The Relative Impact of different Forces of Globalisation on Wage Inequality*

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Introduction

- In recent decades, the globalisation of economic activities has expanded rapidly, migration has reached unprecedented levels
- Globalisation and its effects hotly debated in politics and economics
  - *"Free trade warning – IMF, WTO and World Bank say it must be defended"* (The Guardian, April 2017)
- Globalisation fosters economic growth, however there are winners and losers
- Globalisation $\rightarrow$ income inequality

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Theoretical Framework of Globalisation Forces

- **Trade → Income Inequality**
  - *Heckscher-Ohlin model*: high level of unskilled (skilled) labor → decrease (increase) in income inequality
  - Feenstra & Hanson (1996): outsourcing of stages of production → rise in inequality in both regions ("North" and "South")
  - Diffusion of technology → skill-biased technologies → increase in income inequality
- **FDI → Income Inequality**
  - *Heckscher-Ohlin model* and Feenstra & Hanson (1997) same implications as above
  - FDI & entry of MNEs → higher demand for skilled labour → increase in inequality in host country
- **Migration → Income Inequality**
  - Effect depends on socio-economic and demographic characteristics of immigrants and native population
  - Substitutability → higher competition in labour market → decrease in wages of native workers
  - Complementarity → different skills → increase in productivity and wages of natives

Research Question

Question

What is the impact of globalisation forces,

- *Trade*
- *FDI*
- *Migration*

on wage inequality among native employees?

Two-step Approach

- Capture the impact at the individual level
- Apply the results in order to evaluate contribution to overall wage inequality

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Econometric Approach I

- **Augmented Mincer regression** → consider globalisation measures at the industry level
- Multilevel regression model → individual and industry level

$$y_{ijt} = \boldsymbol{X}'_{\boldsymbol{ijt}}\boldsymbol{\beta} + \boldsymbol{Z}'_{\boldsymbol{jt}}\boldsymbol{\gamma} + \delta_t + \nu_{jt} + \epsilon_{ijt} \tag{1}$$

y_{ijt}	hourly wage
$\boldsymbol{X_{ijt}}$	vector of covariates at the individual level $(k \times 1)$
$\boldsymbol{Z_{jt}}$	vector of covariates at the industry level $(r \times 1)$
δ_t	time fixed effect
ν_{jt}	industry random effect
ϵ_{ijt}	error term
$i = 1, \ldots, N$	individuals
$j = 1, \ldots, J$	industries
$t = 1, \ldots, T$	years

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Econometric Approach II

- **Shapley-value decomposition** (see Shorrocks, 2013)
  - Regression-based approach

$$\hat{y}_{123} = \hat{\beta}_1 x_1 + \hat{\beta}_2 x_2 + \hat{\gamma}_3 z_3$$

- Calculate wage inequality based on predicted values $\rightarrow \hat{Ineq}_{123}$
- Assessment of importance of variable groups $\rightarrow$ capture the relative contribution to wage inequality
  - Calculate predicted values by stepwise elimination of variables (variable groups)

$$C_1^{\{123\}} = \hat{Ineq}_{123}^{(0)} - \hat{Ineq}_{23}^{(1)}$$

$$C_1^{\{12\}} = \hat{Ineq}_{12}^{(1)} - \hat{Ineq}_{2}^{(2)} \quad \text{and} \quad C_1^{\{13\}} = \hat{Ineq}_{13}^{(1)} - \hat{Ineq}_{3}^{(2)}$$

$$C_1^{\{1\}} = \hat{Ineq}_{1}^{(2)}$$

- Overall contribution to wage inequality $\rightarrow$ average over all C_1
- *Caveat:* the number of combinations increases exponentially with each additional variable

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Data

- **Individual data**
  - *EU Statistics on Income and Living Conditions (EU-SILC)*: cross-sectional data from 2008 to 2013 → NACE at 1-digit level
  - Recodification of occupation (ISCO) in 2011 → separation of period of time: 2008-2010 & 2011-2013
    - Dependent variable: gross hourly wage
    - Explanatory variables: gender, age, age^2, education, occupation, temporary contract, firm size

