

Governing Investment in Inter-Firm Collaborations: the Role of Contracts

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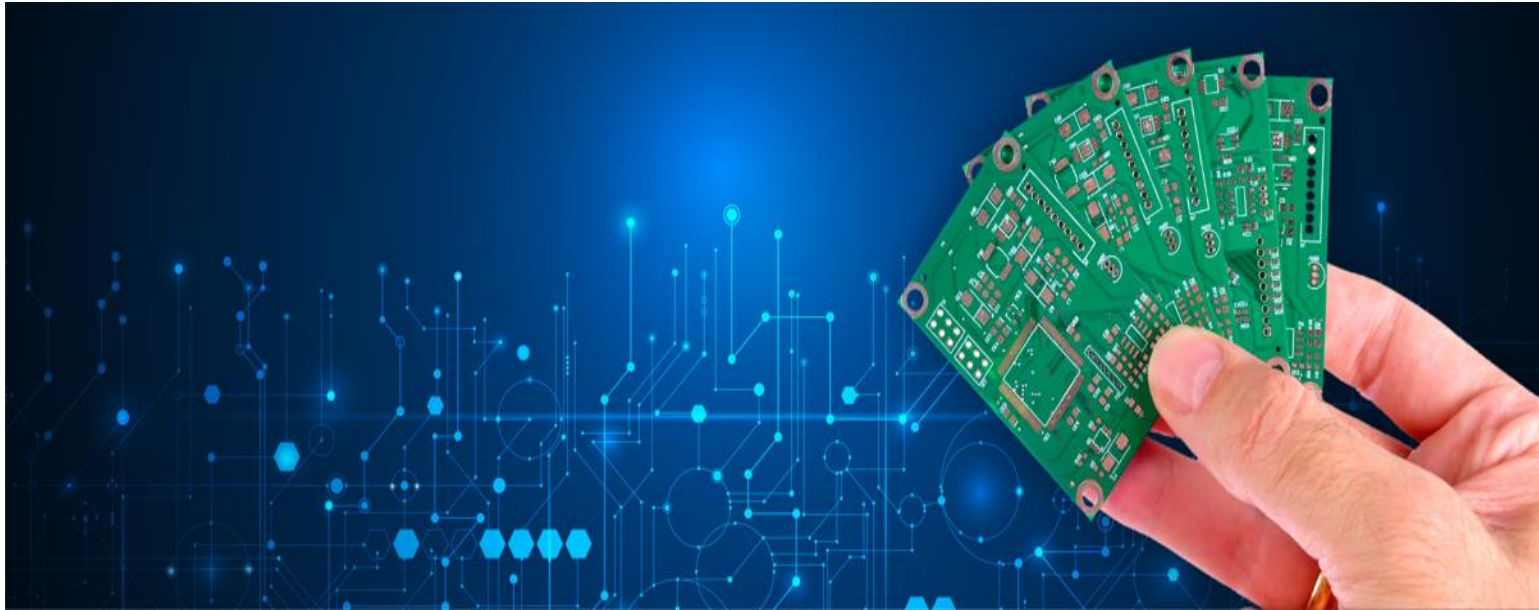
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OEM-supplier relationships



Context and research question

- Suppliers make dedicated investments into OEMs
 - (e.g., vast lean production literature)
- These investments are also a cause of frictions
 - Make supplier dependent → holdup problem
 - May be used by supplier to appropriate OEM's pre-existing resources (e.g., technology, know-how)
- Do contracts help at governing these frictions?
How?

Theoretical approaches

- Transaction Cost Economics (TCE):
 - Fixed price prevents wasteful “haggling” → worthwhile to contract for dedicated investment (e.g., co-location, equipment design)
 - (Williamson 79; Masten 88; Joskow 87; etc.)
- Incomplete Contracting Theory (ICT):
 - Fixed price makes buyer residual claimant → supplier has no incentive to invest effort (e.g., knowledge acquisition)
 - Not optimal if investment adds value to OEM’s end product (Hart & Moore 88; Che & Hausch 99; holdup literature)
 - Optimal if investment enables supplier to appropriate OEM’s resources
(Alcacer & Oxley 14; Zanarone *et al.* 16)

Predicted effects

	Fixed price on supplier's investment	Fixed price on supplier's value-add	OEM's resources on fixed price
TCE	+	+	None
Classic ICT	-	-	None
Resource Protection View	-	-	+

Data

- Survey of 155 contracts for engineered components b/w OEMs and independent suppliers in the U.S.
 - Non-electrical machinery (SIC35)
 - Electrical and electronic machinery (SIC36)
 - Transportation equipment (SIC37)
- Suppliers physically incorporate their components in OEMs' end product
 - Likely to incur dedicated investment to customize components
- OEMs bring in significant product and market strength to collaborations (mean market share = 22%)
- OEM-supplier procurement contract = unit of analysis

