3.7. Les consequences de la compression salariale:

- ✓ Les travailleurs peu diplômés sont-ils trop coûteux au regard de leur productivité?
- ✓ Faut-il régionaliser la formation des salaires pour stimuler l'emploi?

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Faut-il régionaliser la formation des salaires pour stimuler l'emploi ?

Regional Studies, 2018

(Kampelmann, Saks, Rycx & Tojerow)

Motivation

- ✓ Recent studies have shown that productivity-wage gaps may discourage firms from employing specific categories of workers, e.g. lower educated and older ones (e.g. Cataldi et al., 2011, 2012; Lallemand and Rycx, 2009; Hellerstein and Neumark, 2004; Rycx et al., 2015; Saks, 2014; Vandenberghe, 2011, 2013).

- ✓ **Productivity-wage gaps at the root of regional differences in unemployment rates ?**

Why?

Wage-setting mechanisms not flexible enough to account for the diversity of productivity patterns across regions. This would create regional productivity-wage gaps and lead to the destruction of employment in regions where productivity is lagging behind (e.g. Ammermüller et al., 2010; Brunello et al., 2001; Martin et al., 2011; Pereira and Galego, 2014).

Yet, this **explanation is still highly controversial** (Elhorst, 2003; Zeilstra and Elhorst, 2014).

Motivation

✓ **Belgium is an interesting case study to test for the presence of regional productivity-wage gaps**

- Substantial and long-lasting regional differences in labour market performance (data for 2014, source: Eurostat, 2016)

	Unemployment rate (%)	Employment rate (%)
Flanders	5	66
Wallonia	12	57
Brussels	18	54

- Relatively centralised and coordinated wage-setting process (Visser, 2016): coverage rate above 90%, heart of collective bargaining at industry level, only 25-30% workers also covered by firm-level agreements; automatic indexation and 'wage norm'.

- Typical example of a European country for which it could be argued that its wage-setting system is too rigid to account satisfactorily for regional productivity shocks and that differences in regional unemployment rates are fostered by this rigidity (OECD, 2013).

Empirical evidence

- ✓ **Traditional approach:** estimation of Mincer (1974) type wage equations and decomposition of inter-regional wage differentials.

- ✓ **Empirical results vary accross countries:**

  - ❖ Some suggest, in line with a competitive framework, that regional wage differentials are largely due to compositional effects, such as regional differences in human capital, occupations and industries (e.g. Blackaby and Murphy, 1995; Monastiriotis, 2002).

  - ❖ Others suggest that regional wage differentials do not reflect local conditions fully (Garcia and Molina, 2002) and attribute a larger role to non competitive factors (e.g. Bande et al., 2008; Pereira and Galego, 2012; Simon et al., 2006) .

- ✓ **Yet, almost none** of these studies have direct information on firm productivity. Hence, they **could**n't **directly test for regional productivity-wage gaps**.

Empirical evidence

✓ What about Belgium?

- Micro-econometric evidence based on worker-level wage regressions, controlling for a large set of covariates, suggest that inter-regional wage differentials are modest and fluctuate between 0 and 4% (e.g. Plasman et al., 2006, 2007; du Caju et al., 2012).

- Konings and Marcolin (2014): taking Flanders as a benchmark, wage costs are 'too high' with respect to productivity in Wallonia and Brussels. Yet, results likely to suffer from an omitted variable bias and do not address potential firm time-invariant unobserved heterogeneity.

- Rusinek and Tojerow (2014): the more an industry is decentralised in terms of wage setting, the more regional differences in productivity are reflected in wages. Yet, their results are limited by the fact that they rely on data for a single year.

⇒ Micro-econometric **evidence** regarding the potential misalignment of wages to regional productivity differentials **is scarce, subject to econometric biases and ambiguous**.

Aim of our paper

- ✓ **Examine how the region** in which an establishment is located **affects** its **productivity, wage cost and cost competitiveness** (i.e. its productivity-wage gap).

- ✓ Investigate whether the region-productivity-wage nexus varies across work environments defined by the sectoral affiliation of the establishments.

