POSITION IN GLOBAL VALUE CHAIN AND WAGES – EVIDENCE FROM INTERNATIONAL SECTOR-WORKER DATA

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Outline

GLOBAL TENDENCY:

- increasing importance of **trade in parts and components** due to **production segmentation across national borders**
- **"factory world"**
- global value chains (**GVC**)

LABOUR MARKET EFFECTS OF INTERMEDIATE GOODS TRADE AND OFFSHORING

- effects on **employment** and **labour demand structure**
- effects on **wages** (wage levels,skilled/unskilled wage gap, wage inequality) –> this paper

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WHY FOCUS ON GVC-WAGES NEXUS?

1. controversy on the effects of global production sharing on domestic labour markets still exists
2. exploration of new ways of measuring GVC is at hand (–>WWZ methodology applied to WIOD's data)
3. possibility to merge microdata from LIS with sector level statistics from WIOD
4. *The research leading to these results has received support under the European Commission's 7th Framework Programme (FP7/2013-2017) under grant agreement n°312691, InGRID – Inclusive Growth Research Infrastructure Diffusion*

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GVC LITERATURE

1. **wave of papers on cross-country production sharing**: Feenstra (1998), Feenstra and Hanson (1998), Feenstra and Jensen (2009), Hummels, Ishii, and Yi (2001), Yi (2003), Daudin et al (2011), Johnson and Noguera (2012), Stehrer, Foster, and de Vries LopezGonzalez (2012), Antras (2013), Antras and Chor (2013), Antras et al (2012), Baldwain and Lopez-Gonzalez (2013), Baldwain and Nicoud (2014), and Timmer, et. al (2013)

1. key concepts: **vertical specialization** (def. Hummels et al. (2001): „the use of imported inputs in producing goods that are exported") or **value added exports**

1. new methods of **gross exports decomposition into value added components**: Koopman, Wang and Wei (2014); **Wang,Wei and Wu (2013)- WWZ**

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Our contribution

- analysis concerning **heterogeneous impact of GVC on wages - by skill type of workers;**
- confontation of **sector level and micro level** estimates of wage regression;
- **micro level wage data matched with measures of sector's involvment in GVC;**
- **international setting** (16 countries), not a country specific study (as in Hummels et al., 2014 on DK or Ebenstein et al., 2014 on US);
- precise measures of foreign/domestic VA structure and offshoring based on **input-output tables** (WIOD) and **WWZ decomposition.**

DATA (1)

Dataset 1:

- **sector level,** panel, 16 countries; 1995-2011; 35 sectors (manufacturing and services), over 7300 sector-country-year obs.
- countries: cz de dk ee es fi fr gr ie lu mx pl si sk uk us
- w_h , w_m, w_l
  wages per hour for 3 categories of workers (high, medium and low skilled - by educational level) calculated with WIOD Socioeconomic Accounts (2012 +update 2013)

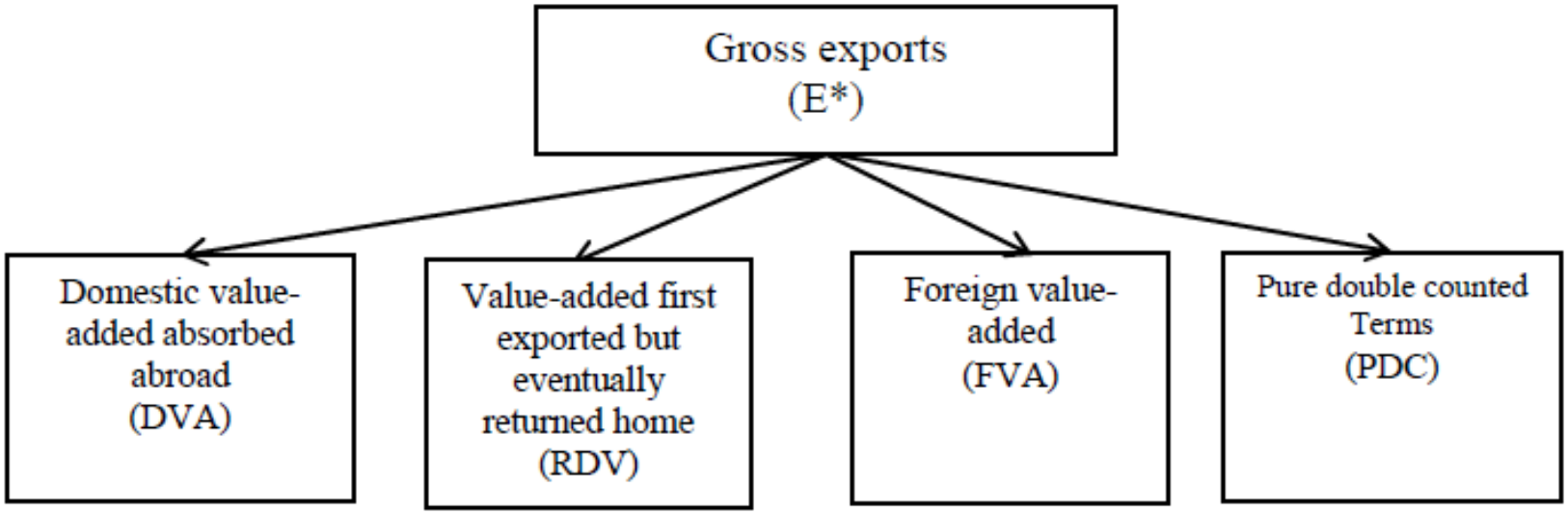
Data (2): International sector-worker dataset

