

## Appendix A: Empirical literature studying the relationship between wage dispersion and firm performance

Study	Country	Data	Wage Dispersion Measure	Conditional Wage dispersion	Firm performance indicator	Control for: simultaneity /state dependence	Method	Results of the relationship
Leonard (1990)	US	Panel data on executives in 439 corporations (1981-1985)	Standard deviation of pay	No	Return on equity	No/No	OLS/Fixed Effects	No significant relationship
Cowherd and Levine (1992)	USA, UK	Cross section of 102 business units	Wage differences between (a) management and hourly paid workers & (b) upper and lower management	No	Product quality index	No/No	OLS	Negative for both (a) and (b)
Pfeffer and Langton (1993)	US	Cross section of 17,000 college and university professors (1969)	CV** of wages	No	(a) Workers' satisfaction, (b) number of publications (productivity) and (c) cooperation	No/No	OLS	Negative impact on (a), (b) and (c)
Eriksson (1999)	Denmark	Panel data on executives in 210 firms (1992-1995)	CV of wages	No	Profit-sales ratio	No/No	OLS/Fixed Effects	Weak positive impact
Winter-Ebmer and Zweimüller (1999)	Austria	Panel of 130 firms (1975-1991)	Variances of residuals from wage equation	Yes	Standardized wages	No/No	OLS/Fixed Effects	OLS: Hump-shaped relationship for BC* and WC* workers FE: No significant impact for BC; flatter hump-shaped relationship for WC

Hibbs and Locking (2000)	Sweden	Panel at industry level (1964-1993) and firm level (1972-1993)	Within and between CV	No	Value-added per worker	No/Yes	OLS	Positive for within and negative for between inequality
Bingley and Eriksson (2001)	Denmark	LEE***- panel data for 22,665 firms (1992-1995)	Variance of residuals from wage equation	Yes	(a) Total factor productivity and (b) sickness absence	Yes/No	2SLS	(a) Hump-shaped relationship for WC on TFP, not for BC (b) Positive (for both BC and WC) on sickness
Beaumont and Harris (2003)	UK	Panel data (1978-1995)	Ratio of wages to manual to non-manual labor	No	Gross value-added per worker	Yes/Yes	Arellano-Bond (GMM)	Positive impact of wage dispersion on most industrial sector (4 out of 5)
Grund, Westergard-Nielsen (2004)	Denmark	LEE panel data (1992-1997)	CV of wages and wage increases	No	Value-added	No/No	OLS/Fixed Effects	(a) Hump-shaped for wages and (b) U-shaped for wage increases
Heyman (2005)	Sweden	LEE panel data for WC workers and managers in private sector (1991 and 1995)	(a) Variance of residuals from wage equation, (b) CV and (c) 90/10 percentile ratio	Yes (for WC workers)	(a) Profits per employee, (b) average wage and (c) variance of sales	Yes/no	OLS, 2SLS and First differences	Positive impact for WC workers and managers
Koubi and Roux (2006)	France	Panel data of 60551 firms (1994-2002)	Variance of residuals from wage equation	Yes	(a) Value-added per worker and (b) Gross operation surplus divided by capital	Yes/No	OLS, Long differences and GMM	Positive impact of wage dispersion on productivity on most sector investigated
Jirjahn and Kraft (2007)	Germany	Firm-level cross section (1997)	Wage differences between unskilled BC workers and skilled WC workers	No	Value-added	No/No	OLS	Results vary and are mostly insignificant
Lallemand et al. (2007)	Belgium	LEE cross section (1995)	(a) Variance of residuals from wage equation and (b) SD of wages, (c) CV and (d) wage differentials	Yes	Gross operating surplus	No/No	2SLS	Positive and larger for BC workers

