

Organizational Theory and Decision Making

Part I: Foundations and Boundaries of Organizations

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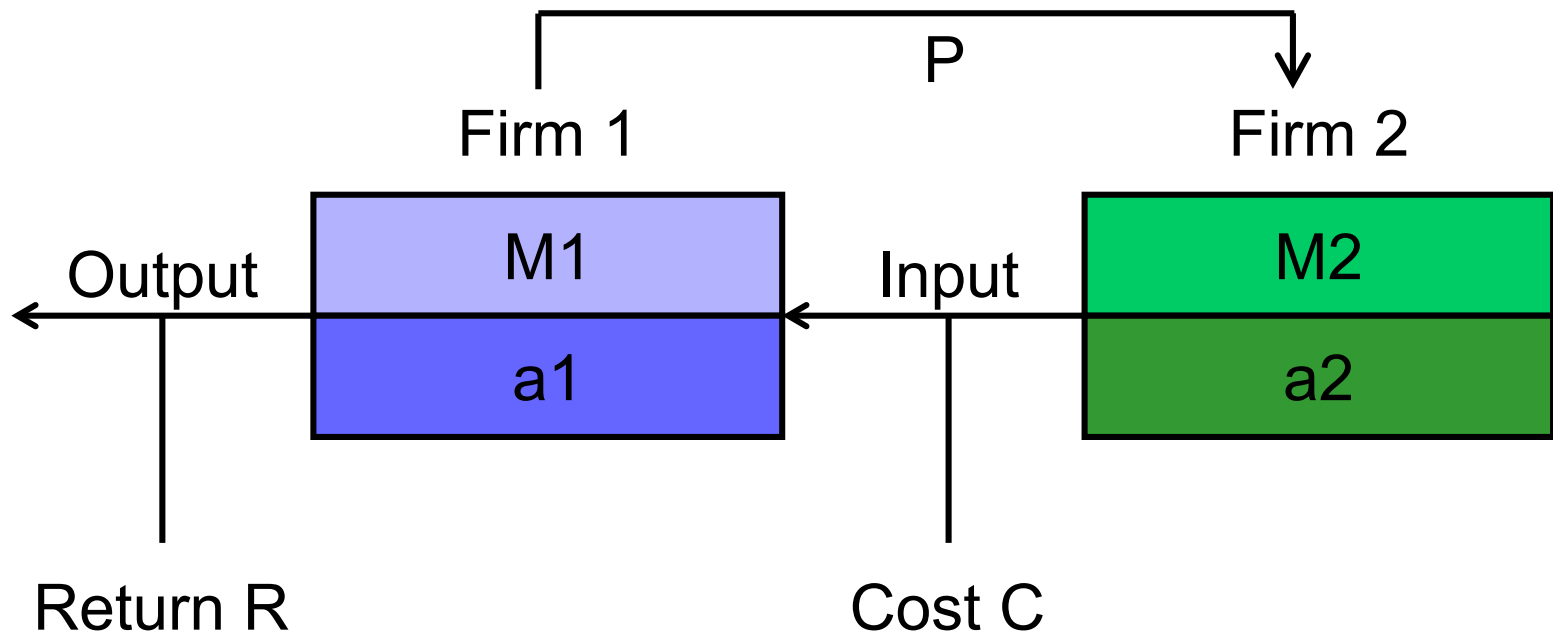


