

Exporters and the Rise in Wage Inequality: Evidence from German Linked Employer-Employee Data

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Motivation

- Period of increasing trade liberalization and rising wage dispersion in most industrialized countries.
- Proximate (potential) driver: wage differential between exporters and non-exporters \Rightarrow focus of this paper.
- Exporter wage gap may influence changes in aggregate wage dispersion over time via two channels:
 - 1 relative employment shares may change
 - 2 size of the wage differential may change

Sketch of analysis

- Inclusion of establishment-level export information in a Juhn-Murphy-Pierce type decomposition of changes in the wage distribution.
- Three components: changes in observable characteristics, changes in prices for these characteristics, and changes in residual inequality.
- Contribution of exporting to wage dispersion after netting out changes in skill distribution and skill prices \Rightarrow intra-group inequality brought into focus.

Related empirical literature

- Exporters pay higher wages: Bernard and Jensen (1995); Schank et al. (2007); Munch and Skaksen (2008); Frías et al. (2009).
- Increase in German wage dispersion: e.g., Dustmann et al. (2009).
- Exporters and wage inequality
 - Bernard and Jensen (1997): employment shifts between exporters and non-exporters and the rising demand for skill.
 - Klein et al. (2010): skill structure of the exporter wage premium.
⇒ focus on between-group wage inequality

Theory

Two dimensions:

- 1 Why do we observe the wage differential between exporters and non-exporters?
⇒ Worker heterogeneity vs firm heterogeneity + labour market imperfections
- 2 Given the explanation for (1), what is the impact of increasing trade liberalization on the wage differential and on overall wage dispersion?

Theories elaborated within the Melitz (2003) framework.

Trade liberalization, the exporter wage gap, and overall wage dispersion: theoretical predictions

- Yeaple (2005):
increased worker sorting; rising wage differential and rising between-group wage inequality but no effect on intra-group wage inequality.
- Davis and Harrigan (forthcoming); Egger and Kreickemeier (2009):
wage differential between firms stable but (intra-group) inequality affected through firm selection and worker reallocation.
- Helpman et al. (2010); Egger and Kreickemeier (2008, 2010):
(intra-group) inequality affected by rising wage differentials between firms as well as by firm selection and worker reallocation.

Effect of firm selection and worker reallocation is ambiguous and depends on initial degree of openness.

Data

- LIAB – linked employer-employee data set supplied by the Institute for Employment Research (IAB).
- Cross-sectional model (QM 1); date of reference: 30th of June of each year
- Sample restrictions: period 1996–2007; manufacturing sector; male full-time employees in regular employment, aged 18–65.

Wage dispersion trends in German manufacturing

Log daily real wages of male full-time workers:

	1996	2007	Change
Standard deviation:			
- Total	0.367	0.461	0.094
- Between establishments	0.260	0.343	0.083
- Within establishments	0.258	0.307	0.049
85-15	0.712	0.875	0.163
85-50	0.409	0.471	0.062
50-15	0.303	0.405	0.101

Note: author's calculation. Source: LIAB, worker sample. Cross-sectional sampling weights have been employed.

Period of increased trade integration

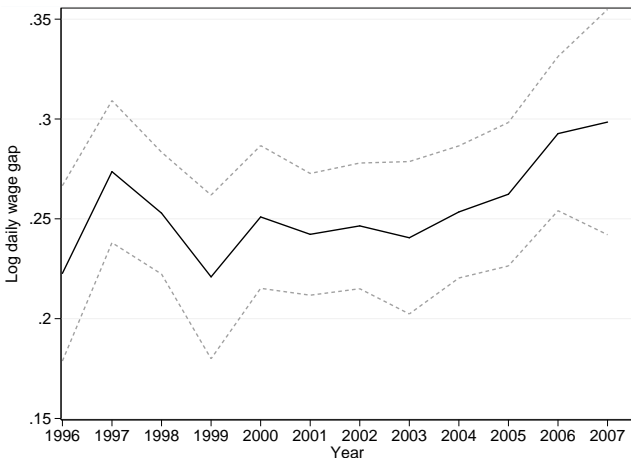
- Deepening of European integration (introduction of euro, enlargement).
- WTO accession of China.
- ...

	1996	2007	Change (in %)
Share of exporters	18.44	24.79	34.44
Export share in sales of exporters	19.62	30.91	57.51
Export share in sales of all establishments	3.62	7.66	111.74
Employment share of exporters			
- All workers	60.87	64.55	6.05
- Regression sample	63.77	70.22	10.11
Ratio of goods exports to GDP	21.43	40.40	88.50
Ratio of goods imports to GDP	18.53	32.20	73.75

Source: LIAB, establishment sample and German Federal Statistical Office. Summary statistics of the LIAB data employ cross-sectional sampling weights.

