Global Value Chain and Trade Policy in the Agri-food Sector

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BATMODEL

BETTER AGRI-FOOD TRADE MODELLING FOR POLICY ANALYSIS

Outline

- Introduction & motivation

- Theory predictions

- Data, measures and identification

- Main results

- Concluding comments

Introduction & motivation

- In the last decades trade and trade policy changed a long **two dimensions**:

  - Rise in **GVC participation** and intermediate inputs trade crossing national border several times

  - An **increase in RTAs** with an expansion of the policy areas covered → **deep** RTAs

- Key Questions:

  - Are these two facts inter-related ?

  - Does GVC participation change the government's incentives over trade policy ?

Introduction and motivation

- Blanchard, Bown, and Johnson (2021) building on Antras and Staiger (2012)

  - Political economy model where the rise in GVC links reduce government' incentives to rise tariffs

    - Empirical support from 14 OECD countries across manufacturing industries

- Ludema, Mayda, Yu and Yu (2018) and Bown, Erbahar, and Zanardi (2020) similar findings

  - Focus only on the manufacturing sector

- What about the GVC effect on agri-food trade policy?

Introduction and motivation

- Crucial research question because **trade protection** in the agri-food is the rule more than the exception

- Greenville et al. (2017)

  – Tariffs and restrictive SPS negatively affects country-sectors participation in agri-food GVCs

- Bailè et al. (2018)

  – Bilateral tariffs are key determinants of both backward and forward GVC links in the agri-food

- Yet, these papers do not focused on a political economy research question

This paper

- We test predictions from the political economy model of Blanchard-Bown-Johnson (2021)

  - Investigating to what extent GVC participation affects trade policy in agriculture and food sectors

- Main value added:

  - **First** application on the agri-food sectors

  - Very large dataset: > **150 countries**, 1995-2015

  - Focus on tariffs and of **NTMs ad-valorem eq.**

  - Accounting for **deep PTAs** (SPS/TBT) when studying heterogeneity of GVA effects in/out **RTAs**,

Theoretical considerations

Blanchard-Bown-Johnson-BBJ (2021)

The model in a nutshell

- GVCs links into the GH (1994) "protection for sale" model

- Forward (DVA) and backward (FVA) links affect the **government optimal** tariff formula

Key result: → *optimal **tariff** will **deviate** from the "inverse export supply elasticity rule" (**TOT motives**) depending on the **nationality** of VA content embody in home and foreign goods*

Theoretical considerations

- **BBJ** model considers:

    - **Domestic value added** (DVA): home country income gains by supplying home inputs to foreigners

    - **Foreign value added** FVA: the revenue component of domestic goods paid to foreign inputs suppliers

- **Mechanism**:

    - **DVA**: when foreigners use inputs from home, domestic govt. incentives to manipulate TOT reduces

    - **FVA**: when home producers use foreign inputs, some of the tariff rents accrue to foreign input suppliers, reducing govt. incentive to rise tariffs

Theoretical considerations

- **BBJ** optimal tariff formula:

$$t_{xj}^i = \frac{1}{e_{xj}^i}\left(1 + \left(1 + \delta_x^{gh}\right)GH_{xj}^i - \left(1 + \delta_x^{dva}\right)DVA_{xi}^j - \left(1 + \delta_{x*}^{fva}\right)FVA_{xj}^i\right)$$

Terms-of-trade and domestic **political motives** for protection

New terms capturing **DVA** and **FVA** motives for optimal tariff

- Where t_{xj}^i is bilateral tariff (i, j) on **final goods x**

- e_{xj}^i is the **export supply elasticity** driving TOT motives;

- $GH_{xj}^i \rightarrow$ inverse of import penetration $\frac{q_x^i}{M_{xj}^i} \rightarrow$ domestic PE concerns;

- $\frac{DVA_{xi}^j}{M_{xj}^i}$ and $\frac{FVA_x^i}{M_{xj}^i}$ domestic (and foreign) value added share

- δ_x^i (δ_{xi}^*) and δ_{x*}^i are the **political weights** attached by the govt.