Part I.B: The Property Rights Approach

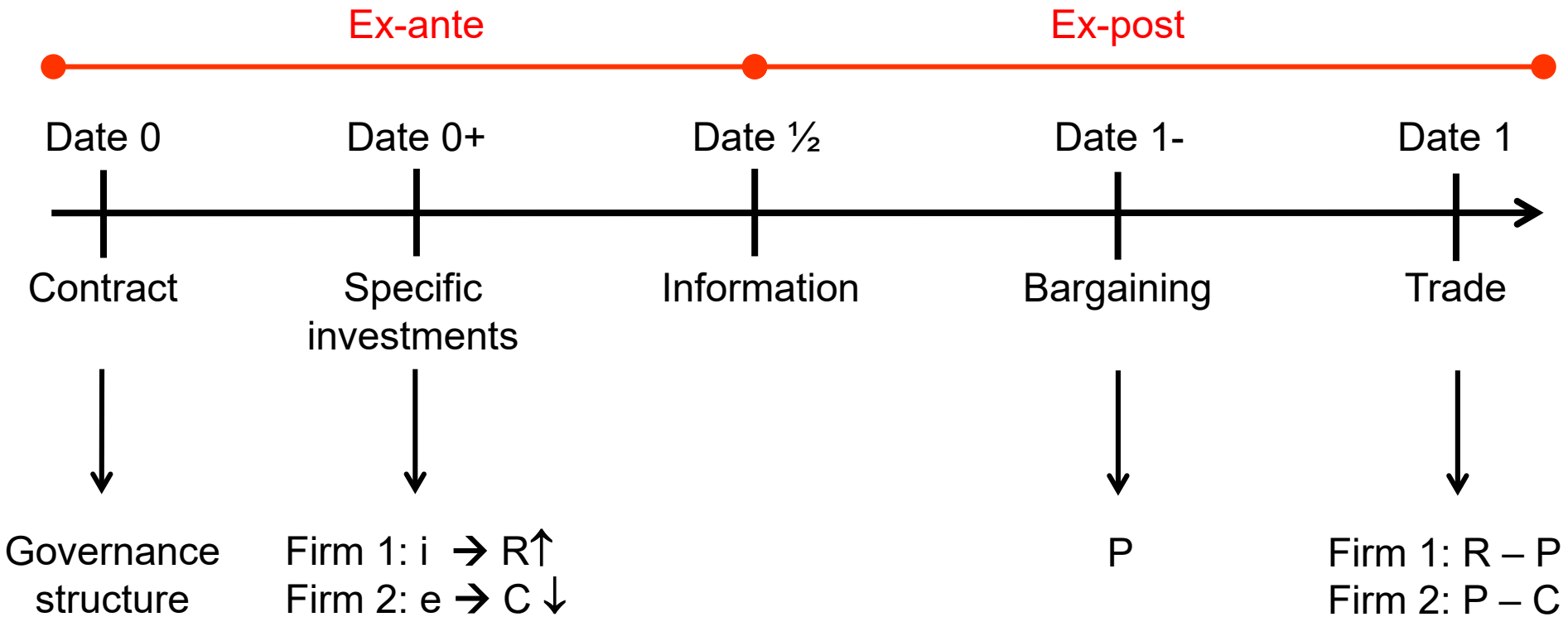
Video 2:
Setup and Assumption

Assumptions and Setup (1): Production

- There are two firms: Firm 1 and Firm 2
 - Each firm has a manager: M1 and M2
 - Each firm uses one asset for production: a1 and a2
- Firm 2 generates the input with which Firm 1 produces the final output



Assumptions and Setup (2): Timing



Assumptions and Setup (3): Governance

■ Governance structures

A: Asset set of Firm 1 / B: Asset set of Firm 2

□ Non-Integration (NI)