- **Industry data**
  - *Migration*: share of foreign born → *EU-LFS*
  - *Trade*: domestic and foreign VAX-VA-ratio, inter- and intra-industry offshoring → *WIOD*
  - *FDI*: inward and outward FDI stocks → *Eurostat & OECD*
  - Additional explanatory variables: business enterprise R&D stocks (PIM), value-added per employee

  - Minimize the number of explanatory variables for *Trade* and *FDI* → principal-component analysis (PCA)

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Augmented Mincer Regression, 2011-2013

Dep. variable:	*gross hourly wage (ihs-transformed)*								
Country	**AT**	**DE**	**EL**	**ES**	**FR**	**IT**	**PL**	**UK**	**HU**
female	-0.122***	-0.135***	-0.104***	-0.136***	-0.0731***	-0.0793***	-0.116***	-0.130***	-0.127***
	(0.0204)	(0.0203)	(0.0202)	(0.0239)	(0.0155)	(0.0305)	(0.0196)	(0.0133)	(0.0228)
age	0.0529***	0.100***	0.0466***	0.0362***	0.0271***	0.0427***	0.0301***	0.0386***	0.0191***
	(0.00941)	(0.00429)	(0.00523)	(0.00485)	(0.00813)	(0.00405)	(0.00366)	(0.00446)	(0.00402)
age × *age*	-0.000494***	-0.00103***	-0.000416***	-0.000285***	-0.000222**	-0.000372***	-0.000301***	-0.000402***	-0.000182***
	(0.000125)	(5.42e-05)	(5.44e-05)	(4.82e-05)	(9.08e-05)	(5.55e-05)	(4.07e-05)	(4.77e-05)	(5.58e-05)
reg. interm.	0.0450**	0.0606***	0.00880	0.0494***	0.0131	0.0308**	0.0544***	-0.00164	0.0399***
	(0.0196)	(0.00623)	(0.0345)	(0.0176)	(0.0134)	(0.0129)	(0.0146)	(0.0204)	(0.00791)
reg. urban	0.0440*	0.0926***	0.000449	0.0766***	0.0403***	0.0390**	0.0817***	0.00702	0.103***
	(0.0240)	(0.00902)	(0.0192)	(0.0263)	(0.00707)	(0.0170)	(0.0204)	(0.0208)	(0.0110)
sec. edu	-0.0876*	0.489**	0.137***	0.109***	0.144***	0.194***	0.0716***	-0.0888**	0.0983***
	(0.0512)	(0.197)	(0.0318)	(0.0232)	(0.0284)	(0.0285)	(0.0176)	(0.0385)	(0.0322)
tertiary edu	0.0376	0.696***	0.241***	0.265***	0.290***	0.319***	0.254***	0.135***	0.347***
	(0.0537)	(0.204)	(0.0395)	(0.0368)	(0.0349)	(0.0316)	(0.0349)	(0.0352)	(0.0383)
occup. medium	0.200***	0.205***	0.0589	0.102***	0.0133	0.147***	0.118***	0.0956***	0.142***
	(0.0417)	(0.0401)	(0.0559)	(0.0160)	(0.0342)	(0.0335)	(0.0256)	(0.0281)	(0.0141)
occup. high	0.450***	0.457***	0.204***	0.314***	0.246***	0.315***	0.387***	0.412***	0.351***
	(0.0411)	(0.0472)	(0.0740)	(0.0331)	(0.0194)	(0.0418)	(0.0406)	(0.0245)	(0.0178)
temp. contract	-0.168***	-0.296***	-0.212***	-0.302***	-0.192***	-0.264***	-0.118***	0.0312	-0.169***
	(0.0442)	(0.0342)	(0.0475)	(0.0234)	(0.0155)	(0.0231)	(0.0134)	(0.0474)	(0.0313)
medium firm	0.0943***	0.129***	0.0576***	0.127***	0.193**	0.163***	0.0685***	0.0952***	0.0765***
	(0.0237)	(0.0247)	(0.0130)	(0.0263)	(0.0966)	(0.0149)	(0.0214)	(0.0324)	(0.0122)
large firm	0.201***	0.307***	0.0959***	0.276***	0.284***	0.260***	0.156***	0.195***	0.150***
	(0.0229)	(0.0410)	(0.0159)	(0.0271)	(0.0944)	(0.0195)	(0.00910)	(0.0364)	(0.0146)
Observations	7,243	25,901	6,909	11,500	20,554	30,906	27,651	11,086	23,051
Industries	12	12	13	11	12	13	13	12	13

