BATMODEL

BETTER AGRI-FOOD TRADE MODELLING FOR POLICY ANALYSIS

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An analysis of retailer-driven value chains and global value chains in the French agri-food industry

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Outline of presentation

1- Context and research design

2- Participation in GVCs investigation

3- Position along GVCs investigation

1- Context and research design

Context

❑ Definition of global value chains (GVCs):

A series of transnational production stages that take a product from conception to final use, with added value at each stage (Fernandez-Stark and Gereffi, 2019 ; Antràs, 2020)

❑ Rapid development of agri-food GVCs since 2000:

- A 8% (12%) average annual increase in OECD trade in intermediate agricultural (food) products (Greenville et al. 2017)
- 45% of global trade in agricultural and food products goes to intermediate consumption (Beaujeu et al. 2018)

❑ Retailers have transformed agri-food GVCs and trade:

- A *supermarket revolution*: a rapid increase of the share of supermarkets in food retailling (Reardon et al. 2012)
- Financial opportunities and ressources of large agrifood manufacturers and retailers contributed to the emergence of a *third food regime* consisting in high sales of pre-fabricated food, ready-meals and private labels (Burch and Lawrence, 2009)
- A shift of control in agri-food chains from the manufacturing sector to the retailing sector (Burch and Lawrence, 2005)
- Domestic retailers' presence/activity in foreign market increases the agrif-food exports to these markets (Cheptea et al. 2015)

Research question

- **How do retailers shape the participation in GVCs and position along the chain of their suppliers ?**

- **An empirical analysis based on French firm-level data**

- **The high level of internationalization of French retailers significantly increases the agri-food exports of their domestic suppliers, but only marginally the exports of other French firms (Cheptea et al. 2019)**

- **We identify the domestic suppliers of retailers with firms that sell private label products:**
  - In France these firms have the IFS certification (Cheptea et al. 2019)

- **We compare the strategies of IFS certified firms and other agri-food firms:**
  - Participation in GVCs
  - Position along the chain

Hypotheses

- **H1:** Participation in GVCs defined by the joint import and export activity of a firm (Baldwin and Yan 2014)

- **H2:** The level of sophistication of the goods that the firms import, produce, sell and export (inputs, intermediate products, final products) permits to identify their position along the value chain (Antràs and Chor 2013; Alfaro et al. 2019 ; Chor et al. 2021)

2- Participation in GVCs investigation

internationalization of IFS certified firms versus non-certified firms

Pizza producer A → Carrefour or E.Leclerc

Italy → France → Great Britain

Process

≠

Pizza producer B → Own brand producer

France → France → France

Process

Existence of sunk and fixed costs of trade

Data

- **Annual data from AMADEUS on firm in the French agri-food industry:**
  Employment, turnover, financial links, NACE Rev. 2 activity codes, SIREN number
- **French foreign trade data (customs):**
  Firms' export and import activities by year-firm-product-destination/origin
- **Annual data from the IFS certification body:**
  Exhaustive list of IFS certified companies

International trade activity	Total number of firms	of which IFS firms
Exclusively importing firms	1 269	94
Exclusively exporting firms	3 060	158
jointly importing and exporting firms	4 112	747
Domestic firms	15 910	158
Total	24 351	1 157

Data 2006-2011

Firms participation in GVCs

A tri-probit model on decisions to export $(y_{EXP,i})$**, import** $(y_{IMP,i})$ **and certify** (IFS_i) **:**

$$\begin{cases} \boldsymbol{y^*_{EXP,i}} = \beta_{EXP0} + \beta_{EXP1}\boldsymbol{x_i} + \varepsilon_{EXP,i} \\ \boldsymbol{y^*_{IMP,i}} = \beta_{IMP0} + \beta_{IMP1}\boldsymbol{x_i} + \varepsilon_{IMP,i} \\ \boldsymbol{IFS^*_i} = \alpha_0 + \alpha_1\boldsymbol{z_i} + \varepsilon_{IFS,i} \end{cases}$$

$$\mathrm{Corr}(\varepsilon_{EXP,i}; \varepsilon_{IMP,i}) = \boldsymbol{\rho_{EXP,IMP}}$$

