Commonalities and differences between production related FDI (PFDI) and technology-related FDI (TFDI) in developed and emerging economies

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Introduction

- Focus of the paper is on internationalization
- Internationalizing production related activities
  - Manufacturing facilities
  - Investments with market-seeking motives (proximity to suppliers,clients, natural resources, ...)
  - R&D aimed at product adaptation and support
  - Asset exploitation srategies
  - Production related FDI (PFDI)
- Increase in internationalization of innovation related activities in last two decades
  - Knoweldge seeking motivations (proximity to universities, innovative firms,human capital,...)
  - Internationalizing knowledge intensive activities such as R&D (more independent of production)
  - Restructuring of innovation related activities (e.g. Role of subsidiaries)
  - Different strategies, networks, connection to different actors, different orientation of activities
  - Asset augmenting strategies
  - Technology relted FDI (TFDI)
- More studies point to a different nature of internationalization of knowledge intensive activities (Blanc& Sierra 1999; Cantwell 1995; Dunning& Narula 1995; Dunning& Lundan 2009, Zanfei 2000; Cantwell& Piscitello 2002, 2005, 2007; ...)

- What are the commonalities and differences betwen PFDI and TFDI in terms of firm characteristics?

Theoretical framework

- Set of factors important for PFDI as well as TFDI
- Firm level factors:
  - Firm type
  - Firm size
  - Global orientation
  - R&D intensity
  - Innovativeness
  - University linkages
- Industry
- Institutional factors
  - Rules and regulations affecting internationalization of production and/or innovatoin
    - External to the firm
      - regarding IPR
      - Regarding FDI and trade
      - Migration
    - Internal to the firm
      - Organizational factors

Data and methodology

- Data based on INGINEUS survey (2009-2011)
- Both developing and developed MNCs
- Across 3 sectors (ICT, Agro-processing and Automotive)
- 2 rounds of logit and one round of multinomial logit as robustness check

Country	Agro-proc	ICT	Automotiv	Total
India	0	324	0	324
China	0	243	0	243
Sweden	0	171	24	195
Norway	2	179	0	181
South Africa	77	1	2	80
Brazil	0	0	69	69
Germany	0	0	53	53
Denmark	49	0	0	49
Estonia	0	17	0	17
Total	128	935	148	1,211

Dependent variables

Offshoring of production proxy of PFDI
Offshoring of Innovation proxy of TFDI

Dependent variables	0	1	2	
OFFSHORE	none offshoring N=909	all offshoring N=306	-	Logit #1
PFDI	exclusive TFDI N=50	all PFDI N=256	-	Logit #2
TFDI	exclusive PFDI N=88	all TFDI N=218	-	
PFDITFDI	exclusive PFDI N=88	exclusive TFDI N=50	both PFDI and TFDI N=168	Mlogit (robustness)

Independent variables

- **Industry (ICT, Automotive, Agro-processing*)**
- **Large**
- **SMEs***
- **Type (standalone*, Subsidiary, HQ)**

Control variables

- **Export**
- **RD**
- **Source_external**
- **inno_WORLD**
- **inno_INDUSTRY**
- **inno_FIRM**
- **inno_NONE***
- **link_UNIVERSITY**
- **foreign_FORMAL**
- **foreign_INFORMAL**

Firm characteristics

- **BARRIER_1 (finding relevant new knoweldge)**
- **BARRIER_2 (managing globally dispersed projects and cultural differences)**
- **BARRIER_3 (regulations, practices and jurisprudence around IPR)**
- **BARRIER_4 (rules and practice regarding FDI and trade policy)**
- **BARRIER_5 (migraion policy regulations for employing foreign scientists/researchers/experts)**