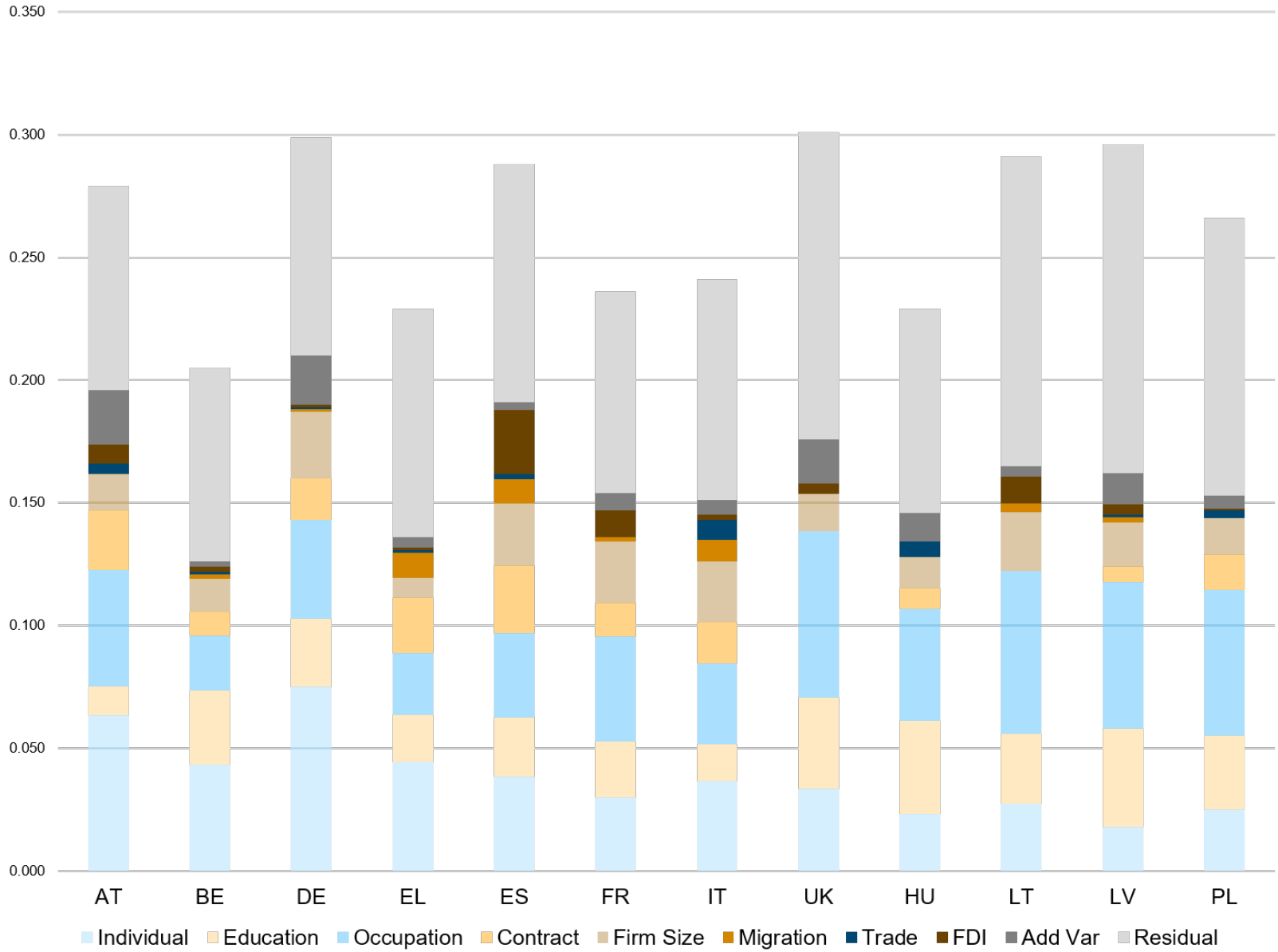
Notes: Selected results, robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Augmented Mincer Regression, 2011-2013