Braakmann (2008)	(West) Germany	Panel data of 11,000 firms (1995-2005)	(a) Variance of residuals from wage equation and (b) CV	Yes	Sales per worker	Yes/Yes	Fixed Effect/Arellano-Bond (GMM)	FE: Negative or U-shaped relationship GMM: Hump-shaped relation always insignificant
Grund, Westergard-Nielsen (2008)	Denmark	Panel data of 5,736 firms (1992-1997)	CV of wages	No	Value-added per employee	No/Yes	OLS/Fixed Effects	OLS: Hump-shaped relationship FE: No significant relationship
Martins (2008)	Portugal	Panel data of 4735 firms (1991-2000)	Variance of residuals from wage equation	Yes	Sales per worker	No/No	OLS/Fixed Effects	OLS: Positive relationship FE: Negative relationship
Hunnes (2009)	Norway	Panel data for WC workers in 1,723 firms (1986-1997)	Variance of residuals from wage equation	Yes	(a) Gross production and (b) profits per employee	Yes/No	OLS/Fixed Effects	OLS: Positive relationship FE: Negative relationship
Mahy, Rycx and Volral (2009)	Belgium	LEE cross section (2003) of 649 firms	Variance of residuals from wage equation	Yes	Value-added per worler	Yes/No	OLS	Hump-shaped relationship, stronger for highly skilled workers, and firms operating in a more stable environment
Mahy, Rycx and Volral (2011)	Belgium	LEE panel data of 9,254 firms (1999-2006)	Variance of residuals from wage equation	Yes	Value-added per worler	Yes/Yes	OLS/FE/Arellano-Bond (GMM)	Positive impact, lower for higher dispersion levels, and stronger among firms with higher proportion of highly skilled workers
Aperte (2013)	Finland	LEE panel of (1990-1992)	Variance of residuals from wage equation	Yes	(a) Sales per person and (b) Value-added per worker	Yes/No	Random Effects/ Fixed Effects	Positive and significant relationship, quadratic relationship when regressed on (a)

\* BC and WC abbreviate for blue-collar and white-collar, respectively

\*\* CV stands for Coefficients of Variation, which is the Standard Deviation divided by the mean

\*\*\* LEE stands for Linked Employer Employee

## Appendix B: Descriptive statistics

**Table i.** Means and Standard deviations of Variables at workers' level, by region

Variables	Mean	Standard Deviation	Regions		
			Wallonia	Flanders	Brussels
Quarterly gross wage	7,902.76	5,909.286	7080.61	7445.71	8561.63
Age (years)	38.23	10.5	38.5	38.4	38.0
Male (%)	72.54	23.38	76.4	73.8	61.3
Blue collar (%)	52.54	34.08	59.05	55.91	28.10
Working time over the quarter (%)	89.60	8.36	88.95	89.79	89.73
Starters* (%)	11.97	11.96	11.90	11.49	14.14
	Count				
Number of Employees	377,778				
Number of firms	2,354				

\* Starters are people who just joined the firm

**Table ii.** Means and Standard deviations of Variables at firm level, by region

Variables	Mean	Standard Deviation	Regions		
			Wallonia	Flanders	Brussels
Firm productivity					
Value added per worker in thousands of EUR (Annual)	86.62	109.42	71.37	85.03	116.14
Intra-Firm wage dispersion					
$\sigma_{C;t}$	.28	.20	.28 (.15)	.26 (.18)	.34 (.33)
$\sigma_{U;t}$	.32	.21			
Control Variables					
i. Workforce composition					
Size (number of workers)	159.9	591.3	125.85	136.83	312.05
Share of workforce aged <25	12.02		12.16	12.03	11.73
Share of workforce aged >50	14.77		15.53	14.52	14.77
Share of male	72.54		76.43	73.78	61.31
Share of blue collars workers	52.54		59.05	55.91	28.10
Share of starters	11.97		11.90	11.49	14.14
ii. Firm Characteristics					
Capital per worker in thousands of EUR	380.3	4,950	125.33	325.22	1,020
Sector of economic activity:					
Manufacturing [C]	33.77		35.94	37.31	14.96
Construction [F]	12.70		17.69	12.23	7.51
Wholesale and retail trade; repair of motor vehicles and motorcycles [G]	24.47		23.02	24.19	27.84
Transporting and storage [H]	8.95		7.74	10.5	3.86
Information and communication [J]	4.20		2.69	3.31	10.34
Professional, scientific and technical activities [M]	5.15		3.02	3.47	15.71
Others	10.76		9.91	8.99	19.78
Total	100		100	100	100
	Count				
Number of firms	2,354		21.2	64.28	14.71