Dataset 2:

- **microlevel** data (on individual earnings and personal characteristics) merged with sector level GVC data
- LIS wave 8 (year 2010) +WIOD (WWZ)
- matching based on **country-specific correspondance tables** between sector of employment (LIS variable) and sectors in WIOD
- 16 countries, 35 sectors
- up to 225 000 obs (!)
- workers aged 24-64, top and bottom of wage distribution - corrected

SECTOR LEVEL GROSS EXPORTS COMPONENTS AND OFFSHORING MEASUREMENT

Figure 1a Gross Exports Accounting: Major Categories

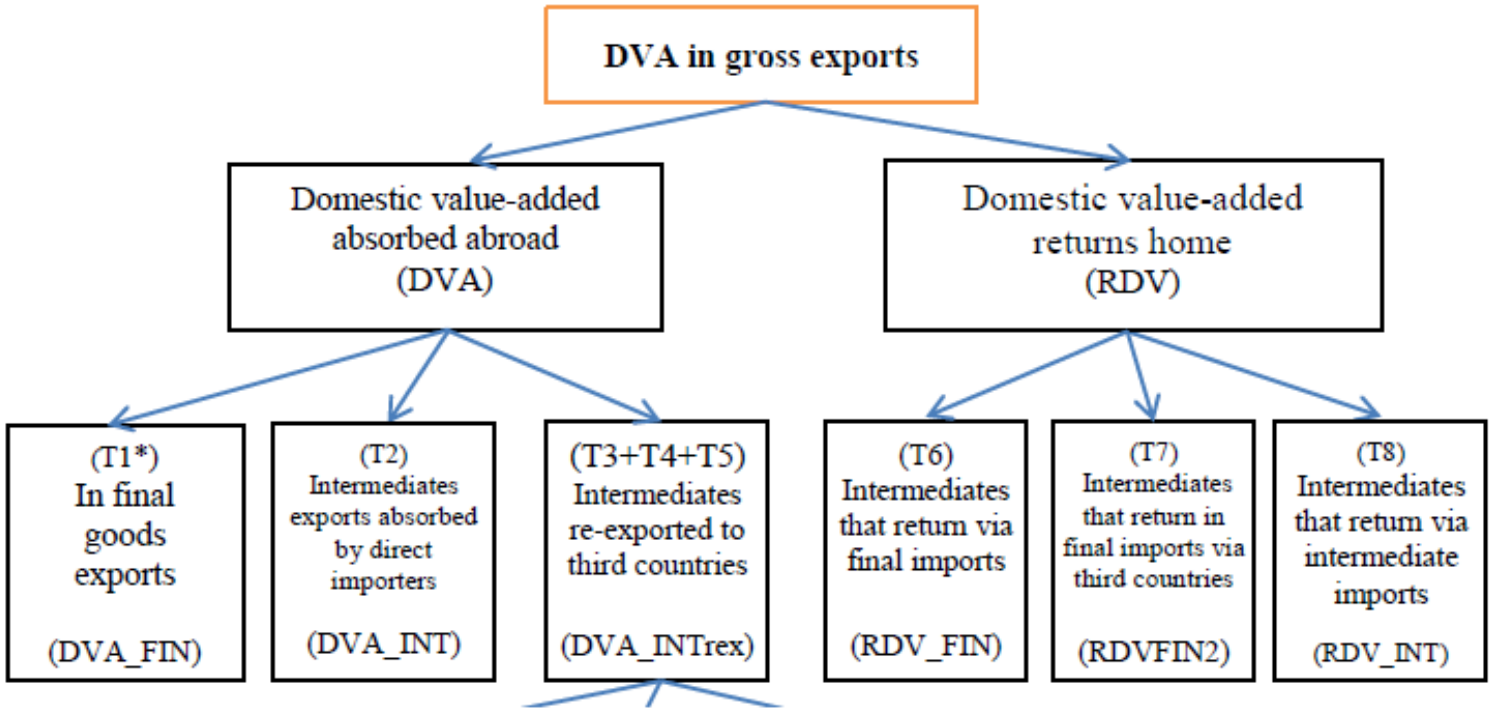


Note: E* can be at country/sector, country aggregate, bilateral /sector or bilateral aggregate; both DVA and RDV are based on backward linkages

Source: Wang, Z., Wei, S. J., & Zhu, K. (2013). Quantifying international production sharing at the bilateral and sector levels. NBER Working Paper No. 19677. [revised version, 2014]

SECTOR LEVEL VA COMPONENTS AND OFFSHORING MEASUREMENT

Figure 1b Gross Exports Accounting: Domestic Value-Added



Source: Wang, Z., Wei, S. J., & Zhu, K. (2013). Quantifying international production sharing at the bilateral and sector levels. NBER Working Paper No. 19677. [revised version, 2014]

TRENDS IN GVC - SELECTED COUNTRIES

FVA (foreign value added), as % of gross exports

RDV (domestic VA returned home), as % of gross exports –> offshoring

35 sectors (manuf+services)

	FVA		RDV	
	1995	2011	1995	2011
USA	5,9	8,7	2,6	2,5
GBR	10,9	13,0	1,1	1,1
GER	9,1	13,4	2,7	1,9
POL	10,7	18,7	0,14	0,30
MEX	10,7	11,8	0,09	0,19

EMPIRICAL MODEL 1 - SECTOR LEVEL

$$lnw_{scjt} = \alpha + \beta_1 lnk_{cjt} + \beta_2 lnL_{scjt} + \beta_3 lnEXP_{cjt-1} + \beta_4 lnGVC_{cjt-1} + D_{ct} + D_{cj} + D_t + \varepsilon_{scjt}$$