Dep. varable:	*gross hourly wage (ihs-transformed)*								
Country	**AT**	**DE**	**EL**	**ES**	**FR**	**IT**	**PL**	**UK**	**HU**
mig. share	-0.000379	0.00339	-0.00516**	-0.00516**	-0.00344	-0.00444**	0.0385	-0.000257	0.00922
	(0.00598)	(0.00576)	(0.00233)	(0.00248)	(0.00317)	(0.00203)	(0.0443)	(0.00466)	(0.00585)
trade PC	-0.0225	-0.0270	0.00776	-0.0531***	-0.0166	-0.0274*	0.0227	0.000593	0.0316**
	(0.0163)	(0.0356)	(0.0125)	(0.0171)	(0.0138)	(0.0145)	(0.0169)	(0.0129)	(0.0127)
FDI PC	0.0328*	-0.0118	-0.00698	0.116***	0.0351**	0.0167	0.00595	0.0134	-0.00537
	(0.0190)	(0.0138)	(0.00485)	(0.0262)	(0.0154)	(0.0236)	(0.0158)	(0.0184)	(0.00943)
VA p.e.	0.288**	-0.0453	0.0515	0.0537	-0.0470	0.0734	0.0477	0.219***	0.143***
	(0.131)	(0.0818)	(0.0693)	(0.0630)	(0.0646)	(0.0845)	(0.0297)	(0.0772)	(0.0482)
RD p.e.	-0.00350	0.0390*	-0.00237	-0.0252**	0.0160	0.00521	-0.0163*	-0.0170	-0.0242***
	(0.00668)	(0.0227)	(0.00891)	(0.0119)	(0.0116)	(0.0118)	(0.00970)	(0.0162)	(0.00732)
Observations	7,243	25,901	6,909	11,500	20,554	30,906	27,651	11,086	23,051
Industries	12	12	13	11	12	13	13	12	13