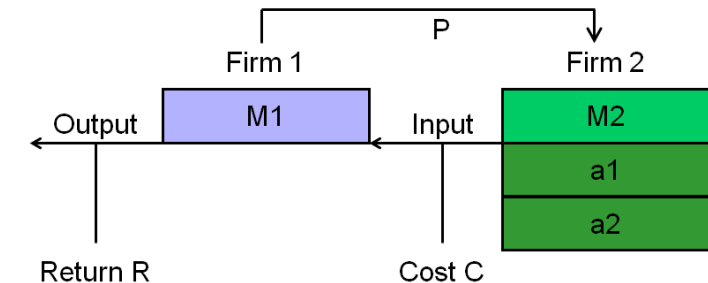
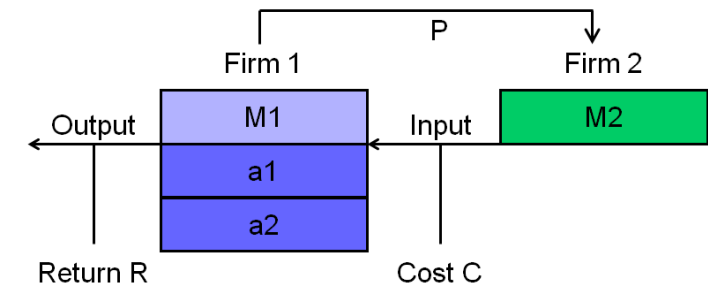
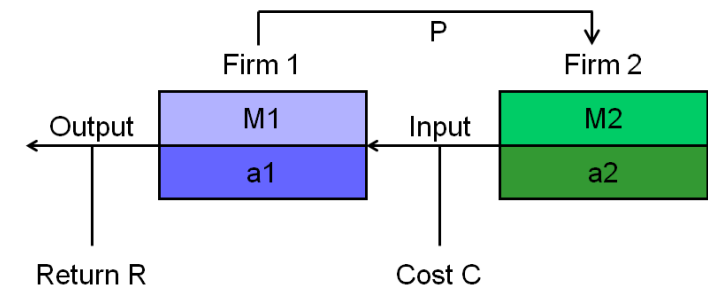
■ $A = \{a1\} / B = \{a2\}$

□ Backward Integration (BI)

■ $A = \{a1, a2\} / B = \{\emptyset\}$

□ Forward Integration (FI)

■ $A = \{\emptyset\} / B = \{a1, a2\}$



Assumptions and Setup (4): Governance (ctd)

□ Others:

- Joint Ownership: Firm 1 and Firm 2 own a_1 and a_2 together

- $A = \{ \frac{1}{2} \cdot a_1, \frac{1}{2} \cdot a_2 \} / B = \{ \frac{1}{2} \cdot a_1, \frac{1}{2} \cdot a_2 \}$

- Reverse Non-Integration: Firm 1 owns a_2 and Firm 2 owns a_1

- $A = \{ a_2 \} / B = \{ a_1 \}$

- In the following we ignore these possibilities, because they are never optimal (given our assumptions)

Details: Initiation of the Contract (Date 0)

- **Date 0:** Initiation of the relationship
 - Firm 1 and 2 meet and agree to do business at date 1
 - The difficulty is that it is not yet completely clear what the necessary characteristics of the input are
 - Because there are many possibilities the price P cannot yet be negotiated
 - The parties write an incomplete contract and agree on a governance structure: NI, FI or BI

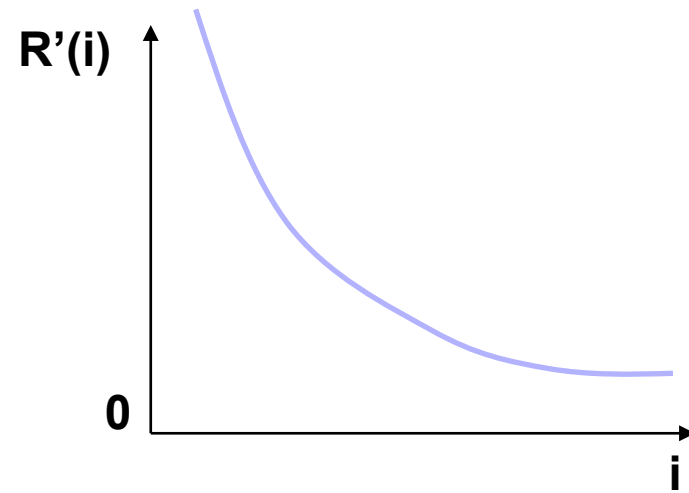
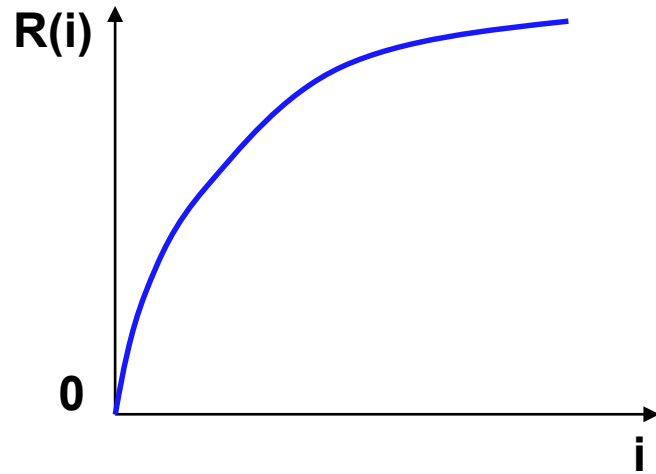
Details: Specific Investments (Date 0+)