- ✓ Detailed Belgian linked panel data:

  - ❖ Cover large part of the private sector.
  - ❖ Information on region in which an establishment is located (NOT location of head office)
  - ❖ Provide accurate information productivity and wage costs within establishments.
  - ❖ Enable to control for wide range of covariates and to address important econometric issues, generally not accounted for in the literature, e.g. establishment fixed effects, endogeneity and state dependence.

Methodology

- ✓ Empirical set-up pioneered by Hellerstein, Neumark and Troske (1999) and refined by Aubert and Crépon (2003) and van Ours and Stoeldraijer (2011).

- ✓ Based on the estimation of a value added, a wage cost and a productivity-wage gap equation at the firm level.

  - ❖ The value added function yields parameter estimates for productivity differentials across regions.

  - ❖ The wage equation estimates the relative impact of each region on the wage bill paid by the establishment.

  - ❖ The gap equation directly measures the size and significance of regional productivity-wage gaps.

Methodology

Benchmark equations:

$$\ln(Value\ \ Added/Hours)_{i,t} = \alpha + \sum_{j-\{0\}}^{J} \beta_j \,\mathrm{Re}\,gion_{j,i,t} + \lambda\, X_{i,t} + \varepsilon_{i,t} \qquad (1)$$

$$\ln(Wage\ \ Cost/Hours)_{i,t} = \alpha^{*} + \sum_{j-\{0\}}^{J} \beta_j^{*} \,\mathrm{Re}\,gion_{j,i,t} + \lambda^{*}\, X_{i,t} + \varepsilon_{i,t}^{*} \qquad (2)$$

$$\mathrm{Pr}\,oductivity - Wage\ \ Gap_{i,t} = \alpha^{**} + \sum_{j-\{0\}}^{J} \beta_j^{**} \,\mathrm{Re}\,gion_{j,i,t} + \lambda^{**}\, X_{i,t} + \varepsilon_{i,t}^{**} \qquad (3)$$

The dependent variable in:

- (1) is the **hourly value added** in firm *i* at time *t*, obtained by dividing total value added (at factor costs) by the total number of working hours (including paid overtime).
- (2) is the **hourly wage cost** in firm *i* at time *t*, including basic and variable pay components, in kind benefits, employer-funded extra-legal advantages (related to e.g. health, early retirement or pension) and payroll taxes (net of social security payroll tax *cuts*).
- (3) is $\ln(Value\ \ Added/Hours)_{i,t} - \ln(Wage\ \ Cost/Hours)_{i,t}$. The productivity-wage gap measures how much value added and establishment produces per hourly wage cost. Often used as a measure of **cost competitiveness** (EC, 2009; OECD, 2008).

Methodology

$$\ln(Value\ \ Added/Hours)_{i,t} = \alpha + \sum_{j-\{0\}}^{J} \beta_j \,\mathrm{Re}\, gion_{j,i,t} + \lambda\, X_{i,t} + \varepsilon_{i,t} \qquad (1)$$

$$\ln(Wage\ Cost/Hours)_{i,t} = \alpha^{*} + \sum_{j-\{0\}}^{J} \beta_j^{*} \,\mathrm{Re}\, gion_{j,i,t} + \lambda^{*}\, X_{i,t} + \varepsilon_{i,t}^{*} \qquad (2)$$

$$\mathrm{Pr}\, oductivity - Wage\ \ Gap_{i,t} = \alpha^{**} + \sum_{j-\{0\}}^{J} \beta_j^{**} \,\mathrm{Re}\, gion_{j,i,t} + \lambda^{**}\, X_{i,t} + \varepsilon_{i,t}^{**} \qquad (3)$$

With,

- ***Region*$_{j,i,t}$** dummies identifying the region *j* in which the establishment *i* is located at time *t*. Establishments are split in three regions (i.e. Brussels, Flanders and Wallonia) according to the NUTS one-digit nomenclature. Flanders is the reference category.