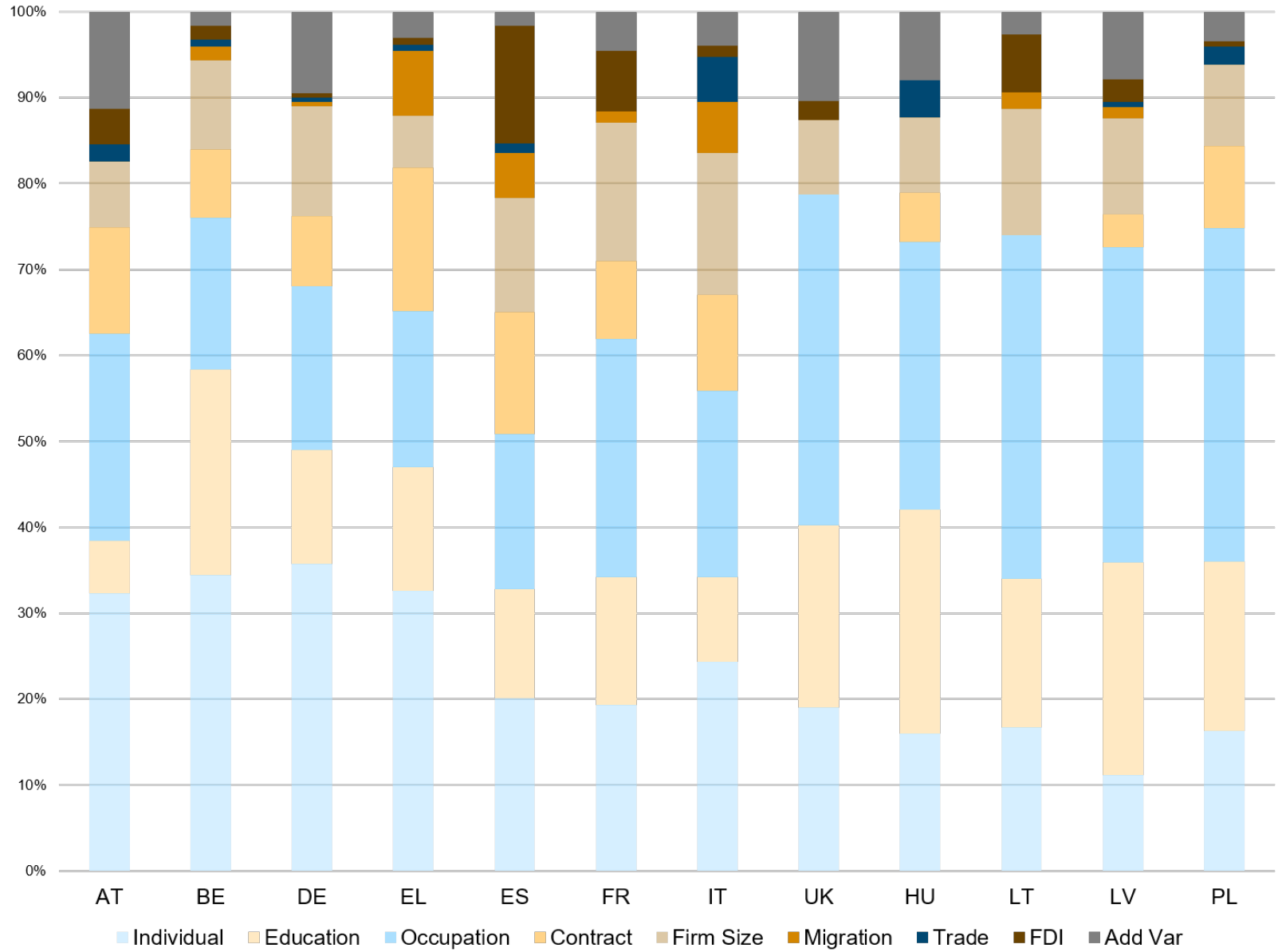
Notes: Selected results, robust standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Shapley-value decomposition – GINI, 2011-2013



Note: Own calculations and illustration.

Shapley-value decomposition – GINI, 2011-2013



Note: Own calculations and illustration.

Shapely-Value Decomposition – Inequality Measure

- **Choice of inequality measure**
  - *Gini-index*: more weight on the centre of the wage distribution
  - *GE(0)-index*: more sensitive to the bottom tail of the wage distribution
  - *GE(2)-index*: more sensitive to the upper tail of the wage distribution

- GE(0) and GE(2): in most cases overall explained part of inequality only one third

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Concluding Remarks

- **Summary**
  - Major part of wage inequality can be ascribed to individual worker characteristics → eduction, occupation, gender, age, ...
  - Globalisation effects are quite heterogeneous
    - Migration contributes to wage inequality among natives in Southern European countries
    - No clear pattern for trade and FDI
- **Caveats**
  - Data issues in general
  - Highly aggregated industries → low level of variation
  - Globalisation also affects labour market participation → selection bias

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References

Feenstra, R. C. & Hanson, G. H. (1996). Globalization, outsourcing, and wage inequality. *The American Economic Review*, *86*(2), 240.

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Shorrocks, A. F. (2013). Decomposition procedures for distributional analysis: a unified framework based on the shapley value. *Journal of Economic Inequality*, 1–28.