Theoretical considerations

- **Predictions for tariffs**:
  - DVA → **lower optimal tariff** as it raises the price of foreign final goods, and some of this pass back to home input prices (also if $\delta^*_{xi} = 0$)
  - FVA → **lower optimal tariff** as part of the cost on import sectors passes upstream to foreign inputs suppliers (weaker if $\delta^i_{x*} > 0$)

- **Heterogeneity** in- vs out-side RTAs:

  - DVA effects = 0 inside RTAs, if they "solve" TOT

  - It does not apply to FVA as it works through a domestic price externality

Theoretical considerations

- **Predictions for NTMs**:
  - **Similar to tariffs if** the price effects of NTMs dominate their possible quantity creation effect (e.g. consumer information)

- **Heterogeneity** in- vs out-side RTAs:
  - Difficult to evaluate a priory because NTM are set as non-discriminatory policy:
    - This is mainly an empirical question
    - We extend BBJ exploiting also information on deep RTAs with legally enforceable SPS/TBT provisions,…

Data and variables (>150 country, 1995-2015)

- DVA and FVA based on UNCTAD-Eora GVC Data

  - Flow decomposition using the R package decompr (Quast and Kummritz, 2015) based on Wang-Wei-Zhu (2013), …

- Applied and MFN **tariffs** from Unctad-Trains and WTO

  - Data problems related to specific tariffs conversion and TRQs, we are **updating using MacMaps**,…

- NTMs ad-valorem-eq from Niu et al. (2018)

  - NTMs are largely non-discriminatory,… we induce "bilaterality" using an index of Abs. $|NTM_i – NTM_j|$ distance

    - This rise some conceptual problem with respect to BBJ

- RTAs from Egger and Larch (2008) data; Deep PTAs with SPS/TBT provisions from World Bank deep PTAs data