where:

s={h,m,l} - skill type, c - country, j-sector, t -time

k - capital/labour ratio

L - total number of hours worked

EXP - openness (exports to sector VA)

GVC - WWZ decomposition elements: domestic & foreign value added terms

EMPIRICAL MODEL 2 - MICRO LEVEL

$$lnw_{icjt} = \alpha + \beta X_i + \beta_1 EXP_{jct-1} + \beta_2 HS_i \times EXP_{jct-1} + \beta_3 GVC_{jct-1} + \beta_4 HS_i \times GVC_{jct-1} + D_j + D_c + \varepsilon_{icjt}$$

where:

i - individual, c - country, j-sector, t -time (2010)

X - personal characteristics (age, sex...)

HS - high skill personal dummy

EXP - openness (exports to sector VA)

GVC - WWZ decomposition elements: domestic & foreign value added terms

SECTOR LEVEL RESULTS (1)

Table 2 The impact of GVCs on low skilled wages – 16 countries, all sectors, FE estimation, alternative GVC components

	(1)	(2)	(3)	(4)	(5)
	FVA	*FVA_FIN*	*FVA_INT*	*DVA*	*RDV*
$\ln k_{cjt}$	0.297***	0.301***	0.306***	0.307***	0.311***
	[0.073]	[0.076]	[0.075]	[0.075]	[0.077]
$\ln L_{cjt}$	-0.03	-0.036	-0.021	-0.031	-0.029
	[0.031]	[0.031]	[0.032]	[0.032]	[0.032]
$\ln EXP_{cjt-1}$	-0.005	-0.003	0.001	-0.006	-0.01
	[0.009]	[0.009]	[0.009]	[0.006]	[0.009]
$\ln GVC_{cjt-1}$	**-0.279*** **	**-0.098*** **	**-0.181*** **	**0.314** **	**-0.015**
	[0.050]	[0.029]	[0.041]	[0.141]	[0.028]
R^2	0.545	0.535	0.538	0.533	0.529
Obs.	7404	7324	7324	7415	7334

Note: a set of year dummies, country-time dummies and country-industry fixed effects included in all mode
Source: own elaboration based on WWZ methodology and WIOD data

SECTOR LEVEL RESULTS (2)

Table 3 The impact of GVCs on medium skilled wages – 16 countries, all secto
FE estimation, alternative GVC components