Evolution of the raw exporter wage gap

No controls.



Note: Author's calculation. Source: LIAB, worker sample. Cross-sectional sampling weights have been employed. Confidence interval accounts for clustering at establishment level.

Decomposition of changes in wage distribution I

- Regression-based decomposition of changes in wage distribution after Juhn, Murphy and Pierce (1993). Here, I use the variant proposed by Lemieux (2002).
- Extension of the Blinder-Oaxaca decomposition for mean differences to differences in the distribution.
- Three components: changes in observable characteristics, changes in prices for these characteristics, and changes in residual inequality.

Decomposition of changes in wage distribution II

$$\ln w_{il} = X'_{il}\beta_l + u_{il} \quad \text{for } l = t, s \quad \text{with } u_{il} = F_l^{-1}(\theta_{il}|X_{il})$$

$$\text{Counterfactual 1: } \ln w_{it}^{C1} = X'_{it}\beta_s + F_t^{-1}(\theta_{it}|X_{it}).$$

$$\text{Counterfactual 2: } \ln w_{it}^{C2} = X'_{is}\beta_s + F_t^{-1}(\theta_{it}|X_{is}).$$

$$\text{Counterfactual 3: } \ln w_{it}^{C3} = X'_{is}\beta_s + F_s^{-1}(\theta_{it}|X_{is}).$$

$$\ln w_{it}^{C3} = \ln w_{is}.$$

Decomposition of changes in wage distribution III

- Use of the reweighting factor proposed by DiNardo, Fortin and Lemieux (1996) to account for changes in X (cf. Lemieux, 2002)

$$\psi_i = [P_{is}/(1 - P_{is})] * [(1 - P_s)/P_s]$$

with $P_{is} = Pr(\text{period} = s | X_i)$.

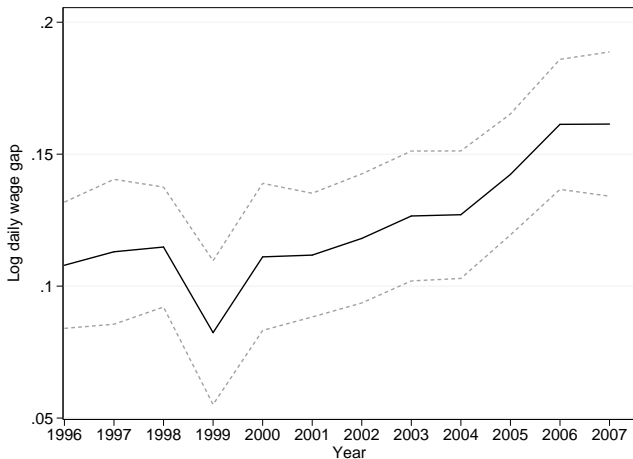
- Sequential decomposition:
 - 1 export coefficient effect
 - 2 coefficient effect of remaining variables
 - 3 export characteristics effect
 - 4 characteristics effect of remaining variables
 - 5 residual effect
- Path dependence acknowledged \Rightarrow reverse-order decomposition.
- Statistical inference based on a bootstrap (200 replications) of the whole decomposition.

Decomposition of changes in wage distribution IV

- Specification I (short model):
 - worker characteristics (age \times education dummies, quadratic term of tenure, dummies for foreign nationality and position as master craftsman).
 - industry dummies.
 - region dummies.
- Specification II (extended model):
 - specification 1 + establishment characteristics (quadratic term of log size, dummies for state-of-the-art technology, single establishments, works council, existence of collective bargaining agreements).

Evolution of the conditional exporter wage gap I

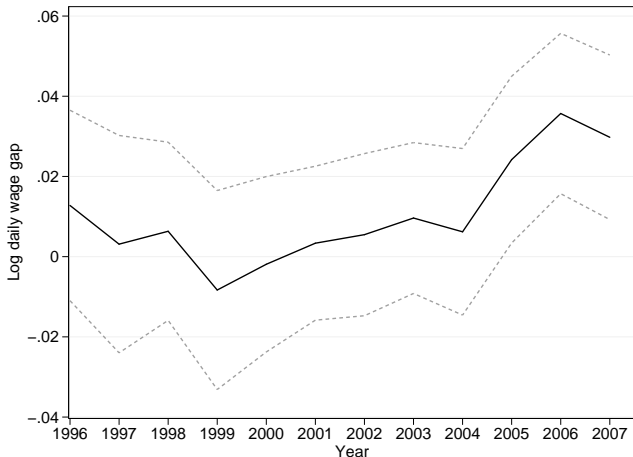
Individual controls; industry and region dummies.



