

# Economic versus social effects of GVC participation: Evidence from merged Structure of Earnings Survey and WIOD data

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# Motivation and value added of the study

- To better understand the nexus between GVC ties and working conditions, the shift from economic to social perspective
- Empirical examination of GVC involvement as a determinant of wages and employment conditions
- Extensive empirical analysis: with almost 9 million observations based on detailed SES employee-employer data on 24 European countries in 2014, combined with WIOD sector-level data
- Different measures of working conditions: relative wages, bonus payments and overtime hours: higher wages, lower overtime share and lower bonus share are interpreted as signs of better working conditions

# Social upgrading and decent work - key concepts and past evidence on the impact of GVCs on working conditions

- Social upgrading and decent work - how to measure? It has been quantified mostly using country-level data (hence losing the individual, worker-specific dimension) based mainly on wages (Bernhardt and Pollak, 2016)
- Research (case studies) mainly focus on developing countries (Barrientos et al., 2011, 2015; Nadvi et al. 2004; Milberg and Winkler, 2011; Rossi, 2013), exception the U.S (Ebenstein et al., 2014; Shen and Silva, 2018)
- for Europe the evidence is country- and/or industry-specific (Flecker et al., 2013 for Austria; Hummels et al., 2016 for Denmark; Pawlicki, 2013 for Romania; Smith and Pickles, 2015 for Slovakia; Weinkopf, 2009 for Germany)
- Ambiguous previous results: Bair and Gereffi, 2001; Nadvi et al., 2004; Barrientos et al. 2011; Knorringa and Pegler, 2006

# Data (1)

- Structure of Earnings Survey (SES): employee data with employer's characteristics for 24 European countries, 9 mln observations, release 2014
- individual workers' characteristics (sex, age, education)
- firms' characteristics (length of service in enterprise, size of enterprise, type of contract)
- outcome variables
  - *relative wage*: average gross hourly earnings in relation to the sectoral mean
  - *overtime* - share of overtime in total hours worked
  - *bonus* - share of bonus payments in total earnings

## Data (2)

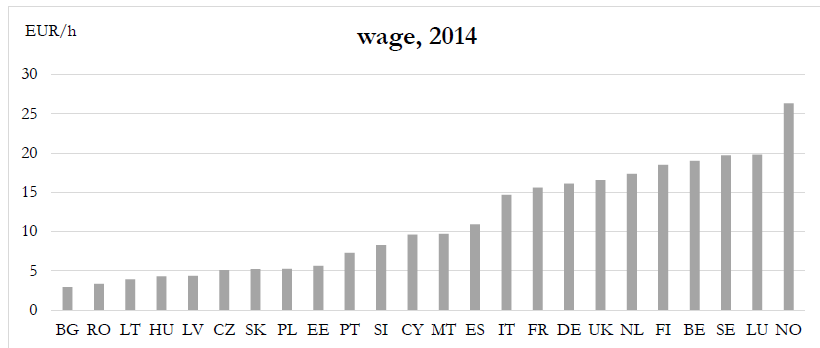
- World Input-Output Database (WIOD), release 2016, 43 countries: middle income versus high income, 56 sectors: manufacturing and services, 2000 - 2014;
  - GVC (1) - Global Import Intensity (GII) - imports of goods and services from all stages of production (Timmer et al., 2016)
  - GVC (2) - upstreamness (UP) - industry position in the global production chain (Antras et al., 2012)
  - sectoral data: productivity: value added per total hours worked
- additional variables: RTI - routine task intensity index (Lewandowski et al, 2019); country level variables: Penn World Table, Database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts, ICTWSS Database version 5.1, Visser (2016)

# Summary statistics of micro-level data

	Variable	N	Mean	Sd	Min	Max
<i>Working conditions</i>	<i>wage (gross hourly wage per hour, in EUR)</i>	8932142	11.233	8.552	1.321	41.875
	<i>overtimes_share</i>	8932142	0.006	0.021	0	0.758
	<i>bonus_payments share</i>	8932142	0.052	0.072	0	1
<i>Personal characteristics</i>	<i>sex (=1 if male)</i>	8932142	0.508	0.500	0	1
	<i>ageyoung (=1 if below 30 years)</i>	8932142	0.181	0.385	0	1
	<i>ageaverage (=1 if between 30-49 years old)</i>	8932142	0.528	0.499	0	1
	<i>ageold (=1 if 50 years old or more)</i>	8932142	0.292	0.455	0	1
	<i>loweduc (=1 if less than primary, primary, lower primary)</i>	8932142	0.166	0.372	0	1
	<i>mededuc (=1 if upper secondary and post-secondary)</i>	8932142	0.479	0.500	0	1
	<i>higheduc (=1 if tertiary education)</i>	8932142	0.355	0.476	0	1
	<i>Employment and firm characteristics</i>	<i>shortdur (=1 if less than 1 year in the enterprise)</i>	8932142	0.128	0.334	0
<i>meddur (=1 if 1-4 years in the enterprise)</i>		8932142	0.313	0.464	0	1
<i>longdur (=1 if 5-14 years in the enterprise)</i>		8932142	0.376	0.484	0	1
<i>vlongdur (=1 if 15 or more years in the enterprise)</i>		8932142	0.183	0.386	0	1
<i>small (=1 if 1-49 employees in the firm)</i>		8806327	0.295	0.456	0	1
<i>medium (=1 if 50-249 employees in the firm)</i>		8806327	0.246	0.431	0	1
<i>large (=1 if 250 or more employees in the firm)</i>		8806327	0.459	0.498	0	1
<i>indefinite (=1 if indefinite duration of employment contract)</i>		8697368	0.873	0.332	0	1

