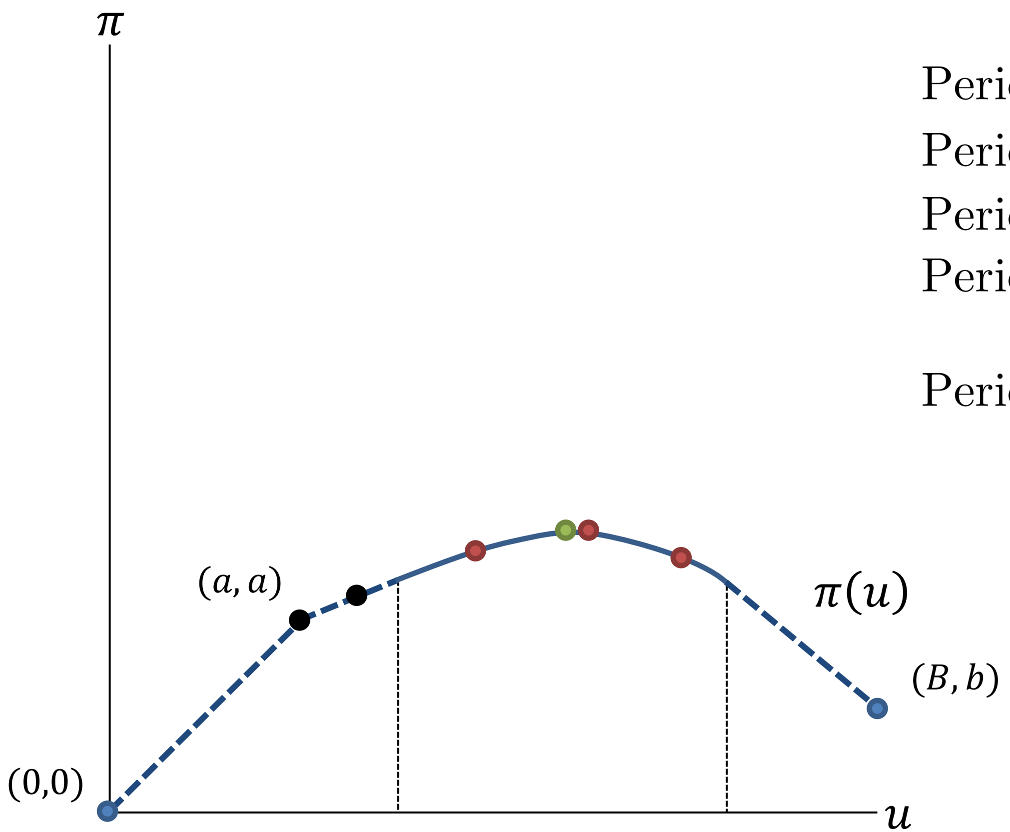
Period 1: D_C, P chosen

Period 2: D_C, A chosen

Period 3: D_C, A chosen

Period 4: D_C, A chosen
Randomization

Optimal Relational Contract



Period 1: D_C, P chosen

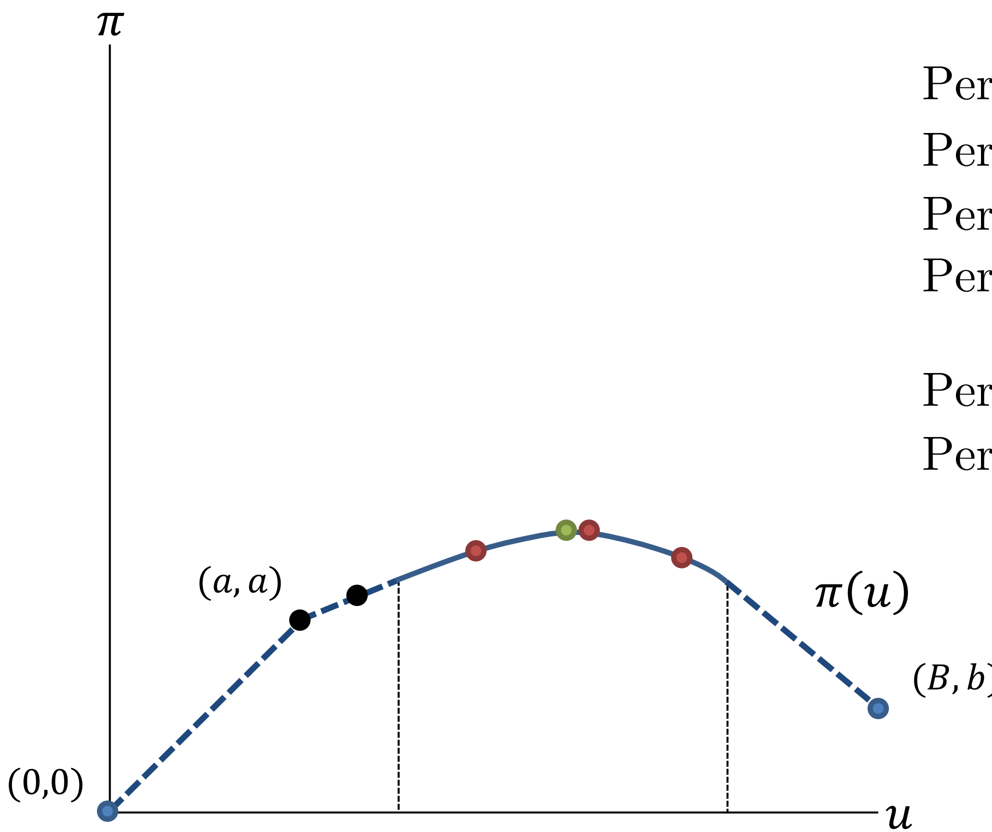
Period 2: D_C, A chosen

Period 3: D_C, A chosen

Period 4: D_C, A chosen
Randomization

Period 5: C, S chosen

Optimal Relational Contract



Period 1: D_C, P chosen

Period 2: D_C, A chosen

Period 3: D_C, A chosen

Period 4: D_C, A chosen

Randomization

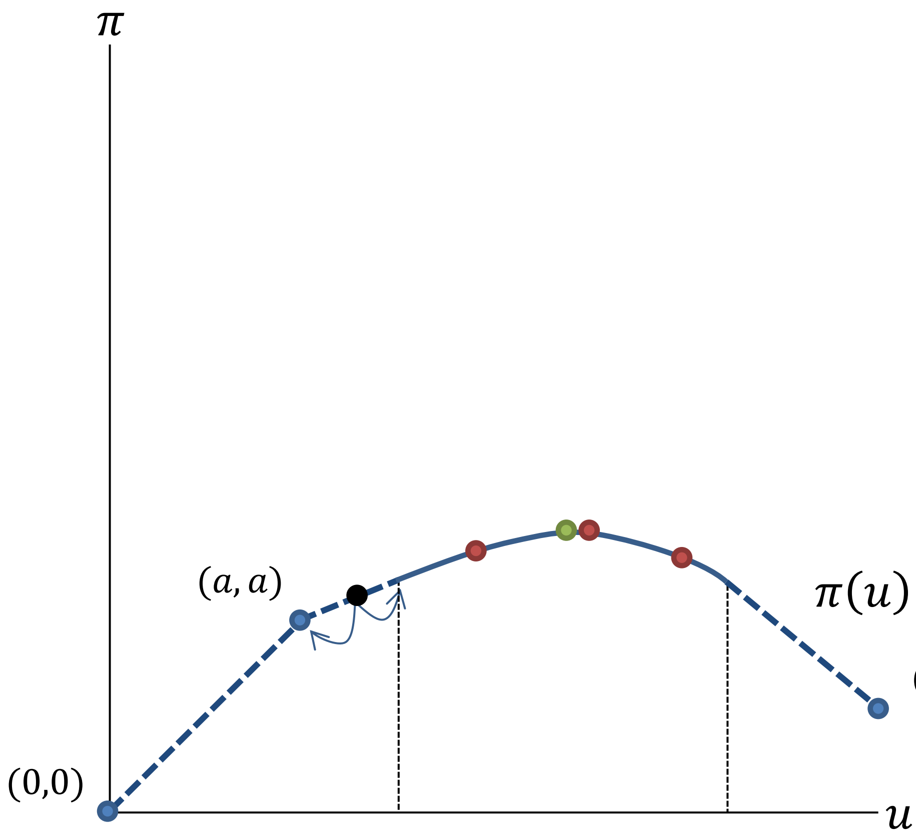
Period 5: C, S chosen

Period 6: C, S chosen

$\vdots$

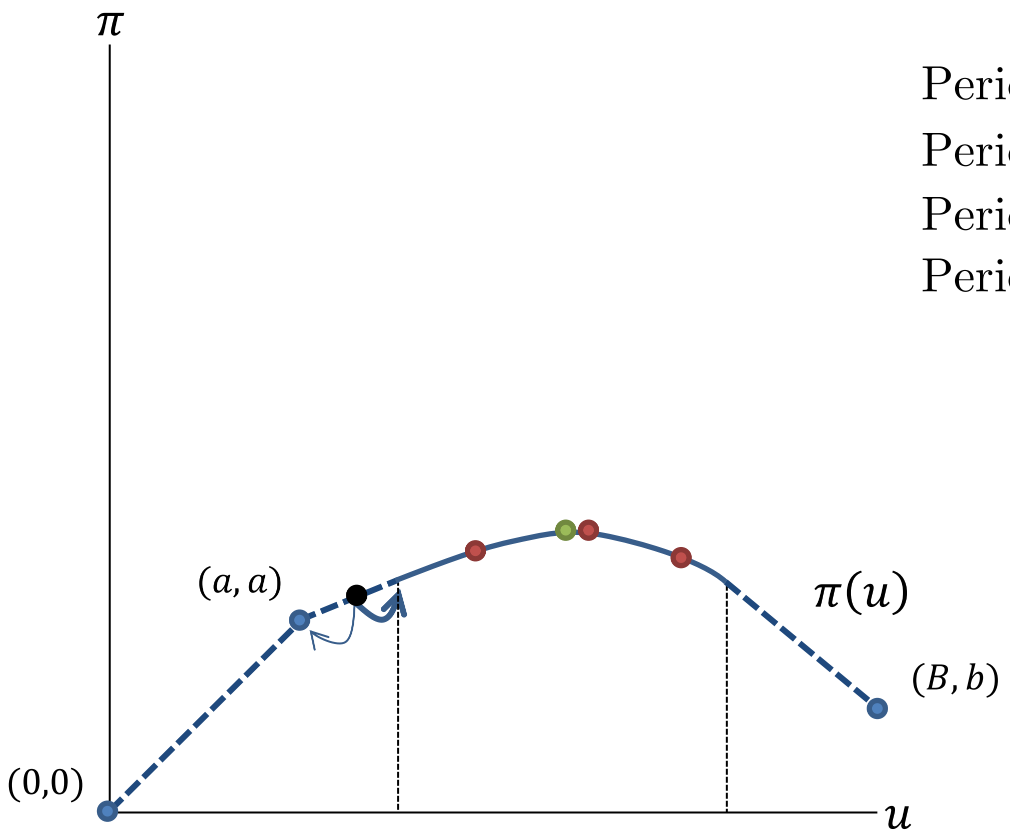
Permanent Centralization

Optimal Relational Contract



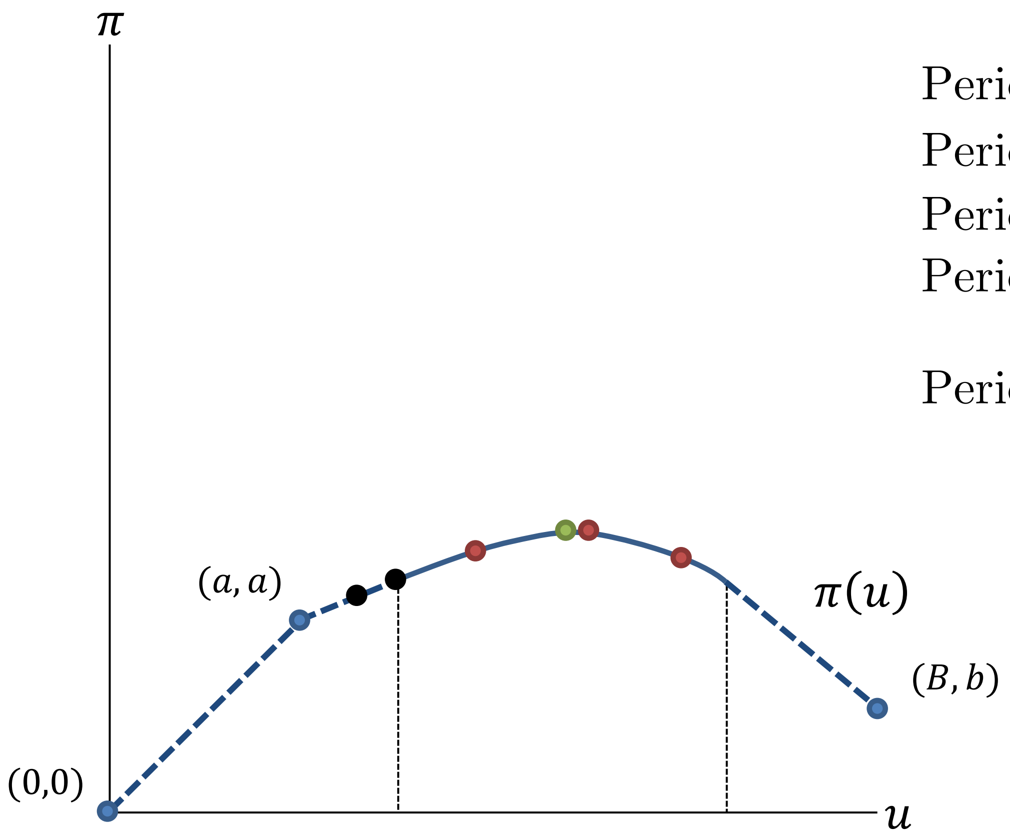
Period 1: D_C, P chosen
Period 2: D_C, A chosen
Period 3: D_C, A chosen
Period 4: D_C, A chosen
Randomization

Optimal Relational Contract



Period 1: D_C, P chosen
Period 2: D_C, A chosen
Period 3: D_C, A chosen
Period 4: D_C, A chosen
Randomization

