

# Non-base Wage Components as a Source of Wage Adaptability to Shocks: Evidence from European firms, 2010-2013

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- **Motivation:** examine the role of non-base wage components as shock absorbers, during 2010-2013

## Labour costs:

- Base wages
  - Non-base wage components
  - Employees (permanent, temporary, agency workers)
  - Working hours
- ⇒ To what extent do firms use non-base wage components (bonuses, fringe benefits) that are usually linked to individual's or firm's performance, as shock absorbers?
- ⇒ Given wage rigidities, do non-base wage components serve as complements or substitutes to base wage adjustment?

# 1. Introduction

- **Motivation:** period 2010-2013 was quite heterogeneous in terms of economic growth

$$CAGR = \left( \frac{GDP_{2013}}{GDP_{2010}} \right)^{1/3} - 1$$

Strong negative impact =>

Mild economic growth =>

Strong economic growth =>

Real GDP in 2010-2013: Cumulative Average Growth Rate and by year

	CAGR 2013/2010	2011/2010	2012/2011	2013/2012
Greece	-6.0	-7.1	-7.0	-3.9
Cyprus	-2.5	0.4	-2.4	-5.4
<b>Portugal</b>	<b>-2.3</b>	<b>-1.8</b>	<b>-4.0</b>	<b>-1.1</b>
Italy	-1.3	0.4	-2.4	-1.9
Croatia	-1.1	-0.2	-2.2	-0.9
Slovenia	-1.0	0.7	-2.5	-1.1
Spain	-0.9	0.1	-1.6	-1.2
Netherlands	-0.4	0.9	-1.2	-0.8
Czech Republic	-0.1	1.8	-1.0	-0.9
Hungary	0.3	1.6	-1.7	1.1
Belgium	0.6	1.8	-0.1	0.2
Ireland	0.7	2.2	0.2	-0.3
France	0.7	2.0	0.0	0.2
United Kingdom	1.0	1.1	0.3	1.7
Bulgaria	1.1	1.8	0.6	0.9
Luxembourg	1.3	1.9	-0.2	2.1
Austria	1.3	2.8	0.9	0.3
Germany	1.5	3.3	0.7	0.4
Malta	1.8	1.4	1.1	2.9
Slovakia	1.9	3.0	1.8	0.9
Romania	2.1	2.3	0.6	3.5
Poland	2.7	4.5	2.0	1.6
Lithuania	4.3	6.0	3.7	3.3
Latvia	4.9	5.3	5.2	4.1
Estonia	5.1	8.7	4.5	2.2
Non-Euro-Area	1.2	1.6	0.3	1.6
Euro-Area	0.2	1.6	-0.6	-0.4
Total	0.4	1.6	-0.4	0.1

Source: Eurostat, authors' calculations

## Background:

- Empirical evidence: even in the face of large negative shocks, not only are workers reluctant to accept cuts in their nominal wages, but also firms seem to be unwilling to carry out such cuts (DNWR).
- The relevance of DNWR depends on whether firms have other margins besides base wages to adjust labour costs when needed.
- DNWR may have little effect on aggregate employment if firms are able to achieve the necessary flexibility by using more flexible pay components, such as performance-related bonuses, commissions and other benefits;
- ... so the key point when analysing DNWR is whether firms can flexibly adjust total compensation as a whole.

## Research questions:

- Are non-base wage components substitutes or complements to adjustment in base wages?
- To which extent does the use of non-base wage components depend on workers' and firms' attributes, and economic environment in which firms operate, including the characteristics of the wage bargaining system?
- How similar are responses of base and non-base wages to different types of shocks?

## Literature on the importance of non-base wage components:

- Lazear and Oyer (2007) show that bonuses play an important role in personnel economics as a performance incentive.
- Nickell and Quintini (2003) find that despite some rigidity at zero nominal wage changes, the macroeconomic impact of such distortion is very modest.
- Lebow et al. (1999) show that firms are able to mitigate at least a part of base wage rigidity by changing benefits (total compensation displays about one-third less rigidity than do wages alone).
- Dias et al. (2013) provide evidence that in the face of negative shocks, the availability of alternative labour cost margins is likely to reduce the detrimental effect on employment that results from the presence of DNWR.
- Babecky et al (2012) find that alternative margins of labour cost adjustment play an important role.