Evolution of DVA and FVA 1990-2015
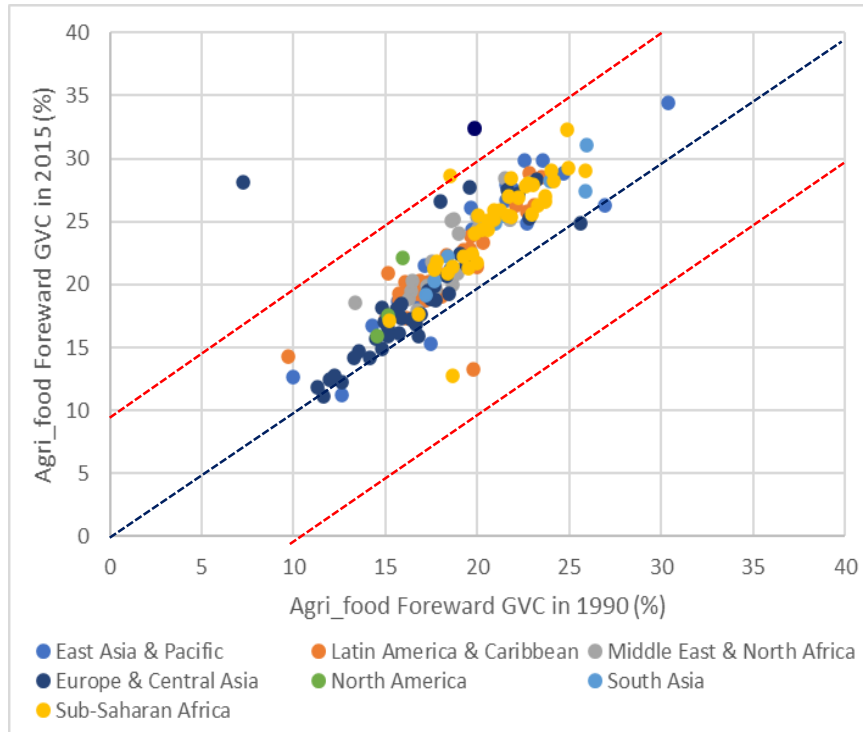
(a) Forward linkages - DVA
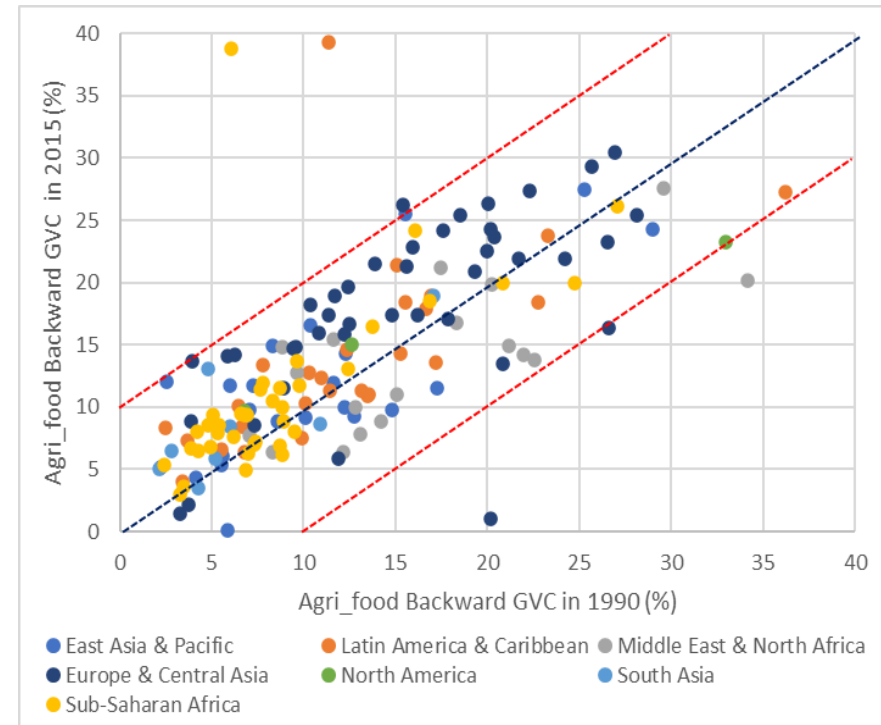
(b) Backward linkages - FVA