Optimal Relational Contract



Period 1: D_C, P chosen

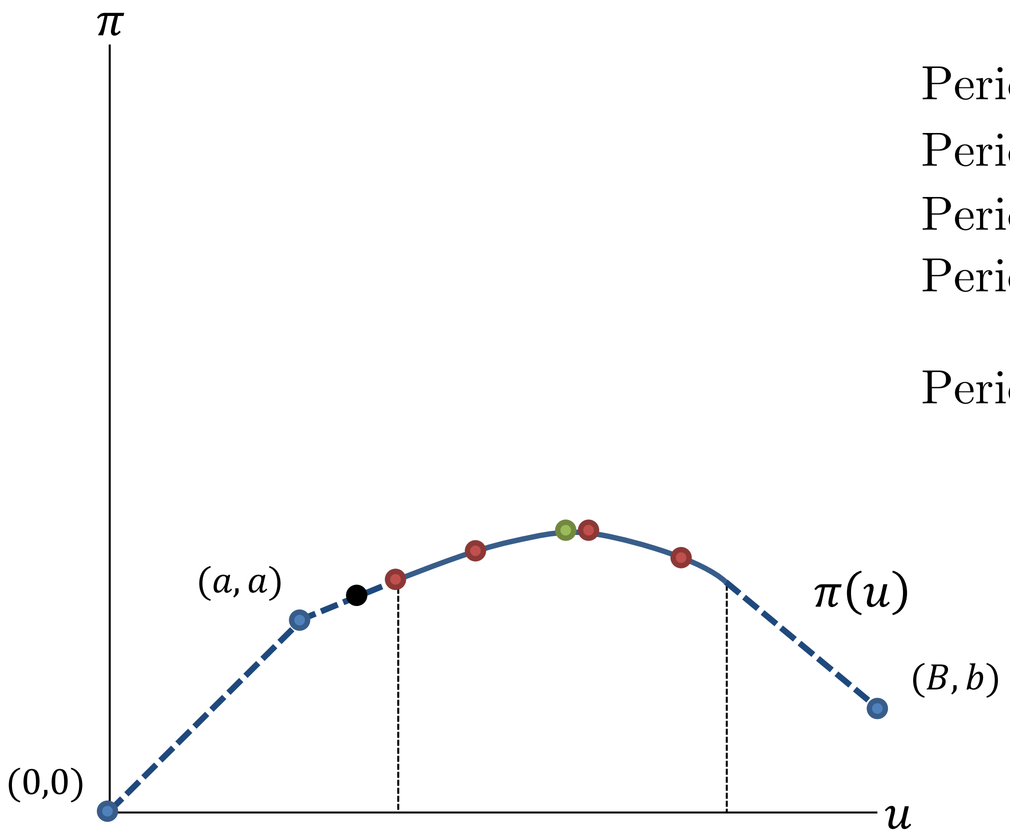
Period 2: D_C, A chosen

Period 3: D_C, A chosen

Period 4: D_C, A chosen
Randomization

Period 5: D_C

Optimal Relational Contract



Period 1: D_C, P chosen

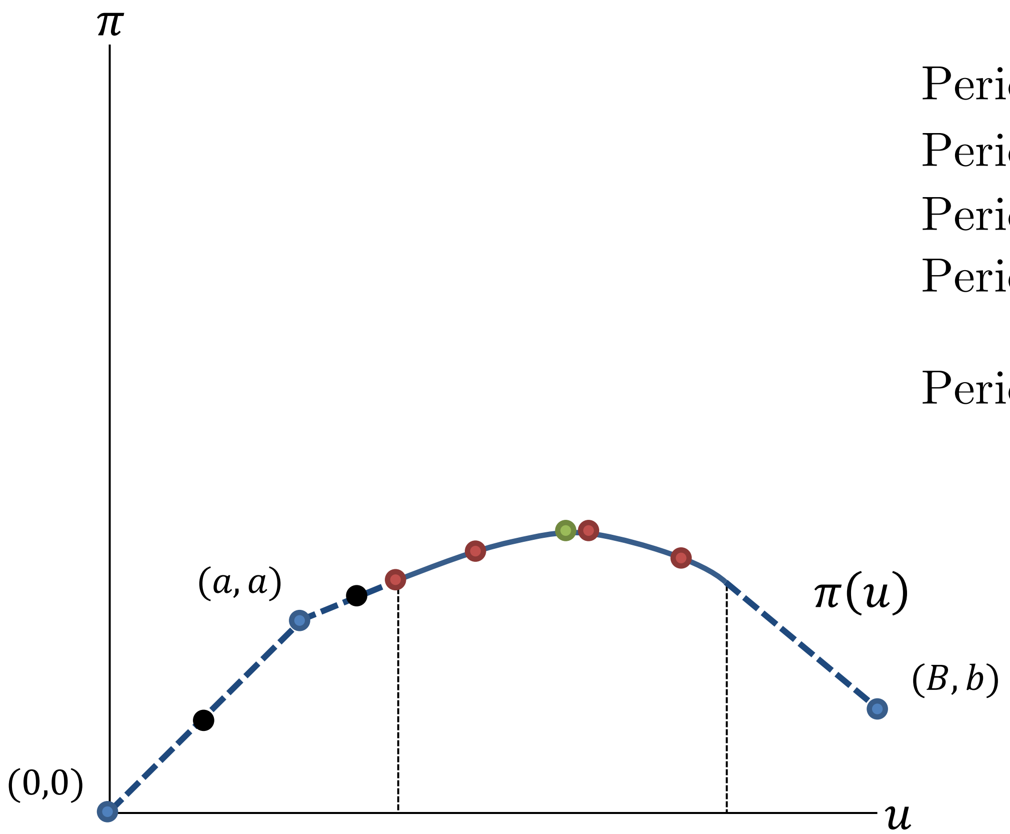
Period 2: D_C, A chosen

Period 3: D_C, A chosen

Period 4: D_C, A chosen
Randomization

Period 5: D_C, A chosen

Optimal Relational Contract



Period 1: D_C, P chosen

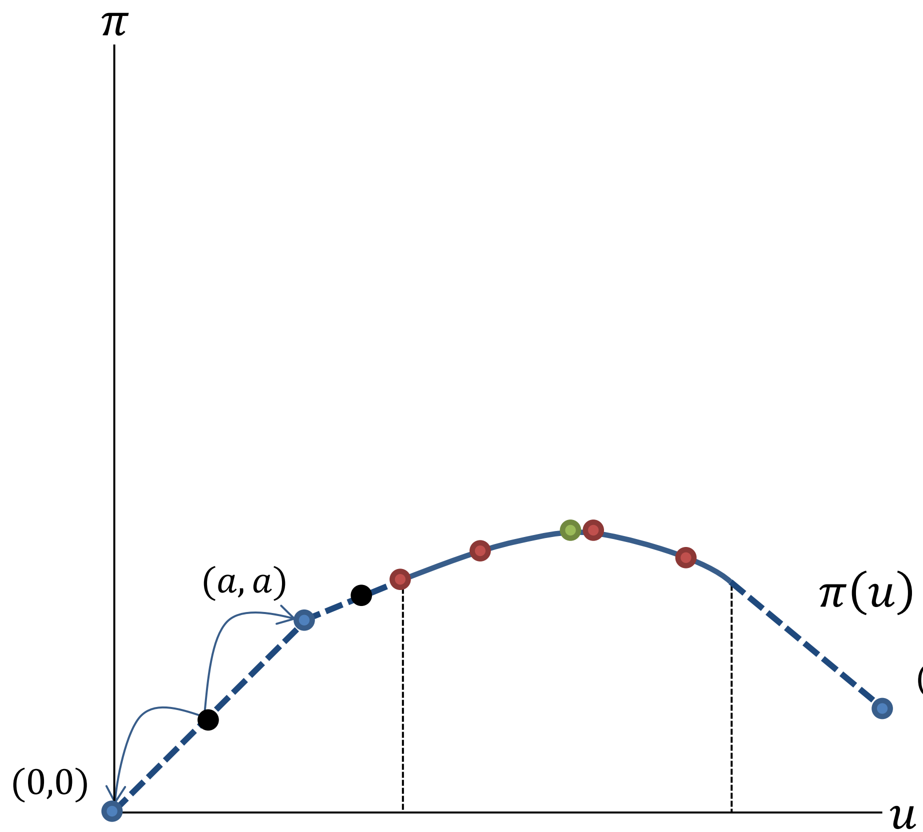
Period 2: D_C, A chosen

Period 3: D_C, A chosen

Period 4: D_C, A chosen
Randomization

Period 5: D_C, A chosen

Optimal Relational Contract



Period 1: D_C, P chosen

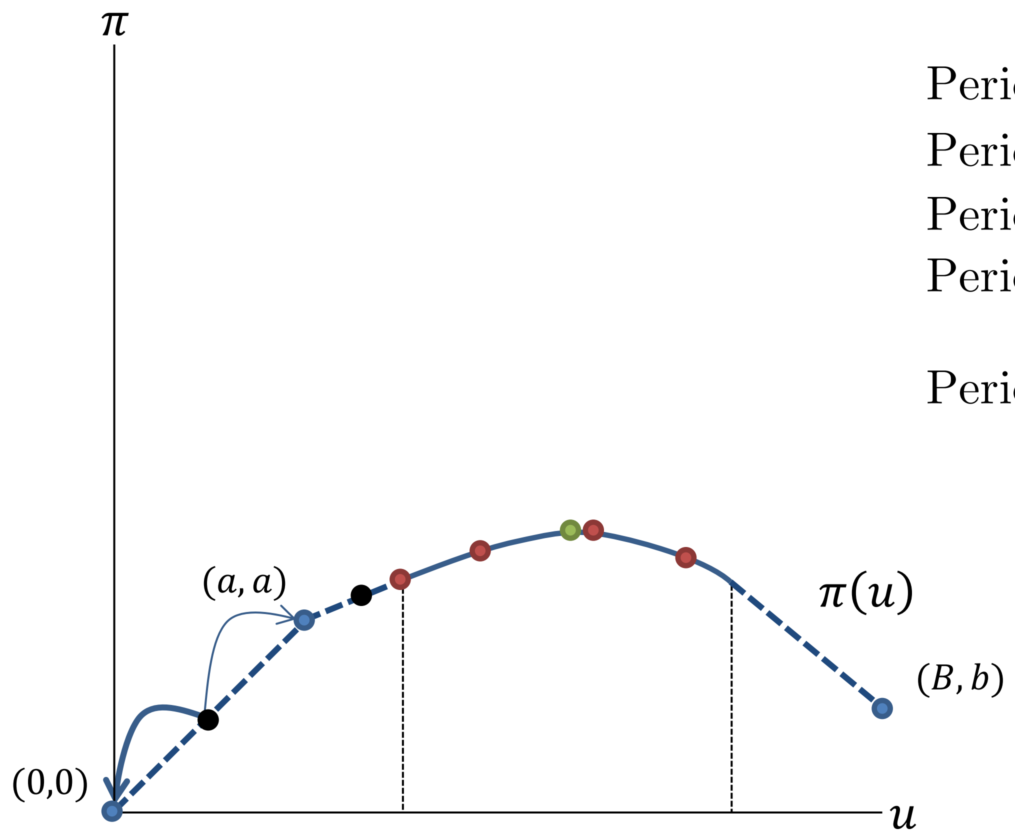
Period 2: D_C, A chosen

Period 3: D_C, A chosen

Period 4: D_C, A chosen
Randomization

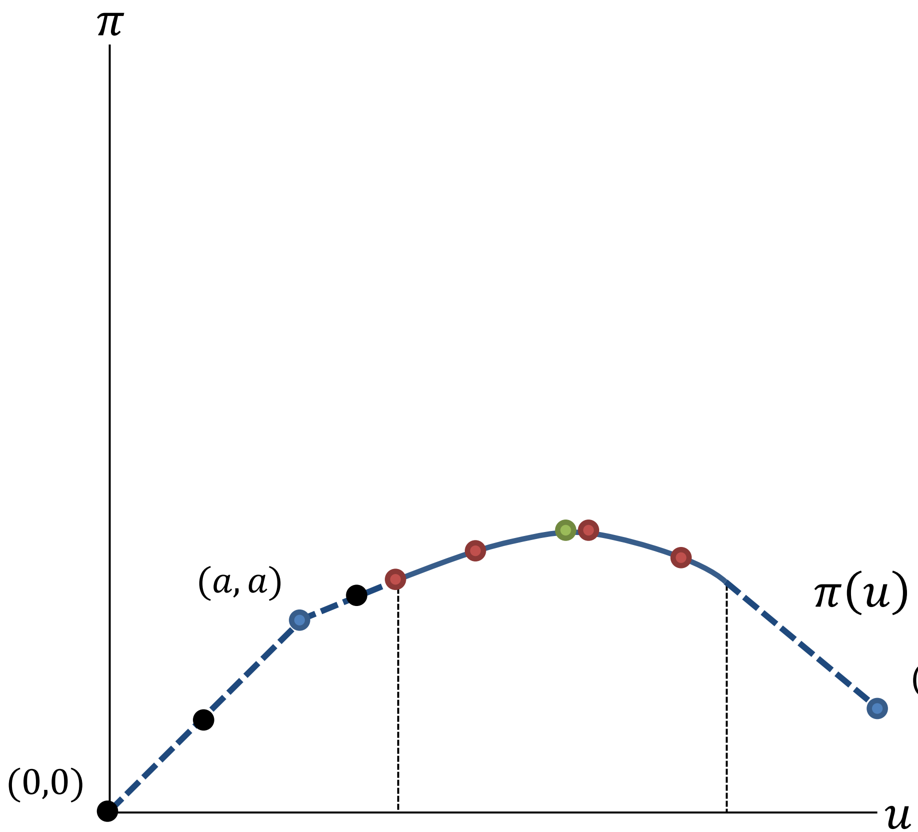
Period 5: D_C, A chosen
Randomization

Optimal Relational Contract



Period 1: D_C, P chosen
Period 2: D_C, A chosen
Period 3: D_C, A chosen
Period 4: D_C, A chosen
Randomization
Period 5: D_C, A chosen
Randomization

Optimal Relational Contract



Period 1: D_C, P chosen

Period 2: D_C, A chosen