## 2. Survey description

- Survey of firms conducted by EU national central banks in 2014/2015 in the context of the Wage Dynamics Network
  - 25 EU countries
  - Harmonised questionnaire referring to 2010-2013
  - Firms: 5+ employees
  - Sectors: manufacturing, electricity & gas, construction, trade, market services, financial intermediation
- ⇒ The survey provided information on labour market adjustment practices and wage and price setting mechanisms of firms
- ⇒ The survey allows inter alia to analyse labour market adjustment in the period 2010/2013 to different shocks, such as a change in demand, customers ability to pay or credit availability



### Differences compared to previous survey-based research:

**WDN1:** period of economic boom (2002-2006),

the effect of **hypothetic shocks**

*(“What if your firm would face a decline in demand...”)*

**WDN3:** period of crisis and recovery (2010-2013),

the effect of **actual shocks** faced by firms

(and several types of shock: demand, finance, customers and supply)

## 2. Survey description

### WDN1 vs WDN3: also differences in the approach

WDN1	WDN3
<p>q18 Has any of the following strategies ever been used in your firm to reduce labour costs?</p>	<p>C2.5 Please indicate how each one of the components of labour costs listed below has changed during 2010-2013</p>
<p><i>Please choose as many options to apply to your firm.</i></p>	<p><i>Please choose ONE option for each line:</i> Strong decrease, Moderate decrease, Unchanged, Moderate increase, Strong increase</p>
<ol style="list-style-type: none"> <li>1. Reduce or eliminate <b>bonus payments</b></li> <li>2. Reduce or eliminate <b>non-pay benefits</b></li> <li>3. Change shift assignments or shift premia</li> <li>4. Slow or freeze rate at which promotions are filled</li> <li>5. <b>Recruit new employees</b> at lower wage level than those who left</li> <li>6. Encourage <b>early retirement</b></li> <li>7. Use other strategies</li> </ol>	<ol style="list-style-type: none"> <li>1. Base wages or piece work rates</li> <li>2. <b>Flexible wage components (bonuses, fringe benefits, etc.)</b></li> <li>3. Number of <b>permanent employees</b></li> <li>4. Number of <b>temporary/fixed-term employees</b></li> <li>5. Number of <b>agency workers</b> and others (free-lance work, etc, not hired under employment contracts)</li> <li>6. <b>Working hours</b> per employee</li> <li>7. Other components of labour costs</li> </ol>

### The data

The survey also provides relevant information on the nature of the shocks faced by firms during the period 2010-2013. For the purposes of this paper, we consider shocks to:

- Level of demand for products/services;
- Access to external financing through the usual financial channels;
- Customers ability to pay and meet contractual terms.

We use this question to identify how firms were affected by different shocks.

We use a question on the use of base wage freezes in the given year (yes/no question) to construct the **DNWR measure**. We regard firms that froze base wages during 2010-2013 as facing DNWR.