For regions, cells contain means with standard deviation in parentheses

## Appendix C: Detailed regression results

*Table i. Detailed OLS/FE Results of the basic specification*

	Dependent variable: value added per workers (log of)			
	OLS		FE	
$\sigma_{C;t}$	-0.0468 (0.0292)	0.122* (0.0596)	-0.00304 (0.0215)	-0.0450 (0.0356)
$\sigma_{C^2;t}$		-0.0749*** (0.0220)		0.0268 (0.0242)
Intercept	3.518*** (0.0553)	3.474*** (0.0574)	3.980*** (0.0741)	3.990*** (0.0735)
Capital per employee (lof of)	0.186*** (0.00970)	0.185*** (0.00971)	0.0955*** (0.00773)	0.0953*** (0.00774)
Information and communication [J]	0.0355 (0.0700)	0.0368 (0.0701)		
Manufacturing [C]	0.140*** (0.0250)	0.140*** (0.0250)		
Professional, scientific and technical activities [M]	0.0302 (0.0650)	0.0278 (0.0647)		
Transporting and storage [H]	0.219*** (0.0367)	0.219*** (0.0368)		
Wholesale and retail trade; repair of motor vehicles and motorcycles [G]	0.0184 (0.0320)	0.0177 (0.0320)		
Other sectors	0.281*** (0.0517)	0.274*** (0.0519)		
Share of male	0.365*** (0.0420)	0.365*** (0.0419)	-0.0019 (0.086)	-0.00003 (0.086)
Share of blue collar workers	-0.641*** (0.0378)	-0.627*** (0.0382)	-0.288*** (0.0786)	-0.294*** (0.0788)
Share of young workers (<25)	-0.479*** (0.0793)	-0.487*** (0.0795)	0.0104 (0.0640)	0.0141 (0.0647)
Share of starters (< one year in the firm)	0.0126 (0.0558)	0.00472 (0.0553)	0.0215 (0.0297)	0.0212 (0.0298)
Firm Size (number of workers)	0.000006 (0.00001)	0.000005 (0.00001)	-0.00009*** (0.00001)	-0.00009*** (0.00001)
Year Dummy F-stat (p-value)	5.36 (0.000)	5.53 (0.000)	Yes	Yes
Interaction year*sector F-stat (p-value)	2.07 (0.000)	2.13 (0.000)	Yes	Yes
Number of observations	16848	16848	16848	16848
Adjusted R <sup>2</sup>	0.440	0.441	0.446	0.450
SD ind. Comp.			0.455	0.456
SD error Comp.			0.212	0.212
rho			0.822	0.822
F	28.60	28.50	16.45	16.31
Hausman			0.000	0.000

Coefficients, robust (for heteroskedasticity & serial correlation) standard errors in parentheses. \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001. Equation 5:  $\ln(\text{productivity}_{jt}) = \beta_0 + \sigma_{jt}\beta_1 + \sigma_{jt}^2\beta_2 + z_{jt}\beta_3 + y_{jt}\beta_4 + \theta_t(+\mu_j) + \omega_{jt}$

**Table ii.** OLS/FE results of firm level wage regression at different proportions of blue and white collar workers

	Dependent variable: value added per workers (log of)					
	OLS		OLS		FE	
$\sigma_{C;t}$	0.313** (0.121)	0.724*** (0.210)			-0.0469 (0.0615)	-0.163 (0.104)
$\sigma_{C;t}^2$		-0.331** (0.102)				0.108 (0.0771)
Share of bcol *	-0.512** (0.157)	-0.914*** (0.265)			0.0627 (0.0789)	0.159 (0.126)
$\sigma_{C;t}$		0.373** (0.122)				-0.104 (0.0854)
$\sigma_{C;t-1}$			0.251** (0.0839)	0.527** (0.173)		
$\sigma_{C;t-1}^2$				-0.174* (0.0743)		
Share of bcol *			-0.423*** (0.112)	-0.632** (0.224)		
$\sigma_{C;t-1}$				0.160 (0.0969)		
Share of bcol	-0.491*** (0.0607)	-0.403*** (0.0778)	-0.518*** (0.0498)	-0.466*** (0.0677)	0 (.)	0 (.)
Intercept	3.407*** (0.0664)	3.319*** (0.0781)	3.434*** (0.0608)	3.368*** (0.0713)	3.966*** (0.0778)	3.988*** (0.0785)
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes
Interaction year * sector	Yes	Yes	Yes	Yes	Yes	Yes
Sector dummy	Yes	Yes	Yes	Yes	No	No
Firm Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Worker Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
N	16848	16848	16848	16848	16848	16848
adj. R <sup>2</sup>	0.442	0.443	0.441	0.442	0.128	0.129
Number of Firms					2320	2320
SD of individual Component					0.448	0.449
SD of idiosyncratic Component					0.214	0.214
rho					0.815	0.815
Hausman p- value					0.000	0.000
F test that all $\mu_j$ = 0: (p-value)					0.000	0.000