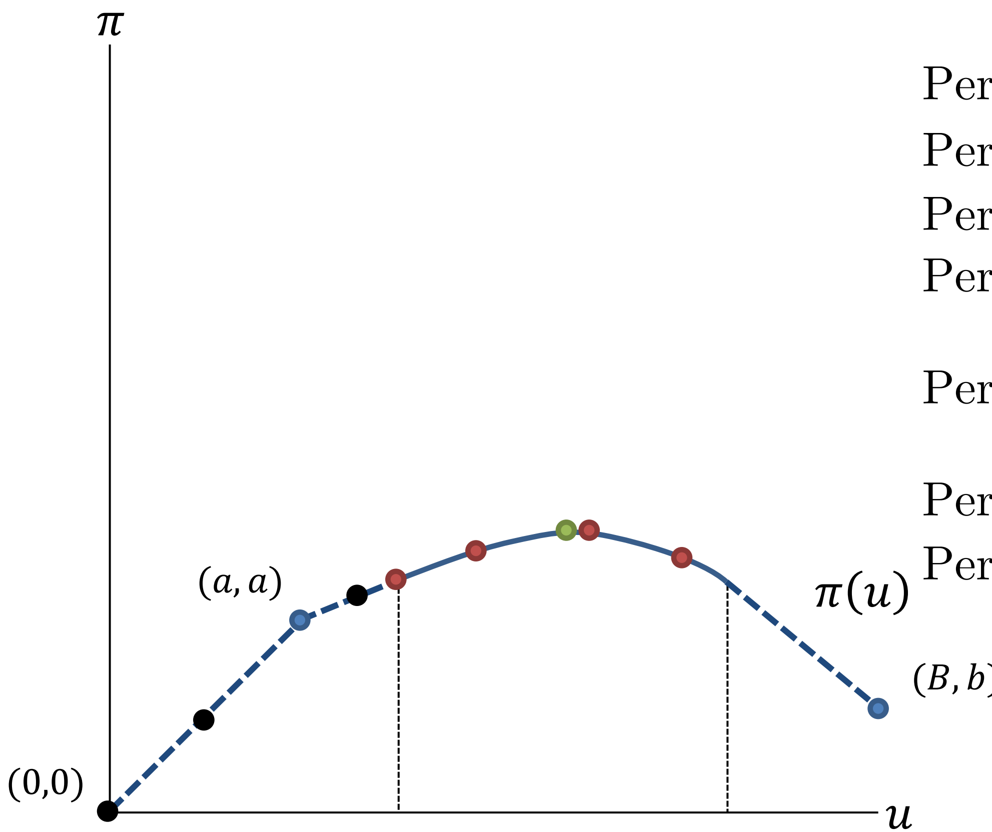
Period 3: D_C, A chosen

Period 4: D_C, A chosen
Randomization

Period 5: D_C, A chosen
Randomization

Period 6: E

Optimal Relational Contract



Period 1: D_C, P chosen
Period 2: D_C, A chosen
Period 3: D_C, A chosen
Period 4: D_C, A chosen
Randomization
Period 5: D_C, A chosen
Randomization
Period 6: E
Period 7: E
$\vdots$
Exit

Optimal Relational Contract Properties

- Start off with cooperative delegation
- If reward (uncooperative delegation), reward forever
- If punish (permanent centralization or exit), punish forever
- Multiple steady states. Will eventually reach one of them and stay.

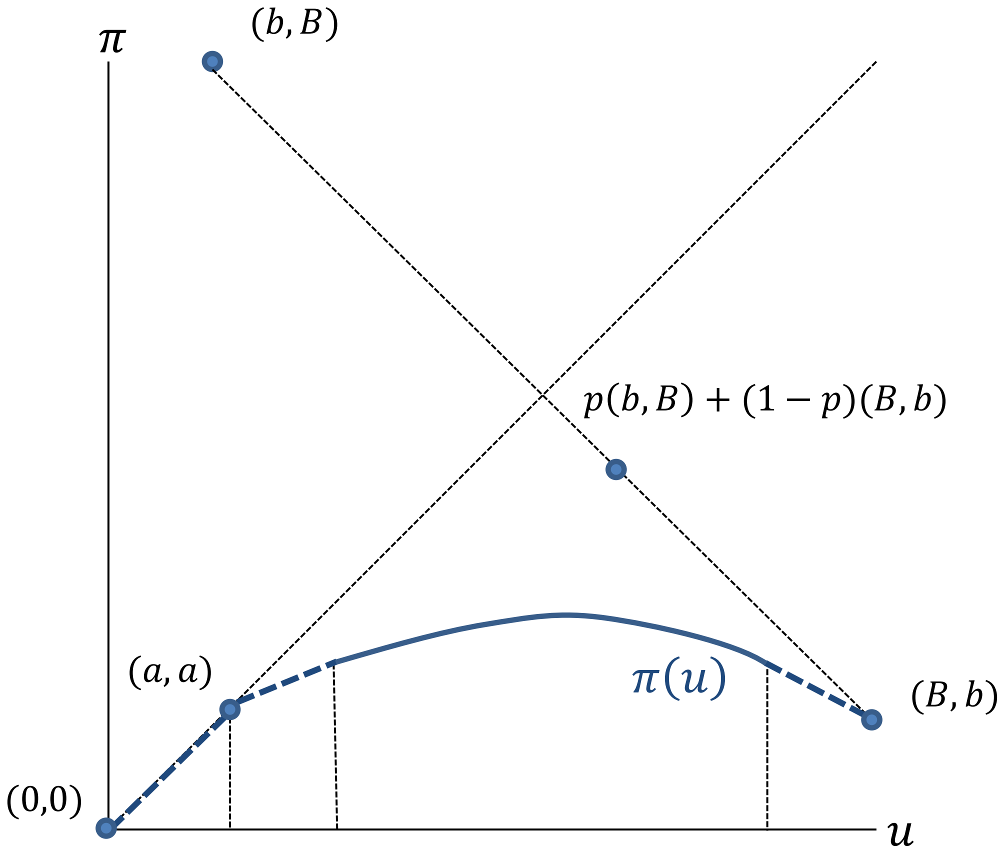
Implications

- Firm performance declines over time
- Initially flexible firms develop inertia and stop adapting to the private information of the agent
- Same starting point and multiple steady states: long-run performance is history-dependent
- Differences in performance linked to differences in organization

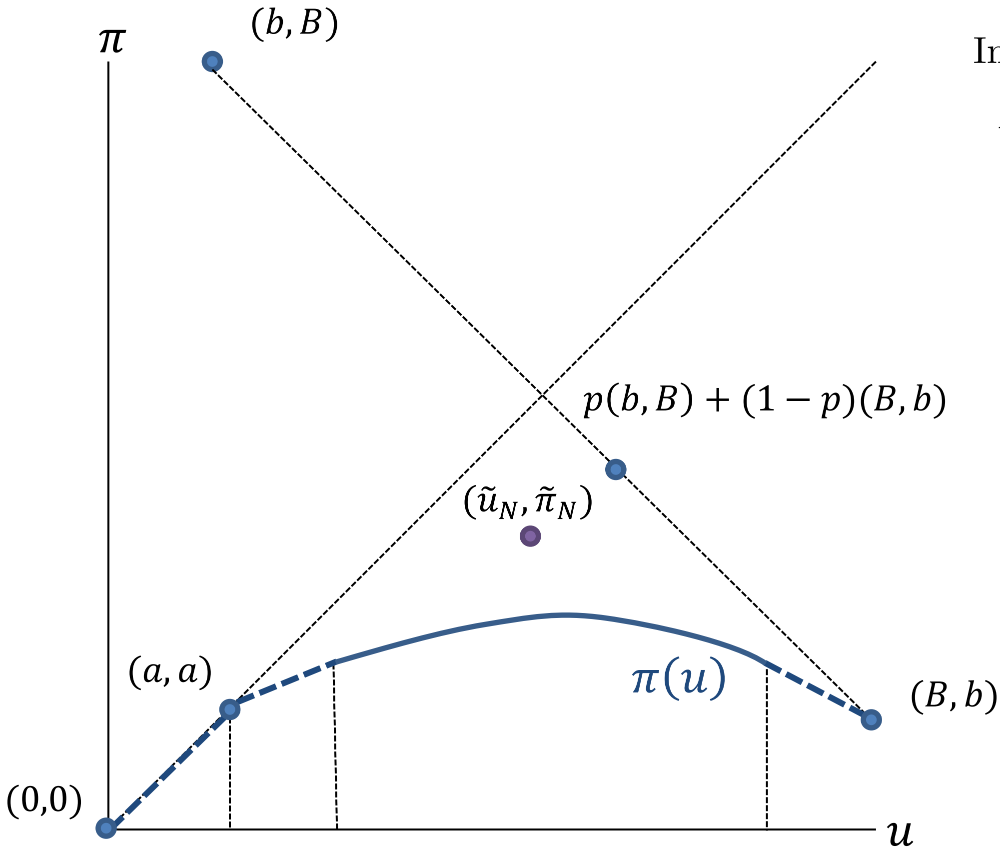
Agenda

- The Model
- The PPE Payoff Set
- The Optimal Relational Contract
- Public Information
- Conclusions