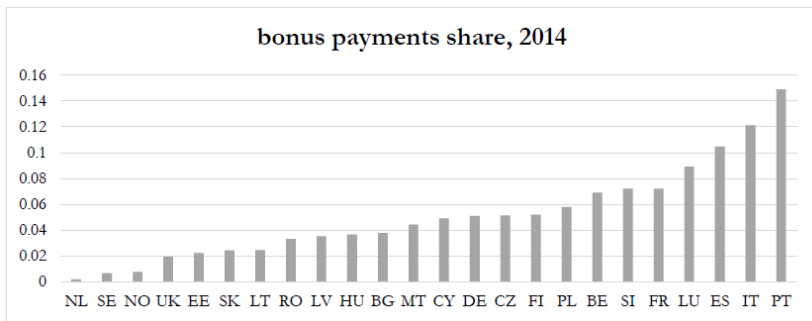
Notes: (1) values in a sample of 24 European countries; (2) Normalised weights applied; (3) Wages in EUR.

# Working conditions in European countries: wages, 2014



Notes: within-country sample averages weighted by grossing-up factor for employees (from SES). Own elaboration based on SES 2014 data.

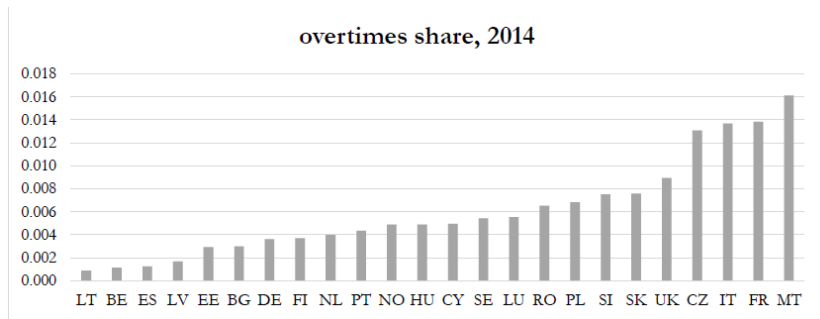
# Working conditions in European countries: bonus payments share, 2014



Notes: within-country sample averages weighted by grossing-up factor for employees (from SES). Own elaboration based on SES 2014 data.

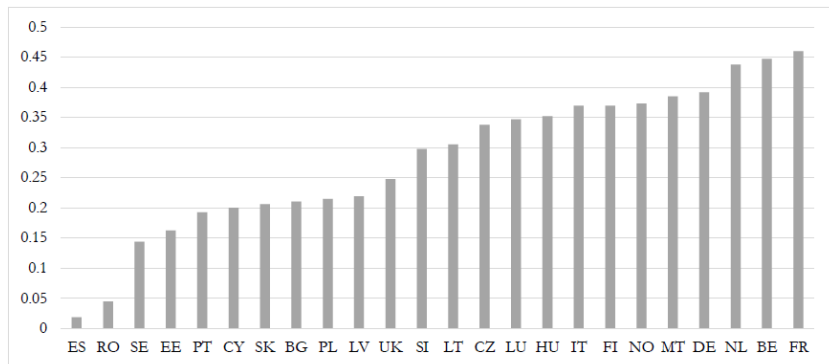


# Working conditions in European countries: overtime share, 2014



Notes: within-country sample averages weighted by grossing-up factor for employees (from SES). Own elaboration based on SES 2014 data.