Note: Author's calculation. Source: LIAB, worker sample. Cross-sectional sampling weights have been employed. Confidence interval accounts for clustering at establishment level.

Evolution of the conditional exporter wage gap II

Individual **and establishment** controls; industry and region dummies.



Note: Author's calculation. Source: LIAB, worker sample. Cross-sectional sampling weights have been employed. Confidence interval accounts for clustering at establishment level.

Decomposition results: short model

Default order		85-15		85-50		50-15	
		logs	[%]	logs	[%]	logs	[%]
Coefficients	Export	0.0192 (0.0062)	[11.73]	0.0041 (0.0023)	[6.53]	0.0151 (0.0052)	[14.93]
	Other	0.0914 (0.0289)	[55.88]	0.0302 (0.0094)	[48.43]	0.0612 (0.0222)	[60.47]
	Total	0.1105 (0.0297)	[67.60]	0.0343 (0.0103)	[54.96]	0.0763 (0.0221)	[75.39]
Characteristics	Export	-0.0128 (0.0077)	[-7.84]	0.0004 (0.0040)	[0.70]	-0.0133 (0.0061)	[-13.10]
	Other	0.0249 (0.0201)	[15.26]	0.0105 (0.0113)	[16.91]	0.0144 (0.0154)	[14.24]
	Total	0.0121 (0.0228)	[7.42]	0.0110 (0.0122)	[17.61]	0.0012 (0.0175)	[1.14]
Residual		0.0408 (0.0195)	[24.98]	0.0171 (0.0167)	[27.44]	0.0237 (0.0121)	[23.47]
Total		0.1635 (0.0296)	[100]	0.0623 (0.0229)	[100]	0.1012 (0.0122)	[100]

Decomposition results: short vs extended model

Default order		85-15		85-15	
		Short model		Extended model	
		logs	[%]	logs	[%]
Coefficients	Export	0.0192 (0.0062)	[11.73]	0.0063 (0.0057)	[3.78]
	Other	0.0914 (0.0289)	[55.88]	0.1019 (0.0199)	[60.87]
	Total	0.1105 (0.0297)	[67.60]	0.1082 (0.0196)	[64.66]
Characteristics	Export	-0.0128 (0.0077)	[-7.84]	-0.0010 (0.0083)	[-0.60]
	Other	0.0249 (0.0201)	[15.26]	0.0791 (0.0237)	[47.29]
	Total	0.0121 (0.0228)	[7.42]	0.0781 (0.0259)	[46.69]
Residual		0.0408 (0.0195)	[24.98]	-0.0190 (0.0249)	[-11.35]
Total		0.1635 (0.0296)	[100]	0.1674 (0.0286)	[100]

Decomposition results: within vs between skill groups

Short model Default order		sd between		sd within	
		logs	[%]	logs	[%]
Coefficients	Export	0.0030 (0.0010)	[4.66]	0.0079 (0.0026)	[11.14]
	Other	0.0275 (0.0037)	[42.94]	0.0321 (0.0096)	[45.26]
	Total	0.0305 (0.0039)	[47.59]	0.0400 (0.0096)	[56.41]
Characteristics	Export	-0.0033 (0.0027)	[-5.22]	-0.0041 (0.0022)	[-5.75]
	Other	0.0309 (0.0077)	[48.30]	0.0003 (0.0059)	[0.38]
	Total	0.0276 (0.0083)	[43.08]	-0.0038 (0.0067)	[-5.37]
Residual		0.0060 (0.0076)	[9.33]	0.0347 (0.0052)	[48.97]
Total		0.0640 (0.0122)	[100]	0.0709 (0.0081)	[100]

Summary of main findings

- In the period 1996 to 2007 the raw wage differential between individuals employed at exporters and the ones working for non-exporters has increased by almost 0.08 log points.
- Most of the increase cannot be accounted for by observable characteristics.
- The increase in the wage gap has contributed to growing overall wage dispersion.
- In contrast, the increasing employment share of exporters has worked towards reducing wage dispersion.
- Net contribution is positive (i.e., inequality-increasing) but moderate.
- Findings are consistent with theoretical models that feature an exporter wage premium that increases with rising trade liberalization (Helpman et al., 2010; Egger and Kreickemeier, 2008, 2010).

Thank you for your attention!