- **Date 0+:** Relationship-specific investments
 - The physical assets are fixed: a_1 and a_2
 - The parties cannot buy or produce new assets
 - However, both firms can invest in human capital to make their assets more productive
 - Firm 1: Investment $i \rightarrow \text{Return} \uparrow$

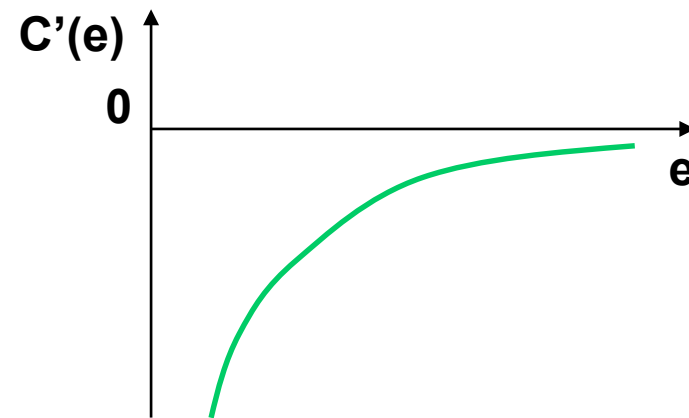
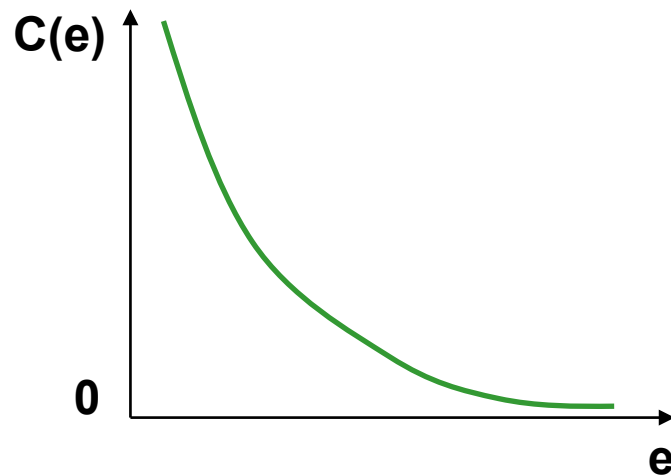
Higher human capital (HC1) means that M1 produces a better final product with the same input and technology (higher return)
 - Firm 2: Investment $e \rightarrow \text{Cost} \downarrow$

Higher human capital (HC2) means that M2 has lower costs to produce the input with the same production technology

■ Firm 1:



■ Firm 2:



Details: Info & Bargaining (Date $\frac{1}{2}$ & Date 1-)

■ **Date $\frac{1}{2}$:** Information

- At date $\frac{1}{2}$ the parties learn the details about the characteristics of the input which is required

■ **Date 1-:** Renegotiation

- Firm 1 and Firm 2 bargain over the price P

- If they can agree on a price, they trade:

M2 produces the input and delivers it to M1

M1 transforms the input into a final product

- If the negotiation fails, they turn to the general market:

M2 produces an input for another company on the market

M1 buys an input from another company on the market

Details: Trade & Payoffs (Date 1)

■ **Date 1:** Trade

- If trade occurs Firm 2 delivers the input and Firm 1 pays the price P to Firm 2:

