GVC involvement and the gender wage gap Micro - evidence for European countries

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Motivation

- to expand the existing literature on Europe-focused research assessing the impact of global production links on the gender inequalities
- to investigate the effect of globalisation on gender wage gap using employee-employer data
- benefits coming from integration into GVCs may be limited due to the gender issues
- to examine the neoclassical theory assuming that international competition pressure rising along with the trade liberalization should lead to the narrowing of gender discrimination (Becker, 1957)

Previous studies of the possible impact of GVC on gender wage gap

- GVCs are perceived as an accelerator of GWG as women are typically employed in unskilled stages of the GVCs in low payed jobs, what is used as a competitive advantage (Barrientos, 2014)
- greater export orientation of companies results in lowering wages both for women and men, while the wage penalty is greater for women than for men (Berik, 2000; Dominguez-Villalobos & Brown-Grossman, 2010; Menon & Van der Meulen Rodgers, 2000)
- involvement into international trade results in narrowing the gender wage gap for unskilled workers, while for skilled ones the impact is limited (Coniglio & Hoxhaj, 2018)
- positive relation between trade liberalization and gender wage gap in apparel industry in Sri Lanka and Cambodia(Robertson et al. (2019)
- firms involvement in exporting activities increases the GWG in Norwegian manufacturing sector (Boler, Javorcik, Ulltveit-Moe, 2018)
- women may be more wage discriminated in export connected companies than in non-exporter sas as they are are perceived as less committed workers than men (Boler et al., 2015)
- unfair renumeration of women in comparison to men at any level of earnings in Belgian manufacturing sector; inequalities in social upgrading of workers (Gagliardi, Mahy, Rycx, 2018)
- a heterogeneous impact of international trade on GWG depending on the skill level: ILO data for the period 1983-99 covering 80 countries around the world (von Oostendorp, 2009)

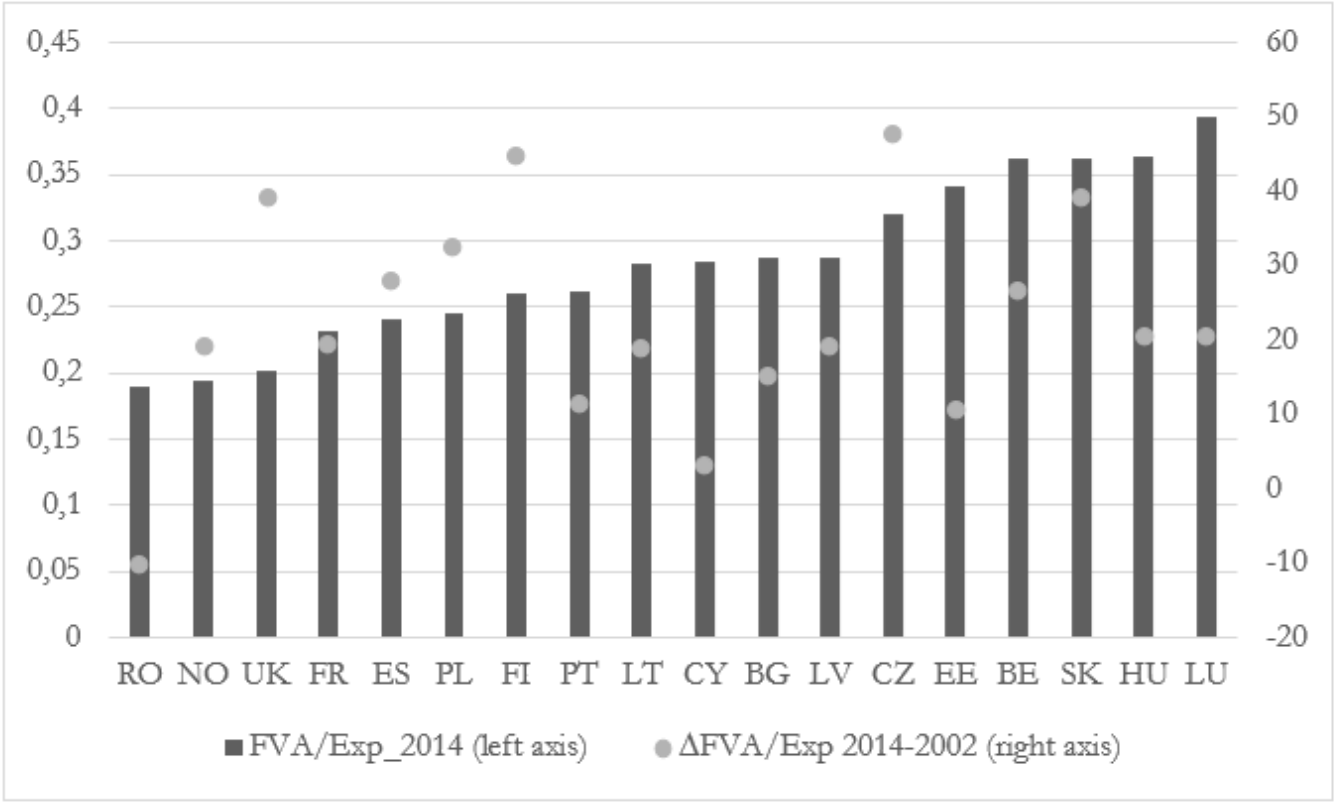
Data - Structure of Earnings Survey (SES)

