

# Vertical Linkages with Foreign Firms and Local Participation in GVCs: Evidence from Vietnam

Dea Tusha <sup>1</sup>    Jacob A. Jordaan <sup>1</sup>    Adnan Seric <sup>2</sup>

<sup>1</sup>Utrecht University

<sup>2</sup>UNIDO

10th FIW Research Conference

9-10 November, 2017

# Motivation

- International production increasingly organized within Global Value Chains
    - In 1995-2008 GVC trade 60-67% of total global trade in value added terms (World Bank, 2017).
  - Developing countries participate in upstream stages of production, as suppliers of intermediate goods.
  - Many ways to participate in and define GVCs (trade, FDI).
  - What does this mean for local suppliers in developing countries?
    - Do they develop different types of linkages with foreign firms?
    - What firm characteristics are important to generate qualitative linkages?
    - (How) do these linkages translate to performance indicators of local suppliers?
- Unique survey data from Vietnam to investigate these questions.

# Literature

- **Effect of foreign firms on local firms' productivity**
  - Intra- and interindustry knowledge spillovers from foreign to local firms at industry level (Javorcik, 2004; Blalock and Gertler, 2008).
  - In theory, firm and linkage heterogeneity important (Melitz, 2003; Rodriguez-Clare, 1996).
    - Empirically, some studies look into firm characteristics that affect spillovers (Damijan et al, 2013).
    - FDI enters productivity determinants, implicit assumption: all firms in an industry are similarly affected by spillovers, regardless of degree of linkages.
  - Due to data limitations, heterogeneity at the level of linkages not explored in depth.
    - How much do foreign firms source locally?
    - What characteristics matter for knowledge transfer?
  - More disaggregated approach necessary (Giroud et al, 2012).

# Literature

## ● Effect of linkages with foreign firms

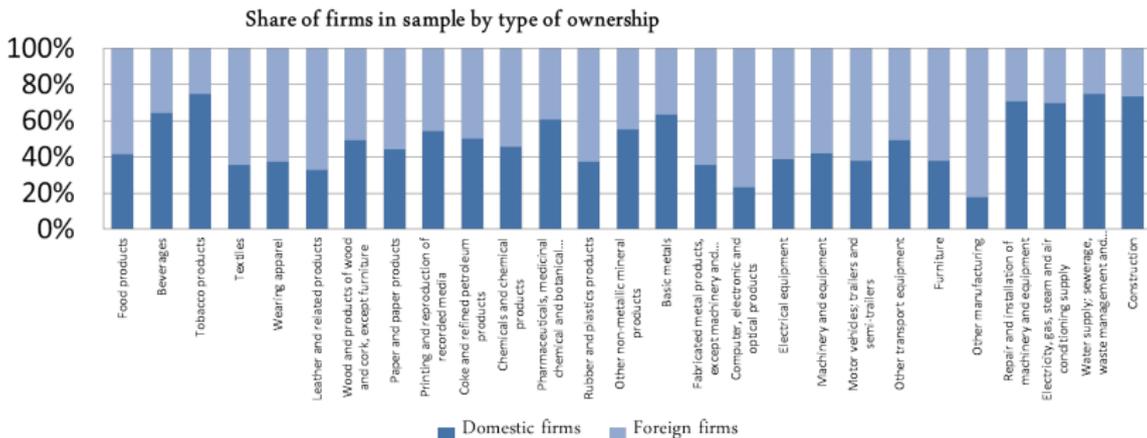
- Distinguishing between quantity and quality of linkages with FDI (Giroud and Scott-Kennel, 2009; Amendolagine, 2013).
  - Focus on specific sectors.
  - Only from perspective of foreign firms.
  - No analysis of effect of linkages on local firm productivity.
- Newman et al, (2017) study effect of transfers/spillovers on productivity of domestic firms.
- Learning by exporting/ GVC literature points out productivity gains from foreign buyers abroad (De Loecker, 2013; Pietrobelli and Saliola, 2008; Pietrobelli and Rabellotti, 2006)

### Contribution

Investigate firm and linkage characteristics that affect local participation in GVCs by focusing on *quantity* and *quality* of linkages with foreign firms **in** Vietnam and **abroad**.

# Data

- Data source: Vietnam Industry Investor Survey (VIIS 2010, UNIDO)
- 1493 observations (1426 in manufacturing), 26 sectors - 2 digit ISIC (23 manufacturing), 9 provinces
- Information on ownership, inputs, output, employment, institutional & business setting.
  - Focus on foreign firms (foreign if  $>10\%$  foreign equity;  $>50\%$  of firms in sample)



# Methodology

- Do foreign firms in and outside Vietnam create different linkages from domestic firms with their local suppliers? Do they provide more/less support?