Payoffs: Firm 1: $R(i) - P$

Firm 2: $P - C(e)$

- If trade fails Firm 1 buys a non-specific input on the general market and Firm 2 sells its input on the market (at the market price \bar{P})

Payoffs: Firm 1: $r(i,A) - \bar{P}$

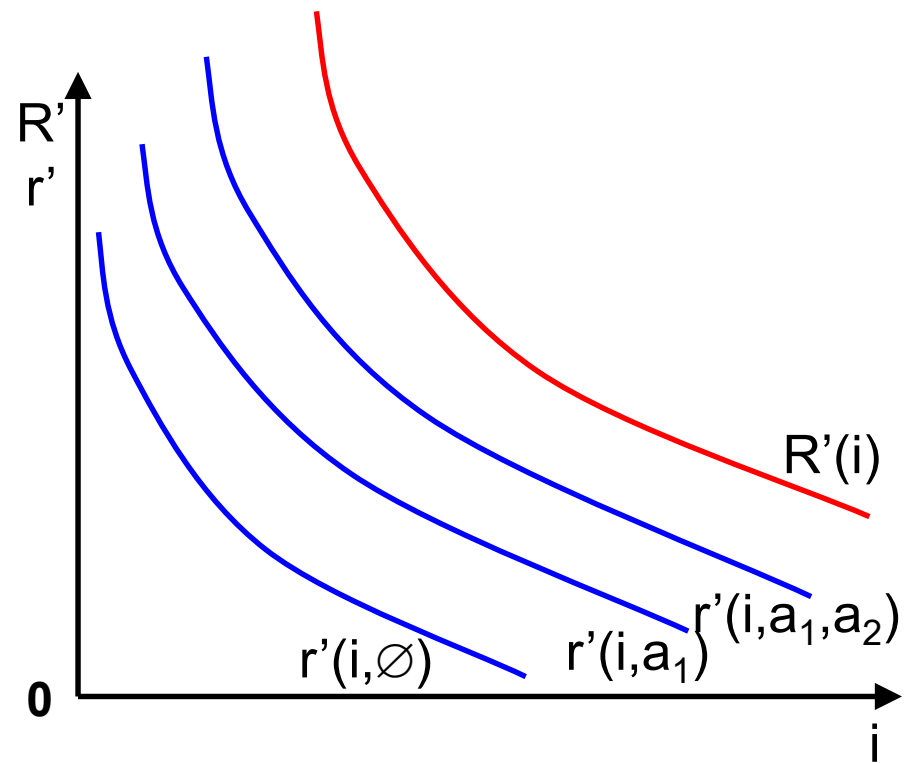
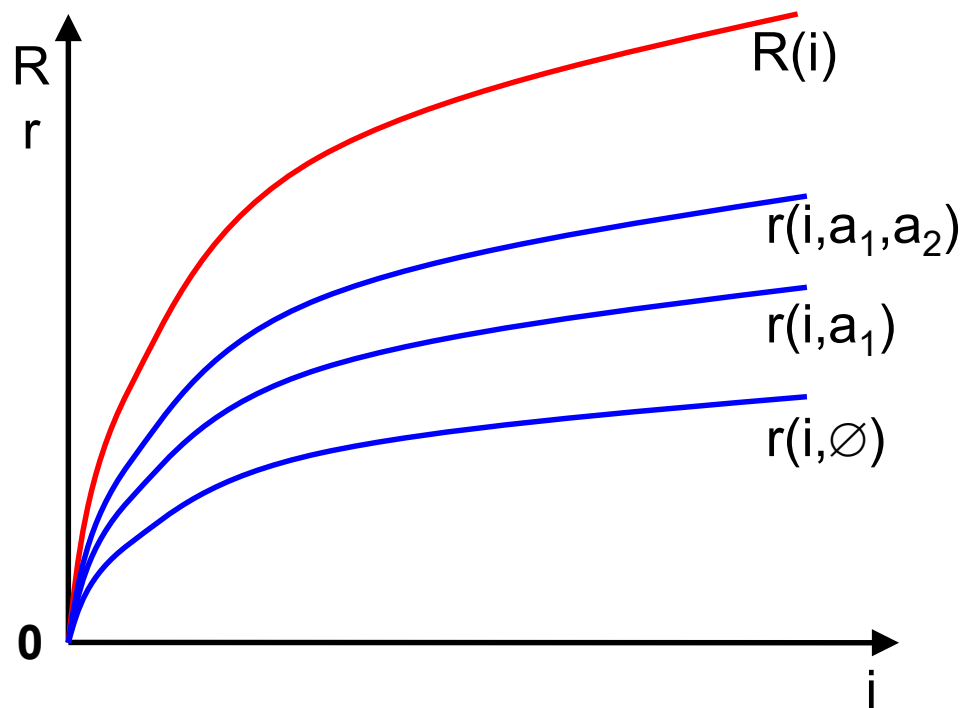
Firm 2: $\bar{P} - c(e,B)$