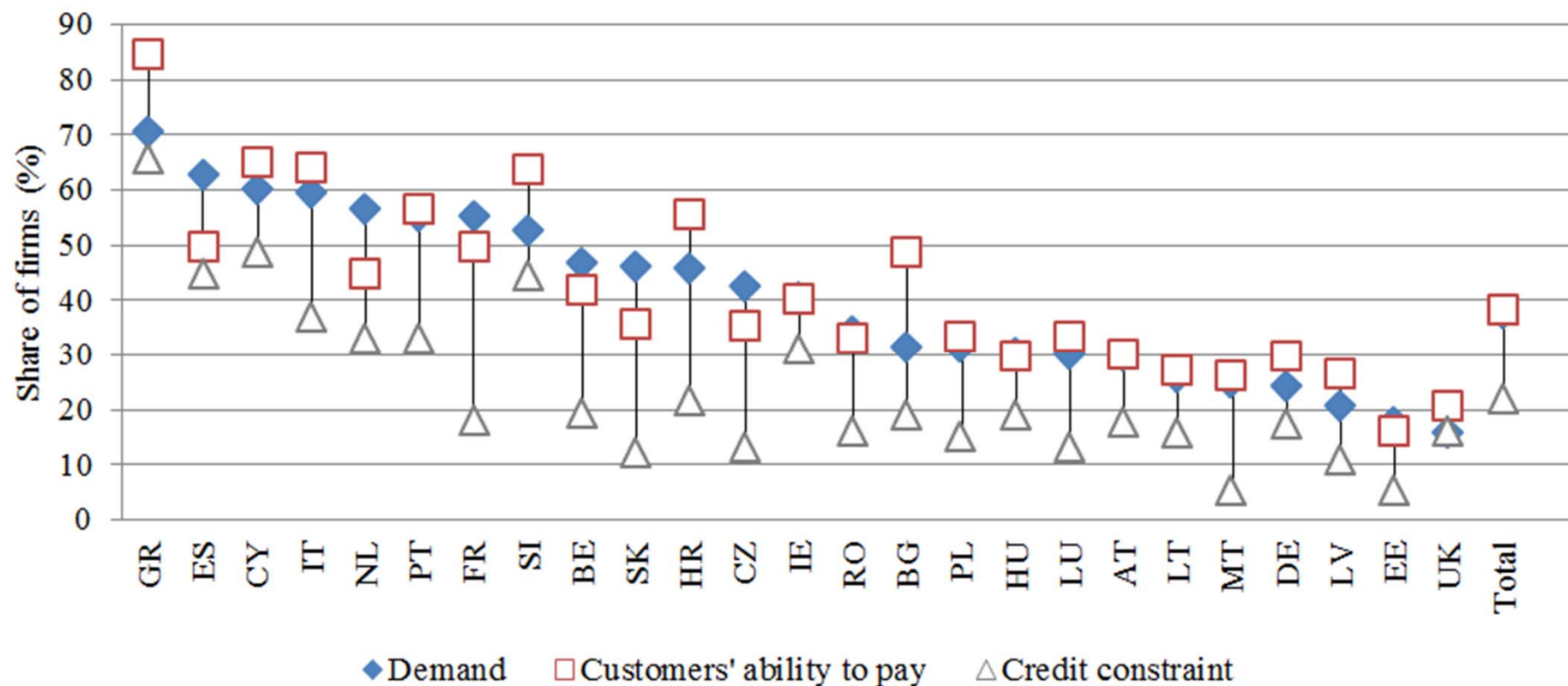
### 3. Stylised facts

#### Non-base wage components by firm size and sector in 2013

Size	Firms using non-base wage components (%)	Non-base wage in total pay, unconditional (%)	Non-base wage in total pay, conditional (%)
5–19 employees	54.9	6.8	12.4
20–49 employees	64.1	6.1	9.5
50–199 employees	73.7	6.3	8.5
> 200 employees	84.9	7.7	9.1
Sector			
Manufacturing	75.9	6.4	8.4
Electricity, gas, water	82.9	8.3	10.0
Construction	59.8	6.0	10.1
Trade	75.0	8.1	10.8
Business services	73.6	6.3	8.6
Financial intermediation	92.7	14.9	16.0
Total	74.2	6.9	9.4

### 3. Stylised facts

## Share of firms facing negative demand, customer ability to pay and credit shocks in 2010-2013



### 3. Stylised facts

## Percentage of firms that cut non-base wage components by country

Country	Unconditional	Conditional on having faced		
		negative shocks (either strong or moderate)	at least one strong negative shock	only strong negative shocks
AT	6.1	6.1	9.0	
BE	2.8	2.9	3.1	
BG	21.1	34.1	42.9	44.1
CY	52.2	63.4	64.7	52.4
CZ	21.6	32.1	43.7	70.4
DE	4.3	6.7	14.6	58.9
EE	5.8	18.5	40.3	
ES	23.7	28.4	22.3	26.7
FR	12.1	13.8	17.9	35.7
GR	50.9	53.8	59.2	72.7
HR	24.2	33.4	42.3	86.4
HU	20.0	28.5	33.1	51.7
IE	27.7	39.4	49.3	58.6
IT	19.9	22.4	28.4	53.0
LT	11.2	19.0	35.1	74.5
LU	15.5	23.5	29.7	
LV	10.6	24.0	45.5	26.7
MT	0.4	1.0	5.6	
NL	28.1	35.5	37.4	48.3
PL	11.8	11.6	24.0	16.5
PT	21.7	25.3	30.2	40.3
RO	11.2	20.6	30.1	49.0
SI	30.4	35.1	44.5	61.9
SK	17.4	20.6	23.9	46.2
UK	9.3	14.9	14.7	
Total	13.0	18.2	25.0	41.4