Methodology

$$\ln(Value\ \ Added/Hours)_{i,t} = \alpha + \sum_{j-\{0\}}^{J} \beta_j \,\mathrm{Re}\, gion_{j,i,t} + \lambda\, X_{i,t} + \varepsilon_{i,t} \qquad (1)$$

$$\ln(Wage\ \ Cost/Hours)_{i,t} = \alpha^{*} + \sum_{j-\{0\}}^{J} \beta_j^{*} \,\mathrm{Re}\, gion_{j,i,t} + \lambda^{*}\, X_{i,t} + \varepsilon_{i,t}^{*} \qquad (2)$$

$$\mathrm{Pr}\, oductivity - Wage\ \ Gap_{i,t} = \alpha^{**} + \sum_{j-\{0\}}^{J} \beta_j^{**} \,\mathrm{Re}\, gion_{j,i,t} + \lambda^{**}\, X_{i,t} + \varepsilon_{i,t}^{**} \qquad (3)$$

With $X_{i,t}$ the share of the workforce within a firm that :

– has at most higher secondary education and tertiary education, respectively;
– has at least 10 years of tenure;
– is younger than 30 and older than 49 years, respectively;
– is female; works part-time;
– occupies a blue-collar job;
– has a fixed-term employment contract;
– is apprentice or under contract with a temporary employment agency.

& ln of firm size (number of workers), ln of capital stock per worker, level of collective wage bargaining (1 dummy), industry (8 dummies) and 11 year dummies.

Estimation techniques

OLS and SYS-GMM estimators

- ✓ **OLS** does not control for establishment fixed unobserved heterogeneity (e.g. quality of management, ownership of a patent or other establishment idiosyncrasies).
- ✓ **FE** cannot be applied as the region in which an establishment is located is (almost) time-invariant.
- ✓ **SYS-GMM** estimator (Blundell and Bond, 1998):
  - ❖ Widely used in the literature to obtain consistent estimates of time-invariant regressors while controlling for establishment fixed effects (Roodman, 2009).
  - ❖ Boils down to simultaneously estimating a system of two equations (respectively in level and in first differences) and relying on internal instruments to control endogenous regressors. Regions, industries, the level of wage bargaining and time dummies are not instrumented.
  - ❖ Accounts for persistency in establishment-level productivity, wages and cost competitiveness by adding the lagged dependent variable among regressors.

Data set

Combination of two large data sets for 1999-2010

- ✓ **'Structure of Earnings Survey'** (SES): information, provided by the management of firms, both on:
  - Establishment-level characteristics (e.g. region, sector of activity, size of the establishment, level of wage bargaining),
  - Individual and job characteristics (e.g. age of the worker, level of education, years of tenure, sex, occupation, working time, employment contract).

- ✓ **'Structure of Business Survey'** (SBS): firm-level survey providing annual information on financial variables (e.g. hourly value added and gross operating surplus).

Final sample: unbalanced panel of 7,418 establishment-year observations from 2,439 establishments.

Representative of all medium-sized and large establishments in the Belgian private sector, with the exception of large parts of sectors E and J.

Means of selected establishment-level variables

	Flanders	Brussels	Wallonia
Value-added per hour (ln)	3,78	3,95	3,75
Wage cost per hour (ln)	3,39	3,48	3,36
Value added-wage gap (ln)	0,40	0,47	0,39

* At 2004 constant prices.

Coherent with:

- Official regional accounts data (ICN, 2015; OECD, 2015).
- Urban economics literature: more concentrated economic areas (i.e. large and dense urban areas) tend to produce more value added per capita and to pay higher wages (Puga, 2010; Behrens et al., 2014).

Means of *selected* establishment-level variables (Cont.)

	Flanders	Brussels	Wallonia
Share of workers with tertiary education	0,23	0,39	0,24
Share of women	0,24	0,29	0,22
Share of blue-collar workers	0,62	0,36	0,61
Industry:			
Mining and quarrying	0,00	0,00	0,02
Manufacturing	0,61	0,35	0,61
Electricity, gas and water supply	0,00	0,00	0,00
Construction	0,12	0,11	0,11
Wholesale and retail trade	0,10	0,15	0,11
Hotels and restaurants	0,01	0,04	0,01
Transport, storage and communication	0,06	0,04	0,06
Financial intermediation	0,01	0,04	0,02
Real estate, renting and business activities	0,08	0,25	0,06
Number of establishment-year observations	4,215	1,009	2,194