Details: Trade & Payoffs (Date 1) (ctd)

- Important: Asset ownership does not matter for returns and costs if trade occurs, but is important if bargaining fails
 - $R(i)$ and $C(e)$ are independent of A and B
 - $r(i,A)$ and $c(e,B)$ depend on the ownership structure
- What is the intuition behind this?
 - If trade occurs a_1 and a_2 are used no matter who owns them → Outcome independent of A and B
 - If trade does not occur, each party takes its assets and walks away → a party's success on the market depends on its assets

Details: Relationship-Specificity

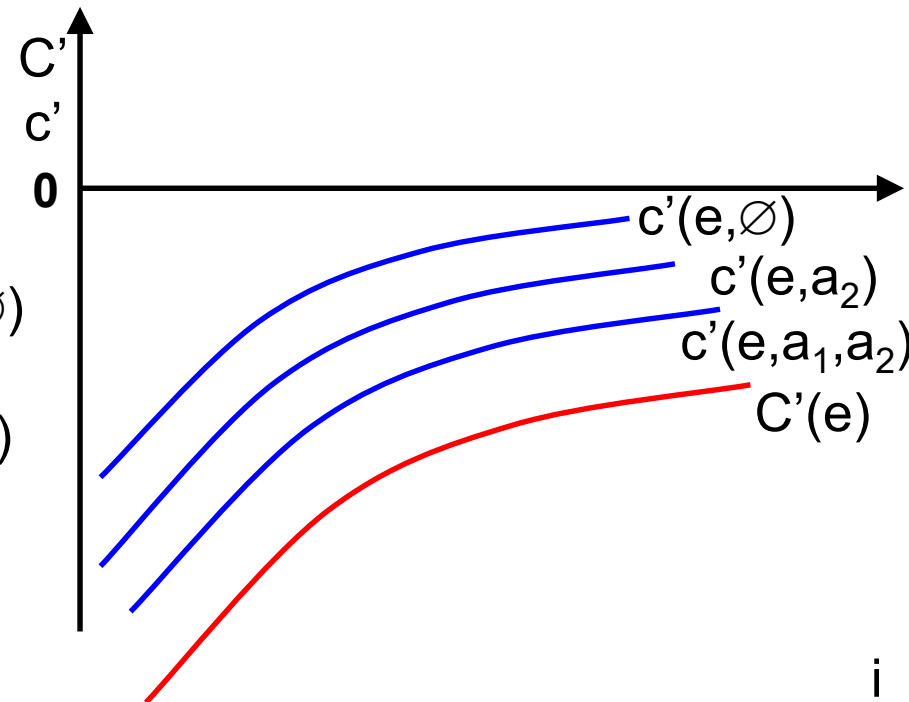
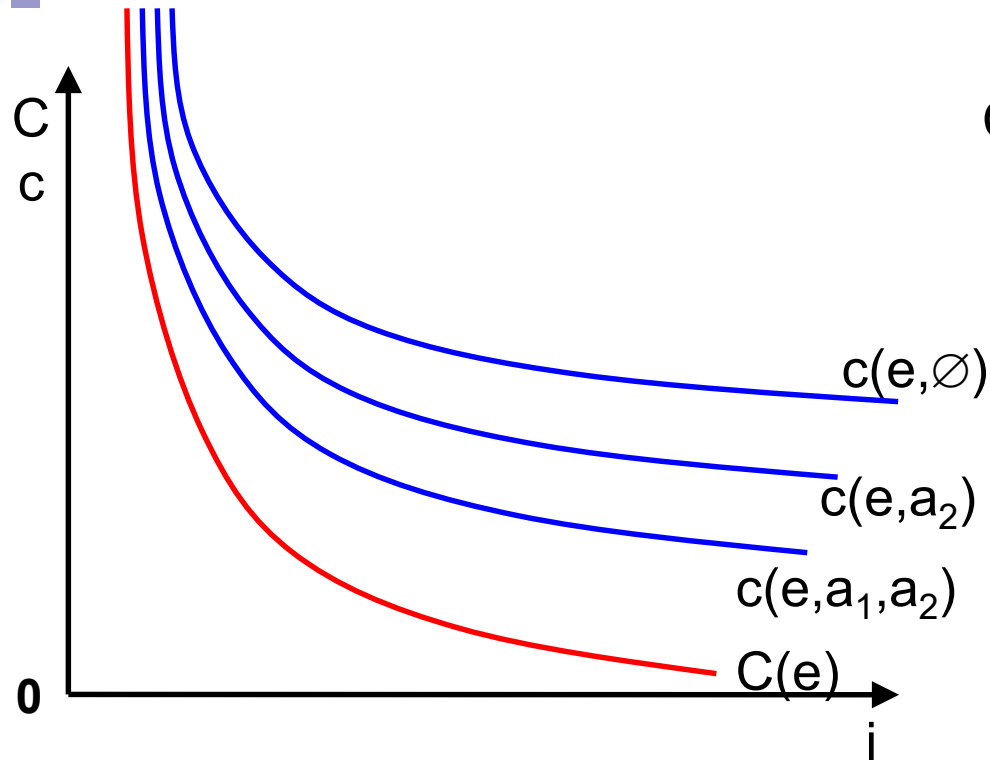
- Relationship-Specificity: Firm 1's return & investment
 - $R(i)$: Access to a_1 and a_2 and Firm 2's human capital
 - Firm 1 gets a highly specific input optimal for its production
 - $r(i, a_1, a_2)$: Access to a_1 and a_2 but not to Firm 2's HC
 - Firm 1 needs to hire an outsider on the market to produce the specific input with help of a_2 (not the perfect human capital)
 - $r(i, a_1)$: Access to a_1 but not to a_2 and Firm 2's HC
 - Firm 1 gets an unspecific input from the outside market
 - $r(i, \emptyset)$: Only access to own human capital
 - Firm 1 gets an unspecific input and does not have the proper technology to transform it into output (only human capital)