Notes: Coefficients, robust (for heteroskedasticity & serial correlation) standard errors in parentheses.

\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001. 'Share of bcol' is a continuous variable describing the proportion of blue collar workers in each firm. Equation (7):  $\ln(\text{productivity}_{jt}) = \beta_0 + \text{bcol}_{j,t} \beta_1 + \sigma_{C;j,t} \beta_2 * \text{bcol}_{j,t} + \sigma_{jt}^2 \beta_3 * \text{bcol}_{j,t} + z_{jt} \beta_4 + y_{jt} \beta_5 + \theta_t (+\mu_j) + \omega_{jt}$

**Table iii.** OLS/FE results of firm level wage regression with region dummy

	Dependent variable: value added per workers (log of)					
	OLS		OLS		FE	
$\sigma_{C;t}$	-0.0259 (0.0415)	0.154 (0.0934)			-0.00556 (0.0227)	0.0257 (0.0395)
$\sigma_{C;t}^2$		-0.102* (0.0480)				-0.0220 (0.0216)
Wallonia * $\sigma_{C;t}$	-0.0107 (0.0796)	0.314 (0.214)			-0.0306 (0.0353)	0.0138 (0.0969)
Wallonia * $\sigma_{C;t}^2$		-0.424* (0.194)				-0.0515 (0.0787)
Brussels * $\sigma_{C;t}$	-0.0459 (0.0589)	0.272 (0.200)			0.0433 (0.0709)	-0.246* (0.102)
Brussels * $\sigma_{C;t}^2$		-0.0466 (0.0675)				0.125** (0.0389)
$\sigma_{C;t-1}$			-0.0219 (0.0407)	0.170* (0.0820)		
$\sigma_{C;t-1}^2$				-0.114** (0.0413)		
Wallonia * $\sigma_{C;t-1}$			0.0143 (0.0673)	0.293 (0.179)		
Wallonia * $\sigma_{C;t-1}^2$				-0.363* (0.146)		
Brussels * $\sigma_{C;t-1}$			-0.0177 (0.0607)	0.282 (0.178)		
Brussels * $\sigma_{C;t-1}^2$				-0.0362 (0.0594)		
Brussels	0.0242 (0.0376)	-0.0701 (0.0563)	0.0144 (0.0377)	-0.0746 (0.0522)	0 (.)	0 (.)
Wallonia	-0.0570* (0.0259)	-0.109* (0.0423)	-0.0641** (0.0234)	-0.109** (0.0368)	0 (.)	0 (.)
Intercept	3.521*** (0.0588)	3.475*** (0.0623)	3.523*** (0.0592)	3.473*** (0.0624)	3.980*** (0.0740)	3.981*** (0.0736)
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes
Interaction year * sector	Yes	Yes	Yes	Yes	Yes	Yes
Sector dummy	Yes	Yes	Yes	Yes	No	No
Firm Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Worker Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16848	16848	16848	16848	16848	16848
Adjusted R <sup>2</sup>	0.442	0.444	0.441	0.444	0.142	0.143
Number of Firms					2320	2320
SD of individual Component					0.455	0.457
SD of idiosyncratic Component					0.212	0.212
rho					0.821	0.823

Notes: Coefficients, robust (for heteroskedasticity & serial correlation) standard errors in parentheses.

\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001. Equation (8):  $\ln(\text{productivity}_{jt}) = \beta_0 + \text{Region} \beta_1 + \sigma_{C;t} \beta_2 * \text{Region} + \sigma_{C;t}^2 \beta_3 * \text{Region} + z_{jt} \beta_4 + y_{jt} \beta_5 + \theta_t (+\mu_j) + \omega_{jt}$ . **Flanders is set as the baseline for the region dummy.**