Evolution of tariffs and preferences
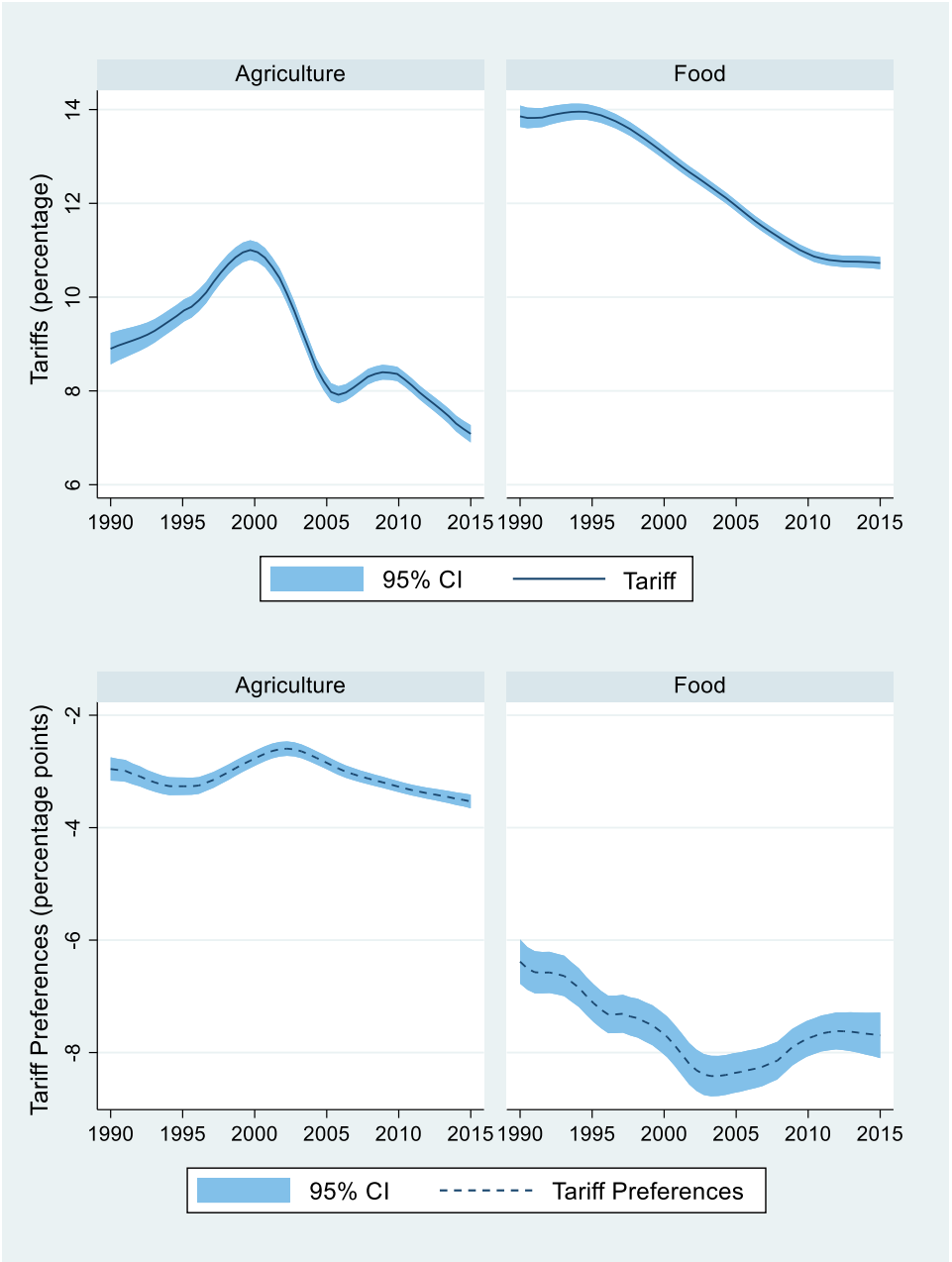
Identification (1)

1. **Reduce form eq**. with imp-exp-sector-time FEs to control for observed(unobserved) tariff determinants

$$t_{xjt}^i = \Phi_{xit} + \Phi_{xjt} + \beta^{DVA} \ln\left(DVA_{xit}^j\right) + \nu_{xijt}$$

- t_{xjt}^i applied tariff, or NTM ad-valorem distance
- OLS and **2SLS** because DVA is endogeneous to tariffs
  - Instrument: **DVA-services** by country i used by j
- expected signs $\beta^{DVA} < 0$
- Main identification assumption: FEs control well for omitted variable bias,…

Identification (2)

2. Full specification accounting for FVA(GH), but relaxing FEs with imp-sector and time FEs → FVA is a multilateral variable

$$t^i_{xjt} - t^{i,MFN}_{xt}$$
$$= \Phi_{xi} + \Phi_{it} + \Phi_{xjt} + \beta^{IP} \ln(FG\_sh^i_{xt}) - \beta^{FVA} \ln(FVA\_sh^i_{xt})$$
$$- \beta^{DVA} \ln(DVA\_sh^j_{xit}) + \omega_{xijt}$$

- $t^i_{xjt} - t^{i,MFN}_{xt}$ tariff preference (or NTM ad-valorem distance)
- All variable scaled by bilateral import (share)
- $FG\_sh^i_{xt}$ final goods production scaled by imports
- Expectation: $\beta^{IP} > 0$, $\beta^{DVA} < 0$ and $\beta^{FVA} < 0$
- Main identification assumption: **NO** simultaneity bias !