- $R(i) > r(i, a_1, a_2) \geq r(i, a_1) \geq r(i, \emptyset)$
- $R'(i) > r'(i, a_1, a_2) \geq r'(i, a_1) \geq r'(i, \emptyset)$



- The return is highest (for a given investment) if the parties trade
- Otherwise the return of a given investment is higher, the more assets Firm 1 owns
- Investing more has the strongest positive impact on the return if the parties trade
- Otherwise, the impact of increasing the investment is higher, the more assets Firm 1 owns

Details: Relationship-Specificity (ctd)

- Relationship-Specificity: Firm 2's cost & investment
 - $C(e)$: Access to a_2 and a_1 and Firm 1's human capital
 - Firm 2 delivers a highly specific input to Firm 1
 - $c(e, a_1, a_2)$: Access to a_2 and a_1 but not to Firm 1's HC
 - Firm 2 can use a_1 and hire an outsider to transform the specific input into output (only small adjustments necessary)
 - $c(e, a_2)$: Access to a_2 but not to a_1 and Firm 1's HC
 - Firm 2 needs to transform the input into a general purpose input
 - $c(e, \emptyset)$: Only access to own human capital
 - Firm 2 needs to transform the input into a general purpose input, but does not have the proper technology
- $C(e) < c(e, a_1, a_2) \leq c(e, a_2) \leq c(e, \emptyset)$
- $C'(e) < c'(e, a_1, a_2) \leq c'(e, a_2) \leq c'(e, \emptyset)$