OLS estimates

Dependent variable:	Value added per hour worked (ln)	Wage cost per hour worked (ln)	Value added-wage cost gap
	(1)	(2)	(3)
Flanders	*Reference*	*Reference*	*Reference*
Brussels	**0.091*** **	**0.034*** **	**0.057*** **
	(0.020)	(0.012)	(0.016)
Wallonia	**-0.028*** **	-0.004	**-0.024*** **
	(0.011)	(0.007)	(0.008)
R-squared	0.399	0.451	0.235
F-stat (joint significance)	90.20***	155.37***	36.09***
Number of observations	7,418	7,418	7,418
F-test, H_0: Brussels = Wallonia	**16.10*** **	**6.24** **	**14.00*** **
	⇒	⇒	⇒
	B > F > W	**B > (F = W)**	**B > F > W**

Notes: ***/**/* significant at the 1, 5 and 10% level, respectively. Robust standard errors between parentheses. Regressions also control for: a) the lagged dependent variable; b) worker, job and firm characteristics; and c) year dummies.

SYS-GMM estimates

Dependent variable:	Value added per hour worked (ln)	Wage cost per hour worked (ln)	Value added-wage cost gap
	(1)	(2)	(3)
Flanders	*Reference*	*Reference*	*Reference*
Brussels	**0.046****	**0.018***	**0.034****
	(0.022)	(0.010)	(0.017)
Wallonia	0.002	0.006	-0.009
	(0.011)	(0.006)	(0.008)
Hansen over-identification test, p-value	0.535	0.376	0.410
Arellano-Bond test for AR(2), p-value	0.189	0.132	0.100
Number of observations	7,418	7,418	7,418
χ^2 test , H_0: Brussels = Wallonia	**4.45****	1.63	**6.04****
	$\Rightarrow$	$\Rightarrow$	$\Rightarrow$
	B > (F = W)	**B > F**	**B > (F= W)**
		B = W	
		F = W	

Notes: ***/**/* significant at the 1, 5 and 10% level, respectively. Robust standard errors between parentheses. Regressions also control for: a) the lagged dependent variable; b) worker, job and firm characteristics; and c) year dummies.

SYS-GMM estimates, industry vs. services

	Industry			Services		
Dependent variable:	Value added per hour worked (ln)	Wage cost per hour worked (ln)	Value added-wage cost gap	Value added per hour worked (ln)	Wage cost per hour worked (ln)	Value added-wage cost gap
	(1)	(2)	(3)	(4)	(5)	(6)
Flanders	Reference	Reference	Reference	Reference	Reference	Reference
Brussels	0.018	0.009	-0.002	**0.133*** **	**0.025** **	**0.050** **
	(0.031)	(0.012)	(0.022)	(0,042)	(0.013)	(0.020)
Wallonia	-0,004	0.003	-0.011	-0.001	0.005	-0.016
	(0.012)	(0.005)	(0.010)	(0.034)	(0.015)	(0.013)
Hansen test, p-value	0.327	0.806	0.539	0.426	0.588	0.425
Arellano-Bond test, p-value	0.938	0.083	0.292	0.465	0.366	0.168
Number of observations	5,198	5,198	5,198	2,219	2,219	2,219
χ^2 test, H_0: Brussels = Wallonia	0.53 ⇒ **B = F = W**	0.38 ⇒ **B = F = W**	0.14 ⇒ **B = F = W**	**7.21*** ** ⇒ **B > (F = W)**	1.38 ⇒ **B > F B = W F =W**	**7.89*** ** ⇒ **B > (F = W)**

Notes: ***/**/* significant at the 1, 5 and 10% level, respectively. Robust standard errors between parentheses.
Regressions also control for: a) the lagged dependent variable; b) worker, job and firm characteristics; and c) year dummies.