Frontier of Baseline Model

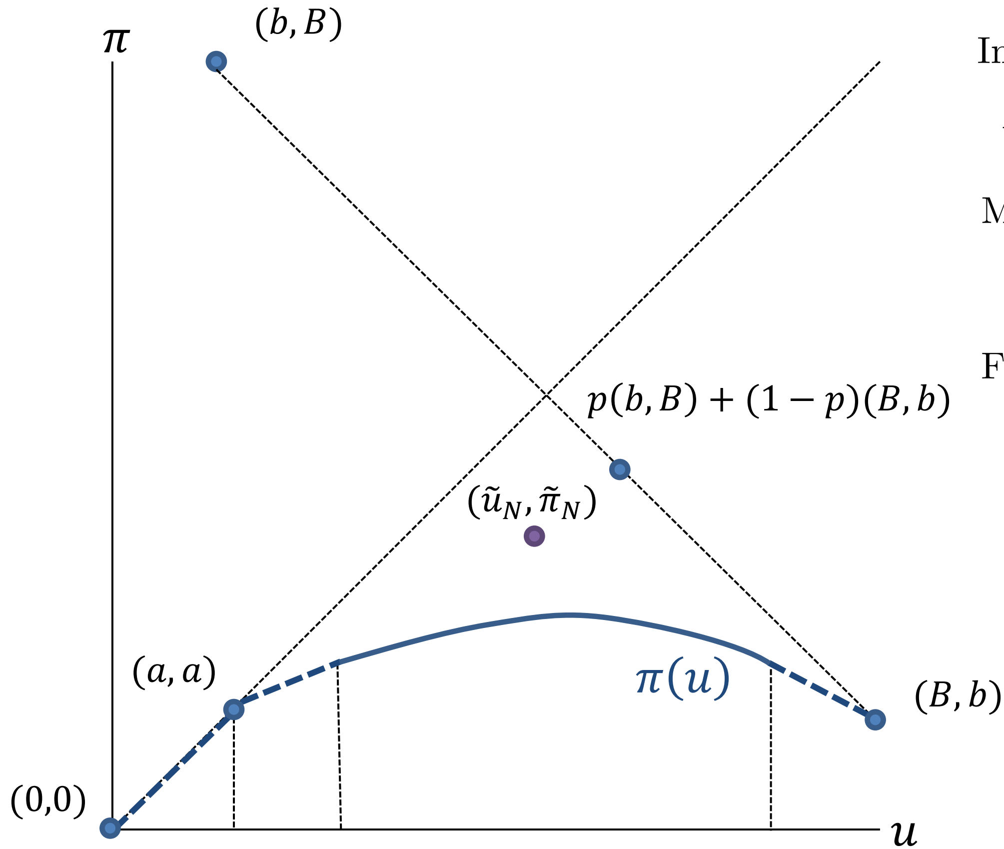


New Project Becomes Available



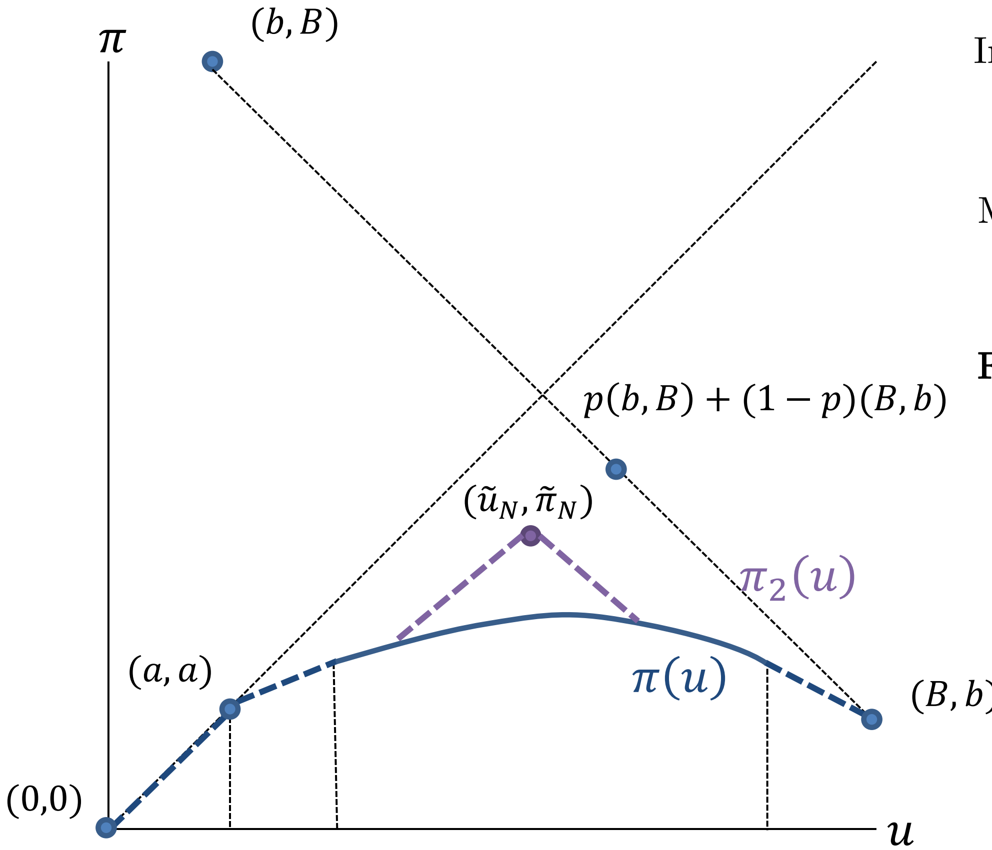
In each period, with probability q, new centralized project becomes available permanently

New Project Becomes Available



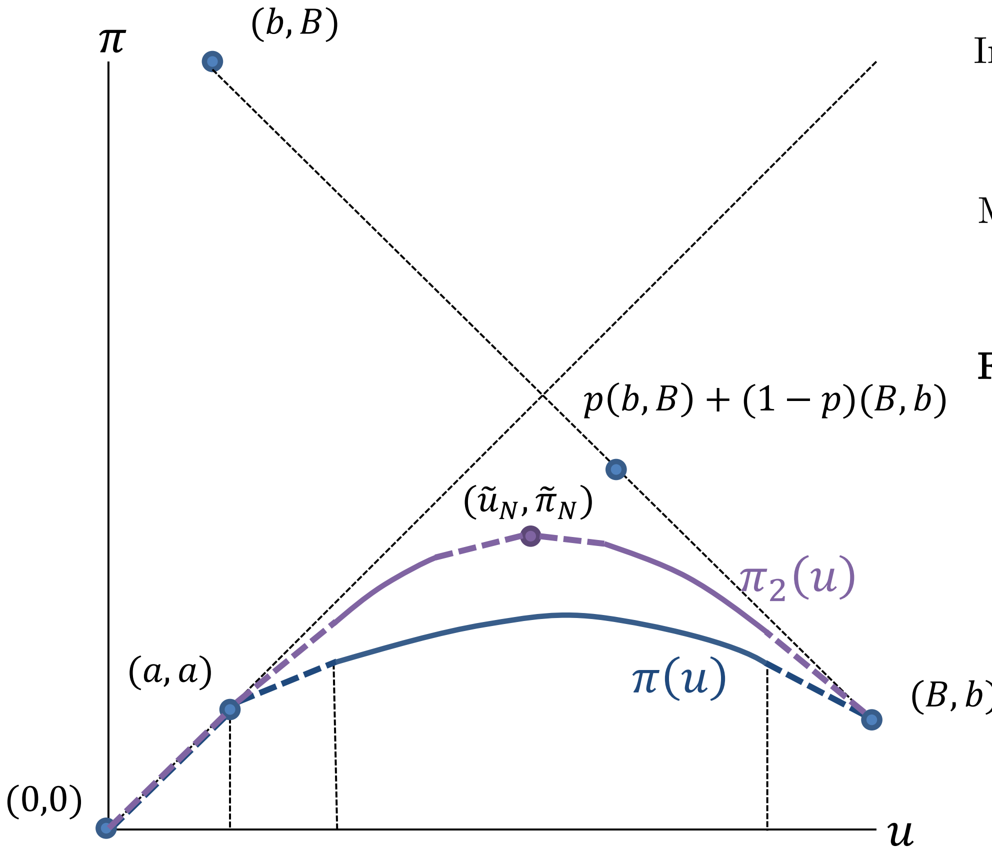
- In each period, with probability q, new centralized project becomes available permanently
- Must characterize two frontiers: post-opportunity $\pi_2(\cdot)$ and pre-opportunity $\pi_1(\cdot)$
- First characterize $\pi_2(\cdot)$; then characterize $\pi_1(\cdot)$, taking $\pi_2(\cdot)$ into account

New Project Becomes Available



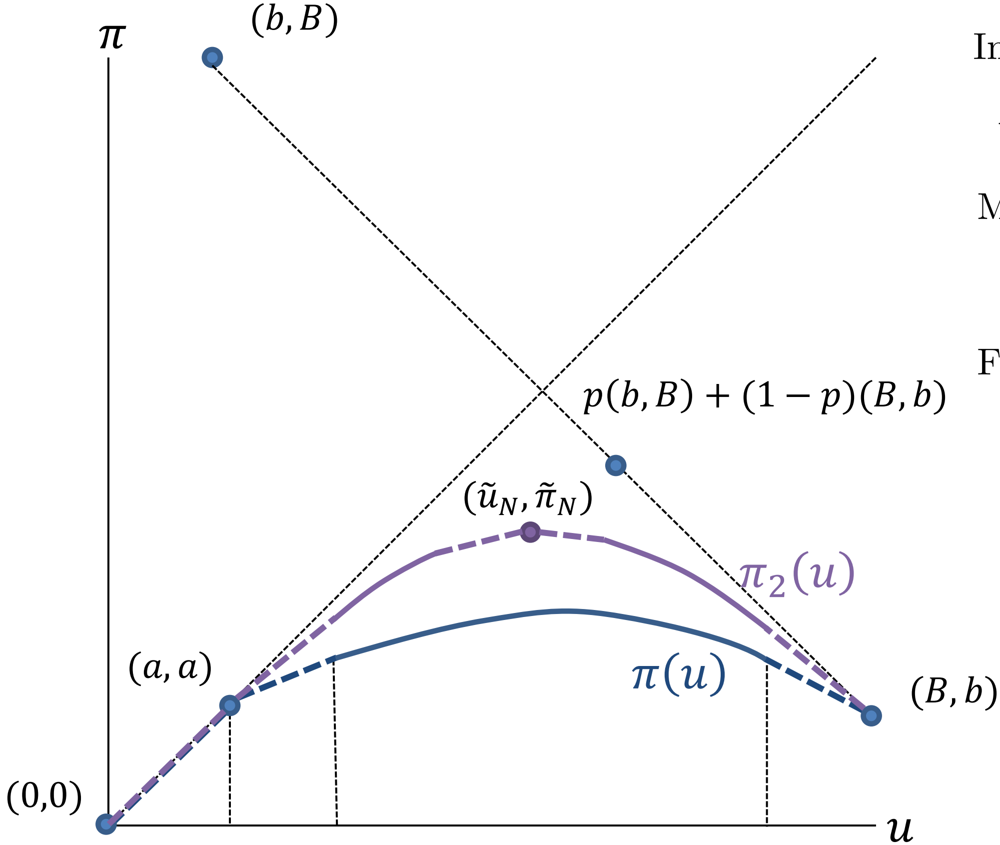
- In each period, with probability q, new centralized project becomes available permanently
- Must characterize two frontiers: post-opportunity $\pi_2(\cdot)$ and pre-opportunity $\pi_1(\cdot)$
- **First characterize $\boldsymbol{\pi_2}(\cdot)$**; then characterize $\pi_1(\cdot)$, taking $\pi_2(\cdot)$ into account