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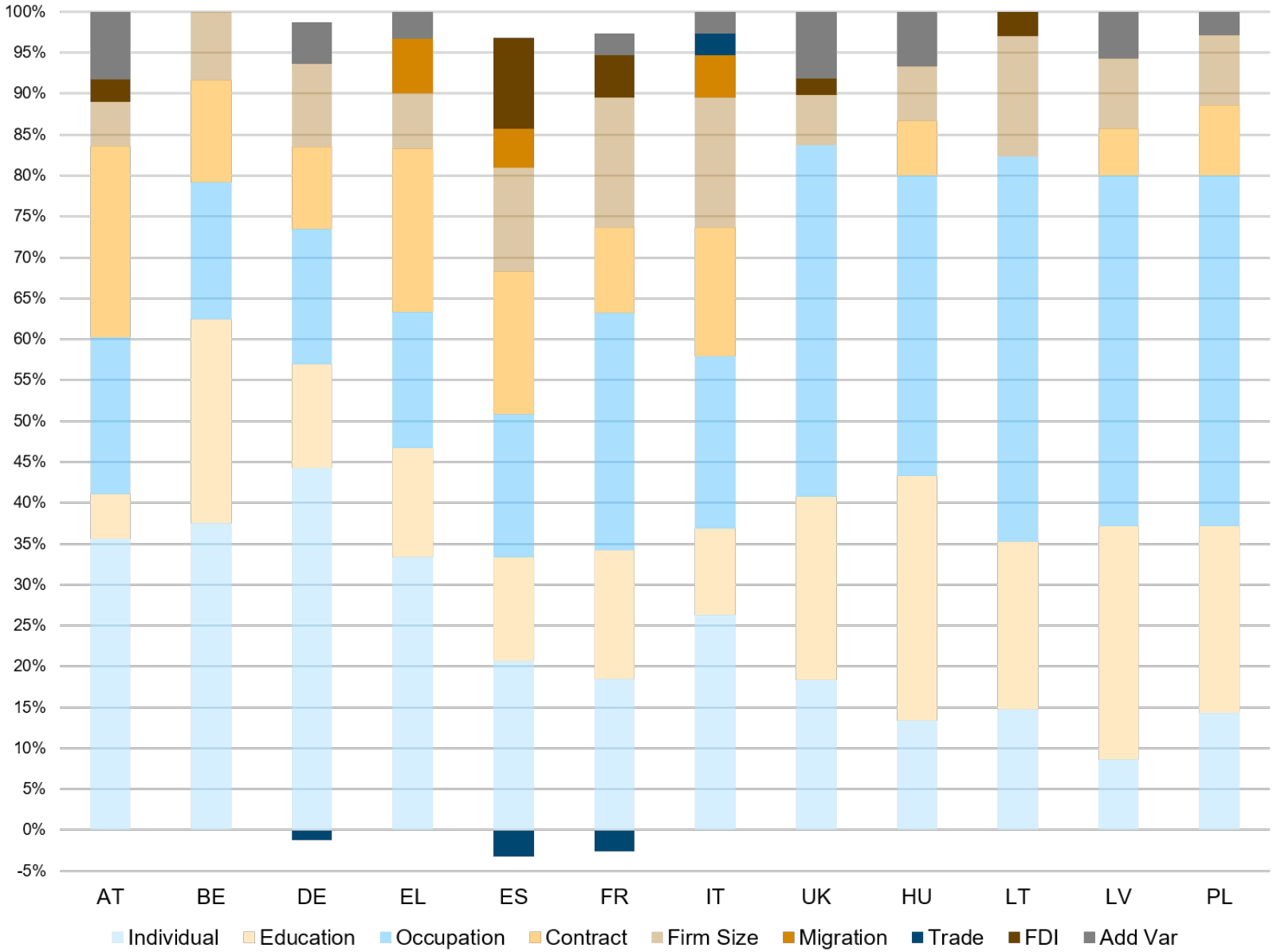
