

Deep Agreements and Vertical FDI

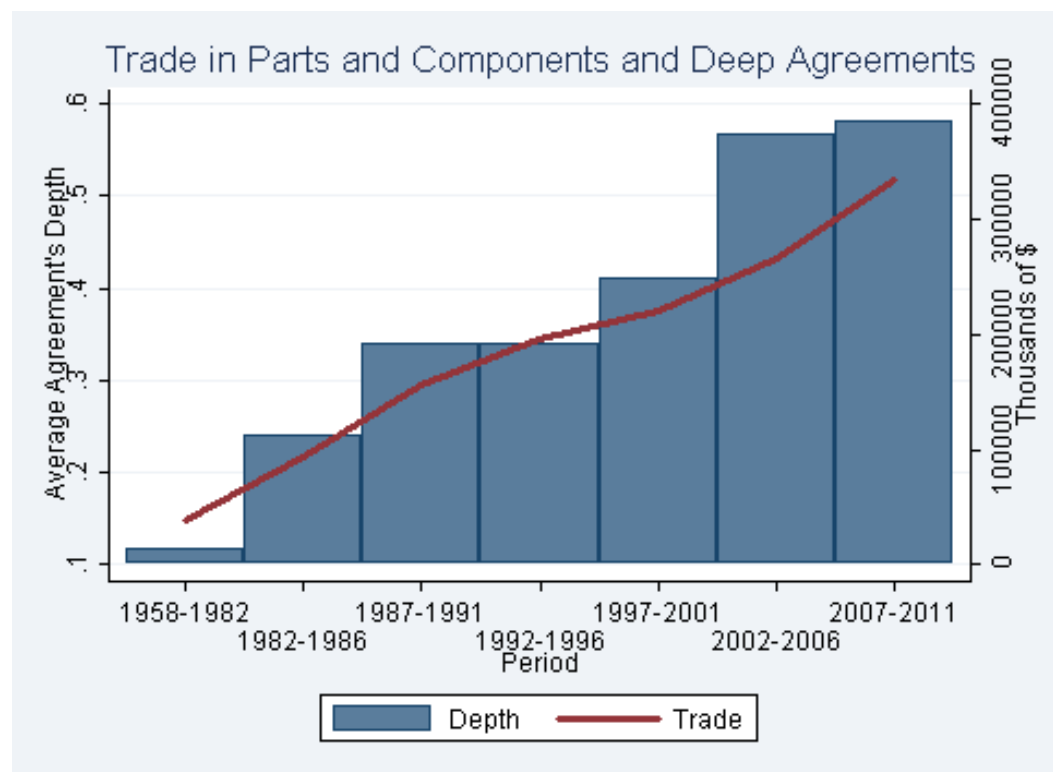
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Second IMF/WB/WTO Trade Workshop
Geneva, 5/6 June 2013

Deep agreements and int. production

- Depth of PTAs and the international fragmentation of production have changed over time



Source World Trade Report (2011)

Deep agreements and int. production

- This paper:
 - Digs further into the relationship between deep trade agreements and the internationalization of production
- Specific question:
 - How are deep agreements and *vertical FDI* related?
- General idea:
 - Deep provisions improve the contractual environment
 - However, different provisions affect the contractibility of various inputs differently
 - FDI respond to (and, possibly, determine) these institutional changes

Outline

1. Theory: Deep PTAs and the choice between FDI and outsourcing
 - Antras and Helpman (2008)
2. Data description and methodology
 - Depth and composition of deep agreements
 - A bottom-up approach to vertical FDI
3. Empirical findings
 - Depth of PTAs and vertical FDI
 - Composition of PTAs and vertical FDI
4. Summary and work ahead

Vertical FDI and deep PTAs

- Two countries: North (high cost) and South (low cost)
- Production:
 - Final good production located in North combining HQ services (h) and components (m)
 - Final good producers supply HQ services, but can source components domestically or from South
- Contractual environment:
 - South has weaker contracting institutions relative to North
 - Define μ_h (μ_m) as the contractibility of HQ services (components) in South

Vertical FDI and deep PTAs

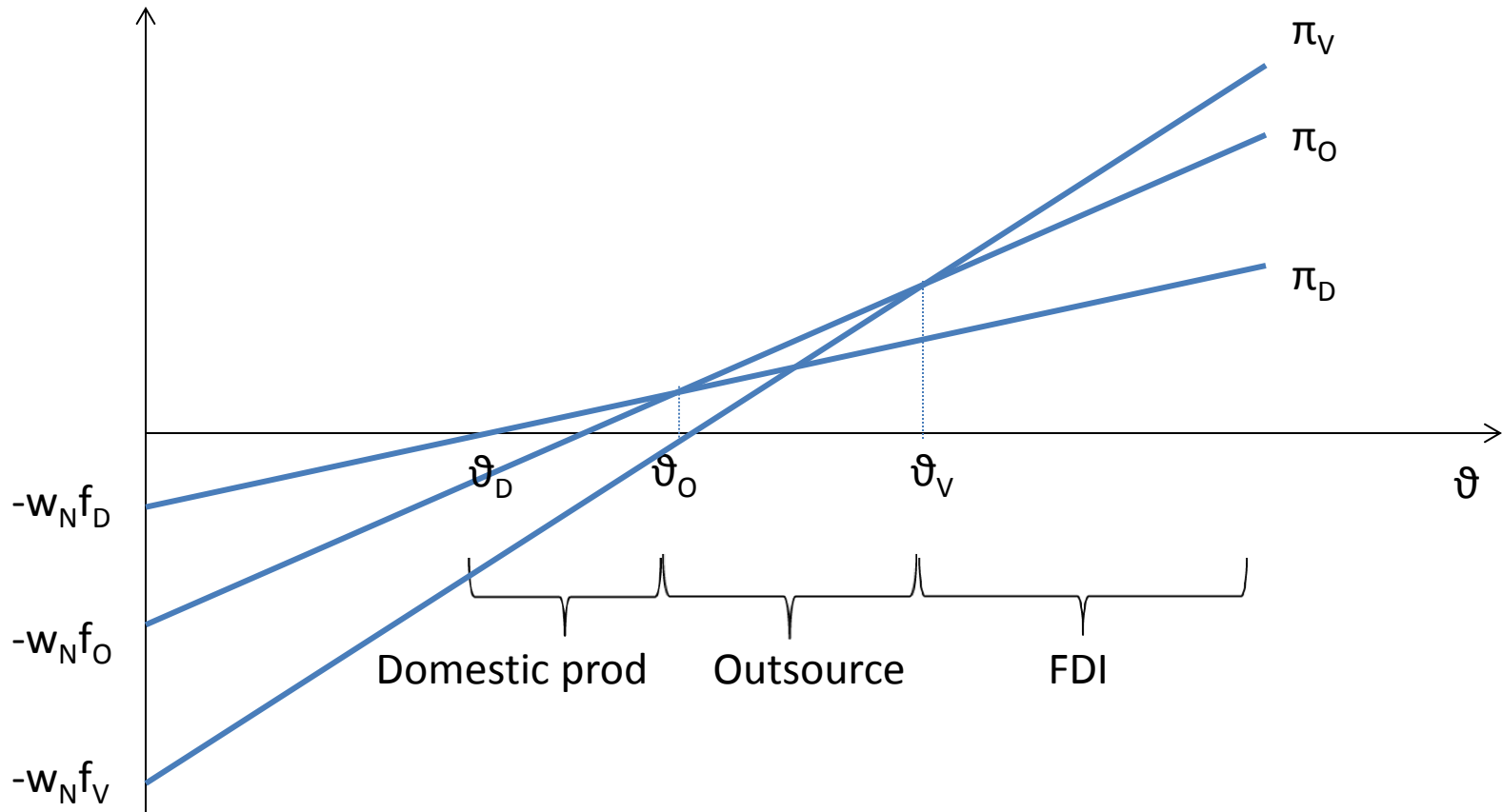
- Final good producers have three alternatives to obtain components (m)
 - Domestic sourcing (D)
 - Foreign outsourcing (O)
 - FDI, i.e. foreign vertical integration (V)
- Profits can be expressed with the standard form

$$\pi_i = Z_i \vartheta - w_N f_i \quad \text{with } i = D, O, V$$

where ϑ is a function of productivity and profitability Z_i depends on μ_h and μ_m

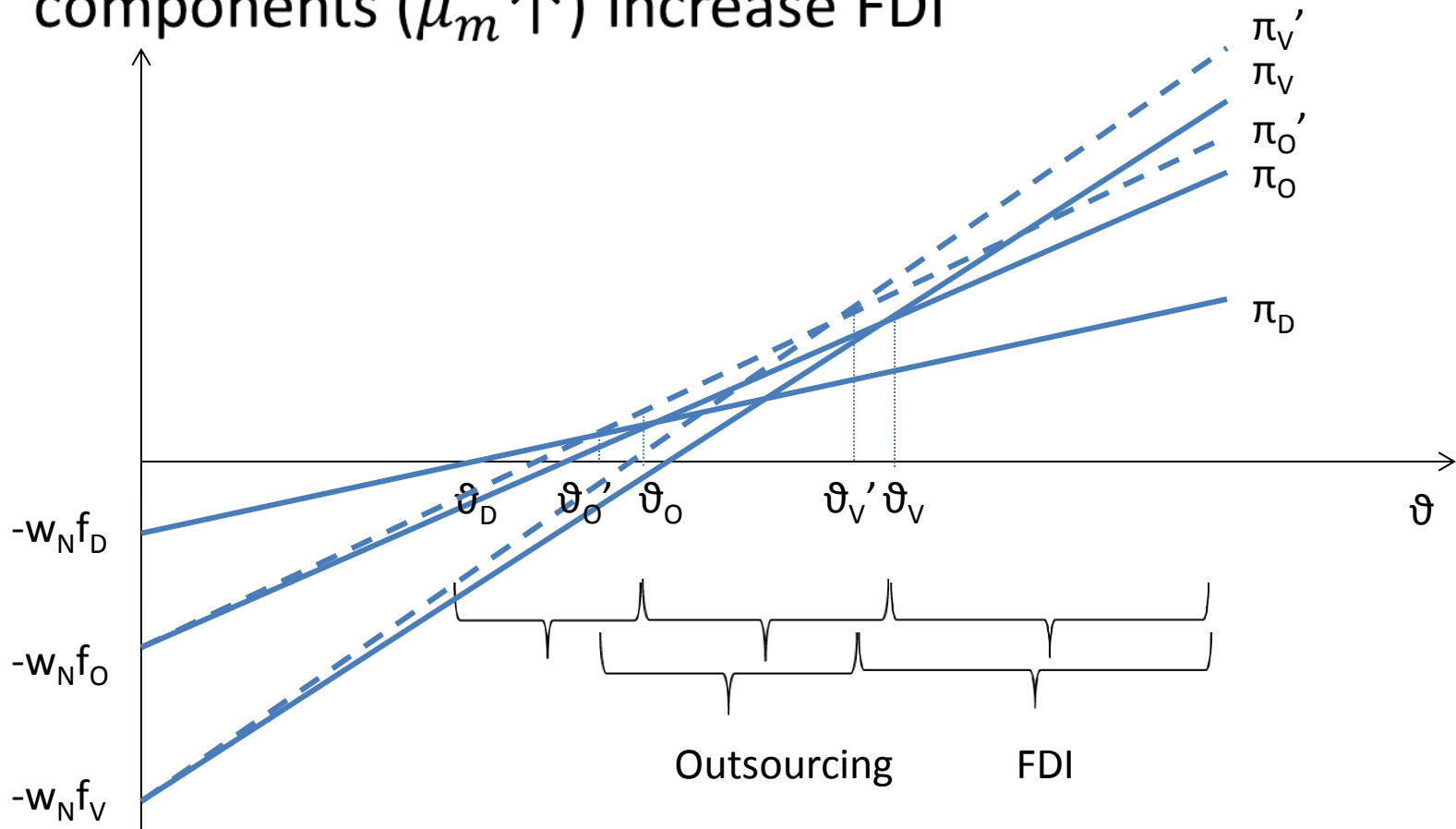
Vertical FDI and deep PTAs

- Domestic production, foreign outsourcing and FDI coexist



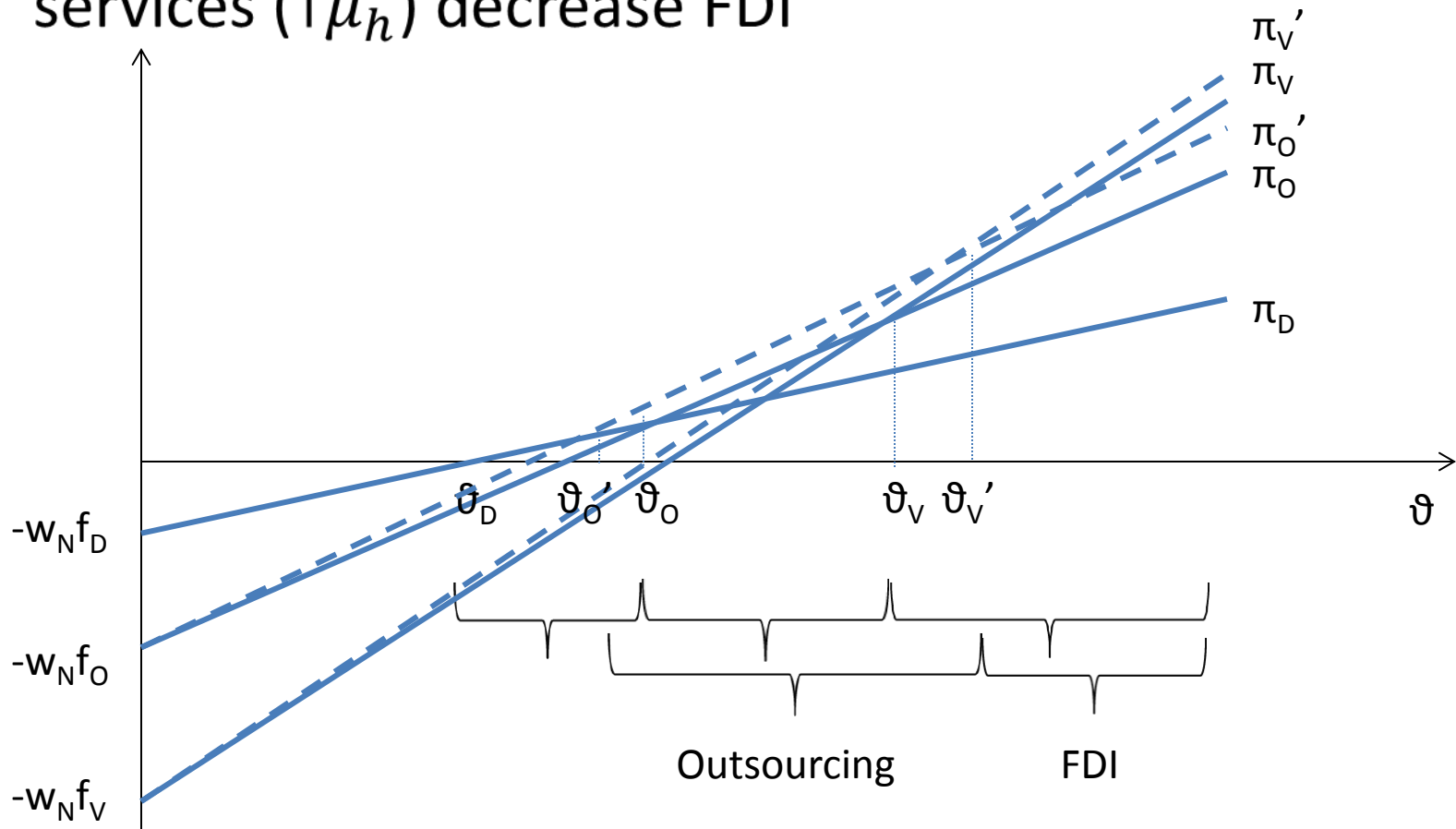
Vertical FDI and deep PTAs

- PTA provisions that improve contractibility of components ($\mu_m \uparrow$) increase FDI



Vertical FDI and deep PTAs

- PTA provisions that improve contractibility of HQ services ($\uparrow \mu_h$) decrease FDI



Vertical FDI and deep PTAs

- Summary of model's prediction:
 - Depth of agreements is associated to more offshoring, but relationship with FDI is ambiguous
 - Discipline improving contractibility of components (HQ services) are associated with increasing (decreasing) FDI

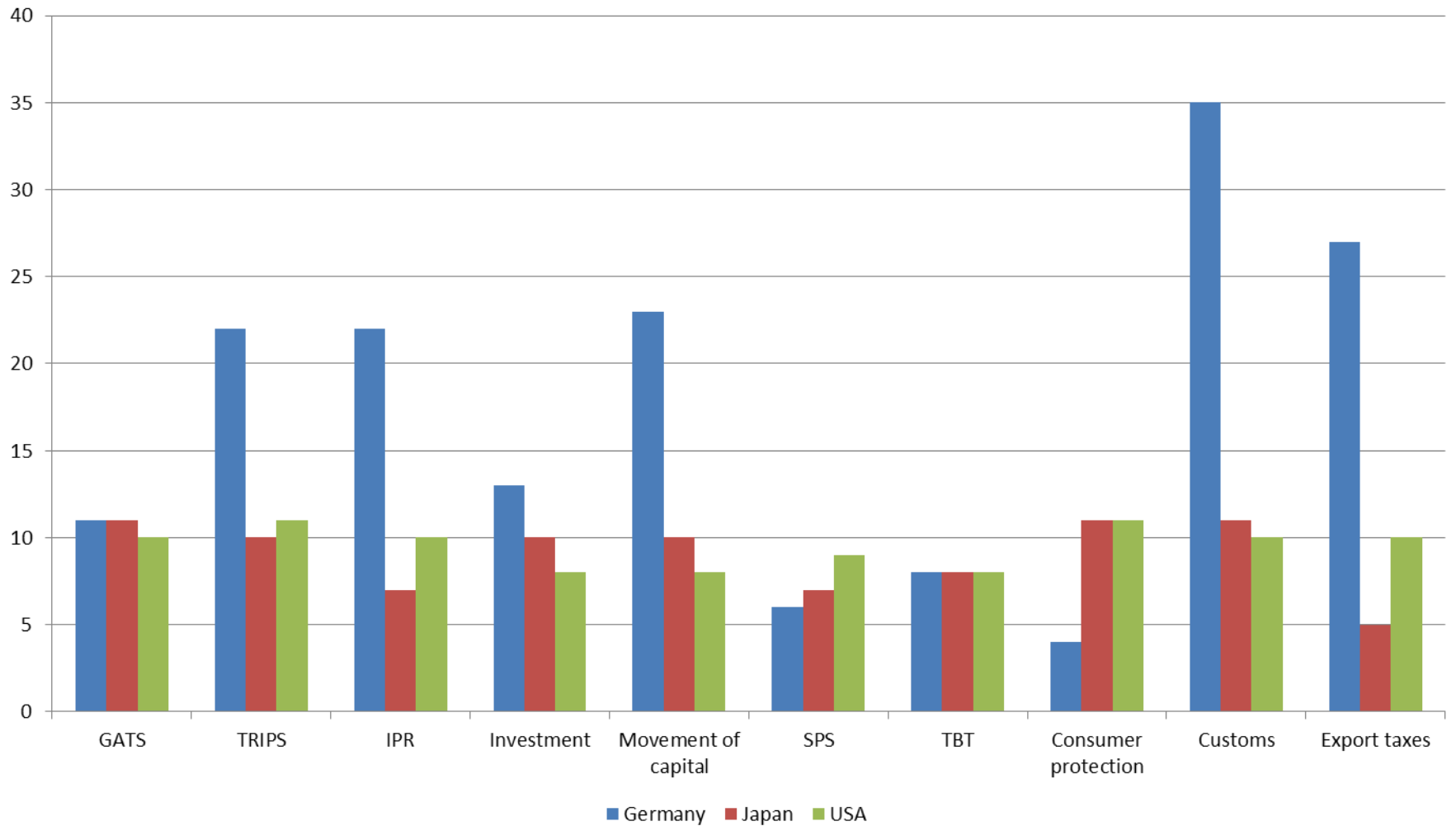
Side note: Property Rights versus Transaction Cost model

- Empirical analysis provides an indirect test of two competing theories of the boundaries of the firm

Depth and composition of PTAs

- We use WTO data on the content of PTAs
- To analyze the depth of PTAs, we construct three variables following Orefice and Rocha (2013):
 - Total count of enforceable provisions (*# Provisions*)
 - *Top 5* and *top 10* provisions with the highest degree of commonality across the agreements
- To analyze the composition of PTAs, we classify provisions into two groups:
 - **HQ-provisions:** GATS, TRIPS, IPR, investment, and movement of capital
 - **M-provisions:** SPS, TBT, consumer protection, customs, and export taxes

Number of agreements with specific provisions by country

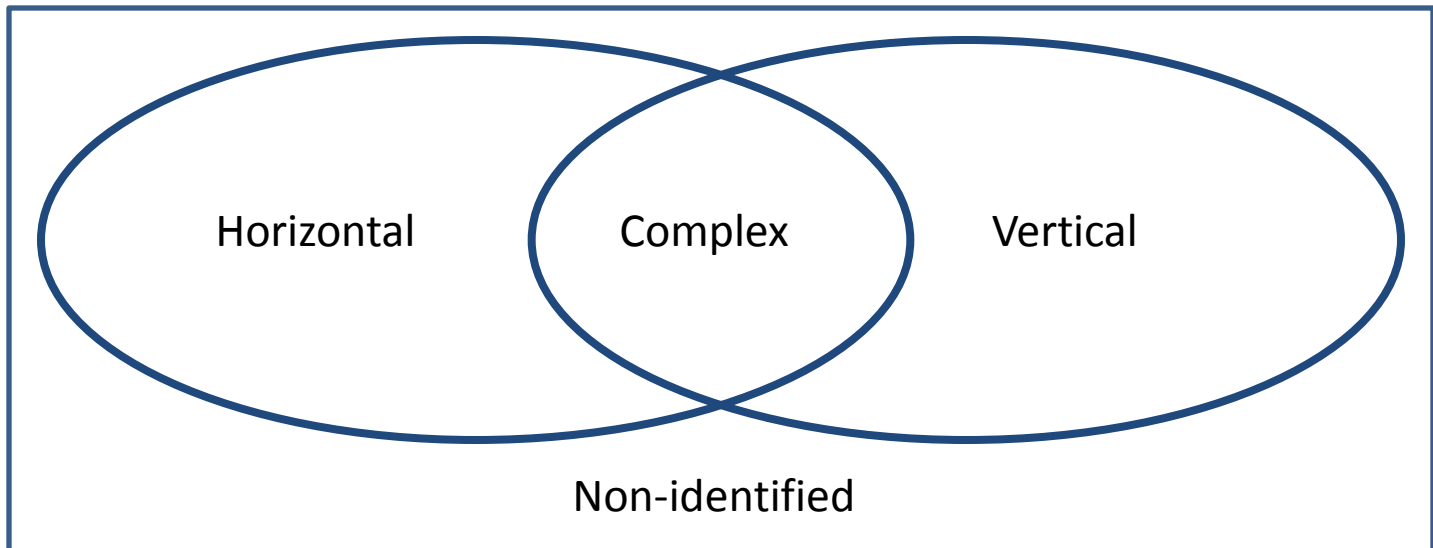


Measuring vertical FDI

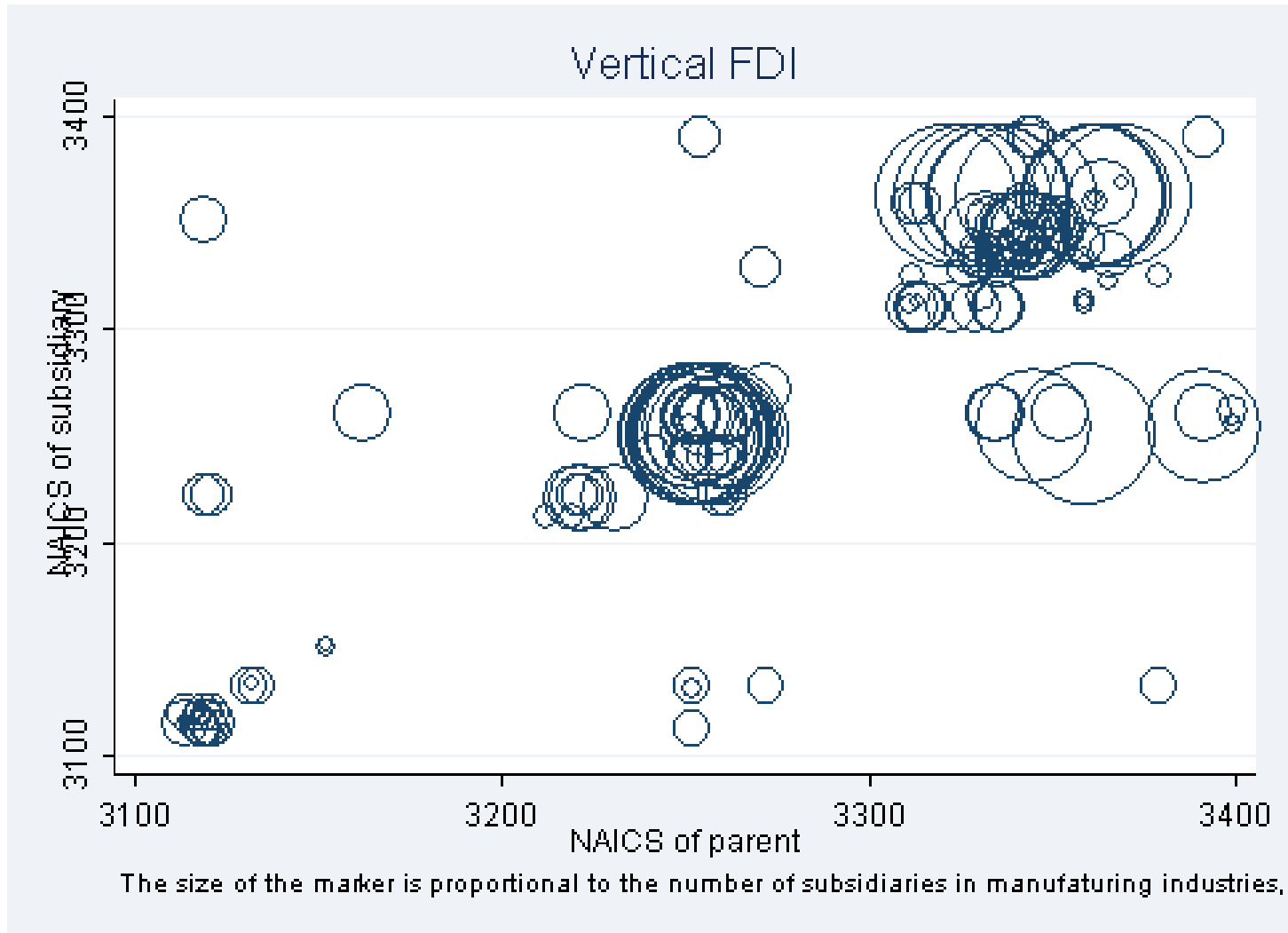
- FDI data has been constructed using the ORBIS database assembled by Bureau van Dijk
 - ORBIS includes location, ownership, detailed sector level, and operational data (e.g. revenues) for more than 100 million firms in Europe, Americas, and Asia-Pacific region
- We restrict our analysis to subsidiaries in any country owned by parent firms located in Germany, Japan, and USA in 2003, 2007, and 2011
 - We have the revenues of 125,212 subsidiaries
 - We can identify 42,984 ultimate owner parents

Measuring vertical FDI

- Following Alfaro and Charlton (2009), we can identify 4 types of connections:
 - Horizontal FDI: if activities in S and P are in the same industry
 - Vertical FDI: if activities in S are upstream from P according to US IO matrix
 - Complex FDI: if S and P satisfy both criteria
 - Non-identified: if none of the above is satisfied



Measuring vertical FDI



Depth of PTAs and vertical FDI

- Ideally, we would want information on intra-firm trade, but data are not available
- Quantification of vertical FDI
 - FDI_{ijkt} is the aggregate value of the revenues of subsidiaries in country (destination) j owned by parents operating in sector k , country i (US, Japan, or Germany) at time t
- Example:
 - Vertical FDI of the German car sector in any country is the sum of revenues of all German-owned subsidiaries that produce car inputs, such as plastic, seat-belts, glass.

Depth of PTAs and vertical FDI

$$FDI_{ijkt} = \alpha + \beta_1 DEPTH_{ijt} + \beta_2 INSTITUTIONS_{jt} + \gamma_1 X_{jt} + \gamma_2 X_{ij} + \delta_t + \delta_k + \delta_i + \delta_{it} \quad (1)$$

where k is sector, t is time, i and j are country indexes (i for the "origin" country and j for the "destination" country)

- $DEPTH_{ijt}$ is # *Provisions* and *Top 5* and *top 10* provisions
- X_{jt} are controls for characteristics of the destination country that vary over time (GDP and GDP per capita)
- X_{ij} are country-pair variables (distance, contiguity, common language, colonial relationship)
- $\delta_t, \delta_k, \delta_i, \delta_{it}$ are time, sector, country (origin), and country-time fixed effect

Depth of PTAs and vertical FDI

FDI and Deep Integration

VARIABLES	(1)	(2)	(3)	(4)
		FDI (log of revenues in 1000\$)		
PTA	0.527** (0.208)			
N. of Provisions		0.0169** (0.00736)		
log(Top 5)			0.543* (0.297)	
log(Top 10)				0.478** (0.218)
Dummy=1 if $\eta >$ average	0.802*** (0.284)	0.806*** (0.285)	0.804*** (0.284)	0.803*** (0.284)
Rule of Law	0.306** (0.126)	0.282** (0.123)	0.282** (0.124)	0.290** (0.125)
Observations	4,951	4,914	4,914	4,914
R-squared	0.249	0.246	0.245	0.246
Year FE	Yes	Yes	Yes	Yes
Industry-4dig FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Country-Year FE	Yes	Yes	Yes	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

All regressions control for distance, contiguity, colony relationship, common language, BIT, a dummy for China, GDP, GDP per capita, and remoteness of the country of the subsidiary.

Composition of PTAs and vertical FDI

$$\begin{aligned} \text{FDI}_{ijkt} = & \alpha + \beta_1 \mu^M_{ijt} + \beta_2 \mu^H_{ijt} + \beta_3 \text{DEPTH}_{ijt} + \beta_4 \text{INSTITUTIONS}_{jt} \\ & + \gamma_1 X_{jt} + \gamma_2 X_{ij} + \delta_t + \delta_k + \delta_i + \delta_{it} \end{aligned} \quad (2)$$

- We construct two variables for μ_h and μ_m :
 - *Dummy* $\mu_l = 1$, if there is at least one provision of the *l*-type in the PTA
 - *Discrete* $\mu_l = \begin{cases} 2 & \text{if all provisions of } l\text{-type in PTA} \\ 1 & \text{if at least one provision of } l\text{-type,} \\ 0 & \text{otherwise} \end{cases}$
- where $l = h, m$

Composition of PTAs and vertical FDI

FDI, different provisions, and depth

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	FDI (log of revenues in 1000\$)					
Dummy μ^H	0.678*		-0.665			
	(0.389)		(0.551)			
Dummy μ^M		0.968***	1.448***			
		(0.288)	(0.393)			
Discrete μ^H				0.269		0.133
				(0.221)		(0.233)
Discrete μ^M					0.569***	0.534***
					(0.172)	(0.182)
N. of Provisions	-0.00476	-0.0114	-0.00283	0.000308	0.000703	-0.00775
	(0.0155)	(0.0102)	(0.0155)	(0.0183)	(0.00747)	(0.0179)
Rule of Law	0.243**	0.267**	0.271**	0.237**	0.286**	0.287**
	(0.108)	(0.110)	(0.109)	(0.108)	(0.111)	(0.111)
Observations	7,108	7,108	7,108	7,108	7,108	7,108
R-squared	0.337	0.339	0.339	0.337	0.338	0.338
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Country-Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

All regressions control for distance, contiguity, colony relationship, common language, BIT, a dummy for China, GDP, GDP per capita, and remoteness of the country of the subsidiary.

Conclusion

- We use the AH model to guide our analysis of the relationship between deep PTAs and FDI
- We exploit two new datasets on content of PTAs and on vertical FDI
- Consistently with the theory, we find that:
 1. Depth of PTA is associated to an increase in FDI (this finding is not robust)
 2. PTA provisions that improve the contractibility of components relative to HQ activities are associated to more FDI (this supports PR over TC approach)
- Future work on direction of causality