### 3. Stylised facts

#### Sample conditional proportions

	Cut base wages	Cut non-base wages	Cut number of employees	Cut number of hours	Freeze base wages
$P(.)$	0.053	0.130	0.329	0.114	0.262
Having faced negative shocks (either strong or moderate)					
$P(.)$	0.075	0.182	0.423	0.162	0.296
$P(. cut\ non-base\ wages)$	0.260	1.000	0.745	0.270	0.471
$P(. cut\ base\ wages)$	1.000	0.631	0.784	0.293	0.508
$P(. cut\ non-base\ and\ base\ wages)$	1.000	1.000	0.862	0.331	0.580
Having faced at least one strong negative shock					
$P(.)$	0.108	0.250	0.552	0.226	0.365
$P(. cut\ non-base\ wages)$	0.319	1.000	0.783	0.313	0.491
$P(. cut\ base\ wages)$	1.000	0.739	0.854	0.352	0.548
$P(. cut\ non-base\ and\ base\ wages)$	1.000	1.000	0.879	0.389	0.604
Having faced only strong negative shocks					
$P(.)$	0.209	0.414	0.704	0.302	0.449
$P(. cut\ non-base\ wages)$	0.441	1.000	0.819	0.337	0.529
$P(. cut\ base\ wages)$	1.000	0.875	0.893	0.426	0.559
$P(. cut\ non-base\ and\ base\ wages)$	1.000	1.000	0.905	0.455	0.542

## 4. Non-base wage components...

... as a buffer to overcome base wage rigidity

**Method: probit estimation, marginal effects**

(country + sector fixed effects included)

**The dependent variable** is equal to one, if the firm reduces non-base wage components, zero otherwise

∨ non-base wage components = F (base wage rigidity, shocks, Z)



## 4. Results: $\downarrow w_{n-b} = F(\text{DWR}, \text{shocks}, Z)$

	(1)	(2)	(3)
<b>Base wage rigidity</b>			
DNWR base wage freezes	0.117*** (0.010)	0.086*** (0.008)	0.084*** (0.016)
<b>Shocks</b>			
Demand shock		0.109*** (0.013)	0.114*** (0.015)
Finance shock		0.058*** (0.007)	0.062*** (0.008)
Customers' ability to pay shock		0.032*** (0.008)	0.019** (0.009)
Availability of supplies shock		0.028*** (0.006)	0.033*** (0.008)
<b>DNWR * Shocks</b>			
Base wage freezes & demand shock			-0.019 (0.021)
Base wage freezes & customer pay shock			0.038*** (0.012)
Base wage freezes & credit shock			-0.014 (0.013)
Base wage freezes & availability of supplies shock			-0.015* (0.009)
Observations	19,234	18,582	18,582

*Note: The dependent variable is equal to one, if the firm reduces non-base wage components*

*DNWR: Base wages were frozen at least once during 2010-2013.*

*Marginal effects; t-statistics in parentheses. Sector, size, and country fixed effects (not reported).*

## The role of unions

DNWR – Firms froze base wages	0.573*** (0.053)	0.561*** (0.049)	0.574*** (0.047)	0.560*** (0.049)
% of workers covered by coll. agreement	0.001 (0.001)	0 (0.002)		
Collective agreement of any kind		0.077 (0.128)		0.066 (0.045)
Collective agreement outside of the firm	-0.022 (0.101)			
Collective agreement at the firm	-0.019 (0.047)		0.046 (0.032)	
Observations	9,288	10,194	10,172	10,277

*Note: The dependent variable is equal to one, if the firm reduces non-base wage components*

*DNWR: Base wages were frozen at least once during 2010-2013.*

*Marginal effects; t-statistics in parentheses. Sector, size, and country fixed effects (not reported).*