Results (1)
Reduce form equation

Main results

Equation 1. DVA and tariffs, OLS results

	Agri-food			Agriculture			Food industry		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ln DVA	-0.689***	-0.552***		-0.598***	-0.480***		-0.777***	-0.621***	
	(0.032)	(0.030)		(0.030)	(0.028)		(0.041)	(0.040)	
FTA		-4.410***	-5.654***		-4.133***	-4.880***		-4.658***	-6.368***
		(0.179)	(0.330)		(0.185)	(0.382)		(0.213)	(0.393)
Ln DVA_FTA=1			-0.325***			-0.345***			-0.307***
			(0.064)			(0.069)			(0.082)
Ln DVA_FTA=0			-0.595***			-0.506***			-0.680***
			(0.029)			(0.027)			(0.038)
Fixed effects									
Imp-Ind-Year	Yes	Yes	Yes	No	No	No	No	No	No
Exp-Ind-Year	Yes	Yes	Yes	No	No	No	No	No	No
Imp-Year	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Exp-Year	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	171214	171214	171214	81901	81901	81901	89313	89313	89313
R-Sq	0.876	0.881	0.881	0.915	0.919	0.919	0.833	0.838	0.839

Quantitatively, the DVA coefficient of **–0.55 in column** (2), means that moving from low to high DVA, induce a tariffs reduction of **about 42%**

DVA effect outside FTAs is significantly larger than inside

Main results

Equation 1. DVA and tariffs, OLS vs IV estimates

	Agri-food		Agriculture		Food	
	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)
Ln DVA_FTA=1	-0.386***	-0.363***	-0.361***	-0.364***	-0.410***	-0.371***
	(0.073)	(0.105)	(0.071)	(0.111)	(0.100)	(0.121)
Ln DVA_FTA=0	-0.672***	-1.188***	-0.522***	-1.052***	-0.817***	-1.310***
	(0.034)	(0.058)	(0.031)	(0.062)	(0.044)	(0.062)
FTA	-5.314***	-7.518***	-4.513***	-6.669***	-6.075***	-8.251***
	(0.426)	(0.614)	(0.448)	(0.673)	(0.554)	(0.706)
No. of obs.	123036	123036	59562	59562	63474	63474
R-Sq	0.889	0.887	0.926	0.923	0.848	0.846

DVA coefficient systematically larger when FTA=0 vs FTA=1, particularly in the IV regressions

Main results

Eq. 1. NTMs and DVA: OLS and IV regression results

Dependent variable:	NTMs ad-valorem equivalent distance				
	OLS	OLS	OLS	IV	IV
	(1)	(2)	(3)	(4)	(5)
L5.lnDVA	-0.0147***	-0.0146***		-0.0247***	
	(0.001)	(0.001)		(0.002)	
FTA		-0.0029	0.0042	0.009	0.0026
		(0.007)	(0.012)	(0.007)	(0.018)
L5.lnDVA_FTA=1			-0.0158***		-0.0237***
			(0.002)		(0.003)
L5.lnDVA_FTA=0			-0.0145***		-0.0248***
			(0.001)		(0.002)
No. of obs.	57433	57433	57433	57433	57433
R-Sq	0.608	0.608	0.608	0.604	0.604

Quantitatively, the DVA coefficient of **–0.0146** in column 2, suggests that moving from a low to a high DVA values in our sample, induce a reduction in NTMs of about **33%.**

However, no difference in and out FTAs.