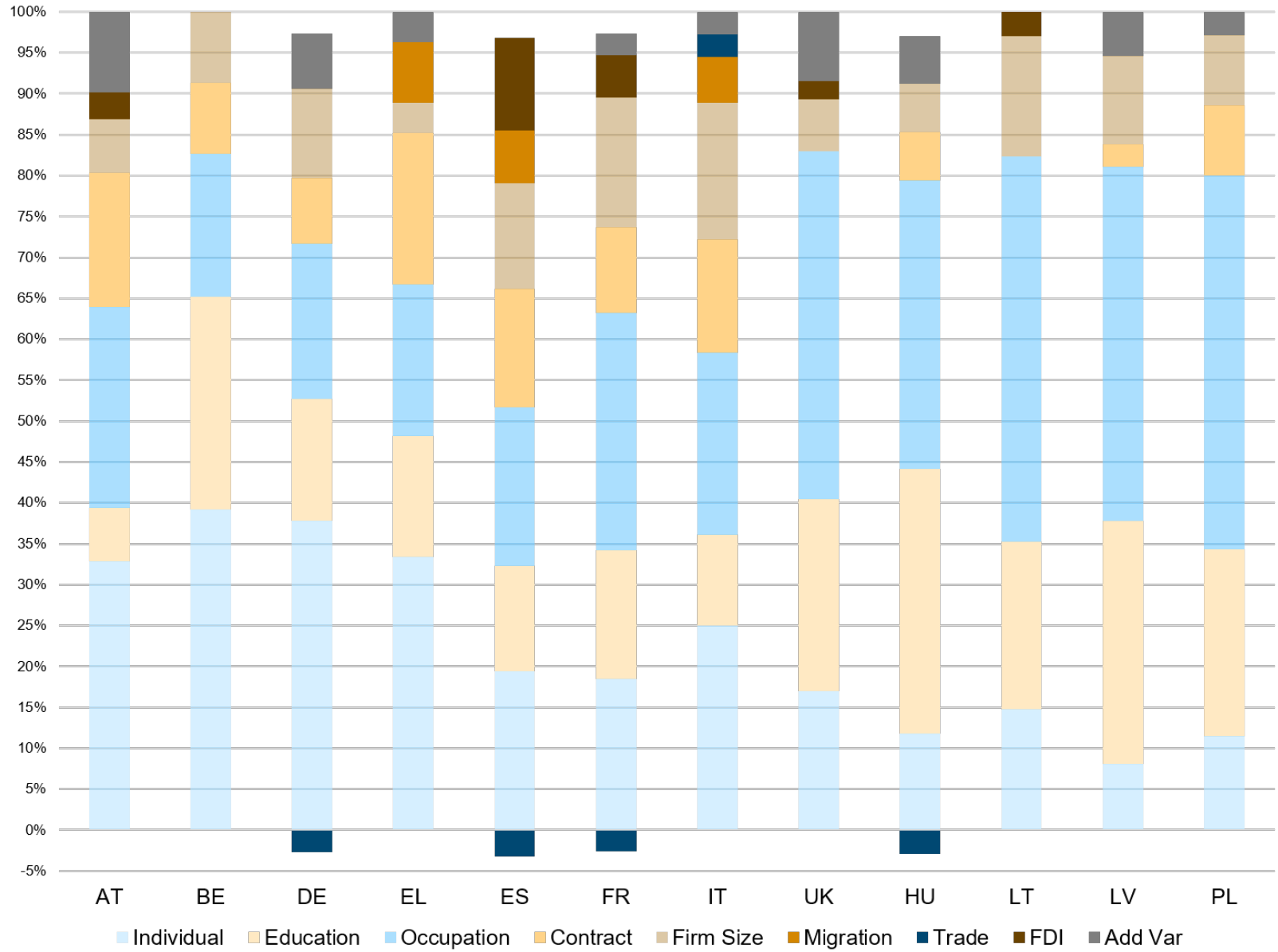
Shapley-value decomposition – GE(0), 2011-2013