	(1)	(2)	(3)	(4)	(5)
	FVA	*FVA_FIN*	*FVA_INT*	*DVA*	*RDV*
$\ln k_{cjt}$	0.240***	0.248***	0.249***	0.253***	0.260***
	[0.065]	[0.067]	[0.066]	[0.066]	[0.068]
$\ln L_{cjt}$	-0.097***	-0.091***	-0.084**	-0.086**	-0.078**
	[0.036]	[0.035]	[0.036]	[0.036]	[0.035]
$\ln EXP_{cjt-1}$	-0.001	0.006	0.009	-0.002	-0.001
	[0.009]	[0.008]	[0.008]	[0.007]	[0.008]
$\ln GVC_{cjt-1}$	**-0.212*** **	**-0.077*** **	**-0.148*** **	**0.199**	**-0.033**
	[0.048]	[0.023]	[0.035]	[0.127]	[0.024]
R^2	0.568	0.561	0.564	0.558	0.557
Obs.	7413	7333	7333	7424	7343

Note: a set of year dummies, country-time dummies and country-industry fixed effects included in all mo
Source: own elaboration based on WWZ methodology and WIOD data

SECTOR LEVEL RESULTS (3)

Table 4 The impact of GVCs on high skilled wages – LIS countries, all sectors FE estimation, alternative GVC components

	(1)	(2)	(3)	(4)	(5)
	FVA	*FVA_FIN*	*FVA_INT*	*DVA*	*RDV*
$\ln k_{cjt}$	0.231***	0.235***	0.237***	0.239***	0.247***
	[0.061]	[0.062]	[0.062]	[0.062]	[0.063]
$\ln L_{cjt}$	-055*	-0.059**	-0.056*	-0.058**	-0.049*
	[0.028]	[0.028]	[0.029]	[0.029]	[0.030]
$\ln EXP_{cjt-1}$	0.017**	0.014	0.014	0.012*	0.005
	[0.007]	[0.009]	[0.009]	[0.007]	[0.010]
$\ln GVC_{cjt-1}$	**-0.219*** **	**-0.078*** **	**-0.112*** **	**0.106**	**-0.081**
	[0.044]	[0.022]	[0.036]	[0.114]	[0.086]
R^2	0.523	0.515	0.515	0.512	0.514
Obs.	7394	7319	7319	7405	7329

Note: a set of year dummies, country-time dummies and country-industry fixed effects included in all mo

Source: own elaboration based on WWZ methodology and WIOD data

MICRO LEVEL RESULTS

Table 5 Estimation results: individual level wage regression

	Dep. var.: $\ln w_{ij}$ (individual gross hourly wage)				
	(1)	(2)	(3)	(4)	(5)
	lngross1	*lnHW_1*	*lnHW_1_imp*	*lnHW_2*	*lnHW_2_imp*
age_i	0.043***	0.046***	0.055***	0.046***	0.054***
	[0.005]	[0.005]	[0.006]	[0.005]	[0.005]
age_i^2	-0.000***	-0.000***	-0.001***	-0.000***	-0.001***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
sex_i	0.205***	0.206***	0.221***	0.202***	0.218***
	[0.014]	[0.014]	[0.014]	[0.014]	[0.014]
EXP_j	-0.032***	-0.032***	-0.024**	-0.031***	-0.024**
	[0.010]	[0.010]	[0.010]	[0.010]	[0.010]
$HS_i \times EXP_j$	0.105***	0.107***	0.094***	0.104***	0.094***
	[0.018]	[0.018]	[0.016]	[0.018]	[0.017]
$\boldsymbol{RDV_j}$	**-0.056****	**-0.058*****	**-0.079****	**-0.057*****	**-0.078****
	[0.021]	[0.020]	[0.031]	[0.020]	[0.032]
$\boldsymbol{HS_i \times RDV_j}$	**0.185*****	**0.186*****	**0.227*****	**0.186*****	**0.226*****
	[0.018]	[0.019]	[0.025]	[0.019]	[0.025]
R^2	0.76	0.726	0.692	0.73	0.694
Obs.	115845	116867	225713	116845	225691

Note: Sector and country dummy variables included. Constant not reported. Clustered (at the level of sector) standard errors in parentheses. Normalised weights used in all regressions.
Source: own elaboration based on LIS and WIOD data

Conclusions (preliminary!)

- higher foreign content affects negatively sector level wages;
- no statistically significant impact of offshoring on sector level wages;
- negative but negligible impact of offshoring on individual wages

Thank you for your attention!

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