Results (2)
Full specification in share

Main results

Eq. 2. Tariffs and FVA: OLS regressions

Dependent variable	Tariffs preferences	
	(1)	(2)
lnDVA_sh FTA = 1	-0.1803*	-1.0382***
	(0.0942)	(0.0962)
lnDVA_sh FTA = 0	-0.0572	-1.1037***
	(0.0528)	(0.0486)
ln FVA_sh FTA = 1	-0.1653	
	(0.1057)	
ln FVA_sh FTA = 0	-0.3008***	
	(0.0485)	
ln FG_sh FTA = 1	0.5430***	
	(0.0664)	
ln FG_sh FTA = 0	0.8033***	
	(0.0295)	
ln FVA_FG_sh FTA = 1		0.6109***
		(0.0510)
ln FVA_FG_sh FTA = 0		0.7543***
		(0.0296)
FTA	-0.6040	-1.8148***
	(0.5181)	(0.3559)
Fixed effects		
Importer-year	Yes	No
Industry-year	Yes	No
Importer-industry-year	No	Yes
Exporter-industry-year	Yes	Yes
No. of obs.	96552	96552
R-Sq	0.983	0.986

Main results

Eq. 2. NTM ad-valorem distance and FVA: OLS results

Dependent variable:	NTMs ad-valorem distance	
	(3)	(4)
L5. ln DVAsh_FTA=1	0.0110**	-0.0212***
	(0.005)	(0.003)
L5. ln DVAsh_FTA=0	0.0045*	-0.0252***
	(0.003)	(0.002)
L5. ln FVAsh_FTA=1	-0.0181***	
	(0.004)	
L5. ln FVAsh_FTA=0	-0.0124***	
	(0.002)	
L5. ln FGsh_FTA=1	0.0161***	
	(0.001)	
L5. ln FGsh_FTA=0	0.0173***	
	(0.001)	
L5. ln FVA_FG_FTA=1		0.0149***
		(0.002)
L5. ln FVA_FG_FTA=0		0.0168***
		(0.001)
FTA	0.0078	0.0067
	(0.008)	(0.008)
Fixed effects		
Importer-year	Yes	No
Industry-year	Yes	No
Importer-industry-year	No	Yes
Exporter-industry-year	Yes	Yes
No. of obs.	50494	50492
R-Sq	0.566	0.608

Results (3)
Are deep PTAs different ?

Main results

Eq. 2. NTMs ad-valorem distance and DVA: Heterogeneity in Deep FTAs

	Agri-food (1)	Agriculture (2)	Food (3)
Lag 5. lnDVA_sh: FTA=0, Deep=0 (1)	-0.0215***	-0.0168***	-0.0270***
	(0.0018)	(0.0021)	(0.0024)
Lag 5. lnDVA_sh: FTA=0, Deep=1 (2)	-0.0221***	-0.0176***	-0.0279***
	(0.0022)	(0.0026)	(0.0029)
Lag 5. lnDVA_sh: FTA=1, Deep=0 (3)	-0.0202***	-0.0160***	-0.0247***
	(0.0026)	(0.0030)	(0.0037)
Lag 5. lnDVA_sh: FTA=1, Deep=1 (4)	-0.0229***	-0.0176***	-0.0298***
	(0.0043)	(0.0037)	(0.0074)
Lag 5. lnFGsh_FVA_sh	0.0145***	0.0115***	0.0176***
	(0.0011)	(0.0012)	(0.0013)
Fixed effects			
Importer-industry-year	Yes	Yes	Yes
Exporter-industry-year	Yes	Yes	Yes
No. of obs.	50492	24404	26088
R-Sq	0.6109	0.6115	0.5952

Deep is a dummy equal to 1 (0 otherwise) when the FTA involve higher than the median number of SPS/TBT provisions legally enforceable

Conclusions

- Results **strongly confirm** the Blanchard et al theory using both tariffs and NTMs

- GVC participations emerged as a **first order determinant** of trade policy in the agri-food

- We find **mixed evidence** of the heterogeneity impacts of DVA on tariffs in and out FTAs

  – Endogeneity problems or sensitive products ?

- And **no heterogeneity** at all when **NTMs** ad valorem distance is considered

- This highlights the governments' difficulty to cooperate over trade policy when the agri-food sector is at stake

Thank you