## 4. Summary of the results:

$$\downarrow w_{\text{non-base}} = F(\text{DWR}, \text{shocks}, Z)$$

**DWR(+)**: In presence of downward rigidity of base wages, firms are more likely to reduce non-base wage components

**Shocks (+)**: (decline in demand, finance, customers' ability to pay, availability of suppliers)  $\Rightarrow$  firms which are hit by negative shocks are more likely to reduce non-base wage components

### **Other factors (Z):**

- Larger firms (+)  $\Rightarrow$  more use of non-base wage components
- Sectors of financial intermediation, construction, service, trade (+)  $\Rightarrow$  more likely to reduce non-base wage components
- No significant effect of unions, incl. interactions of variables, sectors, and collective bargaining characteristics

$\Rightarrow$  substitutability between base and non-base wages is not limited by the presence of unions

## 5. Wage adjustment to shocks

### 4 options of wage reactions by firms to negative shocks:

1. Reduce neither base wages nor non-base components (base=0, non-base=0);
2. Reduce only non-base components (base=0, non-base=1);
3. Reduce both base wages and non-base components (base=1, non-base=1);
4. Reduce only base wages (base=1, non-base=0).

**Table: Frequencies of wage reduction**

Subsample of firms	Wage adjustment options (%)				Total	Obs
	(1)	(2)	(3)	(4)		
	base=0 non-base=0	base=0 non-base=1	base=1 non-base=1	base=1 non-base=0		
Total	82.6	11.6	3.7	2.0	100	18,503
Decline in demand	72.5	18.7	6.1	2.7	100	8,416
Decline in demand or customers ability to pay	76.0	15.9	5.2	2.9	100	11,172
Decline in demand or in customers ability to pay and credit restrictions	75.4	16.3	5.7	2.6	100	8,995

=> Evidence of overall wage rigidities (col. 1)

=> In case of wage reduction, non-base wages is the most frequent option (columns 2-3)

=> Base wage reduction only is very rare (col. 4)

### Ordered probit regressions, marginal effects

(country + sector fixed effects included)

Base wage adjustment (decrease, no change, increase)

$$\text{Prob. (base wage adj.)} = F1 (\text{D shocks, Fin shocks, Z}) \quad (1)$$

Non-base wage adjustment (increase, decrease, no change)

$$\text{Prob. (non-base wage adj.)} = F2 (\text{D shocks, Fin shocks, Z}) \quad (2)$$

**Seemingly unrelated regressions (SUR)**

Equations (1) and (2) estimated jointly

## 5. Base wage adjustment, SUR estimates

	(1) Base wages Decrease	(2) Base wages Unchanged	(3) Base wages Increase
Demand			
<i>Decrease</i>	0.027*** (0.003)	0.039*** (0.005)	-0.066*** (0.009)
<i>Unchanged (reference)</i>	-	-	-
<i>Increase</i>	-0.041*** (0.003)	-0.096*** (0.006)	0.137*** (0.009)
Finance shock	0.024*** (0.003)	0.036*** (0.005)	-0.060*** (0.008)
Customers ability to pay shock	0.008*** (0.003)	0.013*** (0.004)	-0.021*** (0.007)
Availability of supplies shock	0.009** (0.004)	0.013** (0.005)	-0.022** (0.009)

=> Firms which experienced *negative D shocks* were more likely to *reduce base wage* (compared to unchanged demand).

## 5. Non-base wage adjustment, SUR estimates

	(1) Non-base wages Decrease	(2) Non-base wages Unchanged	(3) Non-base wages Increase
Demand			
<i>Decrease</i>	0.068*** (0.006)	0.019*** (0.002)	-0.087*** (0.008)
<i>Unchanged (reference)</i>	-	-	-
<i>Increase</i>	-0.069*** (0.004)	-0.071*** (0.004)	0.140*** (0.008)
Finance shock	0.045*** (0.005)	0.018*** (0.002)	-0.063*** (0.007)
Customers ability to pay shock	0.019*** (0.004)	0.009*** (0.002)	-0.027*** (0.007)
Availability of supplies shocks	0.017*** (0.006)	0.007*** (0.002)	-0.025*** (0.008)

⇒ Firms which experienced *negative D shocks* were more likely to *reduce non-base wage* (compared to unchanged demand).