- The cost is lowest (for a given investment) if the parties trade
- Otherwise the cost (for a given investment) is lower, the more assets Firm 2 owns
- Investing more has the strongest negative impact on costs if the parties trade
- Otherwise, the cost reducing effect of increasing the investment is higher, the more assets Firm 2 owns

Details: Relationship-Specificity (ctd)

- Both investments i (Firm 1) and e (Firm 2) are relationship-specific, i.e., their value is highest within the relationship
 - Investment i has the largest positive effect on the return, if Firm 1 trades with Firm 2
 - Investment e reduces costs most, if Firm 2 trades with Firm 1
 - This implies that efficiency requires that Firm 1 and Firm 2 trade with each other, otherwise surplus is destroyed
 - To compare the efficiency of trading and going to the outside market, we consider the total surplus
 - The total surplus in this model is defined as the sum of the payoffs of Firm 1 and Firm 2
- Total Surplus = Payoff Firm 1 + Payoff Firm 2

Details: Relationship-Specificity (ctd)

- Total surplus if trade occurs (for given investments i, e):

$$R(i) - P - i + P - C(e) - e = R(i) - C(e) - i - e$$

- Total ex-post surplus if trade does not occur (given inv. i, e):

$$r(i, A) - \bar{P} - i + \bar{P} - c(e, B) - e = r(i, A) - c(e, B) - i - e$$

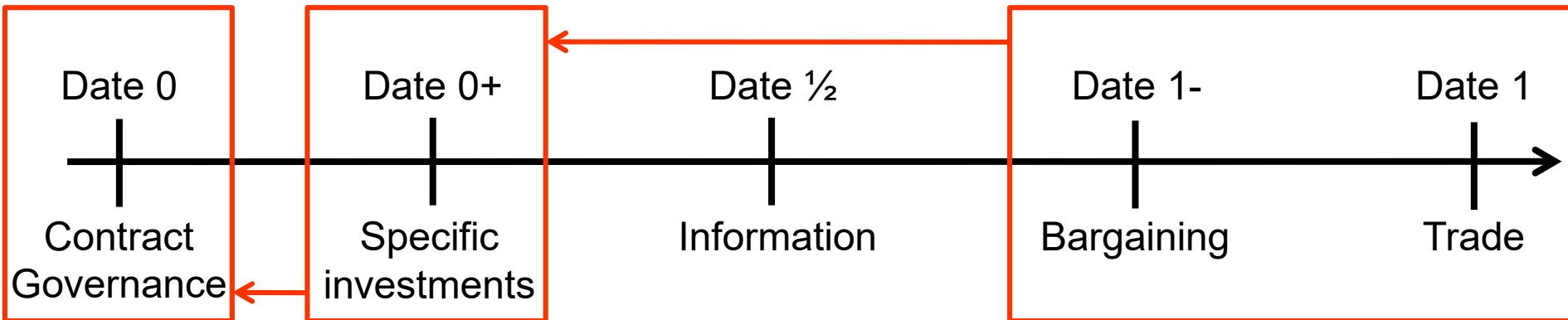
- Assumption on relationship-specificity imply:

$$R(i) - C(e) > r(i, A) - c(e, B) \text{ for all } i, e, A \text{ and } B$$

- For given investments (i, e) the surplus is always larger when trade takes place than when the parties go to the general market
- Assets are relationship-specific: their value in their intended use is larger than their value in alternative uses

Solving the Model

■ Structure of the model:



■ We solve the model backwards:

- We start with the bargaining and trade stages (Date 1 & Date 1-) and determine the ex-post outcome for given investments i,e
- Then we move to the investment stage (Date 0+) and determine the investment choices under the assumption that the parties anticipate the ex-post outcome
- Last we look at the governance structure (Date 0) and determine the conditions under which NI, FI, or BI are optimal