Trade in Tasks the Organization of Firms

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Motivation

Internal firm organization:

- Firm productivity
- Wage inequality within a firm
- Important decisions about finance, strategy, R&D, etc.

Motivation

Globalization seems to play a role:

- Guadalupe and Wulf (2010): bilateral trade liberalization leads to flatter corporate structure
- Caliendo, Monte and Rossi-Hansberg (2012): firms that enter the export market are more likely to reorganize production than non-exporters

Motivation

The nature of international trade has been changing:

- Modern economic commerce involves movements within the boundaries of the firm
- Firms separate different production stages across the world economy to exploit differences in production costs $\Longrightarrow$ trade in tasks (offshoring).
  - changes in transportation and communication technology $\Longrightarrow$ a dramatic rise in offshoring of manufacturing and business tasks in recent years
  - the evidence suggests that trade in tasks and intra-firm trade have increased much stronger than final goods trade in the last three decades

Offshoring is an important part of globalization!

Motivation

- Offshoring is an important candidate as a driver of organizational change!
  - the question that has not been looked at yet
  - the existing studies ignore the role of offshoring in explaining the firm's corporate structure
- The question we address:

Have offshoring or 'trade in tasks' been one of the driving forces behind the observed changes in the corporation?

What This Paper Does

- The theory of trade in tasks (Grossman and Rossi-Hansberg (2008)) is incorporated into the theory of firm organization (Aghion and Tirol (1997) and Marin and Verdier (2012)):
  - how does offshoring of different types of tasks affect the corporate organization of the parental firm in the home country?
- The theory is then confronted to an original firm survey data of German and Austrian multinational firms with affiliate firms in Eastern Europe
  - the data are mainly consistent with the theory

Outline

- Relationship between firm organization and profits
- Relationship between profits and offshoring of different types of labor
- Testable predictions for the relationship between offshoring and firm organization are formulated

The Model: Firm Organization

- A firm consists of an owner (the principal P) and a manager (the agent A)
  - the principal hires a skilled manager to start a firm
- There are a number of alternative ways to run the firm that differ in terms of production costs
- Only two of them are worth doing from the perspective of the principal and the manager
  - one project has the lowest cost of production (yielding the highest possible profit B)
  - the other project is the "best project" for the manager (yielding the highest possible non pecuniary benefit b for the manager)

The Model: Firm Organization

- *B* and *b* are known ex ante, but the parties do not know ex ante which project yields such a payoff
  - learning the payoffs is costly
- There are projects with very high negative payoffs to both the principal and the agent
  - choosing a random project without being informed is not profitable
  - uninformed party prefers to rubber-stamp the informed party's suggestion
- Private information about the payoffs gives decision control to the informed party that, in this case, has "real power" rather than "formal power" in the firm

The Model: Firm Organization

- Three types of the internal organization of a firm:
  - a *P*-organization: the principal has formal power
  - an *A*-organization: the principal delegates formal power to the manager.
  - an *O*-organization: the principal also has formal power, but the manager puts zero effort into learning the payoffs of the available projects
- The principal chooses between the three modes of firm organization to maximize her utility.

The Model: Firm Organization

From Marin and Verdier (2012):

Proposition: *For $B/w < \tilde{B}_P$, the principal chooses the P-organization. For $\tilde{B}_P \leq B/w < \bar{B}$, the principal prefers the A-organization. Finally, for $B/w \geq \bar{B}$, the O-organization yields the highest utility.*

The Model: Firm Organization

- A trade-off between control and initiative arises at intermediate levels of profits
  - the principal delegates formal power to the manager to keep her initiative
- At high levels of profits, the principal's stakes are so high that she puts a lot effort in monitoring the projects
  - zero effort put in by the manager under any type of firm organization: the *O*-organization is optimal
- At low levels of profits, the principal's stakes are small and she monitors little
  - the manager puts in the maximum effort and the *P*-organization is optimal