New Project Becomes Available



- In each period, with probability q, new centralized project becomes available permanently
- Must characterize two frontiers: post-opportunity $\pi_2(\cdot)$ and pre-opportunity $\pi_1(\cdot)$
- **First characterize $\boldsymbol{\pi_2}(\cdot)$**; then characterize $\pi_1(\cdot)$, taking $\pi_2(\cdot)$ into account

New Project Becomes Available

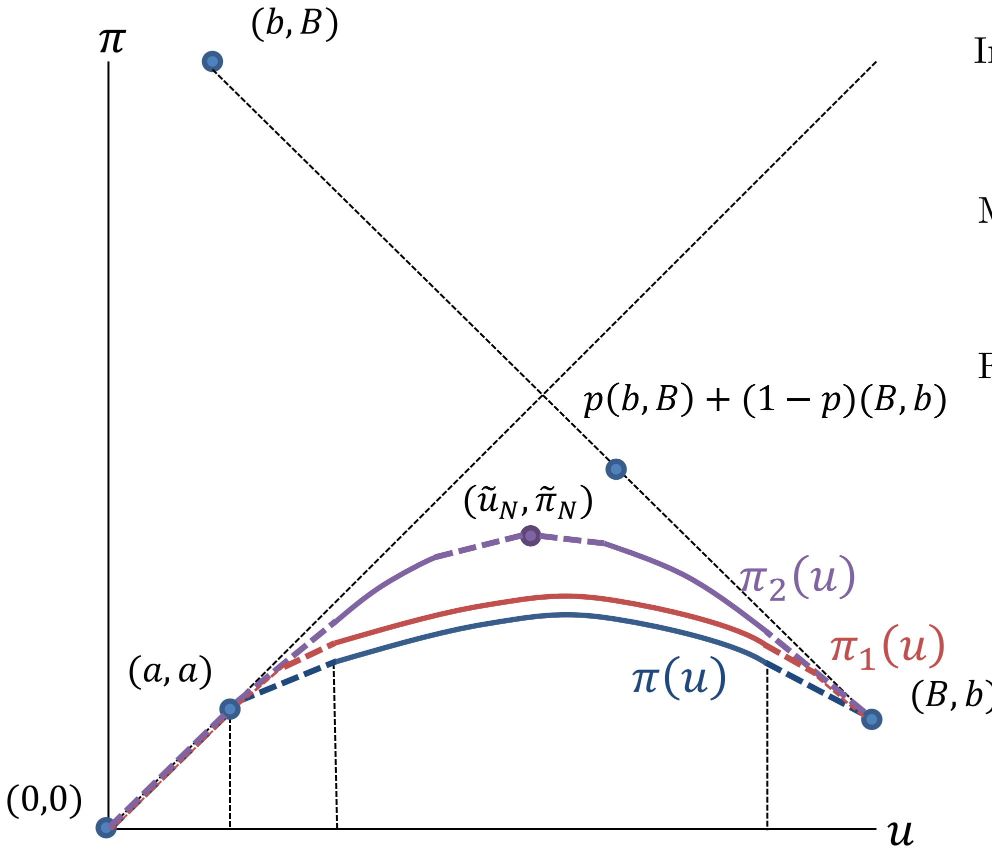


In each period, with probability q, new centralized project becomes available permanently

Must characterize two frontiers: post-opportunity $\pi_2(\cdot)$ and pre-opportunity $\pi_1(\cdot)$

First characterize $\pi_2(\cdot)$; **then characterize $\boldsymbol{\pi_1}(\cdot)$, taking $\boldsymbol{\pi_2}(\cdot)$ into account**

New Project Becomes Available

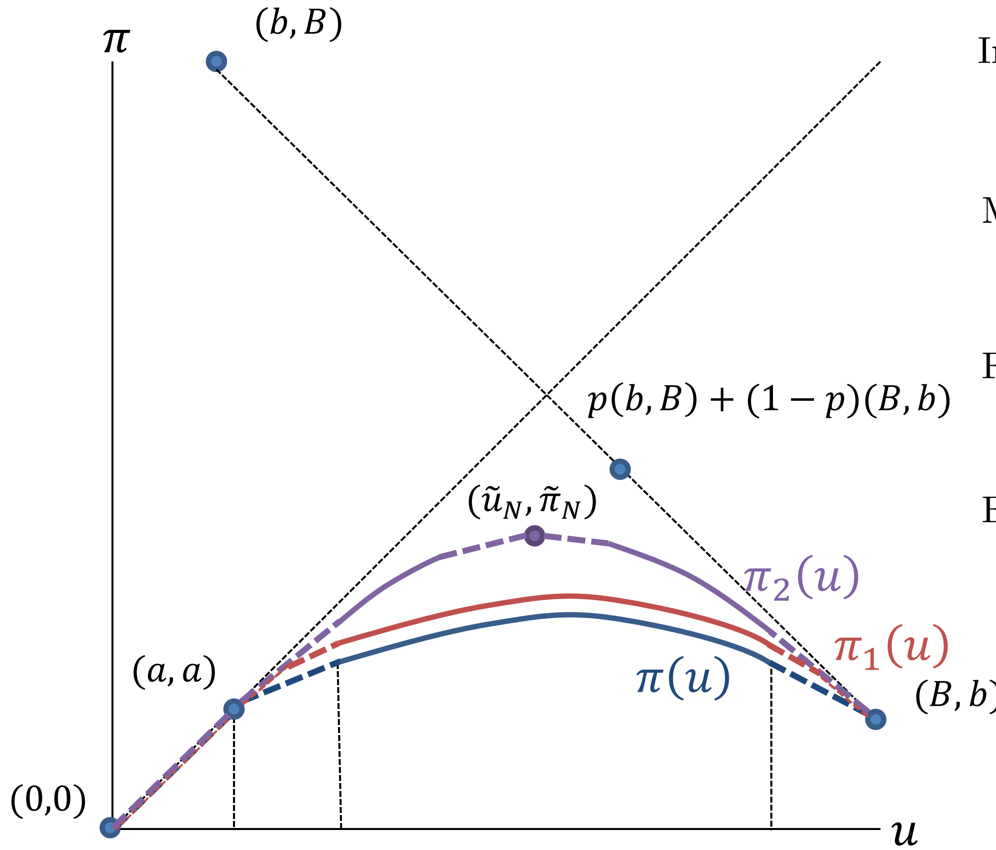


In each period, with probability q, new centralized project becomes available permanently

Must characterize two frontiers: post-opportunity $\pi_2(\cdot)$ and pre-opportunity $\pi_1(\cdot)$

First characterize $\pi_2(\cdot)$; **then characterize $\boldsymbol{\pi_1}(\cdot)$, taking $\boldsymbol{\pi_2}(\cdot)$ into account**

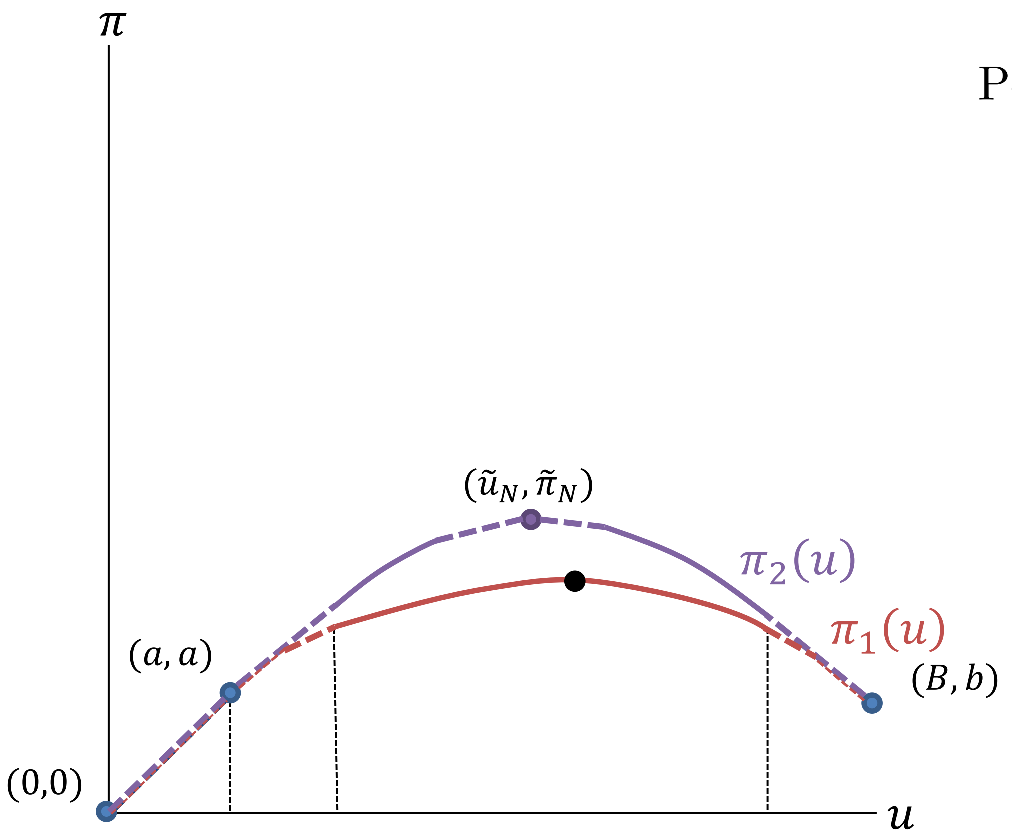
New Project Becomes Available



- In each period, with probability q, new centralized project becomes available permanently
- Must characterize two frontiers: post-opportunity $\pi_2(\cdot)$ and pre-opportunity $\pi_1(\cdot)$
- First characterize $\pi_2(\cdot)$; **then characterize $\boldsymbol{\pi_1}(\cdot)$, taking $\boldsymbol{\pi_2}(\cdot)$ into account**
- Each point on $\pi_1(\cdot)$ specifies an action and continuation payoffs if opportunity unavailable and if available