# Global import intensity (GII) total growth rate 2004-2014



Notes: weighted by sectors' value added. Own elaboration based on WIOD 2016

# Model specifications:

$$w_{ij,c} = \alpha + \beta \text{Ind}_i + \gamma \text{Firm}_i + \delta \text{Sector}_{jc} + \theta \Delta \text{GVC}_{jc} + D_c + D_j + \epsilon_{ijc} \quad (1)$$

$$\text{overtime}_{ij,c} = \alpha + \beta \text{Ind}_i + \gamma \text{Firm}_i + \delta \text{Sector}_{jc} + \theta \Delta \text{GVC}_{jc} + D_c + D_j + \epsilon_{ijc} \quad (2)$$

$$\text{bonus}_{ij,c} = \alpha + \beta \text{Ind}_i + \gamma \text{Firm}_i + \delta \text{Sector}_{jc} + \theta \Delta \text{GVC}_{jc} + D_c + D_j + \epsilon_{ijc} \quad (3)$$

where  $i$  - individual,  $j$  - sector,  $c$  - country and :

- $w$  - wage expressed in relation to the sectoral mean
- $\text{overtime}$  - the share of overtime hours in total work hours
- $\text{bonus}$  - share of bonus payments in total earnings
- $\text{Ind}$  - individual worker's characteristics (sex, age, education, RTI)
- $\text{Firm}$  - firm characteristics (length of service, size, type of contract)
- $\text{Sector}$  - sectoral variables: productivity, UP
- $\Delta \text{GVC}$  - GII growth

# Estimation results: the association between GVCs and working conditions assessed via wages

Dependent variable	wage expressed in relation to the sectoral mean			
	(1)	(2)	(3)	(4)
$\Delta$ GII	-0.032**	-0.028*	-0.039***	-0.035***
	[0.015]	[0.015]	[0.012]	[0.012]
UP		-0.018		-0.017
		[0.011]		[0.012]
Individual covariates	Yes	Yes	Yes	Yes
Firm covariates	Yes	Yes	Yes	Yes
Sectoral covariates	Yes	Yes	Yes	Yes
Country/sector fixed effects	Yes	Yes	Yes	Yes
Additional firm variables	No	No	Yes	Yes
R <sup>2</sup>	0.24	0.24	0.26	0.26
N	8929690	8929690	8571469	8571469

Notes: Normalised weighted regression with robust standard errors, clustered at industry, the weights are based on grossing-up factor for employees (from SES) normalised by the number of observation per country;

\* $p \leq .10$ , \*\* $p \leq .05$ , \*\*\* $p \leq .01$ .

Source: own elaboration based on data from SES and WIOD.

# Estimation results: the association between GVCs and working conditions assessed via overtime hours and bonus payments

	Regression parameters				Marginal effects			
	Share of overtime hours		Share of bonus payments		Share of overtime hours		Share of bonus payments	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Proportion								
$\Delta$ GII	0.013	0.019	-0.039***	-0.049***	0.0006	0.0009	-0.0027***	-0.0034***
	[0.012]	[0.012]	[0.005]	[0.005]	[0.001]	[0.001]	[0.000]	[0.000]
UP		-0.037***		0.051***		-0.0018***		0.0035***
		[0.010]		[0.005]		[0.000]		[0.000]
Probability of being zero								
$\Delta$ GII	0.2775***	0.244***	-0.089***	-0.177***	0.0209***	0.0183***	-0.0174***	-0.0346***
	[0.020]	[0.020]	[0.014]	[0.015]	[0.002]	[0.002]	[0.003]	[0.003]
UP		0.182***		0.342***		0.0136***		0.0667***
		[0.015]		[0.013]		[0.001]		[0.003]
$\Pi$	-531821	-531094	4154726	4159051	-531821	-531094	4154726	4159051
N	8929690	8929690	8929654	8929654	8929690	8929690	8929654	8929654

Notes: Individual and firm characteristics as in specification (2) of Table 1. Country and industry dummies included. Zero-inflated beta regression, estimated with command ZOIB in STATA (Buis, 2010). Normalised weighted regression with robust standard errors, the weights are based on grossing-up factor for employees (from SES) normalised by the number of observation per country .

Source: own elaboration based on data from SES and WIOD.

# Extensions and robustness

- Economic significance: based on the interpretation of coefficients - not large
  - for example: the increase in GVC by 1 p.p. is associated with an average drop in relative wage by up to 3.9 p.p. (in case of a worker earning as much as the mean wage, 11.33 eur/h, it is equivalent to 0.44 eur per hour);
- Countries split by cross-country institutional differences: wage bargaining schemes, articulation of enterprise bargaining, coordination of wage-setting, opening clauses in collective agreement;
- Deeper analysis of country heterogeneity: NMS versus OMS
- Others: alternative measure of relative wages, additional country and sector variables

# Conclusions

- relative wages negatively associated with GVC growth
- ambiguous association for other indicators of working conditions:
  - workers in sectors with deeper GVC involvement are less likely to work overtime, but they are also more likely to have less stable remuneration.
  - yet for employees whose earnings already consist in part of bonus components, the share of bonuses in total earnings drops as GVC participation intensifies, which may mean more stable earnings.
- a modest strength of the relationship between GVCs and our measures of working conditions (taking into account changes in GVC over 10 years period)
- sensitivity analysis: for workers in different groups of European countries confirms that the association between global production chains and workers' well-being is context-dependent.

Thank you for your attention.

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