The Model: Trade in Tasks

- The theory of the firm is incorporated into the Helpman and Krugman (1985) framework (in a small open economy)
- Offshoring of tasks is modeled a là Grossman and Rossi-Hansberg (2008):
  - production in the differentiated sector involves a continuum of tasks
  - to run/start a firm, a manager performs a continuum of tasks

The Model: Offshoring of Production Tasks

Proposition: *A larger scale of offshoring of production tasks leads to a higher level of the real profits in equilibrium.*

- A decrease in the marginal cost increases firm's real profits
- A fall in the price index decreases the real profits
- In a small open economy:
  - the productivity effect is enhanced by the presence of the foreign market
  - the price effect is weakened by the presence of foreign firms whose productivity does not change

The Model: Offshoring of Managerial Tasks

Proposition: *A larger scale of offshoring of managerial tasks leads to higher real profits if and only if the intensity of foreign competition is sufficiently high.*

- A higher number of offshored tasks increases the relative cost of skilled labor, raising firm's real profits
  - this effect is reminiscent of the productivity effect in Grossman and Rossi-Hansberg (2008)
- There is a rise the number of domestic firms:
  - the price index in the economy falls, reducing firm's real profits
  - the effect on the price index is weaker, the higher is the competition from abroad

Data

- We confront the empirical predictions to firm level data on German and Austrian multinationals survey among 660 multinational firms in Austria and Germany with 2200 affiliates in Eastern Europe during 1990 – 2001
- The sample covers 80% of German and 100% of Austrian direct investments in Eastern Europe, contains information on production/managerial offshoring and decentralization
- The survey was conducted at the LMU via telephone / mail / personal visits

Data

- **Measure of the level of decentralization**: values between 1 (decisions are completely made by the CEO) and 5 (decisions are made at the divisional level)
  - acquisitions, finance, strategy, transfer prices, new products, R&D, etc. (16 activities for Germany, 13 for Austria)
  - the average level of decentralization in the sample is 2.8

Data

- **Offshoring of production labor**: firms report intra-firm imports from their affiliates
  - later: use road distances and input industry-level differences in wages or lab. prod. as instruments to control for reversed causality
- **Offshoring of managerial labor:**
  - “How many managers of your parent company have been sent to the affiliate firm?”
  - managers working at the affiliate - managers sent from home country = offshored managers
  - multinationals offshore on average 2.6 managers per investment project (max. 39)

Data

- **Trade Openness**: dummy that takes the value 1 if the parent firm faces many or very many foreign competitors and 0 otherwise
  - *industry level measure:* average of the dummy foreign competition (firm) at the ISIC 3 digit level
  - *back to firm level measure:* dummy that takes the value 1 if the parent firm operates in an ISIC 3 digit industry that is above the 25th percentile

Theory Predictions

- **Theory prediction 1:** In an economy open to trade, Northern firms have a more decentralized hierarchy when they offshore production tasks to low wage countries.
- **Theory prediction 2:** Northern firms have a more decentralized hierarchy when they offshore management tasks and the exposure to foreign competition is sufficiently high, and a less decentralized hierarchy when the exposure to foreign competition is low.

Offshoring of Production Tasks

Dependent variable: Level of decentralization of authority	(1)	(2)	(3)	(4)
Intrafirm Trade				
Dummy=1 if intrafirm imports >0	0.314**	0.392***	0.288*	
	(0.142)	(0.139)	(0.169)	
Sum of intrafirm imports / parental sales				0.00185*
				(0.000986)
Foreign Competition				
Foreign competition (industry average)	1.506***			1.291***
	(0.333)			(0.491)
Dummy=1 if many foreign competitors		0.430**	0.230	
		(0.191)	(0.248)	
Firm Size				
ln(parental assets)			0.0928**	0.125***
			(0.0433)	(0.0454)
ln(parental sales)	0.117***	0.115**		
	(0.0410)	(0.0528)		
Observations	640	615	583	601
R-squared	0.253	0.362	0.418	0.227
Parent Firm Controls (3)	No	No	Yes	No
Home Country Dummy (1)	Yes	Yes	Yes	Yes
Host Country Dummies (3)	Yes	Yes	Yes	Yes
Industry Dummies (45)	No	Yes	Yes	No
Survey Controls (3)	No	Yes	Yes	Yes
Clustering	Parent Firm	Parent Firm	Parent Firm	Parent Firm
Number of Clusters	143	131	118	128