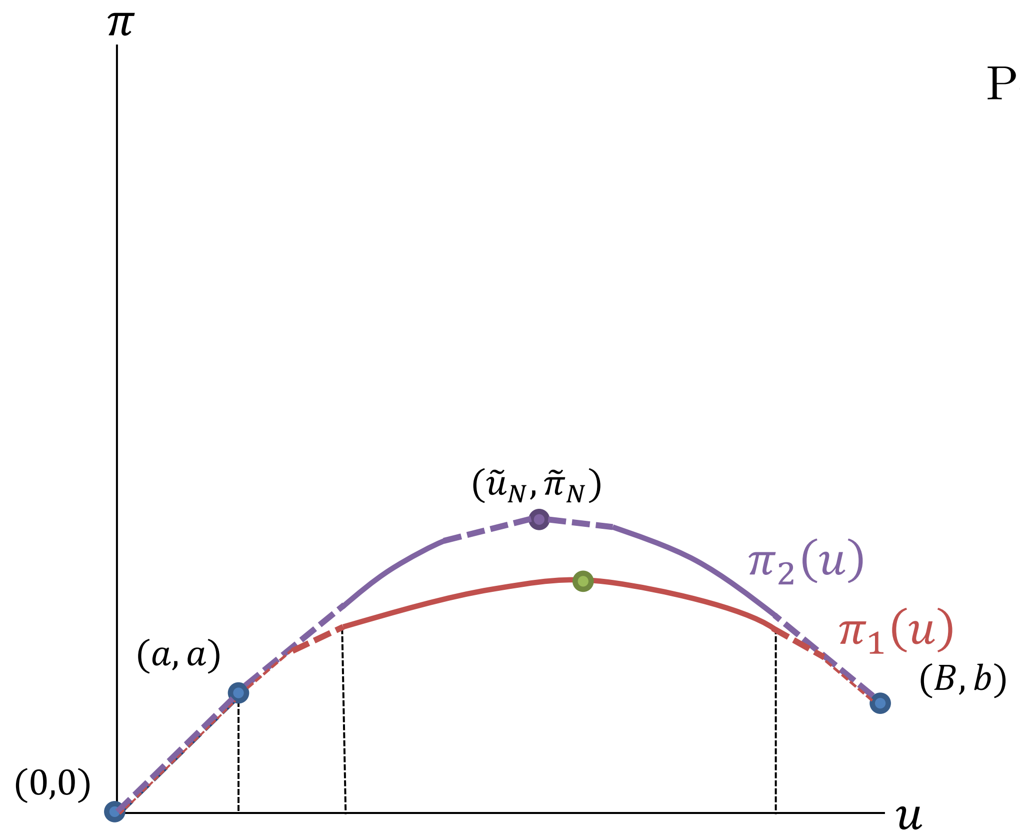
Optimal Relational Contract

Period 1: D_C



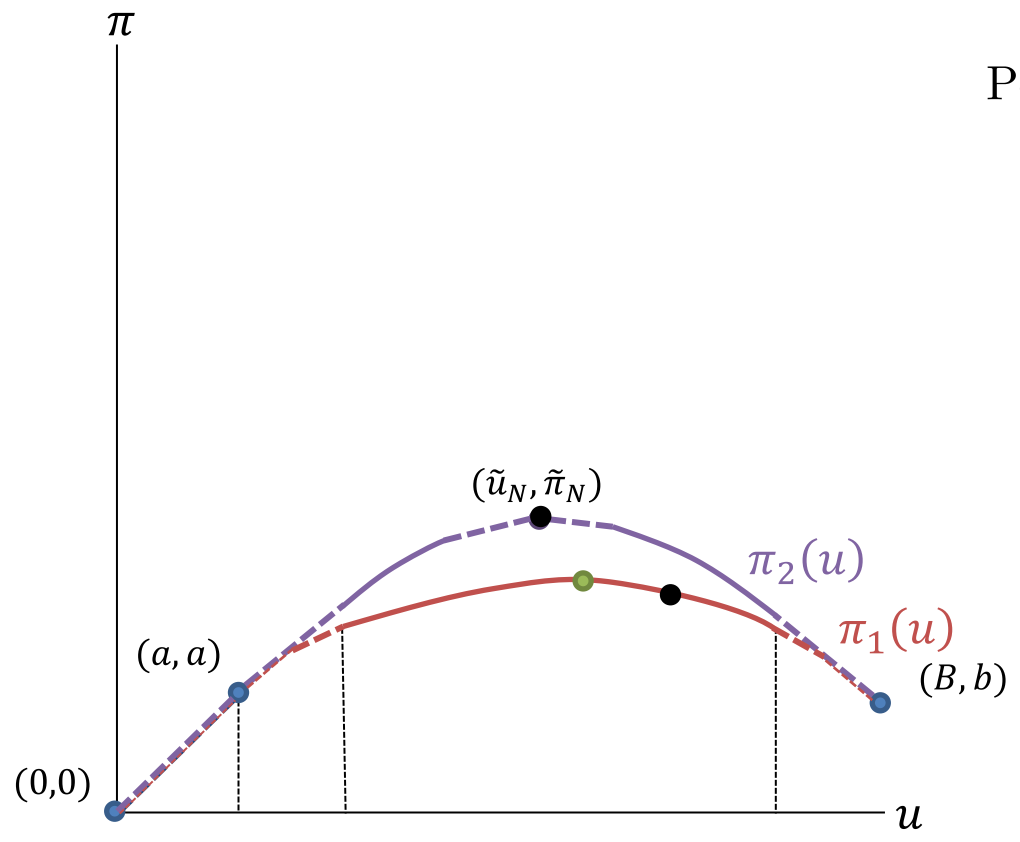
Optimal Relational Contract

Period 1: D_C, P chosen

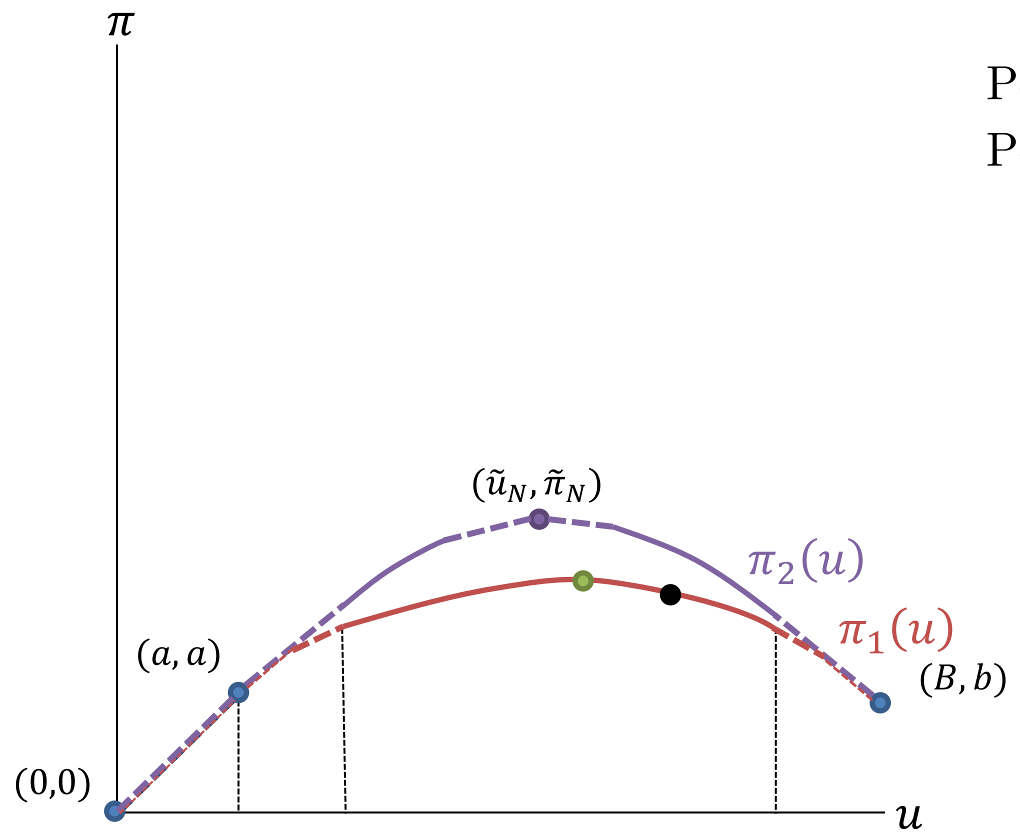


Optimal Relational Contract

Period 1: D_C, P chosen



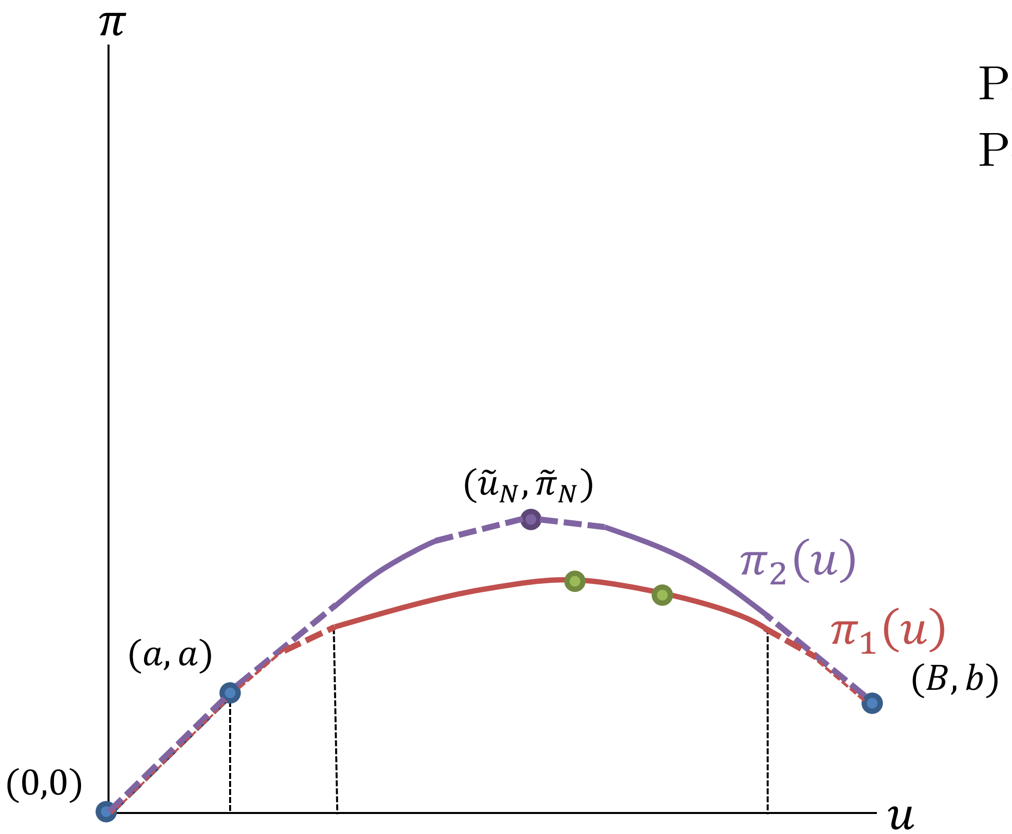
Optimal Relational Contract



Period 1: D_C, P chosen

Period 2: D_C

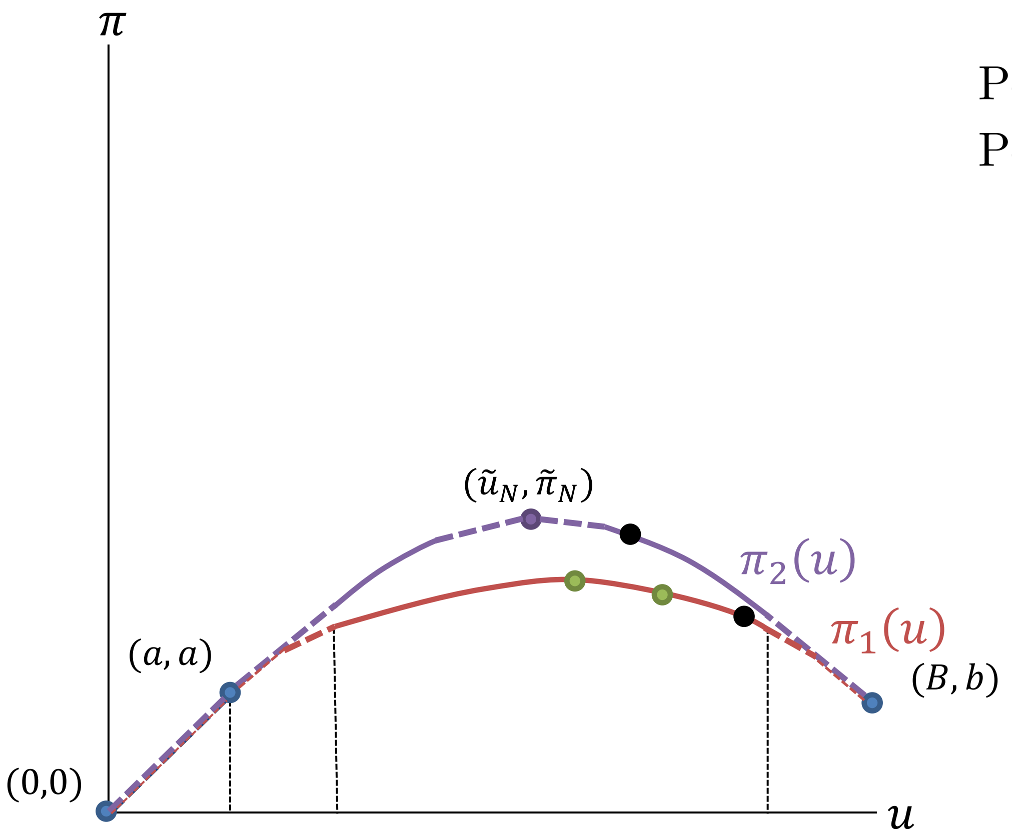
Optimal Relational Contract



Period 1: D_C, P chosen

Period 2: D_C, P chosen

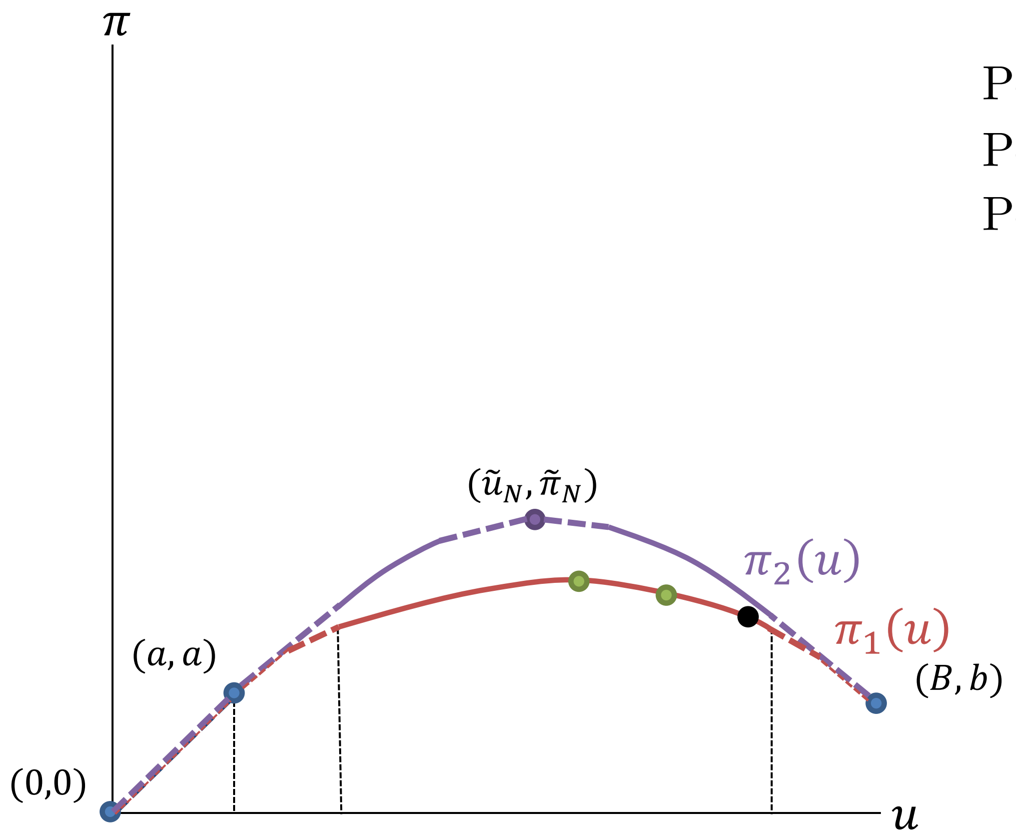
Optimal Relational Contract



Period 1: D_C, P chosen

Period 2: D_C, P chosen

Optimal Relational Contract

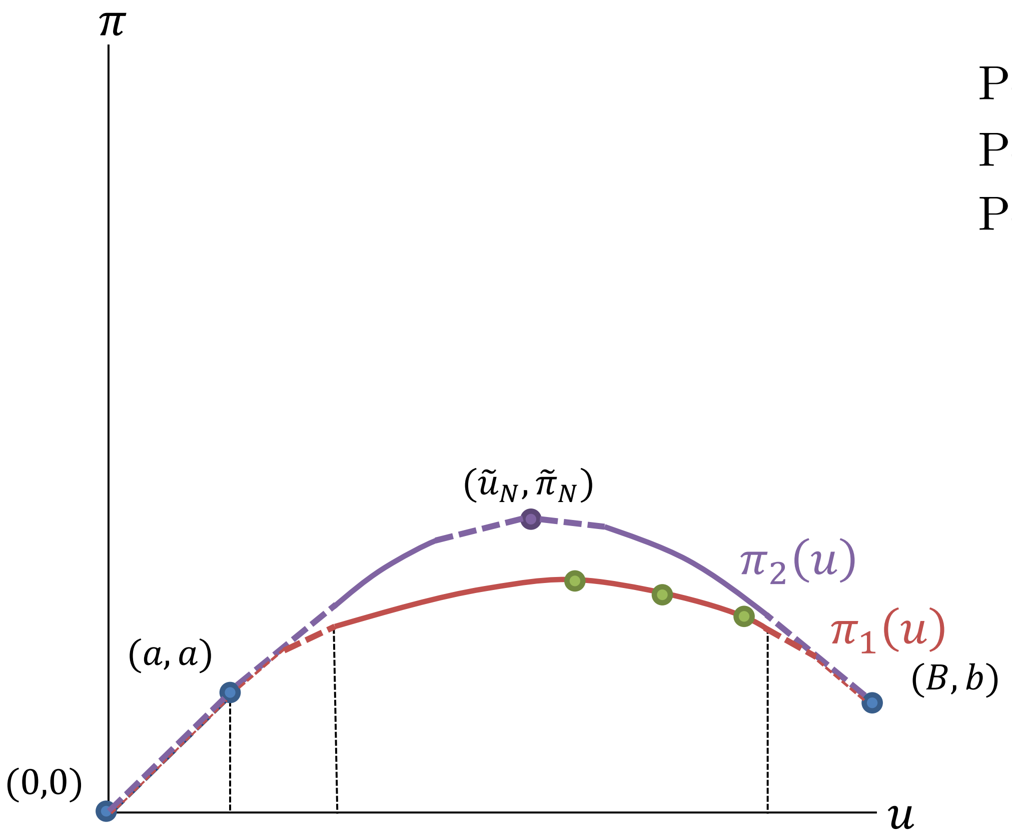


Period 1: D_C, P chosen

Period 2: D_C, P chosen

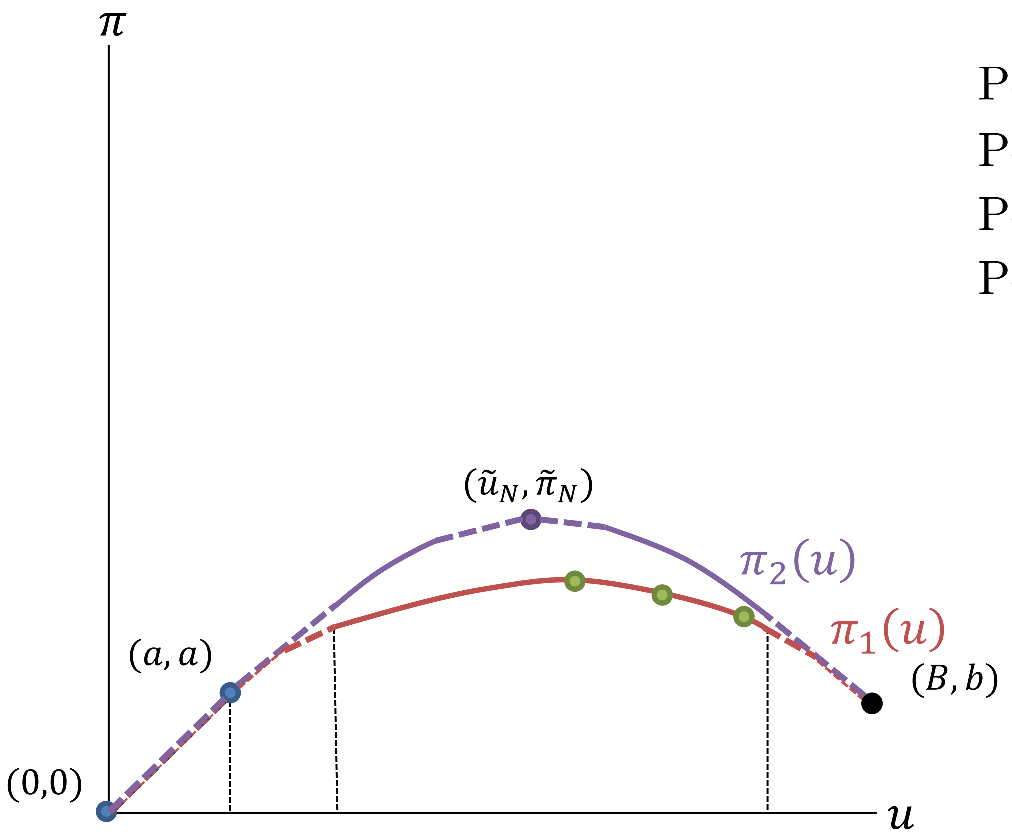
Period 3: D_C

Optimal Relational Contract



Period 1: D_C, P chosen
Period 2: D_C, P chosen
Period 3: D_C, P chosen

Optimal Relational Contract



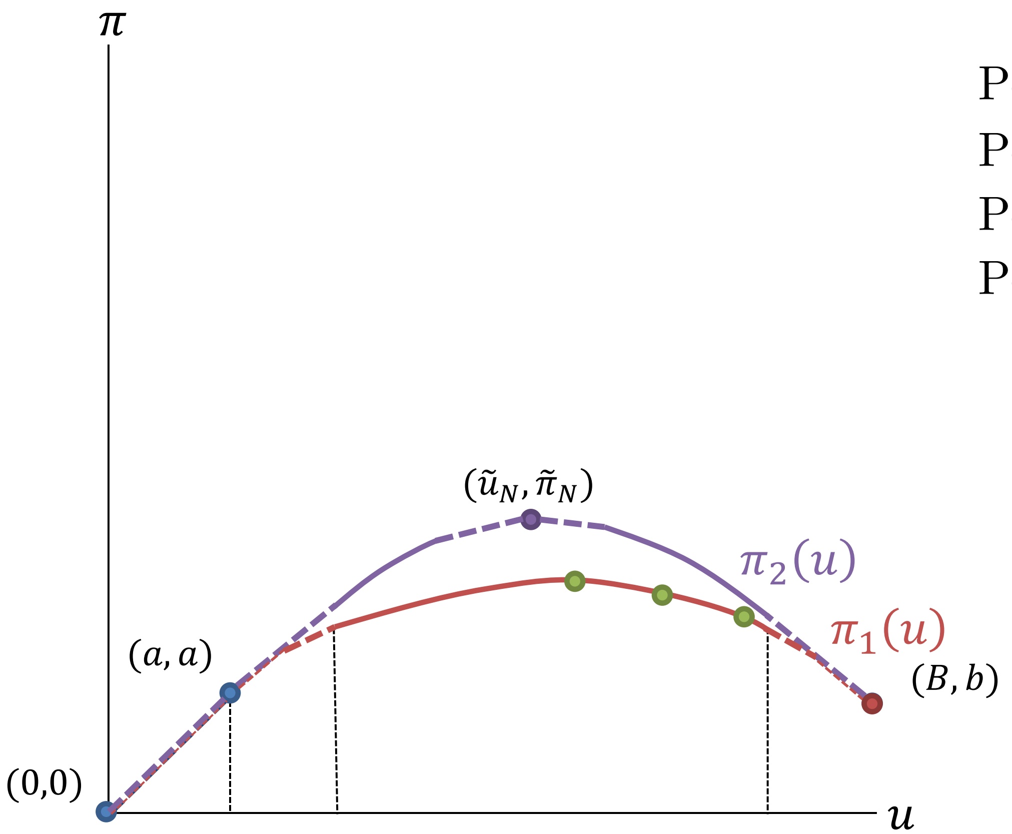
Period 1: D_C, P chosen

Period 2: D_C, P chosen

Period 3: D_C, P chosen

Period 4: D_U

Optimal Relational Contract



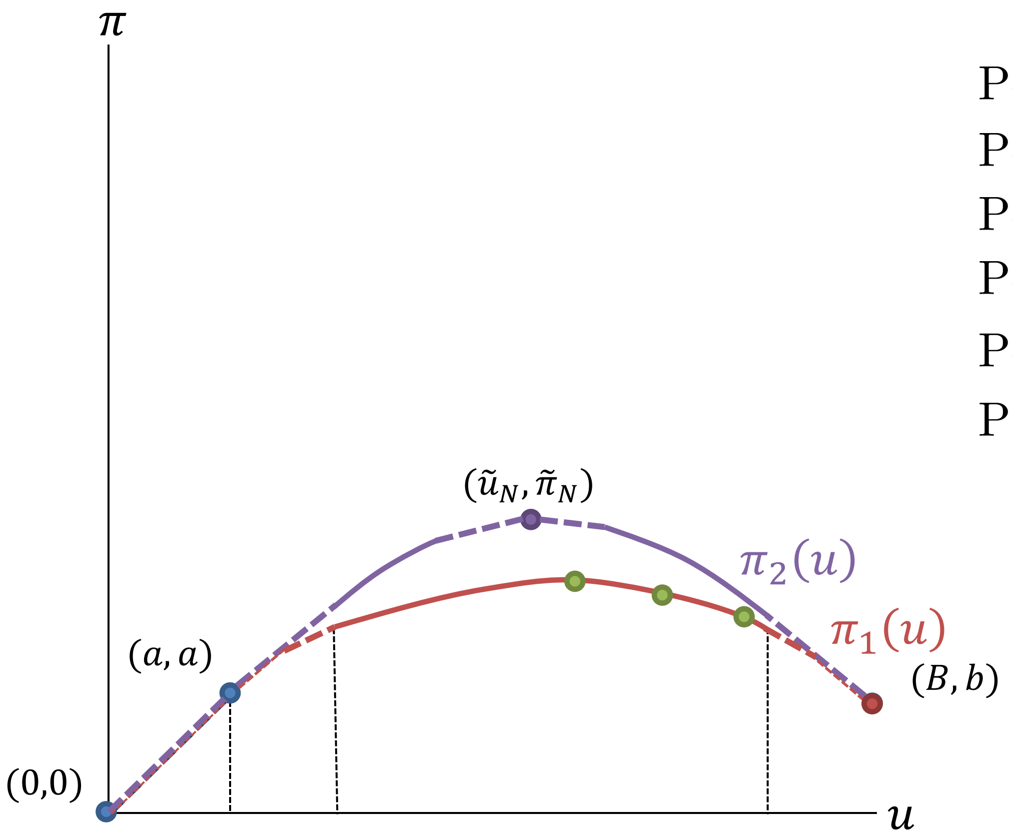