Institutional variables

*reference

	TFDI			PFDI		
	A1	A2	A3	B1	B2	B3
ICT	0.44	0.53	-0.41	-0.19	-0.38	-1.02
	(0.51)	(0.57)	(0.75)	(0.80)	(0.88)	(1.20)
Automotive	-0.23	0.14	-0.80	-0.64	-0.97	-2.16
	(0.59)	(0.64)	(0.84)	(0.90)	(0.98)	(1.37)
Subsidiary	0.10	0.05	0.06	0.23	0.21	-0.33
	(0.30)	(0.33)	(0.37)	(0.39)	(0.43)	(0.54)
HQ	0.48	0.21	0.24	-0.31	-0.22	-0.03
	(0.39)	(0.43)	(0.49)	(0.43)	(0.48)	(0.66)
LARGE	0.50*	0.29	0.37	**1.40*** **	**1.21*** **	**1.81*** **
	(0.29)	(0.32)	(0.36)	(0.40)	(0.43)	(0.60)
Export		0.14	0.33		**1.24*** **	**2.14*** **
		(0.31)	(0.37)		(0.38)	(0.59)
RD		**0.79** **	**0.72***		-0.93*	**-1.70** **
		(0.34)	(0.38)		(0.48)	(0.69)
Source_external		**0.72***	**0.80***		0.16	0.02
		(0.37)	(0.43)		(0.44)	(0.58)
inno_WORLD		0.24	0.06		0.23	0.61
		(0.35)	(0.37)		(0.41)	(0.54)
inno_INDUSTRY		0.39	**0.65***		-0.06	-0.51
		(0.33)	(0.36)		(0.43)	(0.61)
inno_FIRM		-0.05	-0.13		0.17	-0.23
		(0.34)	(0.37)		(0.39)	(0.52)
link_UNIVERSITY		**0.89*** **	**0.87** **		0.37	0.19
		(0.31)	(0.35)		(0.38)	(0.50)
foreign_FORMAL		0.12	0.13		0.39	0.78
		(0.36)	(0.41)		(0.42)	(0.55)
foreign_INFORMAL		-0.30	-0.26		0.01	0.52
		(0.31)	(0.35)		(0.39)	(0.52)
BARRIER_1			0.30			**-1.03** **
			(0.34)			(0.50)
BARRIER_2			-0.48			**1.42*** **
			(0.36)			(0.49)
BARRIER_3			0.65			-0.35
			(0.47)			(0.63)
BARRIER_4			-0.27			-0.24
			(0.45)			(0.63)
BARRIER_5			-0.03			-0.67
			(0.43)			(0.60)
Constant	0.25	-1.31*	-0.60	1.38*	0.91	2.31
	(0.51)	(0.77)	(0.91)	(0.79)	(1.08)	(1.48)
N	299	283	246	299	283	246
chi2	8.69	38.16***	40.96***	17.28***	33.95***	49.97***
"LL"	-175.06	-150.36	-126.43	-124.73	-110.27	-70.10

* p<.10, ** p<.05, *** p<.01 Standard errors in parenthesis

Results and conclusions

- No significant difference were seen between industries
- Being a large firm, as opposed to being an SME, impacts positively offshoring of production but not offshoring of innovation.
- Prior experience as exporter significantly impacts likelihood of PFDI, this confirms the traditional theory (e.g. Stages view of internationalization)
- Being R&D intensive positively (but marginally) impacts TFDI while negatively (moderately) affecting PFDI! This is also strengthened with the fact that firms who offshore their innovation activities have more tendency of looking for technologies in external sources.
- Linkages to local and foreign universities and research centers significantly affects involving in TFDI even after introducing barrier variables
- Firms who are innovative at the level of industry are more likely to offshore their innovative activities.
- Institutaional barriers did not have any impact on the likelihood of offshoring innovation nor on offshoring of production while only organizational barriers affected PFDI. Important not to overlook the role of firm charactersitics!

Limitations

- The database is very unique but has its limitations;
  - Non-response and selection biases
  - Makes it difficult to conduct more complex analytical models
  - Cross sectional data (in what order?)

Thank you for listening