Measures: contractual price format

Variable	Measure	Mean	S.D.	Min	Max
<i>Price format</i> (Closed-price contract=1; Open-price contract=0)	How would you describe the pricing arrangement for the item(s) under this contract? Closed-price contract if fixed price or specified prices with verifiable adjustment formulas (e.g. inflation, produce price index, etc.) over the length of the contract. Open-price contract if prices are not specified ahead of shipment or specified prices with negotiated adjustments.	0.82	0.38	0	1

Measures: OEM's pre-existing resources

Variable	Measure	Mean	S.D.	Min.	Max.
<i>OEM market strength</i> (5 items)	<ol style="list-style-type: none">1. This end product is very profitable for you.2. Customers are willing to pay a large premium for your end product.3. You earn higher margins on your end product than our competition.4. Customers value your end product more than competing products.5. You enjoy a number of competitive advantages in your end-product market.	4.42	1.20	1.6	7

Measures: dedicated investment (1)

Variable	Measure	Mean	S.D.	Min.	Max.
<i>Amount of Supplier's investment</i>	Estimate the total dollar value (over all fiscal periods) of this supplier's expenditure for equipment, training, etc. dedicated to facilitating your procurement of the identified item(s). Choose one from: (1) Less than \$10,000; (2) \$10,000 - \$24,999; (3) \$25,000 - \$99,999; (4) \$100,000 - \$499,999; (5) \$500,000 - \$999,999; (6) \$1,000,000 - \$2,499,999; (7) \$2,500,000 or more.	3.44	1.42	1	7

Measures: dedicated investment (2)

Variable	Measure	Mean	S.D.	Min.	Max.
<i>Supplier's dedicated investment (6 items)</i>	<p>1. This supplier has made significant investment in tools and equipment dedicated to the relationship with you.</p> <p>2. The procedure and routines developed by the supplier for their item(s) are tailored to your particular situation.</p> <p>3. This supplier has spent significant resources designing the specifications for their item(s) to ensure that it fits well with our production capabilities.</p> <p>4. You have some usual technological norms and standards which have required extensive adaptation on the part of this supplier.</p> <p>5. Most of the training that the supplier's people have undertaken related to our requirement for this item(s) cannot be easily adapted for the use with another customer.</p> <p>6. Training personnel has involved substantial commitment of time and money on the part of the supplier.</p>	3.38	1.05	1	6

Measures: supplier's value-add

Variable	Measure	Mean	S.D.	Min.	Max.
<i>OEM profitability</i>	Relative to what you might have obtained from some other supplier, how profitable is your relationship with this supplier?	5.58	1.25	2	7
<i>End-product enhancement</i> (2 items) Reliability = 0.70	<ol style="list-style-type: none"> The image of your end-product in your customer's eyes has received a boost due to this relationship. This relationship enables you to differentiate your end-product vis-à-vis our competitors. 	3.66	1.42	1	7

Control variables

- Years of relations
- Technological uncertainty
- Interface complexity
- Component importance
- OEM/Supplier relative size
- Number of potential suppliers
- Supplier's irreplaceability
- Contract enforceability
- Norm of flexibility
- Norm of long-term orientation
- Monitoring of supplier
- Control of decision rights
- OEM investment
- Industry fixed effects

Econometric specification

- Contracts are endogenous to parties' choice
- Endogenous switching regression (Maddala 1986; Wooldridge 2010)

1. Switching equation (probit)

$$S_i^* = z_i' \alpha + \gamma CS_i + v_i$$

↑ Price format ↙ OEM's pre-existing resources

2. Outcome equation (ordered probit)

$$y_i^* = x_i' \beta + \theta S_i + x_i' \lambda + u_i$$

↑ Supplier's dedicated investment; Value-add

z , but not x , includes *contract enforceability* as instrument

Price format and supplier's dedicated investment

	Price format: Closed-price contract = 1; Open-price contract = 0 (<i>Probit</i>)	Supplier's dedicated investment (<i>Ordered probit</i>)
Price format		-1.39*** (0.07)
OEM market strength	0.48*** (0.14)	0.47*** (0.03)
Controls?	Yes	Yes
	Consistent with RPP; not with TCE, ICT	Consistent with ICT, RPP; not with TCE

Price format and supplier's value-add

	Price format: Closed-price contract = 1; Open-price contract = 0 (<i>Probit</i>)	OEM profitability (<i>Ordered probit</i>)
Price format		-1.41*** (0.07)
OEM market strength	0.65*** (0.14)	0.34*** (0.02)
Controls?	Yes	Yes
	Consistent with RPP; not with TCE, ICT	Consistent with ICT, RPP; not with TCE

Conclusion

- Contracts play important role in governing dedicated investment in interfirm collaborations
- Standard approaches miss important dimensions of such role
 - Fixed price may *reduce* supplier's investment and value-add to OEM
 - Inconsistent with TCE
 - Yet, OEM may choose to fix price to dis-incentivize investments that lead to resource appropriation
 - Inconsistent with TCE, classic ICT
- ➔ Optimal contract balances value-creation benefits and resource appropriation costs of dedicated investment



Thank you