Period 1: D_C, P chosen

Period 2: D_C, P chosen

Period 3: D_C, P chosen

Period 4: D_U, A chosen

Optimal Relational Contract



Period 1: D_C, P chosen

Period 2: D_C, P chosen

Period 3: D_C, P chosen

Period 4: D_U, A chosen

Period 5: D_U, A chosen

Period 6: D_U, A chosen

⋮

Entrenchment

Results from Public Opportunity Case

- The breadth of promises is also an important design variable
- Broad promises may lead to rigidity with respect to public information
- Older firms less likely to adapt to new public information

Agenda

- The Model
- The PPE Payoff Set
- The Optimal Relational Contract
- Public Information
- Conclusions

Conclusion

"Corporate cultures do change over time, and modeling the endogenous evolution of trust and incentives to invest in it would be a fascinating avenue for future research." (Bloom, Sadun, and Van Reenen, 2012)

- View that good relationships take time suggests that trust increases over time, and discretion is positively related to trust.
- Our model suggests that trust (cooperative delegation) decreases over time, while discretion may move in the opposite direction
- Interaction between trust and discretion and their evolution depend on whether there is uncertainty about employees' types or about their actions

EXTRA SLIDES

The PPE Payoff Frontier

$$\pi(u) = \max_{q_j \geq 0, u_j \in [0,B]} \sum_{j \in \{C, D_C, D_U, E\}} q_j \pi_j(u_j) \quad \text{st} \sum_{j \in \{C, D_C, D_U, E\}} q_j = 1 \quad \& \sum_{j \in \{C, D_C, D_U, E\}} q_j u_j = u$$

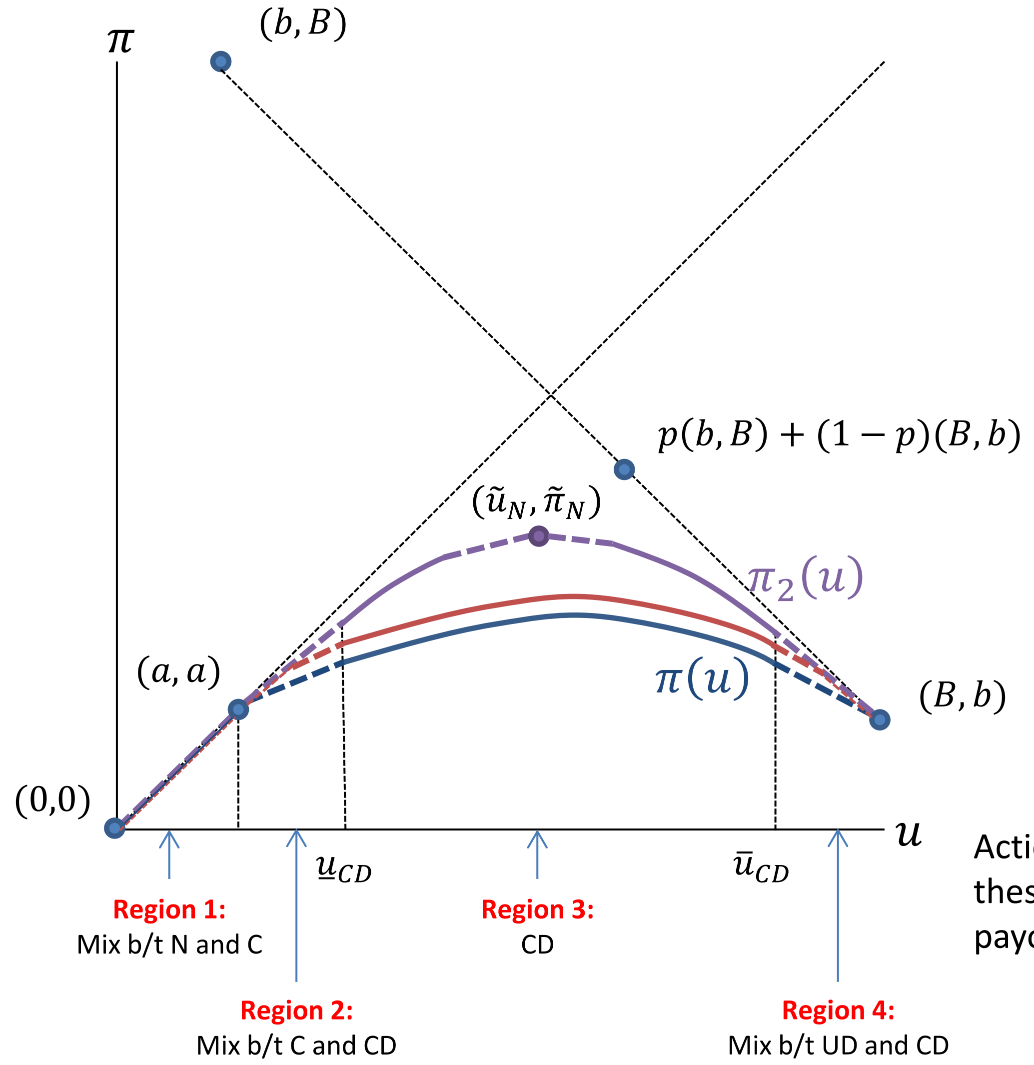
if $q_C = 1$,
$$u_C(u) = \frac{u - (1-\delta)a}{\delta}$$
$$\pi_C(u) = (1-\delta)a + \delta\pi(u_C(u))$$

if $q_{D_C} = 1$,
$$u_h(u) = \frac{u - (1-\delta)b}{\delta} \qquad u_l(u) = \frac{u - (1-\delta)B}{\delta}$$
$$\pi_{D_C}(u) = p[(1-\delta)B + \delta\pi(u_h(u))] + (1-p)[(1-\delta)b + \delta\pi(u_l(u))]$$

if $q_{D_U} = 1$,
$$u_{D_U}(u) = \frac{u - (1-\delta)B}{\delta}$$
$$\pi_{D_U}(u) = (1-\delta)b + \delta\pi\big(u_{D_U}(u)\big)$$

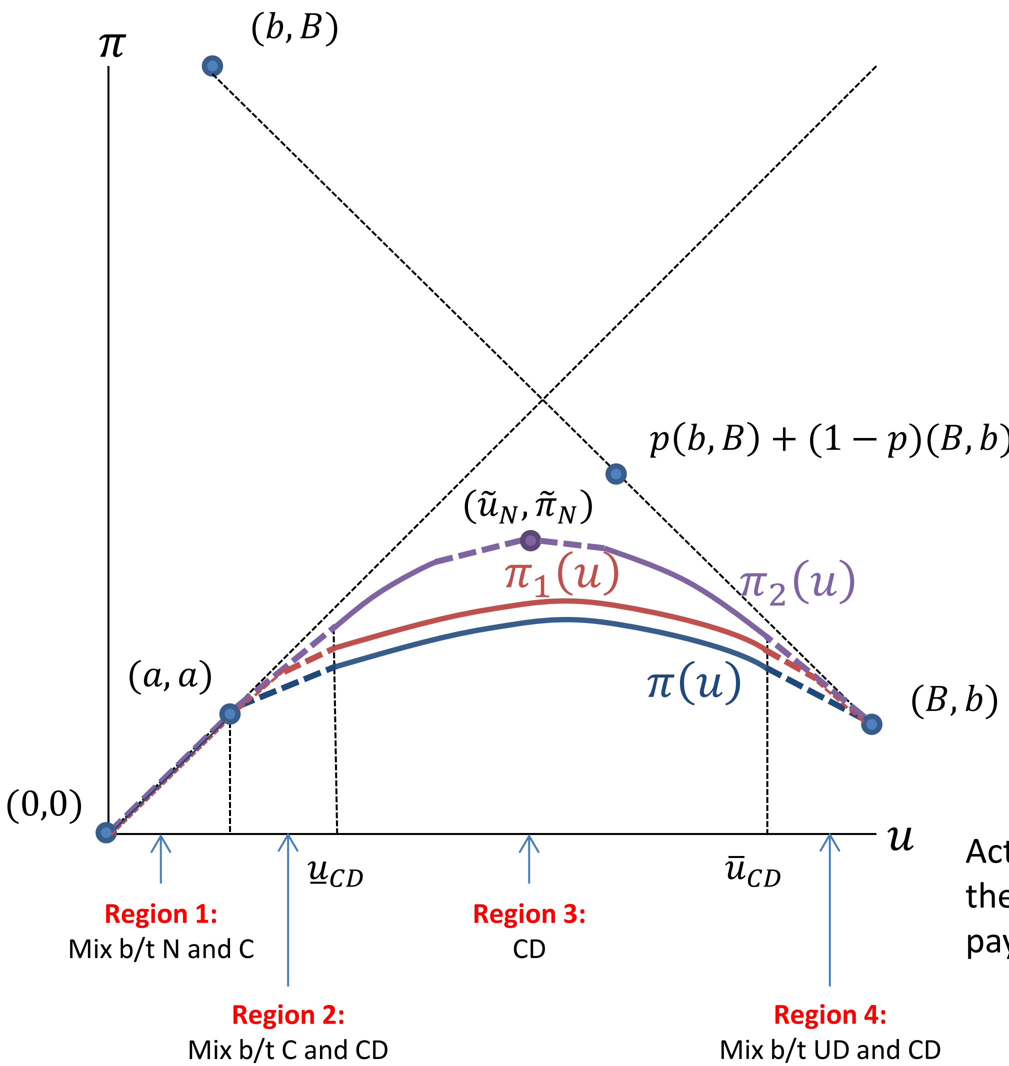
if $q_E = 1$,
$$u_E(u) = \frac{u}{\delta}$$
$$\pi_E(u) = \delta\pi(u_E(u))$$

New Project Becomes Available



Actions supporting these PPE frontier payoffs

New Project Becomes Available



Actions supporting these PPE frontier payoffs