⇒ This reduction is larger compared to the case of base wages

- The adjustment of base wages is consistent with the adjustment of non-base wage components: the same direction (i.e. the same signs in regressions), but ...

z-tests confirm stronger downward responses of flexible wage components than base wages to a fall in demand

- Key message: in case of shocks firms use both base and non-base wages, but **non-base wage components are used more extensively** (particularly for a downward adjustment)



## 6. Results: SUR ordered probit (1/2)

### Base wages: Effect of various negative shocks

	(1) Base wages Decrease	(2) Base wages Unchanged	(3) Base wages Increase
Demand			
<i>No decrease</i> (reference)	-	-	-
<i>Moderate decrease</i>	0.043*** (0.003)	0.080*** (0.005)	-0.122*** (0.008)
<i>Strong transitory decrease</i>	0.072*** (0.013)	0.113*** (0.014)	-0.185*** (0.027)
<i>Strong partly persistent decrease</i>	0.070*** (0.007)	0.111*** (0.008)	-0.181*** (0.015)
<i>Strong long-lasting decrease</i>	0.081*** (0.007)	0.121*** (0.007)	-0.202*** (0.013)
Finance shock	0.021*** (0.003)	0.033*** (0.005)	-0.054*** (0.008)
Customers' ability to pay shock	0.008*** (0.003)	0.014*** (0.004)	-0.022*** (0.007)
Availability of supplies shock	0.006* (0.003)	0.010* (0.005)	-0.016* (0.009)

## 6. Results: SUR ordered probit (2/2)

### Non-base wages: Effect of various negative shocks

	Non-base wages Decrease	Non-base wages Unchanged	Non-base wages Increase
Demand			
<i>No decrease</i> (reference)	-	-	-
<i>Moderate decrease</i>	0.091*** (0.005)	0.053*** (0.003)	-0.143*** (0.007)
<i>Strong transitory decrease</i>	0.135*** (0.022)	0.056*** (0.003)	-0.190*** (0.022)
<i>Strong partly persistent decrease</i>	0.164*** (0.012)	0.052*** (0.003)	-0.217*** (0.011)
<i>Strong long-lasting decrease</i>	0.178*** (0.011)	0.050*** (0.003)	-0.228*** (0.010)
Finance shock	0.039*** (0.005)	0.017*** (0.002)	-0.056*** (0.007)
Customers' ability to pay shock	0.019*** (0.004)	0.010*** (0.002)	-0.029*** (0.007)
Availability of supplies shock	0.014** (0.006)	0.006** (0.003)	-0.020** (0.008)
p-value	0.000		
Rho	0.6		
Observations	18,187		

### **Demand shocks: strength and persistence**

1. Negative D shocks  $\Rightarrow$  firms are more likely to reduce both base and non-base wages.
2. Non-base wages react more compared to base wages
3. A strong fall in D  $\Rightarrow$  stronger marginal effect than a moderate fall in D
4. A strong long-lasting negative D shock – the largest marginal effect

### **Other shocks: finance, customers, and suppliers**

1. Consistent negative effect on wages
2. Non-base wages react more compared to base wages

Estimated: **System of equations (1)-(2)**, adjustment of non-base wage components and base wages, SUR ordinal probit

1. Evidence of **asymmetry** for both base and non-base wages:
2. Error terms are positively correlated, i.e. base wages and non-base wage components move in the same direction.

2 => this supports our view of **complementarity** (in levels)  
between base and non-base wages

1 => At the same time, the adjustment of non-base wages (especially downward) is of higher magnitude compared to base wages. It means that **non-base wages** are **less subject to downward nominal rigidity** (as compared to base wages)

The paper provides evidence on the important **role played by non-base wage components** as a channel for European firms to cut labour costs following the adverse shocks in 2010-2013.

- Firms subject to nominal wage rigidities were more likely to cut non-base wage components to reduce labour costs;
- Firms **used non-base wage components as a buffer** to overcome base wage rigidity;
- While non-base wage components exhibited some degree of downward rigidity this was smaller than base wages.

Thank you for your attention!