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<u>decision to export</u>

$$\begin{cases} y_{EXP,i} = 1 \text{ if } \boldsymbol{y^*_{EXP,i}} > 0 \\ y_{EXP,i} = 0 \text{ if not} \end{cases}$$

<u>decision to import</u>

$$\begin{cases} y_{IMP,i} = 1 \text{ if } \boldsymbol{y^*_{IMP,i}} > 0 \\ y_{IMP,i} = 0 \text{ if not} \end{cases}$$

<u>decision to certify</u>

$$\begin{cases} IFS_i = 1 \text{ if } \boldsymbol{IFS^*_i} > 0 \\ IFS_i = 0 \text{ if not} \end{cases}$$

$\boldsymbol{x_i}$, $\boldsymbol{z_i}$: control variables: productivity, size, financial links, year and activity fixed effects + exclusion variables (instruments)

exclusion variables of IFS_i : share of competing IFS certified firms in the same sector of activity as *i* in the total turnover of the sector (Cheptea et al. 2019)

exclusion variables of EXP_i (IMP_i): share of competing exporting (importing) firms in the same sector of activity as *i* in the total turnover of the sector

Predicted conditional probabilities and treatment effects at the sample mean (%)

Probability of :	IFS certified firms	non-certified firms	treatment effects
exporting $P(EXP = 1)$	63.61 (0.632) ***	22.54 (0.334)***	41.07 (0.000)***
importing $P(IMP = 1)$	19.34 (0.362)***	13.74 (0.285)***	5.60 (0.000)***
both exporting and importing $P(EXP = 1, IMP = 1)$	13.59 (2.200)***	7.76 (0.268)***	5.83 (2.086)***
being domestic $P(EXP = 0, IMP = 0)$	59.02 (12.184)***	72.00 (0.474)***	-12.98 (12.16)

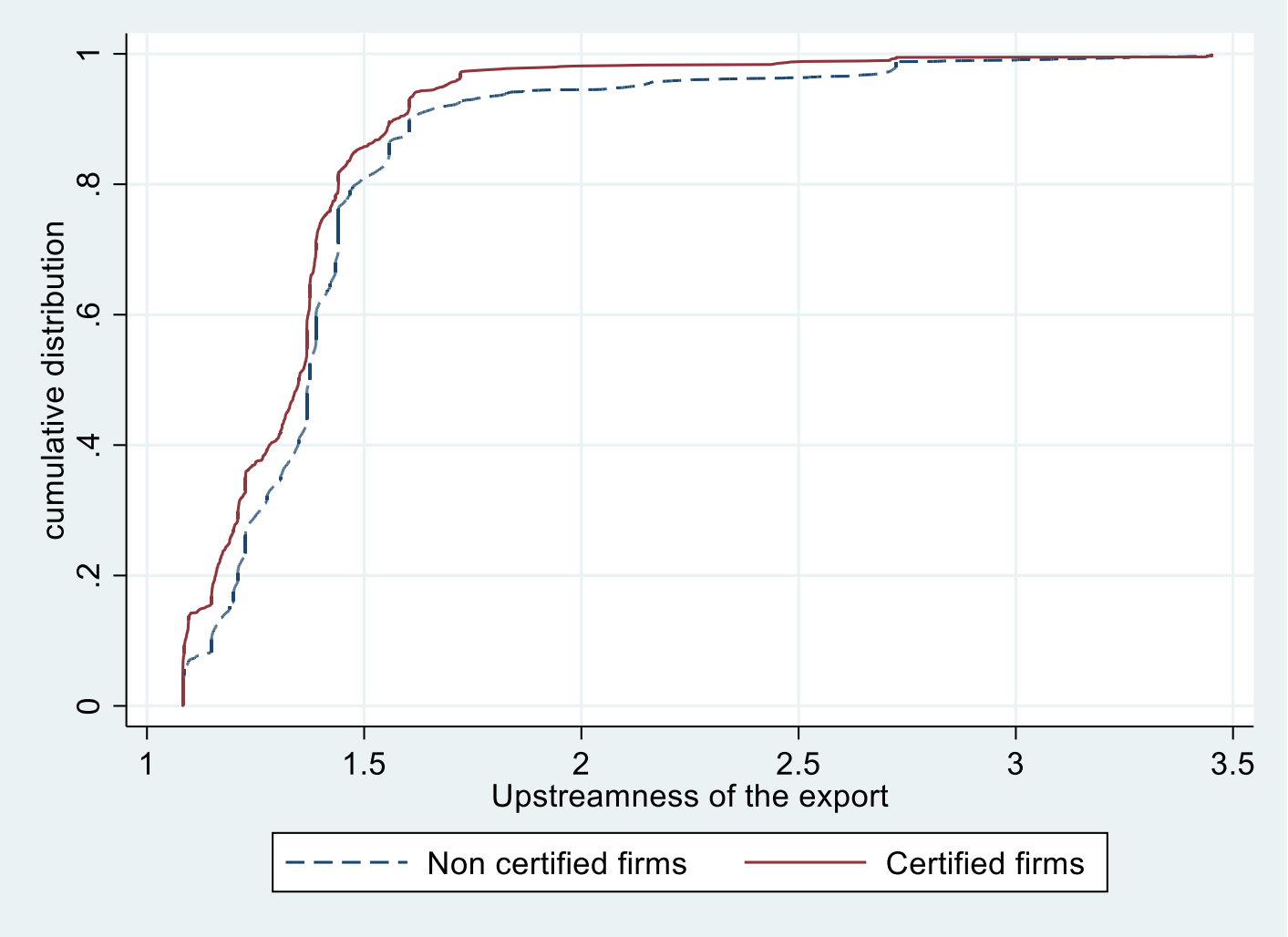
- **The domestic suppliers of retailers (IFS-certified firms) have a 5.83% higher probability of integrating GVCs than other firms;**
- **This premium of IFS-certified firms for integrating GVCs occurs mainly through the export channel**