- employee-employer data
- data for the years 2002, 2006, 2010 and 2014 (only manufacturing sectors)
- 6,431,017 observations for 18 European countries (BE, BG, CY, CZ, EE, ES, FI, FR, HU, LT, LU, LV, NO, PL, PT, RO, SK, UK)
- outcome variable: average gross hourly wage in the reference month
- characteristics of worker: sex, length of service, age group, education, type of employment contract, full/part time employment, skill level
- characteristics of enterprise: size; public/private, collective pay agreement scheme
- country level data: wage setting coordination scheme, openness

Data - World Input-Output Database (WIOD)

- industry level data from WIOD
- latest release from 2016
- 43 countries, 56 sectors
- input-output tables (WIOT) - calculation of measure of foreign value added embodied in exports (FVA/Exp) of a given industry proposed by Feenstra (2017) as a measure of involvement into production fragmentation processes
  - higher the FVA/Exp means that the export of given industry is more depended on inputs that were previously imported

Foreign value added embodied in export(FVA/Exp) by countries and years.



Notes: mean values weighted by sectors value added.
Source: own elaboration based on WIOD 2002, 2006, 2010, 2014.

Male/female mean wage differences

country	2002	2006	2010	2014
BE	1.19	1.16	1.12	1.07
BG	1.28	1.27	1.32	1.31
CY	1.62	1.61	1.53	1.33
CZ	1.37	1.33	1.33	1.33
EE	1.31	1.44	1.44	1.41
ES	1.33	1.31	1.26	1.22
FI	1.20	1.19	1.17	1.14
FR	1.31	1.25	1.16	1.16
HU	1.27	1.29	1.27	1.22
LT	1.23	1.34	1.43	1.33
LU	1.18	1.23	1.18	1.22
LV	1.11	1.22	1.24	1.25
NO	1.16	1.15	1.15	1.13
PL	1.23	1.27	1.25	1.24
PT	1.49	1.45	1.40	1.38
RO	1.34	1.24	1.19	1.19
SK	1.51	1.50	1.37	1.38
UK	1.30	1.27	1.28	1.22

Descriptive statistics (1)

	N	Mean	Std. Dev.	p25	Median	p75
Gross hourly wage (USD)	4120291	15.127	13.622	4.801	10.871	21.931
Age						
ageyoung	4120291	0.189	0.392	0	0	0
ageaverage	4120291	0.543	0.498	0	1	1
ageold	4120291	0.268	0.443	0	0	1
Education level						
loweduc	4120133	0.234	0.424	0	0	0
mededuc	4120133	0.589	0.492	0	1	1
higheduc	4120133	0.177	0.381	0	0	0
Type of employment contract						
indefinite	4006520	0.919	0.273	1	1	1
temporary	4006520	0.076	0.265	0	0	0
apprentice	4006520	0.005	0.069	0	0	0
Tenure						
shortdur	4120291	0.118	0.323	0	0	0
meddur	4120291	0.308	0.462	0	0	1
logdur	4120291	0.347	0.476	0	0	1
vlongdur	4120291	0.227	0.419	0	0	0
FT	4120291	0.960	0.195	1	1	1
Skill level						
skill 1	4091521	0.086	0.281	0	0	0
skill 2	4091521	0.632	0.482	0	1	1
skill 3	4091521	0.121	0.326	0	0	0
skill 4	4091521	0.161	0.368	0	0	0

Descriptive statistics (2)