SYS-GMM estimates, services excluding NACE J

Dependent variable:	Value added per hour worked (ln)	Wage cost per hour worked (ln)	Value added-wage cost gap
	(1)	(2)	(3)
Flanders	*Reference*	*Reference*	*Reference*
Brussels	**0.042****	0.006	**0.036****
	(0.024)	(0.012)	(0.046)
Wallonia	-0.009	-0.007	-0.008
	(0.020)	(0.015)	(0.014)
Hansen over-identification test, p-value	0.818	0.692	0.916
Arellano-Bond test for AR(2), p-value	0.065	0.327	0.149
Number of observations	2,102	2,102	2,102
χ^2 test , H_0: Brussels = Wallonia	**3.75****	0.76	**4.41****
	⇒	⇒	⇒
	B > (F = W)	**B = F = W**	**B > (F= W)**

Notes: ***/**/* significant at the 1, 5 and 10% level, respectively. Robust standard errors between parentheses. Regressions also control for: a) the lagged dependent variable; b) worker, job and firm characteristics; and c) year dummies.

SYS-GMM estimates, only older establishments

	Industry			Services		
Dependent variable:	Value added per hour worked (ln)	Wage cost per hour worked (ln)	Value added-wage cost gap	Value added per hour worked (ln)	Wage cost per hour worked (ln)	Value added-wage cost gap
	(1)	(2)	(3)	(4)	(5)	(6)
Flanders	Reference	Reference	Reference	Reference	Reference	Reference
Brussels	0.009	0.005	-0.003	**0.115*** **	0.015	**0.051** **
	(0.030)	(0.013)	(0.022)	(0.032)	(0.010)	(0.021)
Wallonia	-0.009	0.003	-0.016	-0.002	0.005	-0.017
	(0.012)	(0.006)	(0.012)	(0.028)	(0.009)	(0.015)
Hansen test, p-value	0.409	0.770	0.518	0.263	0.707	0.541
Arellano-Bond test, p-value	0.733	0.380	0.224	0.079	0.465	0.174
Number of observations	4,888	4,888	4,888	1,856	1,856	1,856
χ^2 test, H_0: Brussels = Wallonia	0.38 ⇒ **B = F = W**	0,02 ⇒ **B = F = W**	0.24 ⇒ **B = F = W**	**9,38*** ** ⇒ **B > (F = W)**	0,66 ⇒ **B = F = W**	**7.21*** ** ⇒ **B > (F = W)**

Notes: ***/**/* significant at the 1, 5 and 10% level, respectively. Robust standard errors between parentheses.
Regressions also control for: a) the lagged dependent variable; b) worker, job and firm characteristics; and c) year dummies.

Bartolucci's (2014) approach, SYS-GMM estimates

	All establishments		**Only older establishments**	
	Industry	**Services**	**Industry**	**Services**
Dependent variable:	Wage cost per hour worked (ln)	Wage cost per hour worked (ln)	Wage cost per hour worked (ln)	Wage cost per hour worked (ln)
	(1)	(2)	(3)	(4)
Flanders	Reference	Reference	Reference	Reference
Brussels	0.022	-0.017	0.022	**-0.033*** **
	(0.014)	(0.025)	(0.015)	(0.018)
Wallonia	0.006	0.024	0.012	0.006
	(0.007)	(0.018)	(0.008)	(0.011)
Value added per hour worked (ln)	0.287***	0,457***	0,294***	0.261***
	(0.041)	(0.065)	(0.046)	(0.011)
Hansen over-identification test, p-value	0.499	0.424	0.136	0.421
Arellano-Bond test for AR(2), p-value	0.120	0.702	0.794	0.520
Number of observations	5,198	2,219	4,888	1,856
χ^2 test, H_0: Brussels = Wallonia	1.28	2.24	0.40	**4.10****
	$\Rightarrow$	$\Rightarrow$	$\Rightarrow$	$\Rightarrow$
	B = F = W	**B = F = W**	**B = F = W**	**B < (F = W)**

Notes: ***/**/* significant at the 1, 5 and 10% level, respectively. Robust standard errors between parentheses.
Regressions also control for: a) the lagged dependent variable; b) worker, job and firm characteristics; and c) year dummies.

Conclusion

Most robust estimates (SYS-GMM):

- ✓ **Differences between Flanders and Wallonia** in terms of productivity, wages and cost competitiveness are *ceteris paribus* **statistically insignificant** both in the industry and services.