*PSM analysis to control for probability of being foreign/have foreign buyers.*

- What firm characteristics determine the level and type of support received by foreign and domestic firms?

*OLS and Tobit analysis*

- How do the quantity and quality of linkages with foreign firms in and outside Vietnam affect the productivity of local firms?

*OLS and IV analysis*

# Measuring support to local suppliers

- Determinants of support:
  - Buyer characteristics: ownership (Jordaan, 2011a); productivity, size (Javorcik, 2004)
  - Supplier characteristics: Technology gap (Jordaan, 2011b); Proximity to buyers (Sanfilippo and Seric, 2016); Absorptive capacity (Saliola and Zanfei, 2009); GVC participation (citation here)

## Support measure

$$Total\ support_i = \sum_{j=1}^{18} support_{ij}$$

$$Support_{ij} = \begin{cases} 1, & \text{if firm } i \text{ received support type } j \\ & \text{from at least one type of buyer.} \\ 0, & \text{otherwise.} \end{cases}$$

# Productivity analysis

- Effect of linkages with foreign firms on productivity of domestic firms.
  - Endogeneity issue: reverse causality, selection bias.
  - IV analysis
    - Industry level backward FDI as instrument for linkages with foreign firms in Vietnam (Javorcik and Spatareanu, 2009).
    - Industry level share of exports and GVC participation variables (Fally, 2012).

## Estimation specification

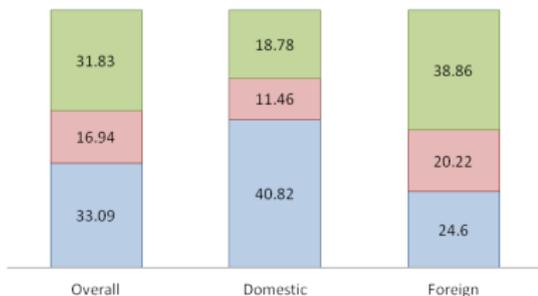
$$\log(TFP_{ik}) = \beta_0 + \beta_1 \log(buyers_i) + \beta_2 foreignbuyershare_i + \beta_3 totalsupport_i + \beta_i X + \alpha_k + \varepsilon_i$$

Cobb-Douglas production function :  $Y = AL^\alpha K^\beta M^\gamma E^\delta$

# Finding 1: Dichotomy between foreign and domestic firms

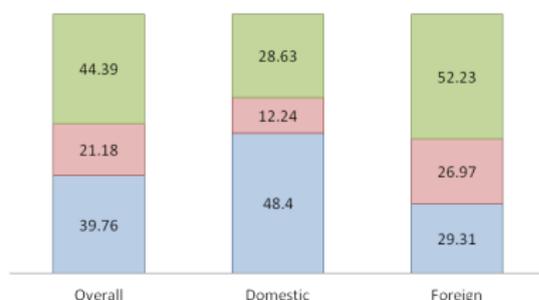
- Foreign (domestic) buyer firms buy larger share of inputs from other foreign (domestic) supplier firms.
- Foreign (domestic) supplier firms sell larger share of output to other foreign (domestic) buyer firms.

**Extent of upstream vertical linkages by ownership type**



- Percentage of inputs provided by domestic suppliers
- Percentage of inputs provided by foreign suppliers in Vietnam
- Percentage of inputs provided by foreign suppliers outside Vietnam

**Extent of downstream vertical linkages by ownership type**



- Percentage of sales sold to long-term domestic buyers
- Percentage of sales sold to long-term foreign buyers in Vietnam
- Percentage of sales sold to long-term foreign buyers outside Vietnam

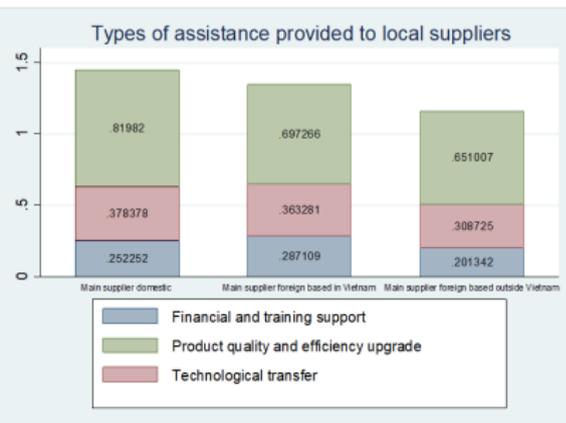
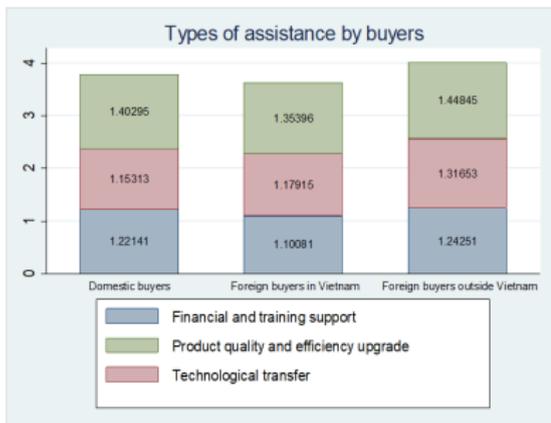
# Finding 1: Dichotomy between foreign and domestic firms

This pattern persists when controlling for probability that buyers and suppliers are foreign.

Treatment variable	Foreign local suppliers	Foreign local buyers	Foreign local buyers
Outcome variable	No. of foreign buyers in Vietnam	No. of local suppliers in Vietnam	Share of inputs by dom. suppliers
No. observations	607	965	659
Off common support	55	56	50
Unmatched difference	10.46	-3.4948	-15.5812
ATE	6.6172 **	-20.982**	-13.0366***
S.E.	2.5835	10.5753	3.0602
Z-value	2.56	-1.98	-4.26
P-value	0.01	0.047	0
Matching algorithm	Kernel matching	Kernel matching	Kernel matching
Propensity score Probit regression explanatory variables			
Age	-.0588***	-.0602***	-.0542***
Size Medium	-0.2236	-0.1592	-0.1169
Size Large	-0.1372	-0.075	-0.0982
Exporter	.755***	.8203***	.665***
Log(capital)	.2013***	.1652 ***	.1988***
TFP	.2203**	.228***	.1633*
GVC	.5911***	.6055***	0.7745

# Finding 1: Dichotomy between foreign and domestic firms

- Foreign (domestic) buyer firms report providing more support to other foreign (domestic) supplier firms.
- Foreign (domestic) supplier firms report receiving more support from other foreign (domestic) firms.



# Finding 1: Dichotomy between foreign and domestic firms

This pattern persists when controlling for probability that buyers are foreign and suppliers sell to foreign firms.

Treatment variable	At least one foreign buyer in Vietnam	At least one foreign buyer overall	More foreign than domestic buyers	More foreign buyers overall	Being a foreign buyer
Outcome variable	Support by the buyers	Support by the buyers	Support by the buyers	Support by the buyers	Support to suppliers
No. observations	1140	1278	1112	1112	1034
Off common support	0	144	3	3	11
Unmatched difference	0.5117	1.2543	-0.1112	0.2271	-0.1261
ATE	0.4579	.8027**	0.2255	.4478***	-0.1527
S.E.	1.2158	0.3746	0.1859	0.154	0.126
Z-value	0.38	2.14	1.21	2.91	-1.21
P-value	0.706	0.032	0.225	0.004	0.226
Matching algorithm	Nearest Neighbour (1)	Nearest neighbour(2)	Kernel matching	Kernel matching	Kernel matching
Propensity score Probit regression explanatory variables					
Foreign ownership	.2486***	.7011***	-.2566***	-.2082 **	-
Exporter status	.2775***	-	-.3916***	-.3628 ***	.7781***
Size Medium	-	.3003***	0.0554	-0.0125	-0.1283
Size Large	-	-	-.2159**	-0.0991	-0.0207
Log(capital)	-	-.0793**	.0704***	.0584**	.1546***
Age	-	-	0.002	0.0016	-.05916***
GVC	-	.7051***	-.1877*	-0.1365	0.6518***

## Finding 2: Determinants of linkage heterogeneity

- Support activities by foreign and domestic buyers determined by different supplier characteristics.

VARIABLES	Overall buyer support	Dom. buyer support	For. buyer in Vietnam support	For. buyer out Vietnam support
Log(buyers)	0.183*** -0.0557	0.487*** -0.0445	0.436*** -0.0801	-0.303*** -0.0651
D. main buyer	0.224 -0.173	0.829*** -0.14	-0.131 -0.244	-0.061 -0.205
Foreign	0.168 -0.222	-1.516*** -0.178	1.349*** -0.324	0.705*** -0.255
Same province	0.00912 -0.173	0.0955 -0.14	1.035*** -0.249	2.751*** -0.23
Skill ratio	-0.0141** -0.00644	-0.000794 -0.00489	-0.0276*** -0.00969	-0.771*** -0.206
Industrial zone	0.510*** -0.197	-0.0428 -0.179	1.175*** -0.282	-0.00869 -0.0079
GVC participation	0.915*** -0.197	-0.592*** -0.154	-0.211 -0.279	2.751*** -0.23
6-10 years	0.487** -0.235	0.149 -0.209	0.620* -0.372	0.21 -0.226
10-20 years	0.435* -0.245	0.349 -0.216	0.234 -0.391	0.744** -0.31
Medium	0.204 -0.218	0.208 -0.181	0.166 -0.323	0.141 -0.285
Large	0.169 -0.195	-0.342** -0.16	0.00798 -0.277	0.684*** -0.243
Observations	1,263	1,369	1,369	1,369

# Finding 3: Effects of linkages on productivity - OLS

Estimated effects of linkage quantity and quality through OLS insignificant.

VARIABLES	tfp	tfp	tfp	tfp
Log buyers	0.0240*	0.022	0.0339**	0.022
	-0.0131	-0.014	-0.0141	-0.0139
forvietbuyershare	0.112	0.0887		
	-0.079	-0.0872		
dforvietsupport	-0.0265	-0.038		
	-0.0451	-0.0425		
foroutbuyershare			-0.0162	0.00159
			-0.0716	-0.0777
dforoutsupport			0.0644	0.0516
			-0.0452	-0.0446
foreign10		0.0467		0.0764*
		-0.0496		-0.0429
gvc		-0.0232		-0.00715
		-0.0433		-0.0444
skillratio		0.00366**		0.00619***
		-0.00166		-0.0017
prodgapisprov		0.00590***		0.00171
		-0.00189		-0.0017
6-10 years		0.205***		0.229***
		-0.065		-0.0687
10-20 years		0.143*		0.165**
		-0.0729		-0.0735
≥20 years		0.0809		0.118
Size dummy		Yes, no effect		Yes, no effect
Technological level dummy		Yes, no effect		Yes, no effect
Observations	629	627	782	780
R-squared	0.006	0.077	0.012	0.058

# Effects of linkages on productivity - IV

- Instrumented linkages with foreign buyers abroad positive effect on supplier productivity.

Linkages with foreign buyers in Vietnam no significant effect.

VARIABLES	1st stage forvietbuyershare	2nd stage tfp	1st stage foroutbuyershare	2nd stage
forvietbuyershare		1.369** -0.61		
foroutbuyershare				-0.259 -0.66
dforoutsupport			0.259*** -0.0229	0.12 -0.181
dforvietsupport	0.183*** -0.0205	-0.290** -0.133		
logbuyers	-0.0263*** -0.00713	0.0528** -0.0212	-0.102*** -0.00599	-0.0051 -0.0707
foreign	0.184*** -0.0216	-0.215 -0.139	0.0164 -0.0239	0.0811* -0.043
gvc	-0.0546** -0.022	0.0353 -0.0578	0.107*** -0.0239	0.0212 -0.0829
Skill ratio	-0.000808 -0.000685	0.00512** -0.00217	-0.00228*** -0.000686	0.00558** -0.0023
Productivity gap	0.000363 -0.000486	0.00545*** -0.00197	-0.00029 -0.000366	0.00163 -0.0017
6-10 years	-0.029 -0.0338	0.237*** -0.0812	-0.00803 -0.031	0.227*** -0.0686
10-20 years	-0.0662* -0.0339	0.234*** -0.0888	-0.00529 -0.0318	0.163** -0.0735
Size		Yes, no effect		Yes, no effect
Technological level	Yes, no effect	Yes, no effect	Yes, no effect	Yes, no effect

# Effects of linkages on productivity - IV

## Relevance of instruments

VARIABLES	1st stage forvietbuyershare	2nd stage tfp	1st stage foroutbuyershare	2nd stage
Backward FDI	0.177*** -0.0387			
Export Share			-0.0348 -0.061	
Backward participation			-0.00725** -0.00305	
No int. prod stages			0.122** -0.0494	
Forward participation			0.0199 -0.0872	
Constant	0.0841** -0.0407	-0.582*** -0.137	0.296*** -0.0909	-0.374 -0.329
Observations	627	627	780	780
R-squared	0.364		0.603	0.045

# Conclusions

- Dichotomy between foreign and domestic firms.
  - Foreign firms inside and outside Vietnam develop more linkages with other foreign firms in the country.
  - Same holds true for domestic firms.
  - Same finding from the reports of both buyers and suppliers.
- This could be a result of less embeddedness.
  - Foreign firms in Vietnam provide more support to local suppliers that are older (more established), closer or in industrial zones.
  - Domestic firms not affected by these factors (more embedded, know the market).
  - Foreign firms outside Vietnam develop more exclusive relationships, but offer the most support.
  - Suppliers that are part of GVCs receive more support from foreign buyers abroad, less from domestic buyers.

# Conclusions

- Productivity premium for local suppliers that have more linkages with foreign buyers in Vietnam, no (short-run) effect from foreign firms abroad.
  - GVC participation no effect on productivity.
- Policy implications: heterogeneity of firms and linkages matters. Potential for knowledge-intensive linkages with foreign firms possible, but they need to be more embedded. GVC participation may help with that.