2- Position along GVCs investigation

Firms' position along GVCs

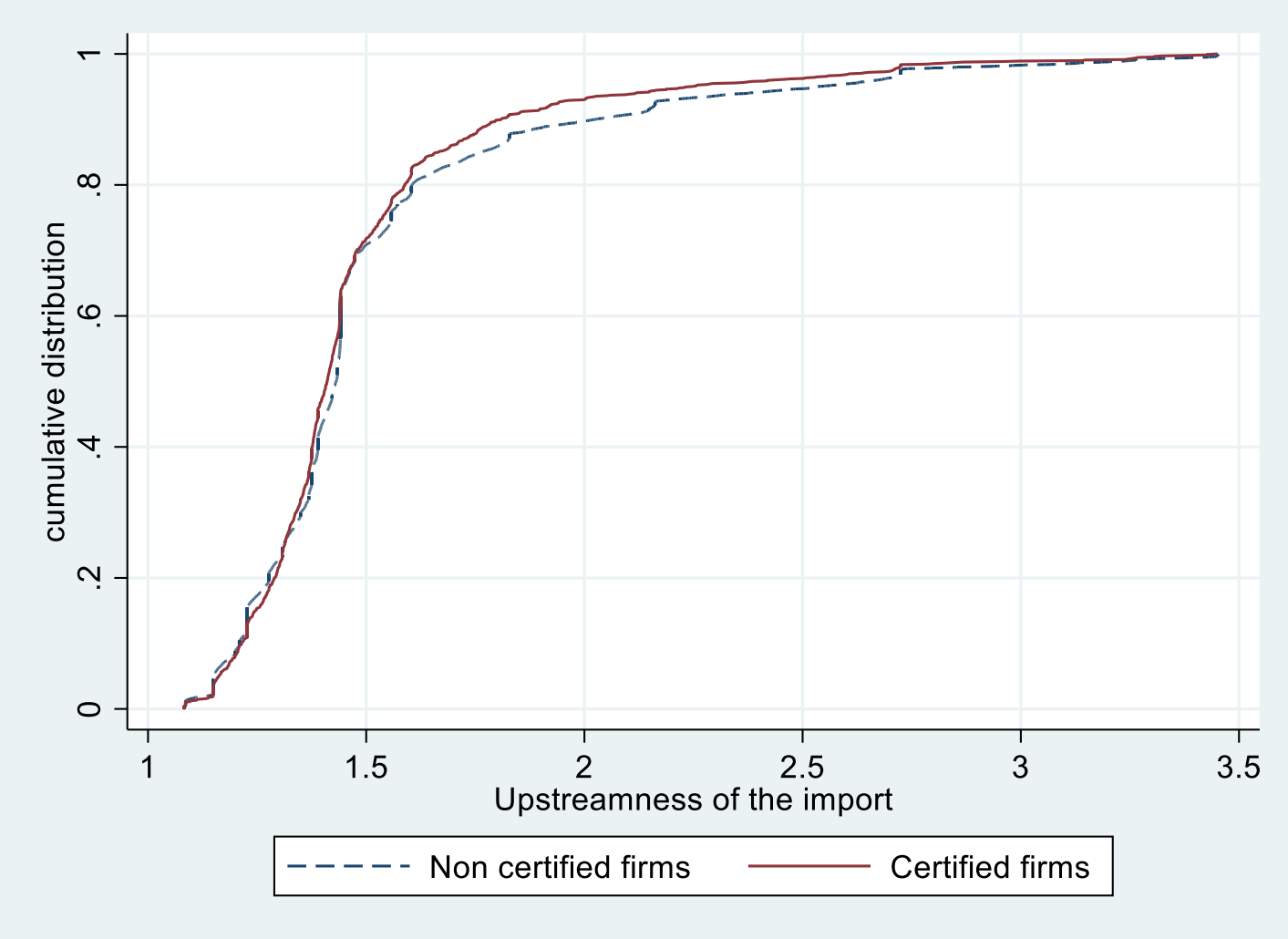
- **Began with the US input-output table (high level of detail: 405 industries)**
- **Build correspondence between I-O table and NACE Rev. 2**
  - Construct an I-O table at the level of NACE Rev. 2
  - Compute an *upstreamness* index U at product (industry) level similarly to Antràs and Chor (2013) and Antras et al. (2012)
    - $U \in [1,\infty)$
    - the larger U, the more upstream is the product/industry in the production process (the closer it is to production factors)
    - High correlation between *upstreamness* from US and European (high level of aggregation: 41 industries) I-O table (Antras et al. 2012)
  - Compute an *upstreamness* indicator at firm level as average of the *upstreamness* of the products imported and/or exported by the firm (Chor et al. 2021)
    - the *upstreamness* of the firms' imports (U^M)
    - the *upstreamness* of the firms' exports (U^X)
    - the intensity of firms' GVC participation (U^M-U^X)