➡ Higher performance of Flanders with respect to Wallonia (in terms productivity and competitiveness) reported in OLS estimates can be attributed to regional differences in time-invariant unobserved establishment characteristics (e.g. specific workers' skills, management talent, patents).

Conclusion

✓ **What about Brussels?**

❖ Industry:

Differences between Brussels and the two other regions in terms of productivity, wages and cost competitiveness are statistically insignificant.

❖ Services:

Significant premium (around 4% when excluding financial sector) for establishments located in Brussels with respect to Flanders and Wallonia in terms of productivity and cost competitiveness.

➡ Establishments operating in **services benefit from agglomeration effects** when they choose to locate **in Brussels**.

Conclusion

To sum up

- ✓ Inter-regional differences in productivity and wages vanish almost totally when controlling for a large set of covariates, establishment fixed effect and endogeneity.
- ✓ Only significant (and positive) productivity-wage gap is encountered in the Brussels' tertiary sector.

Conclusion

Policy implications

- ✓ Estimates don't support hypothesis that (conditional) productivity-wage gaps would be at the root of important differences in unemployment rates across regions.
  - ❖ Workers in Brussels and Wallonia (regions where unemployment is higher) are not found to be 'over-paid', at given productivity, with respect to their co-workers located in Flanders (where unemployment is more limited).
  - ❖ Higher unemployment rate in Brussels relative to Wallonia is not driven by a lower cost-competitiveness in the former region.

⇨ Regionalisation of wage bargaining may not be the most efficient policy to reduce inter-regional differences in unemployment rates.

Conclusion

Policy implications (Cont.)

- ✓ Other variables have been shown to generate much larger and significant productivity-wage gaps
  - ❖ Establishments in Belgian private sector face financial disincentives to employing lower-educated workers (Rycx et al., 2015)
  - ❖ Older workers tend to be 'over-paid' (at given productivity) with respect to their younger co-workers (Lallemand and Rycx, 2009; Cataldi et al., 2011, 2012; Vandenberghe, 2011, 2013).
- ✓ Unemployment rate among low-educated (older) workers: 31% (11%) in Brussels, 22% (8%) in Wallonia, and 9% (3%) in Flanders (Eurostat, 2016).

➡ Policies aiming to improve employability of lower educated and older workers (by increasing their productivity and/or decreasing their labour cost) might also be efficient to attenuate regional differences in (un)employment rates.

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Appendices

Data set

Our sample has been restricted to **single-establishment firms** (SEF).

Rationale:

- Information on dependent variables (taken from the SBS) is at the level of the firm, while explanatory variables (taken from the SES) are measured at the establishment-level.
- Put differently, the dependent variable takes the same value for all establishments, potentially located in different regions, belonging to the same multi-establishment firm (MEF).
- To avoid, this aggregation bias, we focus on SEF only.

Discussion and conclusion

Descriptive statistics

- ✓ **Productivity** is highest in Brussels, intermediate in Flanders and lowest in Wallonia.
- ✓ Ranking of regions in terms of **hourly wage costs** is similar.
- ✓ Given that gross regional wage differentials are more compressed than differences in productivity, **cost competitiveness** is also found to be greatest in Brussels, middle in Flanders and smallest in Wallonia.

Coherent with:

- Official regional accounts data (ICN, 2015; OECD, 2015).
- Urban economics literature ➡ More concentrated economic areas (i.e. large and dense urban areas) tend to produce more value added per capita and to pay higher wages (Puga, 2010; Behrens et al., 2014),

Discussion and conclusion

Controlling for many covariates (OLS)

- ✓ **Compositional effects** (i.e. regional differences in human capital, labour contracts, occupations, sectors, establishment size and capital intensity, among other variables) account for substantial part of the variability in productivity and wages costs across regions.
- ✓ Yet, **same inter-regional pattern** is still obtained.
- ✓ **Cost competitiveness** is found to be:
  - 5,9% higher in Brussels than in Flanders, and
  - 2,4% higher in Flanders than in Wallonia.

➡ Differences in productivity across regions remain somewhat bigger than those in terms of wages even after controlling for observed heterogeneity: