

Institutions and Offshoring Decision

Marcella Nicolini

FEEM

FEEM Lunch Seminar
February, 4 2009

Motivation

- ▶ Huge literature suggests that institutions of the recipient country influence offshoring
- ▶ Contract theory suggests that institutional quality does not have the same impact on different sectors

⇒ Does institutional environment affect offshoring decision differentially across sectors?

Motivation

I test whether institutional quality affects production choices abroad differentially, depending on the sector

I show that institutions have a different impact according to the intended use of the shipped good (further manufacturing/resale)

I provide evidence using U.S. data on Direct Investment Abroad

Structure of the Presentation

1. Review of the Literature
2. Empirical Model
3. Data Description
4. Econometric Specification
5. Results
6. Conclusions

Related Literature

Literature on FDI and institutional quality of the receiving country:

- ▶ Corruption: Wheeler Mody (1992) JIE , Hines (1995), Smarzynska Wei (2000), Wei (2000) REStat
- ▶ Democracy: Rodrik (1996), Harms Ursprung (2002), Busse (2004)
- ▶ Political stability: Juh Singh (1996), Stevens (2000), Jensen (2003), Busse Hefeker (2005)
- ▶ Financial institutions: Hermes Lensink (2003), Durham (2004), Alfaro Chanda Kalemli-Ozcan Sayek (2004) JIE

Related Literature

Contract theory suggests that institutional quality does not have the same impact on different sectors:

Institutions matter differentially across sectors

- ▶ Empirical papers that refer to Rauch's classification (1999):
Ranjan Lee (2005), Linders de Groot Rietveld (2005),
Berkowitz Moenius Pistor (2006) REStat
- ▶ Institutional quality is a source of comparative advantage in the production of complex goods: Costinot (2004), Levchenko (2007) RES, Nunn (2007) QJE, Acemoglu Antràs Helpman (2007) AER

Related Literature

Contracts shape the boundaries of the firm:

- ▶ Hold-up problem shapes the boundaries of the firm: McLaren (2000) AER, Grossman Helpman (2002) QJE, (2003) JEEA, (2005) RES, Ottaviano Turrini (2003), Ornelas Turner (2005)
- ▶ Hold-up problem also within firm boundaries: Antràs (2003) QJE, Antràs Helpman (2004) JPE, Antràs Helpman (2006), Naghavi Ottaviano (2007)
- ▶ Empirical works on outsourcing: Bernard Jensen Schott (2005), Feenstra Hanson (2005) QJE, Swenson (2005) JIE, Nunn Trefler (2007)

The Empirical Model

Institutional quality at country and industry level could affect:

- ▶ outsourcing abroad (offshoring outside firm boundaries)

⇒ *Data are not available*

- ▶ offshoring of production (hold-up also within firm boundaries, see Grossman-Hart-Moore)

⇒ *Data on multinationals*

The Empirical Model

The offshoring decision is explained by:

- ▶ Standard determinants of FDI (vertical and/or horizontal)
- ▶ Institutional quality **at country and industry level**

I estimate the following equation:

$$flow_{ict} = \alpha + inst_{ict} + hor_{ict} + ver_{ict} + \varepsilon_{ict}$$

flow = intrafirm trade between parent company and foreign affiliate

i = 1...6 = sector

c = 1...62 = country

t = 1994, 1999 = year

The Data - Dependent Variable

Measures of offshoring:

Intra-firm trade data from U.S. Direct Investment Abroad,
Benchmark Surveys for 1994 and 1999, BEA

I have several measures:

- Total intra-firm trade flows between U.S. parent and foreign affiliates

It can be decomposed into:

- Trade flows to U.S. parent company
- Trade flows to foreign affiliates

I can further discriminate between:

- Goods shipped to foreign affiliates for further manufacturing
- Goods shipped to foreign affiliates for resale

The Data - Horizontal FDI

I control for determinants of horizontal FDI:

- ▶ market size: WDI
- ▶ tariffs and NTBs: CEPII
- ▶ freight and insurance costs: Feenstra World Trade Flows
- ▶ plant and corporate scale: U.S. Census Bureau

+ control for marginal corporate tax rate: WDI

The Data - Vertical FDI

I control for determinants of vertical FDI

Low cost of production are captured by comparative advantages
(Yeaple 2003 REStat)

Interaction between:

- ▶ Country factor endowments: Hall Jones (1999)
- ▶ Industry factor intensities: NBER productivity dataset

The Data - Institutional Quality

Institutional quality gives a comparative advantage in more contract-dependent sectors

Institutions-driven comparative advantage is given by the interaction between:

- ▶ Institutional quality at country level
- ▶ Institutional intensity at industry level

The Data - Institutional Quality

Institutional quality at country level:
Kaufmann et al., World Bank:

- ▶ Voice and Accountability
- ▶ Political Stability and Violence
- ▶ Government Effectiveness
- ▶ Regulatory Burden
- ▶ Rule of Law
- ▶ Control of Corruption

The Data - Institutional Quality

Institutional quality at industry level:

- ▶ Nunn's (2007) measure of contract intensity

$$inst_i^{nr} = \sum_j \theta_{ij} \left(R_j^{neither} + R_j^{ref. \text{ priced}} \right)$$

θ_{ij} = value of input j in industry i / total value of all inputs used in industry i

$R_j^{neither}$ = proportion of input j not sold on an organized exchange, nor reference priced

$R_j^{ref. \text{ priced}}$ = proportion of input j reference priced.

Classification of goods by Rauch (1999)

- ▶ Herfindahl Index: measure of concentration in intermediate input use (Levchenko, 2007)

The Choice of Estimation Technique

My dependent variable is integer and presents only positive values

Shapiro-Francia test rejects normality

⇒ I consider the family of Poisson Regression Models:

- ▶ Poisson
- ▶ Zero-Inflated Poisson
- ▶ Negative Binomial
- ▶ Zero-Inflated Negative Binomial

The Choice of Estimation Technique

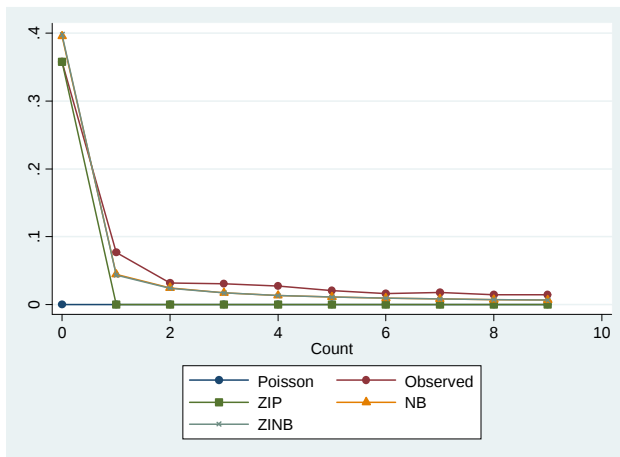
Descriptive statistics

Variable	Nobs	Mean	Std. Dev.	Min	Max
Total intrafirm trade	655	563.52	4239.36	0	81829
Trade to U.S. parents	576	313.35	2378.82	0	44697
Trade to foreign affiliates	589	320.23	2151.56	0	37132
Further manufacturing	590	284.55	1870.35	0	35059
Resale	630	17.76	322.88	0	7990

mean < variance

⇒ Overdispersion

The Choice of Estimation Technique



Observed and predicted distributions

The Choice of Estimation Technique

Comparison of alternative estimators

Dep Var: Total intrafirm flows

	Poisson	ZIP	NB	ZINB	OLS
inst _i *inst _c	6.90*** (.011)	6.79*** (.011)	7.76*** (.919)	7.92*** (.927)	6.43*** (.848)
constant	4.62*** (.004)	5.08*** (.004)	4.42*** (.195)	4.40*** (.194)	2.55*** (.191)
<i>Inflated</i>					
inst _i *inst _c		-.347 (.595)		128.32 (92.85)	
constant		-.526*** (.131)		-69.04 (49.78)	
Log Likelihood	-846292	-692923	-2801	-2798	
BIC	1688567	1381841	1590	1598	
AIC	2703	2213	8.96	8.96	
Specification Tests	1690356 0.000	5.75 0.000	1.7e+06 0.000	0.70 0.242	
Adjusted R ²					0.12
BP Test					7.95 (0.004)
SF Test					6.21 (0.000)

Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

The Results: Total intra firm trade flows

Dep. Var: Total intra-firm flows						
	(1)	(2)	(3)	(4)	(5)	(6)
inst _t *inst _t	7.093*** (2.28)	4.552* (2.35)	7.413*** (2.54)	8.348*** (2.69)	9.048*** (2.58)	6.368** (3.08)
inst _c	0.376 (0.74)	-0.0393 (0.80)	0.0890 (0.91)	0.377 (1.08)	-0.604 (1.08)	-0.363 (1.27)
inst _i	-1.176 (1.44)	-0.142 (1.66)	4.427** (1.82)	-4.753** (2.30)	-3.192 (2.29)	3.693 (3.95)
sales	1.722*** (0.25)	1.832*** (0.48)	-0.251 (0.48)	2.034*** (0.32)	0.510 (0.42)	1.616** (0.67)
market size	1.143*** (0.086)	0.928*** (0.13)	1.118*** (0.099)	1.184*** (0.087)	1.201*** (0.096)	1.020*** (0.13)
tariff		-0.0114** (0.0049)				-0.0167*** (0.0057)
corp. scale		0.0295* (0.016)				0.0537* (0.031)
plant scale		-0.0382*** (0.0088)				-0.0620** (0.029)
freight		-21.19*** (3.69)				-23.16*** (3.78)
corp. tax rate		0.0136 (0.020)				0.0154 (0.020)
NTB		0.953 (0.61)				0.901 (0.73)
capital _i *capital _c			-2.457 (1.54)		-5.782*** (1.69)	-8.592*** (2.11)
capital _c			1.969* (1.10)		4.363*** (1.18)	6.277*** (1.46)
capital _i			38.33** (16.4)		74.56*** (17.9)	86.63*** (22.7)
skill _i *skill _c				-53.83** (25.6)	-82.08*** (29.1)	-106.7*** (30.6)
skill _c				3.567 (2.81)	6.481** (3.05)	8.742** (3.42)
skill _i				57.74** (23.2)	109.0*** (25.9)	30.41 (47.3)
constant	-47.03*** (3.83)	-40.67*** (6.69)	-52.70*** (12.1)	-55.51*** (5.11)	-97.58*** (14.7)	-106.4*** (17.9)
LR test H ₀ :α=0	1.4e+06 (0.000)	4.9e+05 (0.000)	1.3e+06 (0.000)	1.3e+06 (0.000)	1.3e+06 (0.000)	4.7e+05 (0.000)
Observations	603	425	585	585	585	425
Log likelihood	-2641	-2031	-2613	-2615	-2597	-2012

Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

The Results: Intrafirm trade to U.S. parents

Dep. Var.: Intra-firm trade to U.S. parents						
	(1)	(2)	(3)	(4)	(5)	(6)
inst _t *inst _c	3.506 (3.31)	1.347 (3.39)	5.252 (4.12)	1.412 (4.05)	4.347 (4.28)	-0.00853 (4.48)
inst _c	2.603** (1.10)	0.919 (1.19)	2.038 (1.55)	4.518*** (1.72)	3.571* (2.03)	3.752* (2.14)
inst _t	1.903 (2.08)	0.322 (2.41)	5.925** (2.59)	0.857 (3.39)	0.603 (3.35)	14.92** (6.54)
sales	1.665*** (0.35)	3.119*** (0.82)	-0.114 (0.73)	1.996*** (0.46)	0.624 (0.63)	1.909** (0.97)
market size	1.060*** (0.12)	0.816*** (0.21)	1.044*** (0.16)	1.147*** (0.13)	1.208*** (0.17)	1.169*** (0.20)
tariff		-0.0214 (0.020)				-0.0859*** (0.027)
corp. scale		-0.0233 (0.028)				-0.00223 (0.053)
plant scale		-0.0129 (0.016)				-0.0573 (0.042)
freight		-38.85*** (8.39)				-45.14*** (9.05)
corp. tax rate		0.000650 (0.040)				0.0427 (0.034)
NTB		-2.017** (0.95)				-0.938 (1.05)
capital _t *capital _c			-1.615 (2.38)		-5.353** (2.56)	-13.31*** (3.38)
capital _c			1.254 (1.74)		3.726** (1.86)	8.558*** (2.40)
capital _t			28.45 (25.1)		68.79** (27.3)	140.2*** (34.8)
skill _t *skill _c				-31.61 (34.0)	-63.77 (40.8)	-185.9*** (45.9)
skill _c				-0.192 (3.85)	3.080 (4.44)	15.08*** (5.17)
skill _t				32.51 (30.7)	83.94** (36.4)	27.47 (66.5)
constant	-46.48*** (5.29)	-52.24*** (11.3)	-46.16** (18.3)	-53.99*** (7.02)	-91.40*** (21.7)	-141.9*** (28.0)
LR test H ₀ :α=0	7.3e+05 (0.000)	2.6e+05 (0.000)	7.1e+05 (0.000)	6.9e+05 (0.000)	6.7e+05 (0.000)	2.4e+05 (0.000)
Observations	526	365	509	509	509	365
Log likelihood	-1683	-1296	-1672	-1668	-1662	-1272

Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

The Results: Intrafirm Trade to Foreign Affiliates

Dep. Var.: Intra-firm trade to foreign affiliates

	(1)	(2)	(3)	(4)	(5)	(6)
inst _t *inst _c	7.029*** (2.11)	4.255** (2.14)	6.224*** (2.24)	9.105*** (2.50)	8.680*** (2.31)	6.319** (2.94)
inst _c	-0.465 (0.70)	-0.0639 (0.74)	-0.480 (0.81)	-0.960 (0.95)	-1.746* (0.91)	-1.382 (1.19)
inst _t	-2.112 (1.34)	-0.474 (1.54)	4.413*** (1.67)	-5.359** (2.21)	-2.885 (2.19)	2.966 (3.70)
sales	1.635*** (0.24)	1.065** (0.43)	-0.374 (0.41)	1.858*** (0.30)	0.260 (0.39)	0.958 (0.64)
market size	1.210*** (0.079)	1.028*** (0.11)	1.231*** (0.089)	1.221*** (0.083)	1.264*** (0.088)	1.076*** (0.12)
tariff		-0.0108** (0.0048)				-0.0126** (0.0058)
corp. scale		0.0510*** (0.014)				0.0532* (0.029)
plant scale		-0.0360*** (0.0078)				-0.0510* (0.027)
freight		-18.88*** (3.47)				-18.07*** (3.60)
corp. tax rate		0.00447 (0.018)				-0.00993 (0.019)
NTB		1.775*** (0.60)				1.321* (0.69)
capital _t *capital _c			-3.476** (1.42)		-5.693*** (1.57)	-6.109*** (1.81)
capital _c			2.705*** (1.00)		4.379*** (1.09)	4.778*** (1.28)
capital _t			49.66*** (15.1)		74.45*** (16.6)	62.91*** (20.0)
skill _t *skill _c				-43.59* (25.3)	-69.21** (27.8)	-74.70*** (28.9)
skill _c				3.632 (2.69)	6.431** (2.83)	6.896** (3.12)
skill _t				47.93** (23.4)	99.19*** (25.0)	20.59 (44.8)
constant	-47.46*** (3.64)	-34.90*** (5.73)	-62.29*** (11.1)	-53.84*** (5.07)	-96.69*** (13.8)	-85.36*** (15.7)
LR test H ₀ : α=0	6.0e+05 (0.000)	2.3e+05 (0.000)	5.8e+05 (0.000)	5.7e+05 (0.000)	5.5e+05 (0.000)	2.2e+05 (0.000)
Observations	541	381	524	524	524	381
Log likelihood	-2315	-1788	-2281	-2295	-2271	-1778

Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

The Results: Goods for further manufacturing

Dep. Var.: Goods for further manufacturing

	(1)	(2)	(3)	(4)	(5)	(6)
inst _t *inst _c	7.221*** (2.15)	5.830** (2.28)	6.533*** (2.27)	9.224*** (2.49)	8.892*** (2.29)	8.708*** (3.00)
inst _c	-0.620 (0.72)	-0.884 (0.80)	-0.630 (0.83)	-1.105 (0.95)	-1.949** (0.90)	-2.203* (1.23)
inst _t	-2.147 (1.37)	-1.167 (1.63)	3.939** (1.69)	-5.982*** (2.22)	-3.910* (2.19)	-0.517 (3.78)
sales	1.627*** (0.24)	0.943** (0.43)	-0.257 (0.41)	1.912*** (0.30)	0.432 (0.39)	0.867 (0.64)
market size	1.179*** (0.079)	0.999*** (0.12)	1.207*** (0.091)	1.196*** (0.083)	1.246*** (0.090)	1.024*** (0.12)
tariff		-0.0123** (0.0050)				-0.0132** (0.0061)
corp. scale		0.0511*** (0.014)				0.0531* (0.029)
plant scale		-0.0353*** (0.0078)				-0.0420 (0.028)
freight		-18.17*** (3.49)				-17.04*** (3.69)
corp. tax rate		0.00870 (0.018)				0.00108 (0.020)
NTB		1.357** (0.61)				0.925 (0.69)
capital _t *capital _c			-3.459** (1.43)		-5.784*** (1.57)	-4.218** (1.77)
capital _c			2.658*** (1.00)		4.425*** (1.09)	3.365*** (1.25)
capital _t			48.74*** (15.2)		74.91*** (16.7)	43.54** (20.3)
skill _t *skill _c				-45.41* (25.7)	-70.01** (28.3)	-70.85** (29.0)
skill _c				3.704 (2.73)	6.426** (2.88)	6.299** (3.11)
skill _t				53.78** (23.7)	104.8*** (25.2)	34.57 (46.3)
constant	-46.57*** (3.65)	-32.44*** (5.68)	-62.03*** (11.2)	-54.18*** (5.08)	-98.66*** (13.8)	-69.32*** (15.7)
LR test H ₀ :α=0	5.3e+05 (0.000)	2.0e+05 (0.000)	5.2e+05 (0.000)	5.0e+05 (0.000)	4.9e+05 (0.000)	2.0e+05 (0.000)
Observations	542	385	526	526	526	385
Log likelihood	-2275	-1770	-2245	-2255	-2233	-1763

Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

The Results: Goods for resale

Dep. Var.: Goods for resale

	(1)	(2)	(3)	(4)	(5)	(6)
inst _t *inst _c	19.47*** (6.90)	5.279 (6.74)	28.04*** (9.05)	20.25 (12.6)	14.57 (11.5)	-12.09 (12.7)
inst _c	-1.675 (2.82)	1.958 (2.43)	-6.441 (4.21)	-7.504* (4.17)	-6.054 (4.24)	5.103 (4.92)
inst _t	-17.71*** (5.50)	-6.250 (5.37)	-9.005 (8.13)	-11.56 (10.1)	4.107 (10.2)	12.47 (14.0)
sales	3.715*** (1.04)	-1.148 (1.43)	-0.758 (1.22)	2.137 (1.50)	-1.876 (1.38)	-1.447 (2.20)
market size	2.658*** (0.50)	2.576*** (0.51)	2.398*** (0.44)	2.578*** (0.46)	2.490*** (0.44)	2.913*** (0.59)
tariff		-0.0183 (0.042)				-0.0431 (0.047)
corp. scale		0.183*** (0.037)				0.199* (0.10)
plant scale		-0.0344 (0.030)				-0.0630 (0.096)
freight		-10.50 (15.3)				-8.581 (15.7)
corp. tax rate		0.0669 (0.055)				0.0521 (0.062)
NTB		0.666 (2.10)				0.211 (2.18)
capital _t *capital _c			3.505 (5.15)		5.378 (5.92)	4.230 (5.82)
capital _c			-1.485 (3.91)		-3.536 (4.54)	-3.719 (4.47)
capital _t			-8.325 (56.4)		-22.65 (63.8)	-48.76 (66.1)
skill _t *skill _c				-66.78 (117)	121.7 (117)	210.4** (101)
skill _c				13.09 (11.1)	-4.708 (10.9)	-16.10 (10.00)
skill _t				-1.395 (105)	-117.9 (98.2)	-243.2 (164)
constant	-113.3*** (17.5)	-59.77*** (20.5)	-56.65 (46.8)	-95.21*** (23.6)	-23.50 (55.4)	-5.554 (50.0)
LR test H ₀ : α=0	7.2e+04 (0.000)	9380.19 (0.000)	6.6e+04 (0.000)	3.5e+04 (0.000)	1.6e+04 (0.000)	5427.01 (0.000)
Observations	577	396	559	559	559	396
Log likelihood	-299.1	-254.2	-290.5	-296.0	-287.4	-251.1

Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

The Results: Marginal effects for the institutional term

	(1)	(2)	(3)	(4)	(5)	(6)
Trade to foreign af.	466.27*** (147.02)	335.69* (173.27)	384.69*** (143.34)	642.14*** (186.97)	489.71*** (138.58)	444.05** (211.55)
Further manif.	446.43*** (139.86)	419.55** (171.04)	376.8*** (136.6)	598.36*** (171.77)	459.87*** (127.01)	571.67*** (208.69)
Resale	1.688 (1.085)	0.450 (0.623)	1.533 (1.075)	1.960 (1.636)	0.623 (0.713)	-0.733 0.688

Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

Robustness

I consider panel estimates in order to exploit the time-varying dimension of the dataset

country or sector effects

estimator: Panel Negative Binomial

Robustness

Panel Estimates: Fixed vs Random Effects

	Intrafirm trade to foreign affiliates		Goods for further manufacturing		Goods for resale	
$inst_i * inst_c$	3.775*** (0.99)	3.777*** (0.99)	3.706*** (0.99)	3.739*** (0.99)	3.571 (3.72)	2.963 (3.64)
$inst_i$	-3.332*** (0.71)	-3.299*** (0.71)	-3.216*** (0.71)	-3.210*** (0.71)	-5.830** (2.85)	-5.348* (2.75)
$inst_c$	-0.739** (0.36)	-0.670* (0.35)	-0.855** (0.37)	-0.786** (0.36)	0.852 (1.49)	-0.252 (1.09)
sales	0.349*** (0.10)	0.349*** (0.10)	0.373*** (0.10)	0.371*** (0.10)	0.891** (0.35)	0.874** (0.35)
market size	0.281*** (0.053)	0.323*** (0.051)	0.300*** (0.053)	0.338*** (0.050)	0.320 (0.31)	0.785*** (0.16)
constant	-11.87*** (1.88)	-13.02*** (1.82)	-12.64*** (1.86)	-13.68*** (1.81)	-22.33** (9.09)	-33.90*** (5.97)
Log likelihood	-1790	-2205	-1761	-2171	-160.3	-288.2
Estimation	FE	RE	FE	RE	FE	RE

Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%;

Estimates with country effects

Panel Estimates with Country Fixed Effects

	Total intra-firm flows	Intra-firm trade to U.S. parents	Intra-firm trade to foreign affiliates	Goods for further manufacturing	Goods for resale
$inst_i * inst_c$	4.101*** (0.98)	2.108 (1.42)	3.775*** (0.99)	3.706*** (0.99)	3.571 (3.72)
$inst_i$	-3.276*** (0.71)	-1.096 (1.04)	-3.332*** (0.71)	-3.216*** (0.71)	-5.830** (2.85)
$inst_c$	-0.761** (0.35)	0.500 (0.53)	-0.739** (0.36)	-0.855** (0.37)	0.852 (1.49)
sales	0.337*** (0.100)	0.335*** (0.13)	0.349*** (0.10)	0.373*** (0.10)	0.891** (0.35)
market size	0.288*** (0.051)	0.371*** (0.062)	0.281*** (0.053)	0.300*** (0.053)	0.320 (0.31)
constant	-12.14*** (1.79)	-15.75*** (2.27)	-11.87*** (1.88)	-12.64*** (1.86)	-22.33** (9.09)
Observations	586	395	525	527	230
Log likelihood	-2067	-1209	-1791	-1761	-160.3

Panel estimates with country fixed effects. Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

Panel Estimates with Sector Fixed Effects

	Total intra-firm flows	Intra-firm trade to U.S. parents	Intra-firm trade to foreign affiliates	Goods for further manufacturing	Goods for resale
$inst_i * inst_c$	3.032*** (1.08)	1.686 (1.51)	2.778** (1.11)	2.929*** (1.10)	1.267 (4.16)
$inst_i$	-4.002*** (0.78)	-2.154* (1.10)	-4.111*** (0.80)	-4.210*** (0.80)	-5.963* (3.17)
$inst_c$	-0.254 (0.34)	0.816 (0.52)	-0.224 (0.34)	-0.403 (0.35)	0.741 (1.10)
sales	-0.0303 (0.12)	0.0392 (0.15)	-0.0834 (0.12)	-0.0425 (0.12)	-0.442 (0.46)
market size	0.500*** (0.037)	0.547*** (0.045)	0.525*** (0.037)	0.527*** (0.037)	0.766*** (0.11)
constant	-13.61*** (1.67)	-17.28*** (2.13)	-13.37*** (1.74)	-13.80*** (1.75)	-17.45*** (6.51)
Observations	603	526	541	542	577
Log likelihood	-2538	-1569	-2217	-2176	-243.7

Panel estimates with sector fixed effects. Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

Sensitivity

Results with Herfindahl Index

	Total intra-firm flows	Intra-firm trade to U.S. parents	Intra-firm trade to foreign affiliates	Goods for further manufacturing	Goods for resale
$inst_i * inst_c$	1.990* (1.03)	0.597 (1.47)	2.282** (1.03)	2.155** (1.04)	-0.867 (6.23)
$inst_i$	-0.434 (0.73)	0.951 (1.06)	-0.842 (0.70)	-0.789 (0.71)	2.497 (4.98)
$inst_c$	1.531** (0.65)	3.414*** (0.98)	0.571 (0.62)	0.562 (0.62)	3.777 (3.30)
sales	2.320*** (0.24)	2.551*** (0.34)	2.059*** (0.22)	2.047*** (0.22)	3.200*** (1.06)
market size	1.139*** (0.083)	1.161*** (0.12)	1.197*** (0.078)	1.158*** (0.078)	2.426*** (0.43)
constant	-54.47*** (3.79)	-59.93*** (5.45)	-52.61*** (3.53)	-51.52*** (3.57)	-106.6*** (15.5)
LR test $H_0: \alpha=0$	1.4e+06 (0.000)	7.5e+05 (0.000)	6.2e+05 (0.000)	5.4e+05 (0.000)	7.0e+04 (0.000)
Observations	603	526	541	542	577
Log likelihood	-2650	-1688	-2321	-2282	-303.1

Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

Conclusions

- ▶ Institutions do matter in offshoring decision
- ▶ Impact is different across sectors: institutions are more important in the production of more complex goods
- ▶ Empirical evidence using different measures of intra firm trade
- ▶ Institutional quality does not impact when considering final goods

Conclusions

Results are robust using:

- ▶ different measures of intra-firm trade
- ▶ different control variables
- ▶ different specifications (pooled/panel)
- ▶ different measures of institutional quality at country and industry level