Upstreamness of exports: firms integrated in GVCs



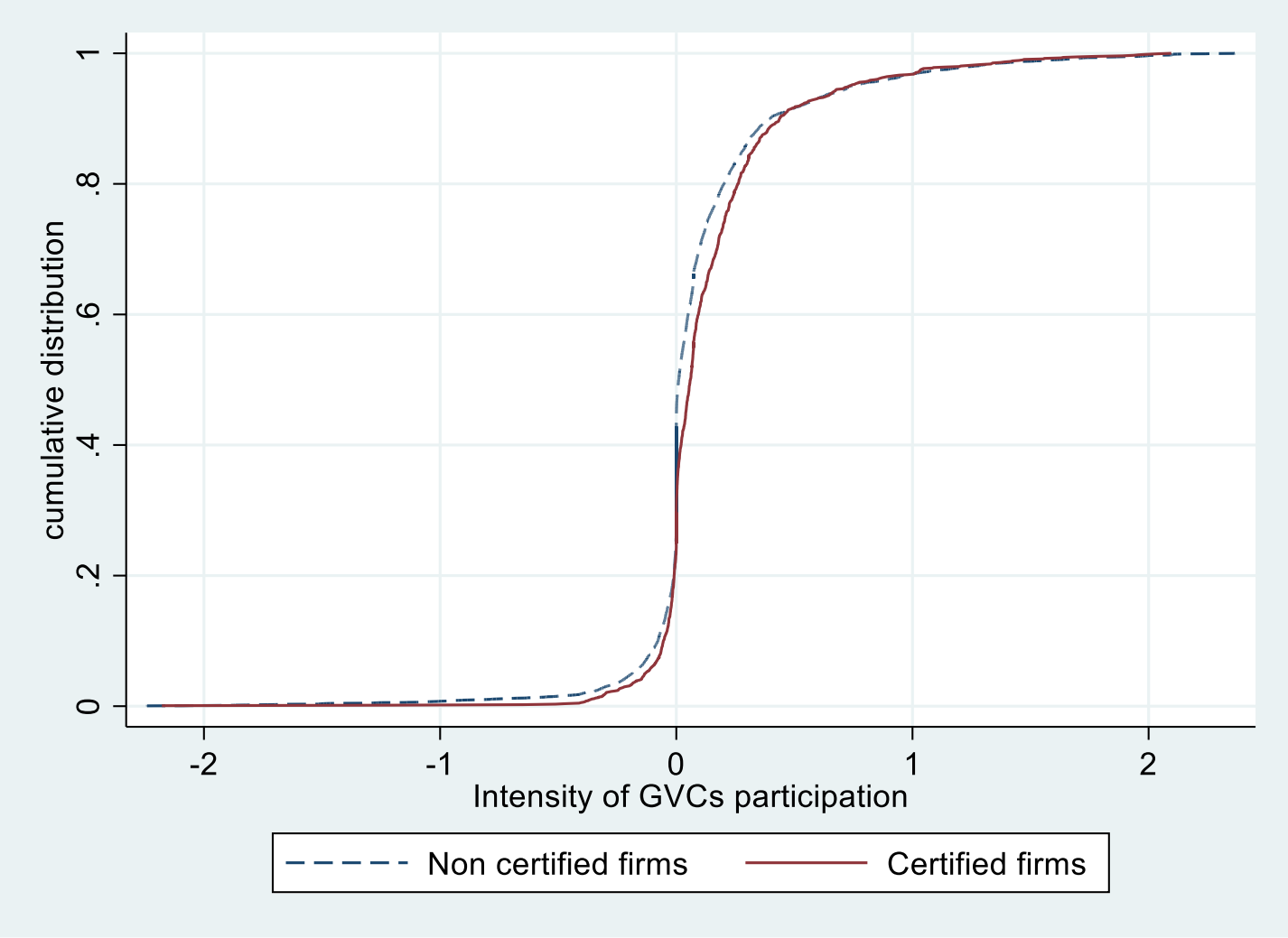
- **IFS certified firms export less *upstreamness* products than their non-certified counterparts**

Upstreamness of imports: firms integrated in GVCs



- **IFS certified firms and non-certified firms import quite similar products in terms of *upstreamness***

Intensity of the participation in GVCs: firms integrated in GVCs



- **IFS certified firms span slightly more production stages in GVCs**

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Comments welcome!

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Appendix: extensive margin (bi-probit)

Table 1 : Average marginal effects on the exporting and importing probability (biprobit), non-IFS firms sample

	Univariate probabilities		Conditional probabilities		Joint probabilities			
	(1)		(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	P(EXP=1)	P(IMP=1)	P(EXP=1| IMP=1)	P(IMP=1| EXP=1)	P(EXP=1, IMP=1)	P(EXP=1, IMP=0)	P(EXP=0, IMP=1)	P(EXP=0, IMP=0)
ln *Productivity*	0.081***	0.090***	0.041***	0.123***	0.066***	0.016***	0.024***	-0.106***
	(0.003)	(0.003)	(0.005)	(0.005)	(0.002)	(0.002)	(0.001)	(0.003)
$\rho IMP, EXP$	0.608***							
Observations	23,194	23,194	23,194	23,194	23,194	23,194	23,194	23,194

Table 2 : Average marginal effects on the exporting and importing probability (biprobit), IFS firms sample

	Univariate probabilities		Conditional probabilities		Joint probabilities			
	(1)		(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	P(EXP=1)	P(IMP=1)	P(EXP=1| IMP=1)	P(IMP=1| EXP=1)	P(EXP=1, IMP=1)	P(EXP=1, IMP=0)	P(EXP=0, IMP=1)	P(EXP=0, IMP=0)
ln *Productivity*	0.141***	0.175***	0.071***	0.142***	0.201***	-0.059***	-0.025**	-0.116***
	(0.018)	(0.016)	(0.017)	(0.016)	(0.017)	(0.012)	(0.010)	(0 .011)
$\rho IMP, EXP$	0.558***							
Observations	1,157	1,157	1,157	1,157	1,157	1,157	1,157	1,157