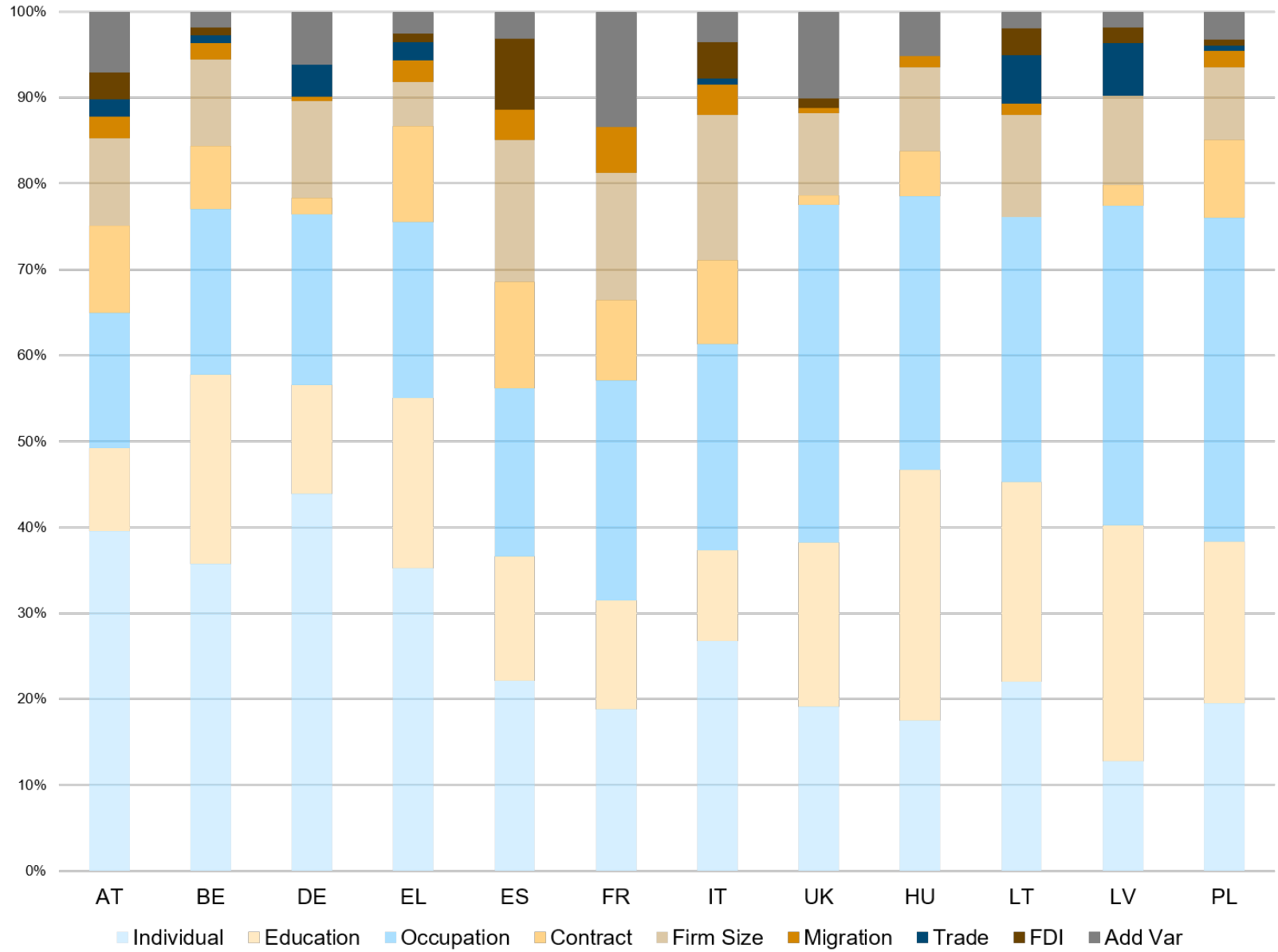
Note: Own calculations and illustration.

Shapley-value decomposition – GE(2), 2011-2013



Note: Own calculations and illustration.

Shapley-value decomposition – GINI, 2008-2011



Note: Own calculations and illustration.