Company size						
small	4083261	0.196	0.397	0	0	0
medium	4083261	0.304	0.460	0	0	1
large	4083261	0.500	0.500	0	0	1
Type of financial control						
public	4100502	0.030	0.171	0	0	0
private	4100502	0.968	0.176	1	1	1
Collective pay agreement						
nationagr	3896324	0.130	0.336	0	0	0
industagr	3896324	0.234	0.424	0	0	0
enterpagr	3896324	0.339	0.474	0	0	1
noagr	3896324	0.296	0.457	0	0	1
Coordination of wage setting	4120291	0.343	0.475	0	0	1
Export (share of GDP)	4120291	0.473	0.287	0.269	0.342	0.657
Import (share of GDP)	4120291	0.566	0.298	0.340	0.461	0.748
GDP per capita	4120291	30832.10	15813.12	19919.57	25994.99	37017.27
Price cost margin (PCM)	4120291	0.692	0.074	0.645	0.698	0.744
FVA/Exp	4120291	0.258	0.076	0.197	0.256	0.314

Model specification

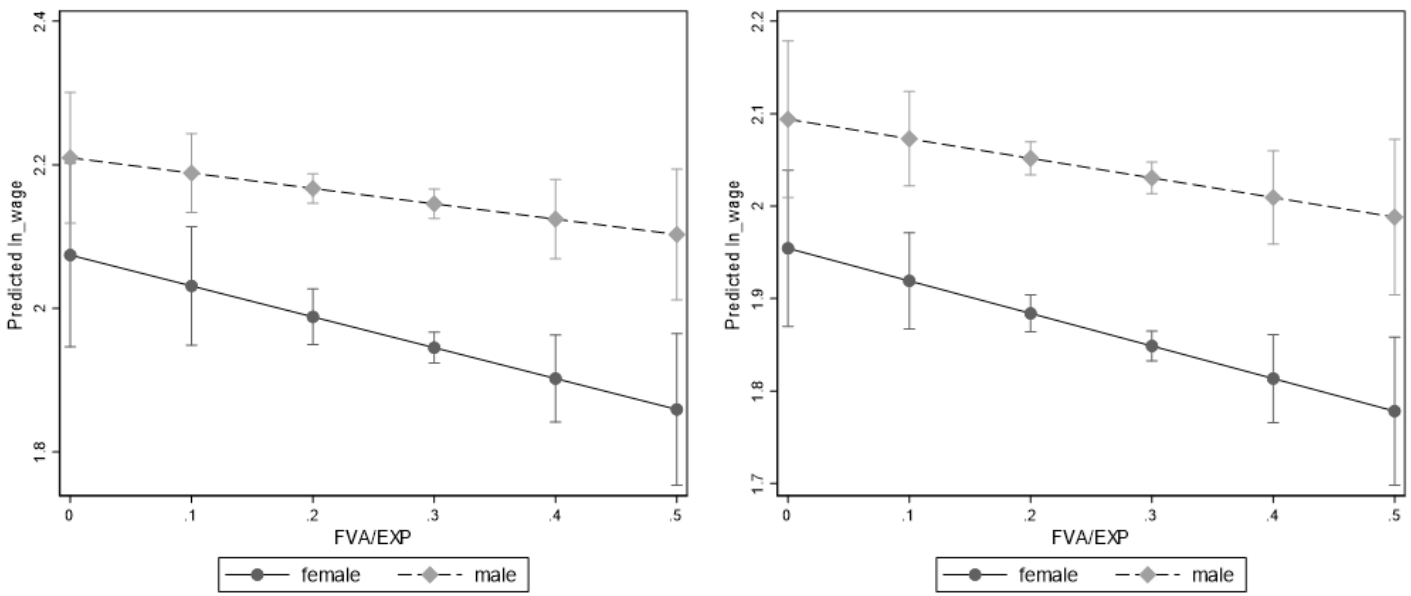
$$lnw_{ijct} = \alpha + \beta_1 Sex_i + \beta_2 GVC_{jct-1} + \beta_3 Sex_i * GVC_{jct-1} + \beta_4 Ind_{it} + \beta_5 Firm_{it} + \beta_6 Sector_{jct} + \beta_7 Coutry_{ct} + D_t + D_j + D_c + \varepsilon_{ijct} \quad (1)$$

where: i: denotes workers, j: refers to the sector of employment, c: is country, t: time

Results (1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sex_i	0.136***	0.160***	0.144***	0.148***	0.148***	0.155***	0.139***	0.139***
	[0.027]	[0.019]	[0.017]	[0.016]	[0.013]	[0.014]	[0.011]	[0.011]
FVA/Exp_{jt-1}	-0.430*	-0.376*	-0.365*	-0.346*	-0.501***	-0.489***	-0.346**	-0.359**
	[0.222]	[0.193]	[0.177]	[0.174]	[0.141]	[0.143]	[0.154]	[0.154]
$Sex_i \times FVA/Exp_{jt-1}$	0.216**	0.143**	0.176***	0.105*	0.101*	0.075	0.143***	0.142***
	[0.086]	[0.060]	[0.053]	[0.051]	[0.055]	[0.057]	[0.047]	[0.047]
R^2	0.808	0.839	0.848	0.865	0.871	0.868	0.874	0.874
N	6431017	6430840	6256011	6220408	6146698	6005878	6005878	6005878

Predicted wages due to changes in FVA/EXP for females and males (illustrating the results in Table 3, Column 1 (left panel) and Column 7 (right panel))



Results - workers with different education levels

	Low education		Medium education		High education	
	(1)	(2)	(3)	(4)	(5)	(6)
Sex_i	0.145***	0.180***	0.138***	0.129***	0.147***	0.142***
	[0.020]	[0.016]	[0.014]	[0.011]	[0.022]	[0.020]
FVA/Exp_{jt-1}	-0.089	-0.047	-0.431**	-0.483***	-0.113	-0.048
	[0.199]	[0.197]	[0.182]	[0.160]	[0.147]	[0.125]
$Sex_i \times FVA/Exp_{jt-1}$	0.154**	-0.026	0.156***	0.188***	0.006	0.018
	[0.071]	[0.064]	[0.047]	[0.048]	[0.077]	[0.070]
Personal and job controls	yes	yes	yes	yes	yes	yes
Firm controls	no	yes	no	yes	no	yes
Sector and country controls	yes	yes	yes	yes	yes	yes
R^2	0.879	0.885	0.878	0.879	0.802	0.811
N	1074434	1024347	4313027	4184004	832947	797527

Results - workers with different skills levels

	Skill_1		Skill_2		Skill_3		Skill_4	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sex_i	0.107***	0.112***	0.142***	0.143***	0.130***	0.116***	0.119***	0.140***
	[0.020]	[0.020]	[0.013]	[0.010]	[0.018]	[0.015]	[0.029]	[0.024]
FVA/Exp_{jt-1}	0.158	-0.061	-0.425**	-0.405**	-0.124	-0.274	-0.312*	-0.163
	[0.226]	[0.148]	[0.186]	[0.178]	[0.183]	[0.161]	[0.163]	[0.164]
$Sex_i \times FVA/Exp_{jt-1}$	0.09	0.004	0.145***	0.141***	0.141*	0.198***	0.129	0.051
	[0.062]	[0.076]	[0.042]	[0.048]	[0.073]	[0.056]	[0.097]	[0.090]
Personal and job controls	yes	yes	yes	yes	yes	yes	yes	yes
Firm controls	no	yes	no	yes	no	yes	no	yes
Sector and country controls	yes	yes	yes	yes	yes	yes	yes	yes
R^2	0.898	0.895	0.876	0.876	0.832	0.84	0.788	0.799
N	460475	443230	4162028	4018923	871006	841657	726899	702068

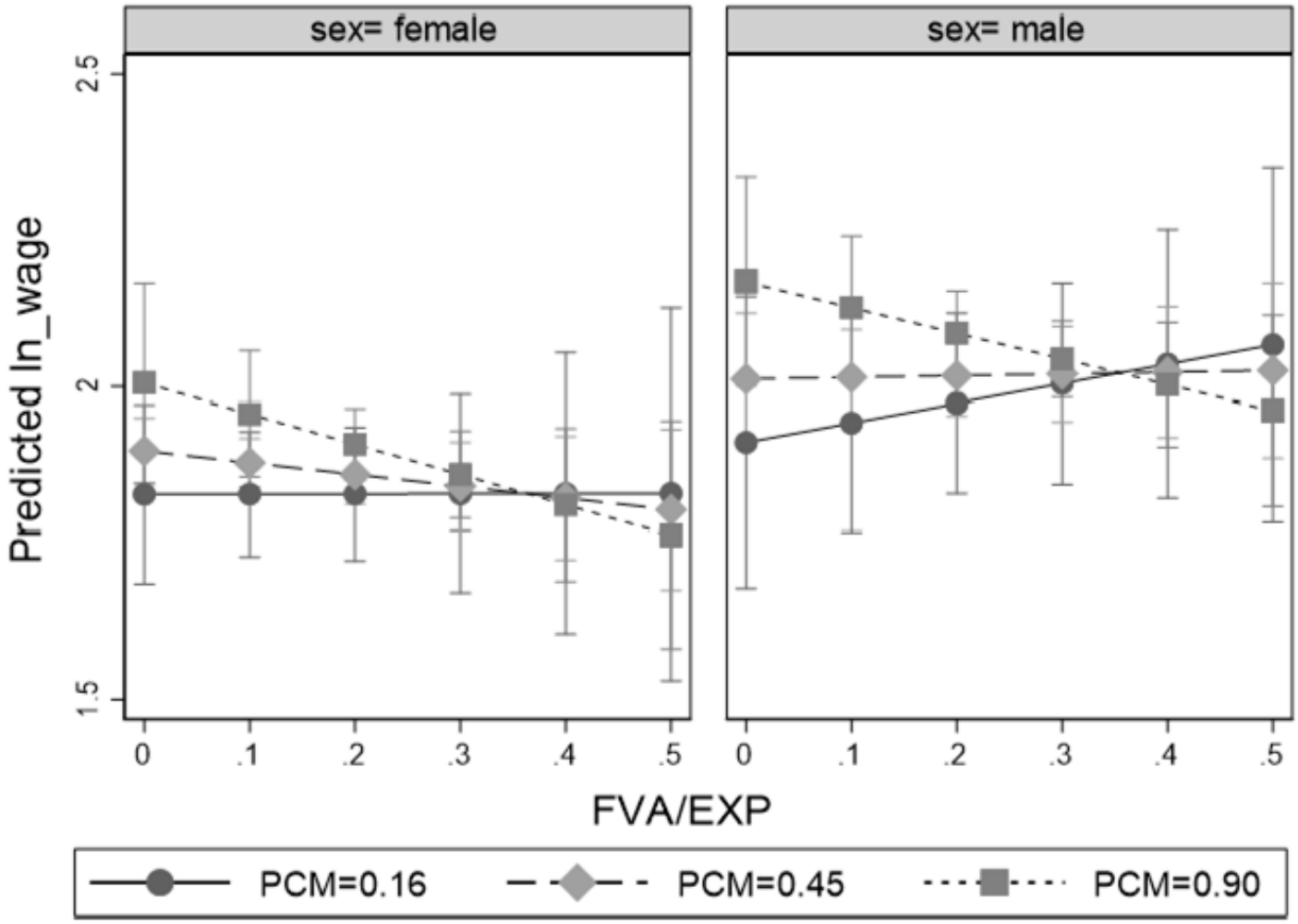
Results - wage regression: workers in different occupations

	Occupations: 1 – digit ISCO-08 classification								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Sex_i	0.098**	0.149***	0.116***	0.142***	0.251***	0.129	0.184***	0.152***	0.112***
	[0.038]	[0.024]	[0.015]	[0.015]	[0.031]	[0.091]	[0.022]	[0.025]	[0.020]
FVA/Exp_{jt-1}	-0.313	0.015	-0.274	-0.023	-0.013	-2.004**	-0.319*	-0.470**	-0.061
	[0.221]	[0.156]	[0.161]	[0.112]	[0.090]	[0.820]	[0.159]	[0.220]	[0.148]
$Sex_i \times FVA/Exp_{jt-1}$	0.191	-0.101	0.198***	-0.112*	-0.332**	-0.204	0.091	0.137	0.004
	[0.146]	[0.085]	[0.056]	[0.055]	[0.145]	[0.279]	[0.072]	[0.086]	[0.076]
R^2	0.781	0.839	0.84	0.866	0.907	0.859	0.863	0.889	0.895
N	300105	401963	841657	288188	106207	5111	1754360	1865057	443230

Extensions

- a need for controlling for concentration of the sector (Berik et al., 2004; Menon Van der Meulen Rodgers, 2009)
- interaction between sex, GVC and sector concentration, the latter measured by price-cost margin (PCM) proposed by Aghion et al. (2008)
- PCM as the proportion of the difference between value added (VA) and labour compensation (LAB COMP) to the gross output (GO) of a given sector
- the values of PCM ranges from (0,1), where the higher the score, the lower the competitiveness and greater the sectors concentration

Predicted wages due to changes in FVA/EXP at different values of sector concentration (PCM) for females (sex=0) and males (sex=1)



Conclusions

- we report a gender wage discrimination among European employees regardless the model specification
- lower wages are typical for younger people, those with low and medium level of education, having temporary type of employment, with shorter tenure in enterprise and performing lower skilled occupation
- employees from small and medium size enterprises as well as in those with industry level collective pay agreement scheme are exposed to pay lower wages
- **the impact of FVA/Exp on wages is negative and statistically significant for our baseline estimations; this negative effect of GVCs on wages is lower for male workers**
- **involvement in GVC can indeed provoke higher gender wage differences**

Further steps

- to examine the impact of GVC on wages taking into account country and sectors heterogeneity
- address the issue of potential endogeneity
- to examine the impact of GVC along the wage distribution through quantile regression analysis

Thank you for your attention.

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