Offshoring of Production Tasks (continued)

Exploiting Differences in Relative Wages and Distance between Parent and Affiliates

Dependent variable: Level of decentralization of authority	(1)	(2)	(3)	(4)
Intrafirm Trade				
Dummy=1 if intrafirm imports >0	0.752**	0.793***	0.893***	0.814**
	(0.319)	(0.290)	(0.275)	(0.344)
Foreign Competition				
Dummy=1 if many foreign competitors		0.457*	0.852***	0.464
		(0.251)	(0.236)	(0.289)
Firm Size				
ln(parental assets)	0.102***	0.0507		0.0499
	(0.0362)	(0.0448)		(0.0459)
ln(parental sales)			0.0123	
			(0.0464)	
Observations	585	567	522	567
R-squared	0.340	0.390	0.473	0.387
Instrumental Variables				
Distance	-0.372***	-0.353***	-0.345***	-0.163*
	(0.084)	(0.083)	(0.08)	(0.096)
Relative wages	0.015***	0.016***	0.018***	
	(0.006)	(0.006)	(0.006)	
Relative unit labour costs				-1.059***
				(0.345)
First stage F-statistic	10.07	9.62	10.41	8.32
Parent Firm Controls (3)	Yes	Yes	Yes	Yes
Home Country Dummy (1)	Yes	Yes	Yes	Yes
Host Country Dummies (3)	Yes	Yes	Yes	Yes
Industry Dummies (45)	Yes	Yes	Yes	Yes
Survey Controls (3)	Yes	Yes	Yes	Yes
Clustering	Parent Firm	Parent Firm	Parent Firm	Parent Firm
Number of Clusters	121	111	98	111

Offshoring of Managerial Tasks

Dependent variable: Level of decentralization of authority	(1)	(2)	(3)	(4)	(5)	(6)
Managerial Offshoring						
Dummy=1 if manager offshored	-0.109	-0.581**				
	(0.186)	(0.284)				
Sum of # offshored managers / sum affiliate employment			-3.471**	-8.732***		
			(1.697)	(2.704)		
Sum of # offshored managers / parent skilled employment					0.0749	-0.0934*
					(0.0631)	(0.0483)
Foreign Competition * Managerial Offshoring						
Highly open * (Dummy=1 if manager offshored)		0.631*				
		(0.359)				
Highly open * (Sum of # offshored managers / sum affiliate employment)				7.249**		
				(3.450)		
Highly open * (Sum of # offshored managers / parent skilled employment)						0.278***
						(0.0857)
Foreign Competition						
Highly open	0.446*	0.00763	0.929***	0.669**	1.225***	0.961***
	(0.227)	(0.256)	(0.285)	(0.293)	(0.327)	(0.313)
Firm Size						
ln(parental sales)	0.191***	0.195***	0.312***	0.303***	0.424***	0.384***
	(0.0651)	(0.0627)	(0.0714)	(0.0698)	(0.0825)	(0.0843)
Observations	474	474	454	454	410	410
R-squared	0.198	0.216	0.515	0.530	0.553	0.615
Parent Firm Controls (3)	No	No	Yes	Yes	Yes	Yes
Home Country Dummy (1)	Yes	Yes	Yes	Yes	Yes	Yes
Host Country Dummies (3)	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies (45)	No	No	Yes	Yes	Yes	Yes
Survey Controls (3)	Yes	Yes	Yes	Yes	Yes	Yes
Clustering	Parent Firm	Parent Firm	Parent Firm	Parent Firm	Parent Firm	Parent Firm
Number of Clusters	119	119	116	116	99	99

Conclusion

- This paper sheds some light on internal firm hierarchy
- It explores the relationship between offshoring and firm organization
  - offshoring of different types of labor has different implications for firm organization
- The data are consistent with the theoretical predictions in the model

THANK YOU!